Global Challenges in Economics and Management: From Capital Markets to Responsible Consumption

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Introduction

In recent decades, the contours of the global economy have been redrawn by forces that transcend traditional disciplinary boundaries: financial integration and digitalisation, demographic shifts and generational turnover, accelerating climate risk, and a growing insistence that growth be measured not only in units of output but also in social and environmental value. *Global Challenges in Economics and Management: From Capital Markets to Responsible Consumption* grew out of the conviction that tomorrow's decision-makers must be able to navigate this multidimensional landscape with equal fluency in balance-sheet analytics, behavioural insight, and sustainability principles.

This volume brings together research papers by advanced students of economics and management under the scientific editorship of Adrian Chojan and Martin Dahl. Their mandate was both simple and ambitious: to offer a platform where emerging scholars can address questions that the established literature sometimes treats in isolation, and to frame them in a manner that resonates with practitioners confronting real-time shocks and long-term structural change. The result is a book organised around two broad sections that mirror the twin imperatives of our age—economic resilience and responsible stewardship.

The opening section examines how cross-border capital flows, macro-policy choices, and institutional design interact to shape growth trajectories. The chapters explore, among other themes, how tax regimes influence foreign direct investment, how crisis episodes challenge received macroeconomic wisdom, and how legal and regulatory ecosystems mediate the impact of monetary policy shocks. Taken together, they demonstrate that global finance is both engine and amplifier: it can

catalyse diversification and productivity, yet can just as readily transmit instability when policy frameworks lag behind market innovation. By analysing FDI in both traditional and digital sectors, revisiting classical puzzles of savings–investment correlation, and reassessing policy lessons of the 2008 crisis, Part I sets out the analytical toolkit needed to understand capital markets in an age of asymmetric information and heightened uncertainty.

If the first part asks where capital flows and how macro-institutions respond, the second asks to what end, under whose leadership, and with what social footprint. Part II broadens the lens from financial aggregates to the human and ecological dimensions of growth. Here, the authors consider the organisational capabilities demanded by rapid technological change, the leadership expectations of Generation Z, the behavioural levers that drive ethical consumption, and the distributional consequences of climate disruption and public health crises. The unifying thread is the recognition that value creation now extends beyond profitability metrics to include equity, legitimacy, and resilience. Effective leaders therefore require not only strategic foresight but also moral imagination—an ability to translate stakeholder expectations into business models that thrive within planetary boundaries.

Although the two parts address different analytical domains, they are intentionally interdependent. Capital allocation decisions cannot be divorced from questions of social licence, just as visions of inclusive, low-carbon prosperity remain aspirational without the financing mechanisms and macro-stability to support them. By reading the sections in dialogue, the reader gains a composite perspective: how international finance shapes the policy space for sustainable transitions, and how evolving consumer norms and leadership paradigms feed back into the design of financial products, corporate strategy, and regulatory oversight.

Equally important is the pedagogical dimension. Each contribution reflects the fresh perspective of emerging researchers who, unencumbered by disciplinary silos, are willing to cross-pollinate ideas from public finance, behavioural science, organisational theory, and development studies. Their work reminds us that the frontier of knowledge often

advances not through incremental refinement but through the creative recombination of insights traditionally kept apart.

The book targets a broad and interdisciplinary readership, reflecting the multifaceted nature of the issues it addresses. For academics, it offers a timely compendium of empirical studies on subjects such as foreign direct investment flows, post-crisis monetary policy, behavioural responses to ecological labelling, and evolving contours of global income inequality. Each chapter is grounded in rigorous methodology—ranging from panel-data econometrics to behavioural experiments—so that researchers can not only cite fresh findings but also replicate and extend them in their own work. Policy-makers and regulators will find in these pages a data-driven basis for redesigning tax incentives, tightening prudential rules, or crafting industrial policies in ways that balance competitiveness with social and environmental objectives. In an era when evidence-based governance is often demanded but rarely delivered, the analyses here translate complex econometric results into actionable insights—highlighting, for instance, how specific institutional configurations can either amplify or dampen transmission of global shocks.

Practitioners in the private sector—managers, entrepreneurs, investors, and consultants—will recognise familiar strategic dilemmas: how to deploy capital across borders amid volatile regulatory regimes; how to guide organisational change when technological cycles compress planning horizons; and how to satisfy stakeholders whose expectations now span both financial performance and ethical conduct. By situating these challenges within broader macro-financial and socio-cultural contexts, the volume helps business leaders move beyond short-term optimisation towards long-term value creation that is resilient, inclusive, and reputationally robust.

Students—particularly those in economics, business administration, public policy, and sustainability programmes—will discover how abstract theories come alive through real-world case studies: the post-2008 liquidity freeze, the COVID-19 consumption shock, the influence of Generation Z leadership ideals, or the catalytic role of e-commerce FDI in emerging markets. Each chapter demystifies advanced analytical tools, thereby

bridging the gap between classroom instruction and empirical frontiers of research. Discussion questions and suggested further readings at the end of each section encourage learners to probe assumptions, compare methodological choices, and identify avenues for original inquiry.

In pedagogical settings, the volume can function as a capstone reader or semester-long scaffold for upper-level undergraduate and master's courses in international economics, strategic management, development finance, global governance, or sustainable business. Instructors might assign Part I to ground students in mechanics of cross-border capital and macroeconomic policy, then pivot to Part II for debates on organisational culture, leadership ethics, and responsible consumption. The juxtaposition naturally sparks classroom dialogue on interlocking challenges—financial stability, social inclusion, and ecological integrity—and invites comparative analysis across geographic regions and industrial sectors. Group projects can leverage empirical datasets referenced in the chapters, policy briefs can be crafted around regulatory implications discussed, and simulation exercises can model behavioural responses of consumers or investors to changing incentives.

Ultimately, the book positions itself as a reference work, teaching tool, and practical guide—a tri-purpose design that reflects the reality that twenty-first-century economic and managerial problems cannot be solved from within a single silo. Whether one is designing a fiscal stimulus, launching a climate-tech start-up, or researching socio-economic ripple effects of pandemics, insights assembled here equip readers to engage thoughtfully with global challenges that will shape markets, institutions, and societies for decades to come.

No single collection can exhaust complexity of global economic and managerial change, but it can map the terrain and signal fruitful paths for future inquiry. Papers assembled here suggest that old binaries—market versus state, efficiency versus equity, shareholder versus stakeholder—are yielding to more nuanced frameworks in which complementarities matter as much as trade-offs. As the world confronts cascading shocks, from geopolitical fragmentation to environmental tipping points, the need for such integrative thinking will only intensify.

We invite readers, therefore, to approach this book not as a set of isolated studies but as a conversation—across methods, across regions, and across generations—about how to build an economy capable of sustaining both material prosperity and collective well-being. Our hope is that insights offered by these young scholars will inform not only academic discourse but also policies, investments, and leadership practices that will define tomorrow's economy.

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Chapter I

Role of Corporate Income Tax in Inflow of FDI: Case of Anglo-Saxon Countries

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Introduction

Drawing the attention of other countries and companies to invest in their country has been, and will continue to be, one of the most important tasks for any state. One of the most popular tools for this purpose is corporate income tax. According to Keightley and Sherlock (2012), this tax is levied on corporate profits, or in other words, net income. Many countries and scholars still discuss the importance of this tax and the possibility of reforming it in any way. Moreover, this charge plays a crucial role in overall tax revenue. That is why many states impose a relatively high percentage and use it to generate income from corporations.

On the other hand, some countries use this tax to make their economies attractive and accessible for investment. As a result, the term 'tax

haven' was coined. Indeed, Corporate Income Tax (CIT) is not the only factor contributing to such status—personal income tax plays a role as well.

In recent years, the overall level of CIT has gradually decreased. It is difficult to identify which country first adopted this approach. However, Ireland is one of the most prominent examples. At the start of the new century, it significantly lowered its corporate income tax rate, which possibly helped it to overcome poverty. That is why, nowadays, many researchers study this issue and analyse the relationship between the foreign direct investment (FDI) and CIT across a large number of countries. However, although there is already an extensive body of literature on this topic, there are still knowledge gaps regarding certain groups of countries. Surprisingly, some researchers appear to have overlooked one of the most prominent groups of countries in terms of their role in the current global setting. Because of this, the present study aims to analyse the relationship between FDI and CIT in a specific group of countries: the Anglo-Saxon group. Since this research can be considered exploratory, it is important to clarify what value it adds to the existing literature. Some of the previously published studies examine individual countries or pairs of countries from the Anglo-Saxon group. In contrast, we analyse the group as a whole. Due to their close relations, we can observe active trade between them as well as relatively high levels of FDI. Additionally, the reasons why this group is of interest for the study will be explained in the literature review. Bearing in mind all these factors, it can be concluded that applying a well-researched topic to a new and specific group of countries may produce valuable results. We will also compare our findings with existing literature, which will further strengthen our conclusions.

Based on the existing literature, the study's central hypothesis is that corporate income tax has a reverse relationship with FDI net inflow. From this, we can underline the research question: *'Does a lower corporate income tax have a positive effect on FDI net inflow?'*

The research will consist of several parts. Firstly, we will analyse previous literature on a similar topic and related issues. The second

section will present pre-analysis information on the dataset that will be used for the primary analysis. Next, we will discuss our dependent and independent variables and present relevant information thereon. Then, descriptive statistics will be provided and briefly analysed to identify noteworthy observations. Another part of the section will focus on the model specification and the main analysis. Initially, we will underline the basic regression model and, on this basis, construct a model for our analysis. It will include six countries (the United States, the United Kingdom, Canada, Australia, New Zealand, and Ireland) from 1990 through 2022, with the total number of observations amounting to 198. After that, we will conduct the necessary tests, used in previous literature, to ensure the reliability of the data and construct three econometric models: pooled ordinary least squares (OLS), fixed effects, and random effects. To be more precise, pooled OLS is used as the baseline of the research, and it has been widely applied in past studies. Next, the fixed effects (FE) and random effects (RE) models are the most common methods used in earlier work on this topic. We will choose between the FE and RE models using the Hausman test. In the final section, we will discuss the results obtained. We will also examine whether our hypothesis is confirmed and compare our results with the previous literature that served as a basis for this study.

1. Literature review

This section presents a background of the literature related to the topic of this study.

1.1 Defining the Anglo-Saxon group

First of all, it is crucial to understand which countries can be included in the study as Anglo-Saxon countries. Several economic studies use this group as a sample. For instance, in a study by Atkinson and Leigh (2010), the authors analysed the distribution of top incomes in five

Anglo-Saxon countries over the twentieth century. They used the following five countries: Australia, Canada, New Zealand, the United Kingdom, and the United States. The authors justify their choice by stating that these countries are similar in several ways. The main point is that all were once under British rule as colonies and share similar legal systems. It is also noted that this group shares a common English language (Atkinson and Leigh, 2010).

In another study, where researchers from the Plekhanov Russian University of Economics examine tax regulation in the Anglo-Saxon states, they also mention these five countries, as in the study above. They underline the fact that when economic studies refer to Anglo-Saxon countries, they usually mean the US and the UK, and, less frequently, Australia, New Zealand, and Canada (Slepov *et al.*, 2021).

Moreover, in research conducted by Chen, Torsin, and Zhang (2022), the authors use a similar list of countries as in the study mentioned above; however, they also highlight Ireland as an Anglo-Saxon country.

Other researchers, in their work, also refer to Ireland as a full participant in the Anglo-Saxon group of countries and use the term as another name for the 'Anglosphere'. They underline that grouping these countries together is possible because of their institutional and economic similarities (Konzelmann, Fovargue-Davies and Schnyder, 2010).

Next, it would be great to understand why this group is interesting for research. First, the members are of interest, as the list includes countries like the United States and the United Kingdom, which are major actors not only in the political sphere but also in global trade and the economy. Moreover, these countries record not only a substantial FDI inflows but also significant outflows to countries such as India and even China. Ireland, which received the name 'Celtic Tiger' because of its CIT policy at the beginning of the twenty-first century, is also included in this group (Ó Gráda 2002). Owing in part to FDI inflows from corporations such as Apple, the country moved from being a developing economy to becoming one of the strongest in the European Union (Barrera and Bustamante, 2017).

Furthermore, according to World Bank data (2022), Ireland mainly has FDI inflow, but not outflow. Importantly, the presented group is especially

interesting for research because of the diversity of its participants, despite their shared historical background. They exhibit significantly different levels and even types of FDI. However, even though we will analyse past literature, we will be able to use it only as a theoretical basis, and not a practical one, due to significant differences in the countries under consideration.

1.2 Determinants of foreign direct investment

Many different variables and factors can influence Foreign Direct Investment. Numerous research papers analyse the relationship between FDI and these factors. As Chakrabarti (2001) states, with such a considerable number of studies, it is understandable why there is a lack of consensus over the results. The reason for this may be the use of different perspectives, methodologies, samples, and analytical tools. In this study, the author presents a table comparing the findings of numerous studies on the subject. The variables influencing FDI include market size, labour cost, trade barriers, growth rate, openness, trade deficit, exchange rate, and tax. Almost every variable shows mixed results, some more mixed than others. The most controversial variable is labour cost. Researchers did not arrive at a unified conclusion, and their opinions are almost equally divided across the possible outcomes.

On the other hand, all of the researchers cited in Chakrabarti's study agreed on one point: the market size as a determinant of FDI. Around 18 scholars in the study found that this variable positively affects foreign direct investment. The author explains thtis using the market--size hypothesis, which suggests that a large market is essential for the efficient use of resources and the exploitation of economies of scale (Chakrabarti, 2001). To clarify, as scholars from Pondicherry University explain, market size is measured by GDP (Gross Domestic Product), GDP per capita, and the size of the middle-class population (Vijayakumar, Sridharan and Rao, 2010).

Another variable discussed in Chakrabarti's research was GDP growth, or *market size growth*, as it was termed in Tocar's (2018) study. The author

presents another hypothesis: that a rapidly growing economy can offer better opportunities for investors to make a profit. However, the effect of this variable is relatively controversial. Most authors found that its effect on FDI is positive. For instance, Mottaleb and Kalirajan (2010) used panel data from 68 developing countries over 2005–2007; Nunnenkamp (2002) used data from 28 developing countries in the 1990s; Durham (2004) used data from 80 countries over 1979–1998; Çeviş and Çamurdan (2007) analysed 17 developing countries; and Fan *et al.* (2007) used Chinese data. Moreover, Fan *et al.* (2007) states that China's rapid growth was one of the reasons for its high FDI inflow. On the other hand, Chakrabarti found two studies where the effect of the growth rate on FDI was insignificant. This is the reason for the controversy surrounding this variable.

The inflation rate is another commonly analysed variable in relation to FDI. As Botrić and Škuflić (2006) explain, when analysing inflation as a determinant, both possible effects must be taken into account. On the one hand, inflation can be beneficial for foreign investors, since rising prices of goods in which the investor has invested may increase returns, thereby encouraging FDI. On the other hand, a high inflation rate may clearly be interpreted as a sign of economic instability in the host country. That is why, as the authors expected, using Generalised Least Squares regression, they found that the inflation rate is insignificant in relation to FDI. In their study, Çeviş and Çamurdan (2007) analysed 17 developing and transition economies over 1989–2006. Using panel data and a fixed effects model, they found that inflation is statistically significant and has a negative effect on FDI. In line with the results of Botrić and Škuflić (2006), Mottaleb and Kalirajan (2010) also show that inflation is an insignificant determinant in lower-middle-income, low-income, Asian, Latin American, and developing countries. Moreover, Azam and Lukman (2010) report the same findings for Indonesia and Pakistan, but in the case of India, this determinant is statistically significant and positive.

In addition to these economic factors, there are others that have a major impact on FDI. For instance, one frequently analysed variable is trade openness, or international trade. Khachoo and Khan (2012) define trade openness as the ratio of imports and exports of goods and

services to GDP. As Sajilan *et al.* (2019) underline, trade openness should positively influence FDI because investors tend to prefer countries with larger markets and those that are generally open to trade and engaged in international trade agreements. Nevertheless, according to Chakrabarti (2001), the opinions and findings on the relationship between openness and FDI are mixed. Four out of six researchers claim that openness positively impacts FDI, while the other two find the relationship to be statistically insignificant. Çeviş and Çamurdan (2007) observe a strong positive relationship, with trade openness being statistically significant at the 5% level. In the studies conducted by Demirhan and Masca (2008), Culem (1988), and Kravis and Lipsey (1982), the results align with those of Çeviş and Çamurdan. Another noteworthy study that includes trade openness was conducted by Azam and Lukman (2010). They found that in Pakistan, the relationship is positive and significant; however, for India, while the result is also statistically significant, the correlation is negative.

1.3 Investigating the CIT-FDI relation

Another possible determinant of FDI might be the corporate tax rate. Since taxation is a fiscal policy, controlled by governments, countries use it as a tool to influence the situation of corporations within their economies, including FDI. In general, during the 1990s, many countries decided to reduce the overall level of taxation, especially corporate income tax. For instance, according to data from the Tax Foundation, Ireland significantly reduced its corporate tax rate to 12.5 percent (Enache, 2023). As Howard (2019) underlines, Ireland's transformation from an emerging economy to a 'Celtic Tiger' is closely linked to these tax cuts in the 1990s. Moreover, this policy became a signal for major corporations to relocate their operations and headquarters to Ireland.

However, researchers have not reached a consensus and often disagree about the actual effect of corporate tax rates on FDI. To be precise, the literature on this topic presents widely differing results. The most frequently observed outcome is a negative relationship.

In a study conducted by Öz-Yalaman (2020), data from 19 OECD countries—major participants in the European Union—between 2003 and 2013 indicate a significant negative relationship between FDI inflows and the Corporate Tax Rate (CTR). The author selected these countries because they experienced a similar period of tax cuts between 2003 and 2008. As independent variables, the study included not only CIT but also GDP growth, inflation, population growth, unemployment, tax revenue, and openness. The author first used fixed effect and random effect estimators to test the hypothesis. The results of the fixed effects model supported the hypothesis, showing a significant negative relationship, although with an extremely low R-squared value. The random effects model did not support the hypothesis. However, since the null hypothesis of the Hausman test was rejected, the author continued using the fixed effects model. To address endogeneity, the study also applied a GMM estimator. In the end, the results showed that corporate tax and openness are negatively correlated with FDI inflow, while GDP growth is positively correlated. Inflation, population growth, unemployment, and tax revenue were not statistically significant.

In a study of seven emerging EU economies (Czech Republic, Hungary, Lithuania, Latvia, Poland, Slovakia, Slovenia) over the period 2010–2019, Beljić, Glavaški and Pejčić (2023) tested the data using classical panel data models and later applied a panel-corrected standard errors (PCSE) estimator as a robustness check and as a solution to problems identified in the initial models. The authors selected this specific time period because it fell between two economic crises. As additional independent variables, they included short-term interest rates, GDP growth rates, competition and corruption indexes, and dummy variables for Latvia and Hungary. Latvia was assigned a dummy variable because it had the lowest corporate income tax rate among the countries analysed, while Hungary received one because it recorded negative FDI inflow values in 2015 and 2016. The Hausman test indicated that the fixed effects model should be used to interpret the results. The FE model showed that the corporate tax rate and the Hungary dummy had a negative impact on FDI, while all other variables had a positive impact. However, under the

PCSE estimator, the corporate income tax rate showed a positive sign and was statistically insignificant. Only in the cases of Hungary and Latvia was a negative relationship confirmed. In conclusion, the authors note that Latvia and Hungary had the highest tax competitiveness index scores, which suggests that tax competition does exist within the European Union.

In his research, Anaraki (2015) analyses core European countries (France, Germany, the Netherlands, Luxembourg) over 2000–2014. As additional variables to corporate income tax, the author includes GDP in the host country, openness, the inflation rate, labour cost, the lending interest rate, the exchange rate, and stock market return. As an estimation method, the researcher uses only the fixed effects model. The difference from other studies is that the author estimates results for each country individually. As Anaraki expected, the corporate tax rate is negatively correlated with FDI flow, as are labour cost, interest rate, and exchange rate. Openness and stock market return have a positive relationship with FDI flow. The only statistically insignificant variable in this model is inflation, across all four countries. Not only are the results in line with the author's hypothesis, but the corporate tax rate is also found to be the most important determinant of FDI flow compared to the other variables.

In a study with a data sample of 28 Asian countries over 1999–2014, Lesmana (2022) also finds a significant negative effect of the corporate tax rate on FDI inflows. As additional variables, the author includes several others, such as GDP per capita, openness, unemployment, internet usage rate, and more. The author uses a fixed effects model regression and later a dynamic panel regression with the system generalised method of moments (GMM) (Arellano–Bover / Blundell–Bond estimator). As a result of the fixed effects model, the corporate tax rate has a significant negative effect on FDI inflow. Openness and GDP per capita show a significant positive effect, while inflation has a significant negative effect. In the GMM estimation, the results are similar to those of the fixed effects model, with some differences: political stability and the exchange rate become statistically significant and negatively affect FDI inflow.

However, not all studies report a negative relationship between the CTR and FDI. Some researchers have found that FDI is not sensitive to corporate income taxes in various samples.

For instance, Ngwaba (2023) finds that foreign direct investment is not sensitive to corporate income tax in developing countries. He analyses 65 developing countries, including those in the Middle East, Latin America, the Caribbean, Asia, and Africa, over 1990–2015. The author adds GDP per capita, the exchange rate, inflation, the interest rate, and telephone line density as additional variables. He uses several regression analysis methods to provide a complete picture: pooled OLS, fixed effects, random effects, and, as a robustness check, the GMM method. As a result, in the fixed effects model, FDI is not sensitive to corporate income tax in all regions except Latin America, where the result is not only significant but also positive. The author attributes these results to the fact that the model accounts for the role of public institutions. Moreover, the GMM results are consistent with the fixed effects findings.

Another example is the study by Kersan-Škabić (2015), where the author analyses the effect of corporate tax on FDI in six Southeast European countries (Albania, Bosnia and Herzegovina, Croatia, Republic of Macedonia, and Montenegro) over 2000–2011. However, this research differs from previous studies. Here, the author first introduces the gravity model of trade, where the main point of interest is the difference in tax levels between the home and host country, based on bilateral FDI inflows. Next, total FDI inflows are analysed. As additional variables, the researcher uses an extensive list of possible determinants drawn from the literature, including GDP per capita, GDP growth rate, population, distance, investment freedom, and others. As the regression method, the author applies a one-step GMM methodology. In the end, the study finds that corporate income tax is not significant in the models for bilateral and total FDI flows. However, when the author considers FDI stock, the result becomes significant with a positive sign. This is explained by the presence of other determinants with a stronger effect on FDI. These results are in line with Haufler's (2001) analysis.

Moreover, some studies on similar subjects have been conducted using time-series model analysis. For instance, Mughal and Akram (2011) analysed this relationship in the case of Pakistan over 1984–2008. They used an error correction model based on ARDL (Autoregressive Distributed Lag) as the regression method. They also introduced additional variables, such as market size and exchange rate. As a result, the researchers found that corporate income tax does not influence FDI in the long run; however, in the short run, the correlation is negative.

To sum up, there is a large body of literature on the relationship between corporate income tax and foreign direct investment, covering different countries and time periods. However, there remains a gap in the literature—particularly concerning the Anglo-Saxon group as a unit of analysis—which would be valuable to address. While it is possible to find studies covering each Anglosphere country individually, especially Ireland, which has the lowest corporate income tax level, there are no studies that consider the group as a whole. In line with the majority of existing research, the hypothesis of this study is that corporate income tax has a negative impact on the level of FDI inflow.

1.4 Theoretical framework of CIT

In this subsection, we discuss the central idea of corporate income tax, the history of this phenomenon in Ireland, and how corporations avoid this tax for their own benefit.

As Adelman (1957) states, CIT is the second-largest revenue producer for countries and will remain one of the most important in the future. As mentioned earlier, CIT is a highly controversial phenomenon not only in politics but also in the academic literature. This issue was also underlined by Nürnberg (2009). According to him, CIT can be treated either as an expense and loss or as an anomalous item. From this perspective, it can be seen that the tax rate is often considered primarily from a negative standpoint. This can be explained by the fact that this study examines the issue from the perspective of a company or corporation. Thus,

CIT has a negative impact on the economic position of the corporation because it limits its earnings.

Regardless of the above, the discussion now turns to the historical perspective.

Hines (2001) emphasises the fact that CIT usually works within a progressive scheme, similar to personal taxes. Because of this system, large corporations rapidly reach the highest tax bracket, and one of the main business activities of such corporations becomes tax avoidance. Large companies may even hire staff independently from their main activity departments, where the sole task of employees is to reduce the company's tax burden. One possible method is the use of debt financing for operations and investment instead of equity financing. The reason for this is that debt is generally not taxable by governments. Another potential mechanism, noted by many scholars, is that corporations shift the cost of taxes onto consumers and workers. From the consumers' side, the prices of goods become higher than before. From the workers' side, they begin to receive lower wages.

However, there is one more possible way for corporations to avoid taxes. This involves moving the legal address of the entire company or part of it to tax haven countries. Before discussing this further, it is necessary to understand what a 'tax haven' is. According to Tobin and Walsh (2013), there is no exact definition of this phenomenon. Nevertheless, there are four generally agreed criteria by which it is possible to determine whether a country falls under tax haven status. First, such a country has no or only minimal nominal taxes. The second criterion concerns the absence of transparency, meaning that it is difficult to obtain information on ownership structures, bank details, and business activities. Third, there is a lack of willingness to exchange information with OECD countries regarding anti-money laundering or tax avoidance. The final criterion is that there are easy requirements for company registration and no general need to demonstrate economic activity within the country.

Returning to tax avoidance schemes, there are many well-known cases discussed not only in news articles but also investigated by scholars. For instance, one example analysed by Aslanyan (2021) concerns a tax

avoidance scheme implemented by Nike. For clarification, this corporation specialises in the production of sportswear, mainly footwear, and is based in the United States of America. Because of progressive taxation, Nike initially paid substantial amounts in corporate income tax; however, its board of directors found a way to pay less and earn more through a legal tax avoidance strategy. In 2006, Nike signed a deal with the Netherlands for a special tax regime, which lowered its tax rate to 13.2% by 2017, compared with an initial rate of 34.9%. Next, the company initiated the second part of the plan to reduce the tax rate further. It created a subsidiary, 'Nike International Ltd.', in the offshore jurisdiction of Bermuda, where corporate taxation is minimal. The most notable aspect of this 'new' company is that it has neither office nor employees in the host country. The corporation transferred the rights to the logo design to the Bermuda company, which constituted its sole function. The Dutch company's business activity involved retailing Nike products and collecting sales revenue. This revenue was then paid to the Bermuda company as a fee for using the logo on the products. In other words, customers were effectively paying not only for the product at retail stores but also for the logo itself. As a result, Nike transferred USD 6.6 billion to its offshore entity in 2014, thereby avoiding taxation by the government.

Adding to what was mentioned previously, there is another case of a large corporation that used one of the countries analysed in this study to avoid taxes. According to Barrera and Bustamante (2017), Apple is a relevant example. To be precise, its corporate tax rate is 12.5%, which is much lower than corporate tax rates in the United States and Europe. Apple decided to use this advantage as a way to reduce its tax burden. The company established 'Apple Sales International', which sells products in Europe, Asia, Africa, the Pacific, and the Middle East. In addition, 'Apple Operations International' and 'Apple Operations Europe' were incorporated in Ireland. However, Apple decided to obtain an even lower tax regime and negotiated with Ireland to impose a special corporate tax rate ranging from 0.05% to 2%. Based on publicly available information, USD 215 billion was allocated in 2017 to three subsidiaries. In

other words, Apple shifted this substantial sum of money out of United States taxation through Ireland.

Furthermore, it will be beneficial for this study to analyse the history of one of the most interesting countries from a corporate income tax perspective. Ireland, one of the participants in the Anglo-Saxon group and often referred to in media and literature as the 'Celtic Tiger', was analysed by Howard (2019). Today, it is a country with relatively high GDP per capita, one of the highest standards of living, and, according to some media, the IT capital of the European Union. However, as Howard underlines in his research, Ireland was a relatively underdeveloped country at the beginning of the twentieth century, especially in comparison with other European nations. If we consult data from the World Bank, we find that in 1960, Ireland's GDP in US dollars was only 1.94 billion (World Bank, 2022). Due to inadequate political and economic decisions, and the general atmosphere at the time, there was significant emigration of Irish citizens to other countries. Eventually, however, Ireland found a way out of this situation and experienced remarkable economic growth in the 1990s. Because of this, according to Ó Gráda (2002), Ireland earned the nickname 'Celtic Tiger'. Moreover, at the beginning of the 1990s, Ireland's GDP in US dollars was 49.31 billion; by 2000, it had increased to 100.21 billion. Although there were expectations that this economic surge would gradually lose momentum, Ireland continued to grow. Based on the most recent available data, in 2022, the GDP of the Celtic Tiger stood at 533.14 billion US dollars. As noted by Howard (2019), many scholars believe that this GDP growth was driven by a policy of reducing the overall level of corporate income tax. According to the Tax Foundation, in 1990, Ireland's CIT stood at 43%; however, following a series of reductions, by 2003, the rate had been lowered to 12.5% (Enache, 2023). Such low tax rates motivated major international corporations to relocate operations to Ireland or open subsidiaries there in order to benefit from a lower tax burden. Apple is one of the most prominent examples. Howard concludes his paper stating that, although corporate income tax is not the only determinant of FDI attraction, the statutory rate played a key role in enabling Ireland to become a competitive economy. However, some

scholars argue that the apparent growth in GDP was merely statistical, and that the Irish population did not perceive the same improvement in everyday life. Tedeschi (2018) analyses this phenomenon in Ireland. The core issue lies in the theoretical distinction between Gross Domestic Product (GDP) and Gross National Income (GNI). According to economic theory, GDP is calculated as the sum of consumption, government spending, investment, and net exports (exports minus imports).

GNI, on the other hand, is calculated as GDP plus net income from abroad (i.e. income from abroad minus income sent abroad). This distinction explains the statistical illusion behind the Irish case. Tedeschi highlights that the Irish economy was among the most 'foreign-owned' economies in the world. After the implementation of its tax haven policy, FDI inflows to Ireland increased dramatically. However, these investments were largely owned by foreign entities. As a result, Irish citizens could not access this capital, and it had little impact on their actual living standards. Another study, by Clarke (2004), supports this conclusion. As Clarke states, at the time of writing, Ireland ranked among the top five OECD economies by GDP. However, in terms of GNI, the Celtic Tiger had dropped to 17th place. Because of this statistical discrepancy, Ireland was referred to as a fast-growing economy 'on paper only'.

2. Methodology

This section presents the origin of the data, a list of additional variables, the method of data analysis, and the econometric model. A regression model will be used to analyse the relationship between FDI and corporate income tax in Anglo-Saxon countries using panel data analysis. This approach will help us establish the degree of relationship between variables and provide precise figures for comparison with previous studies.

2.1 Research design

Even though the topic of analysing the influence of corporate income tax on foreign direct investment inflow is relatively common in academic research, at the time of this study, no analysis of the Anglo-Saxon group of countries as a unit was found. Therefore, this study can be classified as exploratory research. To clarify this concept, we refer to Gratton and Jones (2003), who describe it as research which is undertaken when there is little or no prior explanation or study on the topic. We will use existing academic literature as a foundation for our analysis—particularly regarding the types of regression models previously used and the results those studies obtained.

2.2 Sample selection

We use a panel dataset to identify and estimate the overall effect of CIT on FDI inflow. The dataset covers six Anglo-Saxon countries over the period 1990–2022. These countries are the United Kingdom, the United States, Canada, Australia, New Zealand, and Ireland. Geographically, they are distributed across three continents: North America, Europe, and Oceania. The total population of this group is approximately 485.9 million (World Population Review, 2024).

As regards the sources for all variables used, the data for the dependent and first primary variable in our regression model, FDI net inflow, were obtained from World Bank Data (2024). As for the second primary and independent variable, corporate income tax, the data source is the Tax Foundation (Enache, 2023). For the remaining control variables, the primary data source is also World Bank (2024). However, in some cases, data were not fully available from these sources. For example, trade openness data for the United States in 2022 were calculated manually using data from FRED (2024). Additionally, data on the unemployment rate in the United Kingdom for the years 2019 to 2022 were unavailable in the World Bank database but were retrieved from Macrotrends (2024). Our entire dataset consists of 198 observations, comprising six countries over a period of 33 years.

2.3 Variables and descriptive statistics

This section provides an overview of all dependent and independent variables used in the regression model, along with descriptive statistics and the expected signs of the variables based on previous literature.

The first and dependent variable is foreign direct investment net inflow as a percentage of GDP. This refers to the process whereby a foreign company or government invests capital in another economy. According to the World Bank data (2024), this variable is defined as the sum of equity capital, reinvested earnings, and other capital. It is selected as the dependent variable, in line with the central hypothesis of this study.

The second main and independent variable is corporate income tax. According to Devereux, Griffith, and Klemm (2002), the basic measure for this variable is the statutory tax rate. In general, this variable indicates the percentage of income that corporations are required to pay as tax to the governments of the countries in which they operate. As proposed in the hypothesis and supported by some prior literature, this tax rate may be considered a key factor in a company's decision to invest abroad. Moreover, some countries have acquired tax haven status due to their low or zero CIT levels.

The next variable that will be used in the regression model is the inflation rate. Since we used inflation rates from World Bank data in our dataset, they are calculated using the consumer price index as a basis. To put it simply, inflation is the process by which money loses its value due to various economic factors. As a result, the cost of a standard consumer basket may increase annually, even though its contents remain the same.

The next variable is the Gross Domestic Product growth rate. This allows us to assess a country's economic condition and how rapidly it is expanding.

Another variable is the population growth rate. This is an annual rate indicating the change in population compared to the previous year. Some studies related to this one have used this variable as an additional indicator, which can be interpreted relatively easily.

The next variable is trade openness. This index is calculated by dividing the sum of imports and exports of goods and services by a country's gross domestic product. As shown in the literature review, a higher index reflects a greater inclination of the country to engage in international trade.

The final variable is the unemployment rate. This indicates the proportion of the labour force that is not currently employed but is actively seeking work and ready to begin employment.

Table 1. Descriptive statistics

Variable	Observ.	Mean	Std. Dev.	Min	Max
FDI inflow	198	4.59	8.28	-11.69	81.08
CIT	198	30.43	8.41	12.5	44.6
GDP growth	198	3.02	3.23	-11.03	24.37
Pop. growth	198	1.03	0.51	-0.08	2.89
Inflation	198	2.43	1.70	-4.48	8.06
Unemployment	198	6.90	2.66	3.30	15.77
Openness	198	69.43	51.10	19.79	252.49

Source: Author's calculations.

From Table 1 presented above, we can identify some notable values and interpret them. Firstly, we can observe the variation in corporate income tax rates. As discussed earlier in the Literature Review, Ireland has a corporate tax rate of 12.5%, the lowest in the table. In contrast, the maximum rate is 44.6%, while the mean is 30.43%. As previously noted, there is a general trend toward lowering corporate income tax rates, yet Ireland stands out as an outlier in this dataset. Additionally, the mean GDP growth rate is 3%, which aligns with our findings from the Literature Review. The trade openness index displays one of the widest ranges among the variables, with a minimum of 19.79 and a maximum of 252.49, indicating significant variability across countries and years.

However, it is also necessary to examine the raw values obtained from the data sources.

As a first step, we examine corporate income tax based on data from the Tax Foundation (Enache, 2023). Ireland is clearly the most noteworthy case. Its corporate tax rate was 43% in 1990, but this was dramatically reduced to 12.5% by 2003. There is a substantial body of literature analysing the reasons behind this reduction and its economic consequences. Another interesting case is the United Kingdom, which had a tax rate of 34% in 1990, decreasing gradually to 19% by 2017. Other countries in our dataset exhibit relatively smoother reductions in their overall tax levels.

The next variable to discuss is FDI net inflow. Based on World Bank data (2022), we can identify some extreme values in our dataset. The highest recorded FDI inflow among the Anglo-Saxon countries between 1990 and 2022 occurred in Ireland in 2015, amounting to 81.08%. Conversely, the lowest registered value was also in Ireland, in 2019, at –11.69%. It is also worth noting that Ireland is the only country in our sample to exhibit double-digit values for this indicator.

Another variable of interest is the trade openness index. According to the descriptive statistics, it exhibits a relatively high standard deviation. Once again we begin with Ireland, which appears to be the most statistically atypical country in the dataset. The highest recorded value over the period 1990–2022 was observed in 2019, when the trade openness index reached 252.49. In contrast, the lowest recorded value was 105.03 in 1990. Ireland is thus the only country in the group with consistently triple-digit values for this metric. The next country of interest is the United States, which displays considerably lower trade openness than Ireland. Its lowest value was 19.79 in 1991, while the highest recorded value was 30.84 in 2011.

2.4 Model specification

To begin the econometric analysis, we first introduce the basic model. This includes our two main variables—FDI net inflow and corporate income tax (CIT)—as well as several additional variables that allow us to evaluate and compare the impacts of the independent variables.

We construct the model based on the general OLS equation:

$$y_i = \alpha + \beta x_i + \varepsilon_i \quad (1.1),$$

where:
y_i – the dependent variable;
α – intercept of the model;
β – the coefficient showing the general correlation between dependent and independent variables;
x_i – the independent variable;
ε_i – the error term of the model.

Using this example, the following extended model was constructed:[1]

$$FDI\_g\_in_{it} = \alpha + \beta_1 CIT_{it} + \beta_2 infl_{it} + \beta_3 GDP\_growth_{it} + \\ + \beta_4 POP\_growth_{it} + \beta_5 trade_{it} + \beta_6 unempl_{it} + \varepsilon_i \quad (1.2),$$

where:
$FDI\_g\_in_{it}$ – the dependent variable representing foreign direct investment net inflow measured as a percentage of GDP;
α – intercept of the model;
CIT_{it} – the independent variable representing Corporate Income Tax, in percentages;
$infl_{it}$ – the independent variable representing the annual inflation rate, in percentages;
GDP_growth_{it} – the independent variable representing the gross domestic product growth rate, in percentages;
POP_growth_{it} – the independent variable representing population growth rate, in percentages;
$trade_{it}$ – the independent variable representing the trade openness index;

[1] For examples see: Beck (2014, 2019, 2021a, 2021b, 2022, and 2023), Beck and Nzimande (2023), Beck and Okhrimenko (2024), Beck and Yersh (2024).

$unempl_{it}$ – the last independent variable for the unemployment rate, in percentages.

All other variables in the model are described in the basic econometric specification above (see Model 1.1).

Based on our research presented in the section on literature review, we can we can also indicate the expected signs of the variables used in the regression.

Table 2. Expected signs of the variables based on the literature review

Variable	Explanation	Expected sign
FDI inflow	Foreign direct investment inflow as % GDP	
CIT	Saturate corporate income tax (in %)	-
GDP growth	Gross domestic product growth (in %)	+
Pop. growth	Population growth rate (in %)	+
Inflation	Annual inflation rate (in %)	-
Unemployment	Annual unemployment rate (in %)	-
Openness	Trade openness index	+

Source: Author's calculations.

There is no sign listed for FDI inflow, as this variable is the dependent variable in the model.

3. Analysis and results

As a next step, we estimate the model using different approaches to assess the validity of our hypothesis. These approaches include Pooled Ordinary Least Squares, Fixed Effects, and Random Effects. They will also serve as

a robustness check in the future. However, before proceeding with these estimations, we must conduct several diagnostic tests to avoid potential issues arising from the use of secondary data.

Our first test will determine whether the variables exhibit cross-sectional dependence.

Table 3. Cross-sectionally dependence test

Variable	CD statistic	p-value
Fdi_g_in	2.727332	0.0064
CIT	14.98981	0.0000
infl	15.59133	0.0000
GDP_growth	15.58890	0.0000
POP_growth	1.712180	0.0869
trade	7.246681	0.0000
unempl	14.97290	0.0000

Source: Author's calculations.

From the table above, we observe that for all variables in this test, the p-value is below the 10% significance level (0.1), indicating the presence of cross-sectional dependence. This finding will influence the next stages of our analysis.

Our second step is to conduct a unit root test for the cross-sectionally dependent variables. This will show whether the variables contain a unit root and whether a cointegration test is necessary.

Table 4. Unit root test

Variable	CIPS	$CIPS_{\mu}$	$CIPS_{\mu,t}$
Fdi_g_in	-2.92363***	-4.08041***	-4.09312***
CIT	-1.14870	-1.80520	-2.58900
Δ*CIT*	-4.12362***	-3.77713***	-3.71116***
infl	-2.65382***	-2.97963***	-3.37625***
GDP growth	-1.37928	-2.88859***	-2.16266
ΔGDP growth	-4.22002***	-3.65937***	-3.74196***
POP growth	-1.68616***	-0.84733	-0.94256
ΔPOP growth	-3.45140***	-3.43329***	-3.55108***
trade	-0.70333	-1.58441	-2.60951
Δtrade	-4.68657***	-4.64391***	-3.76994***
unempl	-3.38639***	-2.87702***	-2.67928

Source: Author's calculations.

Where: * denotes significance below the 10% level; ** below the 5% level; *** below the 1% level.

Based on this table, we conclude that corporate income tax, GDP growth, population growth, and trade openness are non-stationary in levels but become stationary at first difference. On the other hand, FDI inflow, inflation, and unemployment are stationary in levels and do not require differencing before being used in the model. Therefore, since not all variables are integrated at the same order, we do not need to conduct a cointegration test and can proceed to Pooled OLS, Fixed Effect, and Random Effect models. However, it is also important to underline that in our models, corporate income tax will be included in levels, not in first differences. This is due to limitations of the EViews software used for regression, which causes CIT values to be lost in the first-differenced form. For this reason, it was decided to leave CIT expressed in levels, as this specification is more appropriate for the model and overall results.

Our first model is Pooled OLS, which serves as a baseline approach and is used in some prior studies. The estimation results are presented below.

Table 5. Pooled OLS

	Coefficient	Std. Error	t-ratio	p-value	Significance
const	16.52592	2.392708	6.906786	0.0000	***
CIT	-0.500628	0.061092	-8.194605	0.0000	***
DGDP_grow	0.291082	0.141358	2.059181	0.0409	**
DPOP_grow	2.358373	1.484776	1.588369	0.1139	
DTrade	0.138691	0.099428	1.394886	0.1647	
Infl	-0.544485	0.339853	-1.602118	0.1108	
Unempl	0.635484	0.208058	3.054365	0.0026	***
R-squared		0.334480	Mean dependent var		4.659552
Adjusted R-squared		0.312896	S.D. dependent var		8.402343
S.E. of regression		6.964850	Akaike info criterion		6.755406
Sum of squared resid		8974.189	Schwarz criterion		6.874169
Log likelihood		-641.5190	Hannan-Quinn criterion		6.803506
F-statistic		15.49636	Durbin-Watson stat		1.132773
Prob(F-statistic)		0.0000			

Source: Author's calculations.
Where: * denotes significance below the 10% level; ** below the 5% level; *** below the 1% level.

First of all, based on the output, our model demonstrates relatively low explanatory power, as indicated by the R-squared value. More precisely, the R-squared equals 0.33448, which means that our model explains approximately 33.448 % of the variation in the dependent variable. Next,

half of the included variables are statistically significant. Specifically, GDP growth is statistically significant at the 5% level, while CIT and unemployment are significant at the 1% level. Importantly, CIT is highly significant and has a negative effect on FDI inflow, which supports our hypothesis. However, it is not optimal to rely solely on the Pooled OLS model due to potential statistical limitations. Therefore, we proceed to estimate both Random Effects and Fixed Effects models.

However, because of other EViews limitations, we must delete one variable to estimate a Random Effect model. As explained by the statistical programme, there are more variables than coefficients in our dataset. We chose to delete population growth, as it was one of the most problematic variables previously due to statistical insignificance. The results of the model are shown below.

Table 6. Random effect model

	Coefficient	**Std. Error**	**t-ratio**	**p-value**	**Significance**
const	16.35111	2.299089	7.111997	0.0000	***
CIT	-0.502942	0.058748	-8.561074	0.0000	***
DGDP_grow	0.262369	0.134855	1.945569	0.0532	*
DTrade	0.133694	0.095591	1.398605	0.1636	
Infl	-0.447651	0.321599	-1.391955	0.1656	
Unempl	0.639375	0.200115	3.195040	0.0016	***
R-squared		0.325404	Mean dependent var		4.659552
Adjusted R-squared		0.307270	S.D. dependent var		8.402343
S.E. of regression		6.993305	Sum of squared resid		9096.574
F-statistic		17.94412	Durbin-Watson stat		1.116029
Prob(F-statistic)		0.000000			

Source: Author's calculations.

Where: * denotes significance below the 10% level; ** below the 5% level; *** below the 1% level.

In comparison with Pooled OLS, the results have changed. The R-squared decreased slightly and now equals 0.3254. Other results have not changed substantially. Next, to determine which model is more appropriate, RE or FE, we conduct the Hausman test.

Table 7. Hausman test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	21.676070	5	0.0006

Source: Author's calculations.

As we can see, the p-value of this test is equal to 0.0006, which is below the 10% significance level, indicating that we should proceed with the fixed effect model. Moreover, in the case of FE, the statistical programme allows us to incorporate all our variables, including population growth. The results are shown below.

Table 8. Fixed effect estimation

	Coefficient	Std. Error	t-ratio	p-value	Significance
const	14.67529	2.555810	5.741933	0.0000	***
CIT	-0.320207	0.088240	-3.628827	0.0004	***
DGDP_grow	0.310797	0.135943	2.286229	0.0234	**
DPOP_grow	1.700971	1.438948	1.182093	0.2387	**
DTrade	0.064354	0.097292	0.661460	0.5092	
Infl	-0.667391	0.329590	-2.024909	0.0444	**
Unempl	0.163077	0.244370	0.667338	0.5054	
R-squared		0.402192	Mean dependent var		4.659552

	Coefficient	Std. Error	t-ratio	p-value	Significance
Adjusted R-squared		0.365660	S.D. dependent var		8.402343
S.E. of regression		6.692086	Akaike info criterion		6.700190
Sum of squared resid		8061.123	Schwarz criterion		6.903783
Log likelihood		-631.2182	Hannan-Quinn criterion		6.782647
F-statistic		11.00911	Durbin-Watson stat		1.201714
Prob(F-statistic)		0.0000			

Source: Author's calculations.

Where: * denotes significance below the 10% level; ** below the 5% level; *** below the 1% level.

If we compare this model to the previous models, we can conclude that it performs better in terms of applicability. The R-squared value is equal to 0.402, which means that the model explains 40.2% of the variation in the dependent variable. However, many papers used as a basis for this study also report similar R-squared values. This is the best result obtained so far. Moreover, by observing the results from the three models, we can conclude that the estimated coefficients are consistent across specifications. In addition, a robustness check was performed for our data and models, as three different estimation methods were applied. Finally, we proceed with the fixed effect model results as the main findings of this study and compare them with results reported in previous scientific papers.

Next, we analyse the results of the model that was identified as the most appropriate.

First, we discuss the statistical significance of the variables. The most important variable, corporate income tax, is statistically significant at the 1 per cent level, with a p-value equal to 0.0004. The results indicate that a one-percentage-point increase in the corporate income tax rate leads to a 0.32 p.p. decrease in foreign direct investment net inflow as a percentage of GDP. This finding is fully consistent with the study's

hypothesis and with previous literature on this topic. More specifically, Öz-Yalaman (2020), Beljić, Glavaški and Pejčić (2023) for Hungary and Latvia, as well as Anaraki (2015), and Lesmana (2022) report similar results regarding the relationship between FDI inflows and corporate income tax. The GDP growth rate is statistically significant at the 5% level and has a positive impact on FDI net inflow, which is in line with Mottaleb and Kalirajan (2010), Nunnenkamp (2002), Durham (2004), Çeviş and Çamurdan (2007), and Fan *et al.* (2007). Furthermore, the inflation rate is statistically significant at the 5% level and has a negative impact on FDI inflow, which is consistent with the findings of Çeviş and Çamurdan (2007). However, in this study, population growth, trade openness, and the unemployment rate are statistically insignificant. Chakrabarti (2001), who analysed the research of other scholars, found that two studies also reported trade openness as statistically insignificant in their model, which is in line with our results. Moreover, Öz-Yalaman (2020) reports population growth and unemployment as statistically insignificant variables. Overall, even though this research is exploratory, the results are consistent with those of related studies.

In the end, we obtained results from our analysis and compared them with previous literature. We found that corporate income tax has a negative impact on FDI. Does this mean that countries should completely eliminate it as a fiscal policy or merely lower it to some extent in order to attract FDI inflows? This is a highly problematic question. Based on our results, the effect of lowering corporate income tax may be weaker than suggested in parts of the existing literature. For this reason, the idea of abolishing such a policy cannot be treated as a viable solution to the problem. Based on previous literature on this topic, there are many determinants of FDI inflows. As many scholars note, lowering corporate income tax can indeed help to attract additional FDI, but only if the overall economic environment in the country is also favourable for foreign companies and businesses. Moreover, CIT remains an important instrument in the hands of governments for regulating corporate activity within their economies. However, as Howard (2019) points out, there is another potential negative outcome of lowering corporate income tax,

namely a 'race to the bottom'. In general terms, this means that countries may begin to reduce their tax rates in response to similar actions by neighbouring countries, with the problem continuing until corporate income tax rates approach zero. In addition, lowering CIT is largely a short-term policy decision with limited long-term benefits. If countries were to compete solely on the basis of tax rates, such competition would ultimately benefit no one. As a result, this study recommends not using corporate income tax as the primary instrument for attracting FDI inflows, but instead focusing on other economic determinants and the overall business environment within a country.

Conclusion

This study examined the relationship between corporate income and FDI in the Anglo-Saxon group of countries. First, we established the relevance of the research and formulated the hypothesis and research question. The hypothesis stated that corporate income tax has an inverse relationship with foreign direct investment net inflow measured as a percentage of GDP. Subsequently, we examined previous literature on similar topics related to FDI and CIT, which served as a basis for further analysis. Next, we discussed the variables used in the study. In the next part, we described the databases that served as sources for the data and the sample selected. We then proceeded to model specification and the main analysis. At the outset, we outlined the basic regression model and subsequently used it as a basis for defining the variables and data. Three econometric models were then implemented, namely Pooled OLS, FE, and RE. In the following section, we discussed the results obtained and compared them with previous scientific studies. According to the results, corporate income tax has a negative impact on FDI, indicating an inverse relationship. This finding is consistent with the stated hypothesis and with much of the existing literature. Importantly, this study helps to address a knowledge gap in the literature, as there was limited evidence on the relationship between CIT and FDI inflows for the Anglo-Saxon group considered as

a whole. For this reason, the research is exploratory in nature and makes a scientific contribution. Moreover, additional determinants of FDI were identified. In particular, GDP growth was found to have a positive effect on FDI inflows, while the inflation rate was found to have a negative effect. These findings are also consistent with previous literature.

Limitations and suggestions for future research

One of the main limitations of this study is data shortage. Since the study covers a long time period, many variables that could, in theory, have a significant impact on FDI net inflow could not be included. These variables include corruption and democracy rates. The main issue is that consistent data for these indicators are available only from 1995 onwards, while the dataset used in this study starts in 1990. In addition, due to data limitations, the reliability of the dataset may be reduced. This is because data for some variables, such as the unemployment rate, had to be taken from different sources owing to gaps in World Bank data. Apart from these issues, no major problems were encountered during the conduct of this research.

As for suggestions for improving this paper, several steps could be taken to obtain more robust results. First, reducing the time span of the analysis would make it possible to include additional variables, such as corruption and democracy rates. Second, alternative estimation methods could be applied. Although OLS, FE, and RE are the main models used for this type of research, implementing the GMM method or PCSE would provide an additional robustness check. Finally, using quarterly data instead of annual data could be a way to obtain more detailed and potentially more accurate results, even when relying on the same dataset.

ABSTRACT

This study provides an analysis of the impact of statutory corporate income tax on foreign direct investment inflow in the Anglo-Saxon group of countries, using data from 1990 to 2022. The group comprises

six countries: the United States, the United Kingdom, Canada, Ireland, Australia, and New Zealand. The regression model takes into account other possible determinants of FDI, such as unemployment, inflation, GDP growth, population growth, and the trade openness index. Based on the literature review, a set of regression models was chosen, including pooled OLS, fixed effects, and random effects. According to the test results, the fixed effects model was selected as the most appropriate method for our data. Results from the study indicate that corporate income tax has a negative effect on foreign direct investment inflow. Moreover, GDP growth, population growth, and inflation can also be considered determinants of FDI inflow in Anglo-Saxon countries.

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Chapter II

The Role of Foreign Direct Investments in Driving GDP Growth

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Introduction

Economic growth is one of the most common topics in economics. This is mainly due to the fact that each country aims to increase its growth rate over time. Moreover, over the years, economic growth theory has evolved, and to this day there is still no ideal model that captures all relationships affecting economic growth. Nevertheless, numerous theories and models have been developed that aim to explain the determinants of growth. One of these focuses on foreign direct investment. Many questions have been raised regarding its effect on economic growth, as well as the factors that shape its volume. Therefore, this paper aims to address the impact of FDI on economic growth and to analyse the potential variables that shape the volume of FDI inflows and their effects.

1. Literature review

The topic of economic growth, although extensively examined, has not been fully explored to this day, and an increasing number of studies continue to provide more sophisticated extensions of existing research. Despite this, it remains important to understand the foundations of growth theory as well as the key factors that have shaped it. Among these are the three main economic growth models:

1. the Keynesian Harrod–Domar model,
2. the Solow–Swan neoclassical model,
3. the Romer–Lucas-inspired endogenous growth model.

The order is not random, as the models are listed according to the time of their development, with the Harrod–Domar model (Domar, 1946) being the earliest. It presents the relationship between the savings rate and capital. Output in the model depends on capital, whose growth rate is strongly affected by the savings rate. Therefore, for the sake of simplicity, an increase in the savings rate leads to capital accumulation, making labour more productive and resulting in higher output (Zhao, 2019). This is because an increase in the savings rate leads to higher investment. This also implies that investment activity is depicted as one of the main driving forces of the economy. However, it is important to note that the model is very limited in its application, as it does not take into account several important factors contributing to output growth, such as population growth or technological progress.

The next model is the Solow Growth Model, also known as the Solow–Swan model (Solow, 1956). It extends the previously discussed Harrod–Domar model and introduces a new exogenous variable reflecting technological progress. As in many other economic models, the basic inputs are capital and labour, which are used jointly to produce output. The main assumptions of the model are constant returns to scale and diminishing marginal products. The most important feature of the model is the 'steady state', which the economy reaches in equilibrium. Once this point is achieved, the only factor that can further drive economic development is technological progress. This implies that technological

progress is the main driving force of long-term economic development. With this in mind, higher values of this variable are preferable. There are no limitations to this variable, unlike the other inputs, which aim to reach state-steady values.

Last but not least, there is the Romer–Lucas-inspired endogenous growth model. The key feature of this model is the shift with respect to technological progress. In the Solow–Swan model, this variable is exogenous. However, Paul Romer (1994) endogenised this variable and identified the factors that shape its value. Taking this into account, it is important to note that both models highlight the importance of technological progress in shaping economic development. Although the models differ in their assumptions and approaches, it is crucial to recognise that each has had a greater or lesser influence on subsequently developed models, which to some extent build on earlier frameworks. Based on this, we can clearly observe the underlying thought process and the main areas of focus in the development of growth theory.

In order to better understand both exogenous and endogenous growth models, a simple comparison of the Solow and AK models is conducted.

Solow Model:

$$Y = AK^{\alpha}L^{(1-\alpha)}$$

AK Model:

$$Y = \overline{A}K^{\alpha}L^{(1-\alpha)}$$

$$\overline{A} = A_0K^{\eta}$$

As discussed, the main difference between the models lies in the treatment of technological progress. In the AK model, technological progress is a variable that is also dependent on capital. This implies that changes in capital affect the state of technology. In the Solow–Swan model, 'A' is not defined within the model; therefore, its value is essentially A_0. This

distinction has further implications. In the Solow–Swan model, technological progress is the main driving force of the economy in the long run. In contrast, in the AK model, the inclusion of capital as a determinant of technological progress suggests that the proper allocation of resources is also crucial for long-run economic growth.

Solow Model:

$$g_{\frac{Q}{L}} = g_A$$

AK Model:

$$g_{\frac{Q}{L}} = g_A + \eta$$

Nowadays, depending on the study, either GDP or GDP per capita is used to measure economic growth within a model. Both measures are relevant; however, GDP per capita allows for a more detailed assessment of the actual state of the economy. This is mainly because GDP may increase as a result of population growth, which does not necessarily lead to a comparable change in GDP per capita (Irmen, 2005). The difference between using GDP and GDP per capita in economic models is discussed by Moral-Benito (2016)[2] and Czyżewski (2021), where the same framework is applied but different dependent variables are used. In the GDP-based model, the vast majority of variables are statistically insignificant. In contrast, in the GDP per capita model, the same variables are statistically significant at the 1% level, with one variable significant at the 5% level. The only exception is the population variable, which is statistically significant in the GDP model but insignificant in the GDP per capita model. This result is consistent with Irmen (2005), as GDP per capita already accounts for population. Therefore, the lack of statistical significance of this variable does not raise concerns.

[2] The method used by Moral-Benito is relatively new; however, it has already been applied in analyses of the determinants of business cycle synchronisation (Beck, 2019, 2021a, 2021c, 2021d, 2022; Beck and Nzimande, 2023) and structural convergence (Beck, 2021b).

Having discussed the models, it is important to understand the general contribution of FDI to economic growth. This includes topics such as the overall effect on economic growth, the relationship between FDI and other factors affecting growth, as well as the factors that play a crucial role in stimulating FDI. Economic theory and empirical studies on FDI, such as Pegkas (2015), Li and Liu (2005), Borensztein (1998), Prüfer and Tondl (2008), and Baiashvili and Gattini (2020), share one common aspect: all indicate a positive effect of FDI on economic growth. However, taking into account that FDI is often associated with technology transfer (Osano and Koine, 2016), and that technological progress is one of the core drivers of growth in, for example, the Solow–Swan model, it is not surprising that the overall effects estimated in other studies are also positive. On the other hand, there is an issue on which different studies provide varying insights, namely the effect of FDI on domestic investment.

Having in mind that foreign direct investment contributes to the overall level of investment, there is no doubt that there may be a connection between FDI and domestic investment. Therefore, many studies have been conducted to analyse this relationship and to examine how FDI affects domestic investment. First of all, it is essential to understand the possible reasoning behind each of these effects. In basic closed-economy models, there is no possibility for FDI due to the absence of foreign actors. The level of investment in such models is determined by factors such as government spending and the savings rate. Once additional actors and the possibility of foreign capital inflows are introduced, the total volume of investment can be extended. An important aspect is that FDI and domestic investment are not always shaped by the same variables, thus creating a situation in which one may increase without a corresponding increase in the other, and similarly in the case of decreases. Consequently, the inflow of foreign capital in the form of FDI may reduce incentives for domestic investment due to lower profit opportunities compared to a situation in which such foreign capital is not transferred. This would imply that FDI crowds out domestic investment. In contrast, an increase in FDI may create new job opportunities or new trends that enhance the overall volume of investment due to opportunities arising as

a consequence of foreign capital. Such a situation would imply that FDI crowds in domestic investment. When it comes to the literature, several studies report conflicting results. Makki and Somwaru (2004), as well as Borensztein (1998), found that FDI crowds in domestic investment. Jude (2019) found that, in the short run, FDI crowds out domestic investment; however, in the long run, the overall effect tends towards crowding in. By contrast, in a study covering 34 countries over the period 1988–2013, Mamingi and Martin (2018) concluded that FDI crowds out domestic investment. The fact that the literature is not one-sided with respect to the crowding-out or crowding-in effect suggests that additional factors may influence this relationship, which this thesis aims to examine.[3]

In their research, apart from a general evaluation of FDI and its relationship with other factors, Prüfer and Tondl (2008) also estimated the impact of FDI depending on a country's income level. They found that middle-income countries benefit the most from FDI, while the effects are least visible in low- and high-income countries. To better understand why such a relationship occurs, it is first necessary to consider why foreign capital flows to a country at all. Companies may seek, for example, to expand their business or reduce costs and therefore establish new facilities or production sites in other countries in order to improve their long-run position, as well as to gain access to new markets when domestic demand is limited. A country's income level may reflect conditions such as infrastructure quality, investment opportunities, and the state of institutions. All of these factors affect FDI inflows, as well as the sectors in which such capital investments are viable. Therefore, the less developed a country is, the fewer opportunities there may be for FDI allocation. Li and Liu (2005) identified that a technological gap between countries contributes to a decrease in the volume of FDI. Given that, in most cases, capital transfers are expected to flow from more developed to less developed countries, middle-income countries tend to be the most attractive destinations.

[3] For more, see Beck (2011, 2014, 2017, 2020a, 2020b, and 2023), Beck and Jackson (2024), Beck and Okhrimenko (2024), Beck and Stanek (2019), and Beck and Yersh (2022).

2. Methodology

This section is divided into several subsections that are organised in the following order. First, the data are described, and subsequently each of the models estimated within the research is presented.

2.1 Data description

The main goal in collecting the data was to gather information for as many countries as possible from around the world in order to maximise the number of observations. Given that some variables did not contain data for all countries or lacked information for certain periods, many countries had to be excluded from the estimation. The dataset used in the paper consists of 72 countries covering 2003–2019 and 2002–2019, depending on the model. There are two dependent variables, one for each model: GDP per capita and foreign direct investment inflows. The idea is first to analyse the impact of FDI on GDP per capita and then to examine which variables affect FDI. GDP per capita is used instead of aggregate GDP, as it reflects changes in a country's growth rate more accurately. The distinction between these two GDP measures can be found in Moral-Benito (2016) and Czyżewski (2021). As the estimation includes more than one model, the variables are divided into three categories. The first includes variables common to all models, the second includes variables used in the GDP per capita models, and the third includes variables used in the FDI inflow model.

The first group is as follows:

- share of gross capital formation at current PPPs – the variable is presented as the ratio of investment to GDP. In the Solow model (1956), investments are related to the savings rate. Changes in investment are directly connected with shifts in output per effective worker. When investment increases, output per effective worker also increases. Consequently, a decrease in investment leads to a decrease in output. The variable is denoted as csh_i.

- share of government consumption at current PPPs – the variable is presented as the ratio of government expenditure to GDP. It illustrates the effect that an increase in government spending has on the economy. The variable is denoted as csh_g.
- share of merchandise exports and imports at current PPPs – this is a combination of two smaller variables (csh_x – share of merchandise exports and csh_m – share of merchandise imports) that are merged into a single variable. This variable is denoted as csh_xm.
- human capital index – an index calculated in the Penn World Table (Feenstra, Inklaar and Timmer, 2015) using the Barro and Lee (2013) database. The index takes into consideration years of schooling and life expectancy. The variable is denoted as hc.
- foreign direct investment inflow (in millions of US dollars) – the variable represents the inflow of FDI to each respective country and aims to capture its impact on the overall growth rate of a country. This variable is denoted as FDI_inf.
- GDP per capita – an indicator of economic growth in the model. The variable is denoted as GDP_pc.

All data for the above variables, apart from FDI inflows, were taken from the Penn World Table. FDI inflow data were taken from the World Bank.

The second category contains only variables related to the main GDP per capita model. The variables belonging to this category are as follows:

- voice and accountability – this variable captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. The variable ranges from approximately −2.5 to 2.5, with higher values representing better conditions with respect to the aforementioned freedoms and government selection.
- lagged GDP per capita – this variable represents GDP per capita from the previous year as a reference point for the current GDP value. Given that the model covers the period 2003–2019, this variable contains values from 2002 to 2018. Apart from this variable, all other variables in all models cover the period 2003–2019.

The third category covers the variables used specifically for the FDI model. These variables are related to the financial sector, institutions, and markets in a country, as well as tariff rates. They are as follows:

- financial institution access – an estimate that captures the impact of access to financial institutions on FDI inflows. The variable is denoted as fininacc. Data for this variable were taken from the International Monetary Fund database;
- financial market efficiency – an estimate that captures the impact of financial market efficiency on FDI inflows. The variable is denoted as finmaef. Data for this variable were taken from the International Monetary Fund database;
- tariff rate, applied, weighted mean, all products (%) – a variable that captures the impact of tariffs on FDI inflows. The variable is denoted as avtariff. Data for this variable were taken from the World Bank.

2.2 Model estimation

Having explained the dataset, the models can now be discussed. There are two models in total, with one of them being estimated three additional times for each country group, as explained in more detail in the following subsection. The first model uses GDP per capita as the dependent variable, while the second uses FDI inflows. As discussed above, the main idea is first to analyse the relationship between FDI and economic growth and, second, to examine the factors that affect the volume of FDI inflows and whether their effects are positive or negative. Given that each model has its own specific objective, they are explained in more detail in the respective subsections.

2.2.1 GDP per capita model

As indicated in the previous section, apart from the general estimation accounting for 72 countries, three additional estimations are conducted for each country group. With this in mind, it is essential to first explain the reasoning behind the division of countries and the

additional estimations, beyond the general one that includes all countries. Given that the literature indicates that the magnitude of the effect stemming from FDI inflows may vary depending on a country's level of development, the 72 countries used in the model are divided into four categories based on income level. The division of countries was made according to the World Bank income classification for 2019. Taking into account that the model covers the period 2003–2019, it is important to note that some countries may have shifted between income groups over time. The year 2019 was chosen as the reference point, as it is the final year covered by the model and serves as a simplification. This decision was mainly dictated by time constraints, as an alternative classification would have required a different modelling approach, since the current framework would not be applicable if countries moved between income groups. As mentioned above, countries are divided into four income groups: low income, lower-middle income, upper-middle income, and high income. The number of countries in each group is as follows:

- low income – 7;
- lower-middle income – 18;
- upper-middle income – 19;
- high income – 28.

As can be seen, the low-income group is underrepresented compared to the remaining three groups. That is why, for the purpose of the estimation, it is combined with the lower-middle income group. The positive aspect is that the remaining three categories are relatively close to one another in terms of the number of countries. They are not ideal, as they do not contain the same number of countries. Yet, given that the criteria are based on the World Bank framework rather than a self-designed classification, it is acceptable from an analytical point of view that the groups are relatively close in size. The combined low- and lower-middle income group accounts for approximately 35% of the countries. The upper-middle income group accounts for 26%, while the high income group accounts for 39% of the countries used in the initial estimation.

Having discussed the division of countries, we can turn to the model, which is the same for all countries used in the estimation as well as for each individual group. The model is specified as follows:

$$GDP_{pc} = \alpha csh_i + \beta csh_g + \gamma hc + \delta LagGDP_{pc} + \\ + \varepsilon csh_{xm} + \epsilon voiacc + \theta FDI_{inf} + c$$

The model aims to establish the relationship between FDI and economic growth, which is represented by GDP per capita. Apart from the FDI inflow variable, the model also includes general variables that affect a country's growth rate. These are csh_i, csh_g, csh_xm, and hc, which have already been tested in growth models in, for example, Moral-Benito (2016) and Czyżewski (2021). Lagged GDP per capita serves as a reference variable, as it accounts for the previous period in the estimation. Finally, the voice and accountability variable represents the impact of governance on the economy. First, the model is estimated for all 72 countries and subsequently for each of the income groups described above, with low- and lower--middle-income countries combined. The purpose of this division is to further investigate which country groups benefit most from FDI inflows, an issue also examined by Baiashvili and Gattini (2020). However, that study considered a different set of variables than the current model. Therefore, it may be useful to examine the results using the variables applied here. In this way, the findings can be compared with previous research to assess whether they are broadly consistent or whether they support contrasting conclusions that could provide scope for further investigation.

3.2.2 Foreign direct investments inflow model

Unlike the previous model, this one covers the period 2002–2019, thus adding one additional year. The general aim of the model is to analyse the impact of various factors on FDI inflows. Some of the variables used in this model are also included in the GDP per capita model. This makes it easier to understand the relationship between these variables, FDI, and

economic growth. As before, the model is estimated using panel data techniques. Unfortunately, due to the inclusion of the average tariff rate variable, the number of countries considered is significantly lower than in the previous model, amounting to only 32. Nevertheless, this number of countries and the period 2002–2019 still allow for a meaningful analysis. However, this limitation should be kept in mind, as in an ideal scenario the same set of countries would be used in both models when comparing results. The model is specified as follows:

$$FDI_{inf} = \alpha csh_i + \beta csh_g + \gamma GDP_{pc} + \delta finmaef + \\ + \varepsilon fininacc + \theta avtariff + c$$

3. Results

Similarly to the previous section, this part is divided into two subsections dedicated to the respective models. This does not imply that no comparison between the models will be made. Rather, this section focuses on presenting the model results, while further analysis and comparison of the results from both models take place in the following section.

3.1. Results of GDP per capita models

The following section first presents the results of the estimation for all countries and subsequently for the low-income combined with lower-middle-income, upper-middle-income, and high-income countries. The results for the first group are as follows:

Model 1. Fixed-effects, using 1224 observations

Included 72 cross-sectional units
Time-series length = 17
Dependent variable: GDP_pc

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	−115.951	461.362	−0.2513	0.8016	
csh_i	2478.50	515.810	4.805	<0.0001	***
csh_g	−4885.68	812.851	−6.011	<0.0001	***
hc	821.963	201.645	4.076	<0.0001	***
Lag_GDP_pc	0.919781	0.0104087	88.37	<0.0001	***
csh_xm	234.904	137.986	1.702	0.0890	*
voiacc	243.633	122.299	1.992	0.0466	**
FDI_inf	0.000991953	0.000575134	1.725	0.0848	*

Mean dependent var	21,446.17	S.D. dependent var	19,394.60
Sum squared resid	4.97e+08	S.E. of regression	659.1635
LSDV R-squared	0.998919	Within R-squared	0.922328
LSDV F(78, 1145)	13,559.30	P-value(F)	0.000000
Log-likelihood	−9640.898	Akaike criterion	19,439.80
Schwarz criterion	19,843.48	Hannan–Quinn	19,591.71
rho	0.269646	Durbin–Watson	1.400978

Joint test on named regressors –
Test statistic: F (7, 1145) = 1942.37
with p-value = P (F(7, 1145) > 1942.37) = 0

Test for differing group intercepts –
Null hypothesis: The groups have a common intercept
Test statistic: F (71, 1145) = 3.53189
with p-value = P (F(71, 1145) > 3.53189) = 3.43173e-19

As can be seen in Model 1, all variables turned out to be statistically significant, with the exception of the constant. However, from the perspective of the analysis, this is not something that requires particular attention.

The first variable to be interpreted is the share of gross capital formation at current PPPs (csh_i), which represents the impact of domestic

investment. A 1% increase in the investment-to-GDP ratio increases GDP per capita by 2478.50. Among all variables expressed as a percentage of GDP, investment has the strongest impact. Based on previous studies, the positive sign of the coefficient was expected. This is mainly because investment contributes to the development of new technology, which can significantly improve productivity. Such innovations may enable companies to reduce production costs, thereby creating excess capital that can be reallocated. In this way, businesses can expand their activities. This may involve opening new facilities in other countries or diversifying company operations by entering new industries, which is a natural long--run strategy for prospering corporations. In this context, the positive coefficient and its relatively large magnitude compared to other GDP--share variables are well justified. Additionally, the variable is statistically significant at the 1% level.

The second variable is the share of government consumption at current PPPs (csh_g). Among all variables, it is the only one with a negative coefficient. This variable can be interpreted as follows: a 1% increase in the government consumption-to-GDP ratio leads to a decrease in GDP per capita of 4885.68. The negative effect of the coefficient can be explained by several factors. First, an increase in government consumption may lead to higher inflation, which in the long run can result in an economic downturn. It is important to note that rising inflation can also be a natural outcome of a booming economy. Therefore, governments may prefer to reduce rather than increase expenditure, as higher spending may accelerate an earlier downturn. Second, an increase in government consumption can lead to a crowding-out effect, whereby higher public spending reduces domestic investment. As discussed above, domestic investment is crucial for further technological development. Consequently, any reduction in investment slows a country's growth prospects. Taking these factors into account, an increase in government spending may negatively affect GDP per capita.

The next variable is the human capital index, denoted as hc. This is the first variable that is not expressed as a percentage of GDP. The variable is statistically significant at the 1% significance level. The coefficient

can be interpreted as follows: for each one-unit increase in the human capital index, GDP per capita increases by 821.963. The positive value of the coefficient can be justified by the fact that the index accounts for, among other factors, years of schooling, which implies that higher values correspond to a more educated society. Consequently, there are greater prospects for a more skilled workforce, which can contribute to higher productivity as well as faster innovation, as capital allocated to investment activities can be utilised more efficiently. Additionally, the index also takes life expectancy into account. This may be further linked to the state of technology in areas such as healthcare. In countries where healthcare quality is low, higher mortality rates are more likely to be observed compared to countries with more developed healthcare systems. This also implies that the value of the index may be lower in countries where the level of technology is relatively low.

The lagged GDP per capita, denoted as Lag_GDP_pc, is the last variable that is statistically significant at the 1% level, which is as expected. The sign of the variable can also be clearly justified. A higher initial level of GDP per capita increases the likelihood of a higher value in the subsequent period. As can be seen, the coefficient value is slightly below 1, which would imply diminishing returns to scale. However, one may argue that, given how close the value is to 1, and considering common approximation methods, it would be more appropriate to interpret this result as indicating constant returns to scale. The coefficient can be interpreted as follows: if GDP per capita in the previous period increased by one dollar, GDP per capita in the current period would increase by an additional 0.999789.

The last variable expressed as a percentage of GDP is the share of merchandise exports and imports at current PPPs, denoted as csh_xm. The variable is statistically significant at the 10% significance level. As can be seen, the value of the coefficient is lower compared to those of the other GDP-share variables. This is mainly due to the fact that this variable is the sum of two smaller ones, namely the export-to-GDP ratio and the import-to-GDP ratio. Therefore, when interpreting this variable, it is necessary to account for the fact that changes in either the export

share or the import share of GDP will influence the result. Accordingly, the variable can be interpreted as follows: if either the export or import share of GDP increases by 1%, GDP per capita increases by 234.904. The positive sign of the coefficient was expected, and its justification can be found in standard economic theory on the benefits of trade. Nevertheless, a brief explanation is provided. Without trade, each country would rely heavily on its natural resources and its ability to be self-sufficient. However, it is unlikely that any country could follow such a pattern in the long run, as shortages of resources or products would eventually arise, which can be addressed through trade. In this context, trade enables countries to export excess production while importing goods that would otherwise be more costly to produce domestically. This also relates to the theory of opportunity costs in international trade. Therefore, greater trade activity between countries is associated with better growth prospects, as it facilitates the efficient exchange of goods across borders.

The next variable is voice and accountability. Unlike the other variables in the model, it can take values only between −2.5 and 2.5, which implies a relatively limited impact on GDP per capita. If we compare it with, for example, the share of merchandise exports and imports at current PPPs, it can be observed that although the coefficient values are relatively close, the range of values that this variable can take is significantly smaller. Nevertheless, the variable is statistically significant at the 5% significance level. It can be interpreted as follows: if the variable increases by 1, GDP per capita increases by 243.633.

Last but not least, the FDI inflow variable, denoted as FDI_inf, is statistically significant at the 10% significance level. The sign of the coefficient is positive, which implies that FDI positively impacts GDP per capita growth. Taking into account the previously discussed transfer of technology associated with FDI inflows, it is not surprising that the coefficient is positive. Among all variables, this coefficient has the lowest value; however, given that it is measured in millions of US dollars, this magnitude is understandable. The variable can be interpreted as follows: every one-million-dollar increase in FDI inflows increases GDP per capita

by 0.00610164. The results obtained from this estimation are in line with economic theory and previous empirical studies.

Having discussed the main model that includes all countries, it is now appropriate to analyse the results of the remaining three estimations. Unlike the first model, in the following three models the variables are not discussed individually. Instead, the focus is placed on comparing the results of these models with those obtained from the baseline estimation. The results are presented in the following order: low-income combined with lower-middle-income, upper-middle-income, and high-income countries.

The first issue to note is that, as can be seen in each of the estimations, some variables turn out to be statistically insignificant. The variables that are no longer statistically significant are voice and accountability and human capital. However, FDI inflows become statistically significant at the 1% level. In the main model, this variable was significant only at the 10% threshold, which represents a significant shift. This finding is consistent with the theory suggesting that FDI contributes to technology transfer, which tends to be most limited in the poorest countries. In the upper-middle-income model, both human capital and FDI become statistically insignificant, while the voice and accountability variable is statistically significant at the 10% level. In high-income countries, FDI inflows and voice and accountability are statistically insignificant, whereas human capital is significant at the 1% level. This indicates that there is a connection between the impact of these variables on economic growth depending on the income level of a country. This also implies that there might be more real-life justification for such outcomes. Taking into account that the model with FDI inflow as the dependent variable has not yet been discussed, further explanation and justification will be provided once the results of that estimation are obtained and examined. This is due to the fact that the model may provide additional insights into the currently obtained results, which might be beneficial from the point of view of the analysis.

Model 2. Fixed-effects, using 425 observations

Included 25 cross-sectional units
Time-series length = 17
Dependent variable: GDP_pc

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	122.448	92.2772	1.327	0.1853	
csh_i	311.001	120.120	2.589	0.0100	***
csh_g	−464.570	187.277	−2.481	0.0135	**
hc	−22.4519	48.5828	−0.4621	0.6442	
Lag_GDP_pc	0.999789	0.00771118	129.7	<0.0001	***
csh_xm	109.591	58.2629	1.881	0.0607	*
voiacc	11.5816	25.8364	0.4483	0.6542	
FDI_inf	0.00610164	0.00166261	3.670	0.0003	***

Mean dependent var	4059.947	S.D. dependent var	2590.066
Sum squared resid	3,606,715	S.E. of regression	95.79870
LSDV R-squared	0.998732	Within R-squared	0.986932
LSDV F(31, 393)	9985.172	P-value(F)	0.000000
Log-likelihood	−2525.370	Akaike criterion	5114.741
Schwarz criterion	5244.408	Hannan-Quinn	5165.967
rho	0.328874	Durbin-Watson	1.286656

Joint test on named regressors –
Test statistic: F (7, 393) = 4240.1
with p-value = P (F(7, 393) > 4240.1) = 0

Test for differing group intercepts –
Null hypothesis: The groups have a common intercept
Test statistic: F (24, 393) = 6.02836
with p-value = P (F(24, 393) > 6.02836) = 6.57296e-16

Model 3. Fixed-effects, using 323 observations

Included 19 cross-sectional units
Time-series length = 17
Dependent variable: GDP_pc

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	71.7541	625.425	0.1147	0.9087	
csh_i	1958.39	745.108	2.628	0.0090	***
csh_g	−4599.88	942.566	−4.880	<0.0001	***
hc	276.613	273.046	1.013	0.3119	
Lag_GDP_pc	0.968567	0.0167465	57.84	<0.0001	***
csh_xm	470.725	256.166	1.838	0.0671	*
voiacc	204.936	117.088	1.750	0.0811	*
FDI_inf	0.000531074	0.00322882	0.1645	0.8695	

Mean dependent var	13,159.75	S.D. dependent var	4638.806
Sum squared resid	40,114,271	S.E. of regression	367.5117
LSDV R-squared	0.994211	Within R-squared	0.961772
LSDV F(25, 297)	2040.160	P-value(F)	0.000000
Log-likelihood	−2352.646	Akaike criterion	4757.292
Schwarz criterion	4855.511	Hannan-Quinn	4796.500
rho	0.061247	Durbin-Watson	1.813494

Joint test on named regressors –
Test statistic: F(7, 297) = 1067.47
with p-value = P(F(7, 297) > 1067.47) = 2.29823e-206

Test for differing group intercepts –
Null hypothesis: The groups have a common intercept
Test statistic: F(18, 297) = 4.39303
with p-value = P(F(18, 297) > 4.39303) = 2.10862e-08

Model 4. Fixed-effects, using 476 observations

Included 28 cross-sectional units
Time-series length = 17
Dependent variable: GDP_pc

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	−825.991	1522.99	−0.5423	0.5879	
csh_i	4931.78	1231.77	4.004	<0.0001	***
csh_g	−14,040.9	2383.30	−5.891	<0.0001	***
hc	2179.55	537.922	4.052	<0.0001	***
Lag_GDP_pc	0.880526	0.0198020	44.47	<0.0001	***
csh_xm	433.085	242.143	1.789	0.0744	*
voiacc	236.994	503.150	0.4710	0.6379	
FDI_inf	0.000751585	0.000861278	0.8726	0.3833	

Mean dependent var	42592.50	S.D. dependent var	13,514.82
Sum squared resid	4.21e+08	S.E. of regression	976.4942
LSDV R-squared	0.995153	Within R-squared	0.917219
LSDV F(34, 441)	2663.091	P-value(F)	0.000000
Log-likelihood	−3934.007	Akaike criterion	7938.014
Schwarz criterion	8083.804	Hannan-Quinn	7995.341
rho	0.301212	Durbin-Watson	1.329258

Joint test on named regressors –
Test statistic: F(7, 441) = 698.044
with p-value = P(F(7, 441) > 698.044) = 4.52734e-234

Test for differing group intercepts –
Null hypothesis: The groups have a common intercept
Test statistic: F(27, 441) = 3.68229
with p-value = P(F(27, 441) > 3.68229) = 4.83385e-09

3.2 Results of FDI inflow model

Model 5. Fixed-effects, using 576 observations

Included 32 cross-sectional units
Time-series length = 18
Dependent variable: GDP_pc

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	−135,672	31,751.4	−4.273	<0.0001	***
csh_xm	21,354.2	11,142.0	1.917	0.0558	*
csh_i	−115,316	67,293.1	−1.714	0.0872	*
GDP_pc	3.34307	0.733272	4.559	<0.0001	***
finmaef	55,743.8	18,654.7	2.988	0.0029	***
fininacc	73,998.5	31,949.2	2.316	0.0209	**
avtariff	1626.87	1676.17	0.9706	0.3322	

Mean dependent var	36,507.89	S.D. dependent var	75,869.95
Sum squared resid	1.30e+12	S.E. of regression	49,107.43
LSDV R-squared	0.608015	Within R-squared	0.075325
LSDV F(37, 538)	22.55411	P-value(F)	2.67e-86
Log-likelihood	−7019.470	Akaike criterion	14,114.94
Schwarz criterion	14,280.47	Hannan-Quinn	14,179.50
rho	0.319020	Durbin-Watson	1.308859

Joint test on named regressors –
Test statistic: F(6, 538) = 7.30436
with p-value = P(F(6, 538) > 7.30436) = 1.6131e-07

Test for differing group intercepts –
Null hypothesis: The groups have a common intercept
Test statistic: F(31, 538) = 17.8701
with p-value = P(F(31, 538) > 17.8701) = 8.62538e-64

Out of all the variables used in the estimation, only the average tariff rate turned out to be statistically insignificant. Given that tariffs are not statistically significant, they will not be covered in the analysis. Apart from this, all other variables are statistically significant at thresholds ranging from 1% to 10%. The share of merchandise exports and imports at current PPPs, which illustrates the volume of trade, positively impacts FDI inflow. The positive effect of the coefficient can be justified by the fact that countries that trade extensively tend to have an appropriate economic environment that can support such activity. Such an environment may encourage companies from abroad to expand their business activities into countries that offer these conditions. This is because trade policies affect the volume of products that are imported and exported: the greater the restrictions, the lower the volume of trade. A similar relationship may apply to FDI inflows. Any company seeking to expand its activities abroad will tend to choose a country that offers more favourable opportunity costs. Therefore, an increase in trade restrictions can lead to higher costs. The variable is significant at the 1% significance level and can be interpreted as follows: if either the export or import share of GDP increases by 1%, FDI inflows increase by 21,354.2 million US dollars.

The second variable on the list is the share of gross capital formation at current PPPs, denoted as csh_i. As can be seen, this is the only variable in the model that has a negative coefficient. The theory is not one-sided when it comes to whether FDI crowds in or crowds out domestic investment. Based on the results, we may support the interpretation that an increase in domestic investment crowds out FDI inflows. This relationship can be linked to the fact that, with an increase in investment activity, the expected profit from each additional investment may decline. As a result, at a certain point, foreign companies may no longer find sufficient incentives to invest and may instead choose other countries offering more promising outcomes or allocate capital in their country of origin. Overall, this is to some extent related to opportunity costs, which are crucial in undertaking present and future strategic business decisions. The variable is significant at the 10% significance

level and can be interpreted as follows: each 1% increase in the ratio of domestic investment to GDP contributes to a decrease in FDI inflows of 115,316 million US dollars.

The next variable to discuss is GDP per capita. This variable has a positive effect on FDI, which was expected. This indicates that the higher the level of development of a country, the higher the inflow of FDI is likely to be. It also implies that countries at a very low level of development are less likely to attract foreign companies. The variable is significant at the 1% significance level. It can be interpreted as follows: every one-dollar increase in GDP per capita leads to an increase in FDI of 3.34307 million US dollars.

The following two variables are analysed together, mainly because they reflect the impact of financial market conditions on FDI inflows. As can be seen, financial market efficiency turned out to be more statistically significant than access to financial institutions. The first variable is significant at the 1% significance level and the second at the 5% significance level. The signs of both coefficients are positive. Given that FDI inflow is connected with the transfer of capital from one country to another, there is little doubt that the financial market plays a crucial role in this process. The same applies to access to financial institutions. Both components are key aspects when companies decide to start their activities abroad. This is mainly due to the fact that, for example, loans, deposits, and insurance services are essential components of business operations. When considering market efficiency, it is also important to account for the fact that greater availability of information facilitates price prediction, thereby reducing risk. If information is unclear or difficult to obtain, companies may need to consider a wider range of prices during analysis. This reduces expected profits and may make some countries less attractive from a long-term perspective. The coefficients can be interpreted as follows: if the financial market efficiency index increases by one unit, FDI inflows increase by 55,743.8 million US dollars, while a one-unit increase in access to financial institutions increases FDI inflows by 73,998.5 million US dollars.

4. Discussion

As can be seen from the results of both models, some factors that play a key role in shaping a country's growth rate also affect FDI inflows. These include domestic investment and trade volume. Although both contribute positively to GDP per capita, the same relationship does not apply to FDI inflows. International trade has a positive effect, whereas domestic investment has a negative effect. The negative effect of domestic investment may also help explain why FDI inflows are more prevalent in less developed countries. In highly developed economies, technological progress appears to be one of the main drivers of future growth. Given that the positive effect of FDI on economic growth is often associated with technology transfer, the reduced inflow of FDI in high-income countries becomes more understandable. In order to maintain leading positions in the global economy, high-income countries require new and advanced technologies. However, such technologies are more likely to be developed through domestic investment rather than acquired via FDI. Consequently, the positive impact of FDI diminishes as the level of technology in the host country increases. This pattern is reflected in the estimated coefficients for FDI. For low- and lower-middle-income countries, the coefficient is highest at 0.00610164. For upper-middle- and high-income countries, the coefficients are 0.000531074 and 0.000751585, respectively. These values are substantially lower than that for the low- and lower-middle-income group. Moreover, we need to keep in mind that both coefficients are statistically insignificant, which provides additional insight into the limited role of FDI in promoting economic growth in higher-income countries.

Moreover, the combined results of both models enable a better understanding of the conditions under which FDI inflows are highest. In order to maximise FDI, countries should aim to increase trade volume, improve the state of the financial market—particularly its efficiency—and enhance access to financial institutions, while also reducing the level of domestic investment. However, such an approach, especially the reduction of domestic investment, is almost certainly not optimal for long-run

economic growth. This is mainly because investment turns out to have the strongest impact on economic growth among all variables expressed as a percentage of GDP, across all income groups. Nevertheless, as shown in Model 2, the coefficients for domestic investment and trade volume are closer to one another than in any other GDP per capita model. This may suggest that the effect of domestic investment increases as a country's level of development improves. Therefore, in the least developed and developing countries, FDI can significantly improve the state of technology, which may also enhance the impact of future domestic investment. Consequently, over time, countries may aim to strengthen domestic investment in order to accelerate economic growth. This process would likely be accompanied by a decline in FDI inflows, which would increasingly be crowded out by domestic investment.

Limitations and conclusion

As can be seen, in the case of the FDI model the R-squared value is significantly lower than in the GDP per capita model. This does not imply that the values should be the same, but it indicates that there are additional factors shaping FDI inflows that should be investigated. Further research on the relationship between differences in GDP or GDP per capita across countries and FDI flows would therefore provide additional insights. Moreover, one of the main limitations of the study is data availability, which significantly reduces the number of countries that can be included in the analysis. With a larger sample, different results might have been obtained, mainly because the current models may not account for many potential host countries for FDI. However, this does not imply that the results cannot be considered reliable; rather, it highlights scope for future improvements once data for a wider range of countries become available.

To sum up, FDI has a positive effect on a country's economic growth rate. Depending on the income level, this effect varies, with the strongest impact observed in low- and lower-middle-income countries.

The estimation indicate that an increase in domestic investment negatively affects FDI inflows, which may be related to technological progress. This also suggests that domestic investment crowds out FDI inflows. In contrast, trade volume has a positive effect. Additionally, financial markets play a crucial role in stimulating FDI inflows. Therefore, countries with more developed financial markets are more likely to attract foreign investors.

ABSTRACT

This paper analyses the impact of FDI on economic growth, as well as the factors that influence FDI inflows. To this end, two panel data models are estimated, with one of them being estimated three additional times based on countries' income levels. The first model covers a total of 72 countries over the period 2003–2019, while the second model includes 32 countries over the period 2002–2019. The results confirm the positive effect of FDI on economic growth as well as indicate that both trade volume and domestic investment affect FDI inflows. Trade has a positive impact, whereas domestic investment has a negative effect on inflows. Additionally, the results show that a country's income level influences the volume of FDI inflows. Moreover, some variables that are statistically significant for one income group turn out to be statistically insignificant for another, and vice versa. This suggests that the impact of these factors varies with a country's level of development.

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Chapter III

The Impact of the 2008 Global Financial Crisis on the Feldstein–Horioka Puzzle Among OECD Countries

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Introduction

Over the past decades, many economists have been intrigued by an unsolved paradox: the Feldstein–Horioka puzzle. The first mentions of this puzzle appeared 44 years ago, when two researchers—American economist Martin Feldstein and Japanese economist Charles Horioka—published a seminal paper on the degree of capital mobility (Feldstein and Horioka, 1980). They measured the degree of capital mobility by establishing an econometric regression between domestic investment and domestic savings, such that a lower correlation between them would indicate a higher degree of capital mobility. The result of their study was the conclusion that such a correlation does exist, and in strong

form. Their fundamental research gave rise to extensive discussion and debate in the economic literature and later became known as the Feldstein–Horioka finding, in honour of the researchers. Some scholars disagreed with the results for various reasons; some conducted their own studies, which suggested that capital is in fact perfectly mobile. Others, in turn, proposed explanations as to why Feldstein and Horioka obtained such results. However, the vast majority recognised the existence of this puzzle and continued to investigate this phenomenon. Accordingly, this study also conducts an investigation into the existence of the Feldstein–Horioka paradox.

The global financial crisis of 2008 revealed the ineffectiveness of certain implemented policies. Among the consequences of this event, both changes in the behaviour of the population and measures introduced by policymakers can be observed. Undoubtedly, this event left its mark on all aspects of the economy, and capital mobility was no exception.

The main hypothesis of this study is that the Feldstein–Horioka Paradox did not exist, or was present in a much weaker form, among 22 OECD countries in the period preceding the 2008 global financial crisis than in the original study, and that the 2008 global financial crisis brought back the Feldstein–Horioka Puzzle in a stronger form than before.

The section entitled 'Literature Review' constitutes the theoretical part of this paper and includes a more detailed discussion of the problems associated with the Feldstein–Horioka puzzle, different approaches to solving this paradox, and the impact of the 2008 global financial crisis on the degree of capital mobility. At the end of the section, a short review of the relevant empirical literature used in this paper is provided. The section titled 'Methodology' consists of a description of the data used, the rationale for selecting this particular sample for more in-depth analysis, and an outline of alternative analytical approaches. The 'Results and Discussion' section forms the empirical part of this paper, namely the regressions estimated using several different techniques, together with a detailed discussion of the results. The 'Conclusions' section presents the main findings of the study.

1. Literature review

In this section, one can find a collection of information obtained during the theoretical preparation required for this project.

1.1 Introduction to the Feldstein–Horioka puzzle

The Feldstein–Horioka puzzle is considered one of the six major riddles found in the macroeconomic environment (Obstfeld and Rogoff, 2000). The first seminal study on this topic was published by Feldstein and Horioka (1980) and subsequently changed the approach to measuring the degree of capital mobility. In a closed economy, the equation for the current account is presented below:

$$C_A = Y - (C + I + G) = S - I \quad (1)$$

where:
CA – Current Account;
Y – GDP (Gross Domestic Product);
C – Consumption;
I – Investment;
G – Government spending;

and it must equal zero. In the real world, domestic capital formation and domestic saving must vary independently of each other in an economy open to foreign trade, resulting in imbalances. When domestic investment is higher than domestic saving, the current account records a deficit; conversely, when domestic saving exceeds domestic investment, the current account records a surplus. According to the authors, under conditions of perfect capital mobility, there should be no link between domestic savings and domestic capital formation, because savings in each country respond to global investment opportunities, while investment in that country is financed by the world pool of capital (Feldstein and Horioka, 1980).

Feldstein and Horioka (1980) sought to test whether this was indeed the case by estimating an econometric model to confirm their hypothesis empirically. According to their assumption, the value of the coefficient beta, β, (the so-called Feldstein–Horioka coefficient or saving-retention coefficient), should be close or equal to zero and should not be statistically different from zero in the case of perfect capital mobility. In order to examine the relationship between domestic savings rates and domestic investment rates, the authors proposed assessing the degree of capital mobility by estimating the following equation:

$$\left(\frac{I}{Y}\right)_i = \alpha + \beta\left(\frac{S}{Y}\right)_i \quad (2)$$

where:
$\left(\frac{I}{Y}\right)_i$ – is the ratio of gross domestic investment to gross domestic product in country I; and
$\left(\frac{S}{Y}\right)_i$ – is the ratio of gross domestic saving to gross domestic product in the same country I.

The original 1980 study used data from 21 OECD countries over the period 1960–1974 and considered two types of data: capital formation and net saving, and capital formation and gross saving. A method of analysing multiple cross-sections of data across different periods was used to conduct the investigation. In the base model with gross saving and investment, the authors obtained a beta coefficient of 0.89, which contradicts their expectation of a perfect degree of capital mobility in these countries. A beta so close to 1 implies a very strong correlation between domestic investment and domestic saving, which was at odds with the original theory. When they regressed net domestic saving and investment, the resulting coefficient of 0.94 was even closer to 1, further indicating a strong correlation.

It should also be noted that the assumption of perfect capital mobility is not consistent with the conventional Keynesian interpretation that exogenous changes in the rate of investment lead to changes in income until the resulting level of saving equals investment. Whatever

the validity of this explanation for a closed economy, it is not relevant if domestic savings are added to the global pool of capital (Feldstein and Horioka, 1980).

This puzzle is important because it challenges the conventional understanding of global capital mobility. It suggests that, despite the liberalisation of financial markets, countries still rely heavily on domestic savings to finance domestic investment. This has significant implications for economic policy, particularly in open economies, where the relationship between investment and saving rates plays a crucial role in determining macroeconomic stability and growth.

1.2 Empirical studies on the Feldstein–Horioka paradox

In this subsection, the most significant works concerning the Feldstein–Horioka puzzle are reviewed in order to illustrate the development of the debate and the solutions proposed in these studies. This section also aims to provide a deeper understanding of the problem and to explain why addressing it is important for economic decision-making.

1.2.1 Feldstein and Horioka (1980)

The original study sought to examine the degree of capital mobility between countries in order to assess which savings policy would be most appropriate. In a closed economy, an increase in the saving rate postpones consumption, and for such a decision to be optimal, the postponement of consumption must be more favourable than the domestic marginal product of capital. In an open economy, however, the situation is more complex, as investment flows can move both into and out of the country, thereby creating different conditions for the implementation of an optimal savings policy (Feldstein and Horioka, 1980).

This study suggests that most tax models at the time assumed that capital was perfectly mobile between countries. However, if capital is not perfectly mobile between countries, this would imply that these

models are inefficient and need to be modified or replaced. In addition, a central theoretical issue in this paper concerns whether additional savings remain within the country or flow abroad. Based on Eurocurrency market rates of return on various short-term equities and debt instruments, as well as the forward prices of these currencies, the authors argue that conditions exist for short-term arbitrage. Although one might conclude that a similar situation should occur in long-term securities markets, the authors contend that this is not necessarily the case, as the assumption that investments are directed towards opportunities with the highest returns represents only one extreme approach within portfolio theory in investment analysis. In fact, according to the authors, due to differing degrees of country and currency risk across countries, corporate and individual investors do not necessarily choose portfolios that maximise returns, but instead diversify in order to achieve a desired trade-off between returns and risks. Thus, even when higher returns are available abroad, investors may restrict themselves to domestic investments. The assumption that investments flow exclusively to where the highest returns are possible therefore represents only one of the extreme forms of portfolio investment theory. Moreover, since risks associated with investing in different countries and currencies are not perfectly correlated, investors may rationally choose portfolios in which expected yields differ. As a result, even when higher returns are possible, investors may still favour domestic investments. In addition, official restrictions on capital exports and investors' concerns about potentially higher taxation on foreign investments are equally important factors limiting full capital mobility. According to the author, another significant factor is the control exercised by various financial institutions, which, for example in the case of the United States, restrict pension funds from investing in foreign assets and instead oblige them to invest domestically in dollar--denominated assets. Furthermore, according to the researchers, differences in taxation systems and tax regulations between home and host countries also play an important role. Investment flows do not always behave as they would in the absence of divergent tax regimes across countries (Feldstein and Horioka, 1980).

As a result of estimating econometric regressions for 21 OECD countries over the period 1960–1974, Feldstein–Horioka coefficients of 0.89 for gross saving and investment and 0.94 for net saving and investment were obtained (Feldstein and Horioka, 1980).

The researchers concluded that the degree of capital mobility was negligible, which in turn confirmed the assumption of imperfect capital mobility and initiated a large number of subsequent studies and discussions on this puzzle, later named after the researchers (Feldstein and Horioka, 1980).

1.2.2 Feldstein (1983)

This work, conducted by one of the researchers and originators of the puzzle, Martin Feldstein, is a continuation of the earlier study, but provides a more extended view of the problem. The author explains several issues associated with the original work, noting in particular that the time period used may be highly unrepresentative, as changes introduced after 1974 could have significantly altered the study's results. For example, several factors pointed to an increase in international investment flows. In the United States, for instance, as one of the most liberal countries with respect to freedom of capital movements among OECD members in 1974, less pressure was placed on US multinationals to finance overseas investments through borrowing abroad. In addition, the United States abolished the interest equalisation tax on foreign borrowing in the same year. Thus, the purpose of this paper was to re-examine the puzzle in order to determine whether the findings of the seminal study reflected a coincidence of circumstances or a persistent pattern inconsistent with existing theories. Furthermore, the study clarifies that the results of the previous work should not be interpreted as indicating a near-absolute absence of capital movements between countries, even when the coefficient is close to one, but rather as a rejection of the theory of perfect capital mobility (Feldstein, 1983).

To assess whether the earlier study remained relevant for economic theory, Feldstein extended the time period under consideration to

1974–1979. For this additional period, a Feldstein–Horioka coefficient of 0.865 with a standard error of 0.185 was obtained for gross saving and investment. The full 20-year period 1960–1979 was also analysed, yielding a beta coefficient of 0.796 with a standard error of 0.112 for gross saving and investment, while for net saving and investment a beta coefficient of 0.993 with a standard error of 0.111 was obtained. In the case of gross measures, the value decreased substantially, whereas for net measures it increased. The conclusion of this study is that such an indicator of capital mobility among OECD countries is primarily driven by government policy, thereby reaffirming the existence of the puzzle, albeit over an extended time frame (Feldstein, 1983).

1.2.3 Frankel (1986)

Frankel's work approached the puzzle from a slightly different perspective. Instead of examining, as his predecessors did, the relationship between saving and investment rates, potential problems with empirical data, and econometric methods, he focused on interest rates. The argument is that, under the assumption of a perfect degree of capital mobility driven by arbitrage, interest rates across countries should equalise. The author emphasises that it is not nominal interest rates that should be considered, but real interest rates, as these form the basis for calculating returns on potential investments. He also raises the question of how perfect capital mobility should be defined. Frankel proposes three definitions directly related to interest rates: covered interest parity, uncovered interest parity, and real interest parity, and discusses their differences in detail. More generally, the first definition implies the absence of significant capital controls, transaction costs, or other barriers separating investors from the assets they wish to hold. Uncovered interest parity, in turn, can be defined as the absence of low substitutability, mainly due to risk, between domestic and foreign assets. The author tested whether these two parities hold for the United States by assessing the extent of variation in the relevant parity equations and concluded that they do. At the same time, this result contradicts the

conclusions of Feldstein and Horioka (1980), since the validity of both parities implies a high degree of capital mobility. The author therefore turns to the third definition of perfect capital mobility and points out that it was real interest parity that Feldstein and Horioka considered in their seminal paper. In the author's view, Feldstein focused on real interest parity because only the failure of this condition of perfect capital mobility can lead to the absence of interest rate equalisation (Frankel, 1986).

1.2.4 Feldstein and Bacchetta (1991)

The purpose of this paper was to examine how taxation affects capital inflows and outflows. The authors clarify several theories related to the Feldstein–Horioka puzzle. For instance, Obstfeld, in his 1986 paper, suggested that the results indicate that the econometric regression may omit a variable linking domestic saving and domestic investment. He proposed that this variable could be the GDP growth rate, a hypothesis that was subsequently rejected by Feldstein and Bacchetta. In addition, the authors assessed the relationship between domestic capital formation and domestic saving by extending the sample to include EEC countries and by lengthening the time period compared with both the seminal study of Feldstein and Horioka (1980) and that of Feldstein (1983). As a result, the following beta coefficients for gross investment and gross saving were obtained: 0.791 with a standard error of 0.094 for OECD countries over the period 1960–1986, 0.911 with a standard error of 0.066 for OECD countries over 1960–1973, and 0.669 with a standard error of 0.145 for OECD countries over 1974–1986. These results indicate that the coefficient values decline over time, signalling an increase in the degree of capital mobility (Feldstein and Bacchetta, 1991).

The authors conclude that a strong correlation between domestic capital formation and domestic saving persists, although it weakens over time due to various factors, including the liberalisation of capital flows resulting from policy decisions (Feldstein and Bacchetta, 1991).

1.2.5 Ford and Horioka (2017)

This paper offered one of the most plausible explanations for the puzzle. Earlier studies suggested that global capital markets alone cannot achieve perfect capital mobility, but did not explain what prevents net transfers of financial capital between countries. Other studies indicated that barriers to the mobility of goods and services (such as tariffs, transport costs, and quotas) hinder net transfers between countries. This paper combines these two factors into a single framework (Ford and Horioka, 2017).

The authors argue that global markets cannot, by themselves, generate net capital transfers between countries without the simultaneous integration of both global financial markets and global markets for goods and services. According to the authors, mobility barriers are precisely the cause of the Feldstein–Horioka puzzle, as they explain why real interest rates are not equalised. An example is provided of a Japanese consumer wishing to purchase stock in the United States. To do so, the consumer must first purchase US dollars and then buy the stock, which involves no barriers in the financial market. The individual from whom the consumer purchased dollars then holds a certain amount of yen. This individual subsequently purchases goods from Japan using the available yen, reflecting the absence of barriers in the market for goods and services. Only under these conditions does a net capital transfer occur. If either the financial market or the market for goods and services is not integrated, a net capital transfer cannot be achieved (Ford and Horioka, 2017).

1.3 Factors affecting the savings retention coefficient

It is now necessary to identify the factors that may influence the Feldstein–Horioka coefficient to better understand how the 2008 global financial crisis might be theoretically reflected in the empirical analysis.

The discussion begins with the already mentioned frictions to mobility. Based on the study by Ford and Horioka (2017), attention is directed not only towards international financial markets, but also towards markets for

goods and services. Examples of such frictions include transport, marketing, and distribution costs, technical standards, certification procedures, tariffs, and non-tariff barriers. The authors provide a clear illustration showing that, for perfect capital mobility between two countries, both markets must be fully integrated. Even under this condition, investors must still consider currency risk. Moreover, the researchers attribute the failure of interest rate equalisation to the fact that, given currency risk, even when forward exchange contracts are used, additional returns on foreign investments are negligible or equal to zero. Thus, one factor influencing the Feldstein–Horioka coefficient is the degree of integration of financial markets and markets for goods and services, as well as controls over international flows of capital, goods, and services. It is also worth noting that the existence of non-tradable goods and services increases the saving retention coefficient.

In addition, domestic and foreign interest rates, as well as tax levels, have a direct impact on the Feldstein–Horioka coefficient. The paradox itself is based on the observation that, although interest rates differ across countries, a strong correlation between domestic investment and domestic saving persists within individual countries. Consequently, if domestic investment yields the highest returns, there is little incentive to invest abroad, reducing capital outflows and, thereby increasing the Feldstein–Horioka coefficient.

Demographic trends can also have an implicit impact on the correlation between domestic investment and domestic saving rates. For example, an ageing population causes residents to save more, as individuals tend to increase their savings as they grow older. In turn, older cohorts are generally less risk averse, which may lead to higher levels of domestic investment than among younger cohorts, thus increasing the value of the Feldstein–Horioka coefficient (Mandel *et al.*, 2018).

1.4 Pre-2008 financial crisis literature summary

Prior to the 2008 financial crisis, a number of studies examined the Feldstein–Horioka puzzle in the context of OECD countries. The general

consensus among the authors of these studies was that the link between domestic saving and domestic investment rates was strong, indicating a low degree of capital mobility, which contradicted theoretical expectations of perfect capital mobility (Kumar and Rao, 2011).

For example, in 2009, Rao, Tamazian and Kumar investigated the degree of capital mobility using GMM over the period 1960–2007, with the sample split before and after the implementation of the Bretton Woods system. In their study, the beta coefficient prior to the implementation of the system (1960–1974) was 0.963, while after its implementation it declined to 0.538. For the period 1995–2007, the beta coefficient was equal to 0.289. From these results, it can be concluded that the degree of capital mobility increased over time (Rao, Tamazian and Kumar, 2009). In the context of this paper, these findings indicate that certain events can be sufficiently significant to affect the Feldstein–Horioka coefficient over relatively short periods of time. The Feldstein–Horioka paradox appears credible when taking into account the subsequent studies that confirmed the original findings, suggesting that capital mobility remains relatively low, although it has increased over time, as reflected in a declining saving retention coefficient (for further examples, see Lapp, 1996; Coakley *et al.*, 1998; Obstfeld and Rogoff, 2000; Apergis and Tsoumas, 2009). Consequently, most of the literature published before the 2008 global financial crisis suggests that markets were moving towards the liberalisation of capital, goods, and services flows, which in turn implied increased capital mobility (Horioka, 2024).

The observation of increased capital mobility can be attributed to numerous developments and innovations in the economic environment that have contributed to the liberalisation of capital flows, increased trade openness, and changes in investor behaviour since the publication of the seminal study by Feldstein and Horioka (1980). For example, in the already mentioned research by Feldstein and Horioka in 1974, the results for the later period showed that the value of the saving retention coefficient declined, indicating an increase in the degree of capital mobility. In a study of 13 OECD countries, Rao, Tamazian and Kumar (2009)

likewise reported an increase in capital mobility, demonstrating through their empirical analysis the positive impact of the Bretton Woods and Maastricht agreements on the degree of capital mobility. It should also be noted that, since the original study in 1980, many OECD countries have joined various economic and monetary unions, e.g. NAFTA, the European Union, and the European Single Market. In addition, the impact of new information technologies should not be underestimated, as these have contributed significantly to financial globalisation. Investing abroad has become considerably easier due to online brokerage platforms and improved access to information on financial markets, including simplified access to information on taxation, FDI, and interest rates worldwide. All of these factors have contributed to the increased ease and speed of capital inflows and outflows.

1.5 Post-2008 financial crisis literature summary

The global financial crisis was an event that affected all aspects of the economy, and the impact of this shock is imprinted on the world economy permanently. Naturally, capital flows also did not remain unchanged after such a significant event, which was reflected across the world in one form or another. OECD countries were no exception. De Crescenzio and Lepers (2021) describe extreme capital flow episodes beginning with the onset of the global financial crisis in 2008. In their study, they developed a methodology to identify capital flow episodes at a monthly frequency, applied it to OECD countries over the period 2008–2020, and found that post-crisis behaviour in both portfolio and foreign direct investment mainly consisted of complete stops or reductions in the volume of foreign capital flows. In addition, according to the United Nations (2009), FDI flows to developed countries fell dramatically, declining by 33% in 2008 compared to 2007. This decline was driven by increasing challenges faced by financial institutions, as well as reduced liquidity in debt markets (United Nations, 2009). Thus, it can be assumed that changes in investor behaviour and heightened risk aversion led to a greater share of savings being invested domestically, thereby increasing the saving retention

coefficient and reducing the degree of capital mobility (Crescenzio and Lepers, 2021).

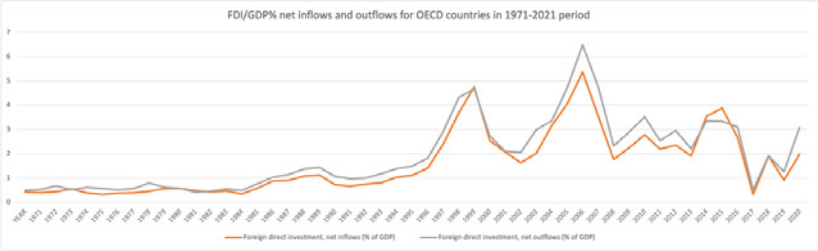

Figure 1. FDI inflows and outflows as a percentage of GDP for 22 selected OECD countries, 1971–2021
Source: World Bank Indicators.

Figure 1 illustrates net FDI flows to and from OECD countries as a percentage of GDP. The graph shows that the level of flows increased steadily from 1971 until approximately 1995, followed by a sharp rise and an equally sharp decline. Prior to the global financial crisis, in 2007, the level of bilateral flows reached an absolute maximum over the period 1971–2021, before falling sharply immediately after the crisis. It is worth noting that since then, the volume of FDI flows in OECD countries has not returned to its pre-crisis levels, likely also due to the subsequent crisis associated with the COVID-19 pandemic.

As discussed earlier in this section, global financial markets alone cannot generate net capital transfers; integration of markets for goods and services is also required in order to obtain goods and services in exchange for capital investment. With regard to global export and import flows following the 2008 global financial crisis, these declined by 12.2 per cent in real terms at the beginning of 2009, according to Shelburne (2010). This decline can be attributed to several factors, the most important of which, as in the case of financial markets, was traders' reluctance to engage in cross-border transactions, leading to increased home bias. Thus, the situation regarding cross-border flows of goods and services

following the 2008–2009 global financial crisis is expected to affect the saving retention coefficient as well, with a corresponding decrease in the degree of capital mobility due to increased mobility frictions (Shelburne, 2010).

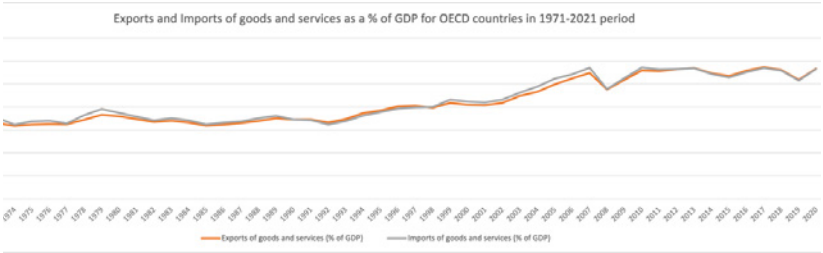

Figure 2. Exports and imports of goods and services as a % of GDP for OECD countries, 1971–2021
Source: World Bank Indicators.

Figure 2 represents the volume of imports and exports expressed as a percentage of GDP. The graph shows that the share of imports and exports as a percentage of GDP experienced a gradual increase between 1971 and 2007. As in the case of FDI flows to OECD countries (see Figure 1), the level of import and export flows reached an absolute maximum in 2007, before the global financial crisis, followed by a rapid fall immediately after the crisis. The same pattern can be observed as in Figure 1. Import and export levels never fully recovered after the crisis, and the situation further deteriorated following the onset of the pandemic in 2019.

A number of studies examining the impact of the global financial crisis on the degree of capital mobility in different countries confirm the hypothesis of this study, namely a post-crisis increase in the value of the Feldstein–Horioka coefficient. For example, Katsimi and Zoega (2016), analysing a sample of 30 OECD countries over the period 1993–2014, divided the data into several sub-periods: 1993–1998, 1999–2007, and 2008–2014. They found that the saving retention coefficient increased

after the 2008 global financial crisis. Similarly, in a study focusing on 27 OECD countries, But and Morley (2017) divided the period 1980–2012 into three sub-periods: a historical period (1980–2003), five years before the crisis (2004–2008), and five years after the crisis (2008–2012). Based on their empirical results, the authors also confirmed the hypothesis of this paper, finding an increase in the correlation coefficient between domestic investment and domestic saving and a return of the Feldstein–Horioka puzzle. Moreover, they reported a negative saving retention coefficient in the five years before the crisis, which, in the context of both their study and this paper, can be interpreted as evidence of the disappearance of the Feldstein–Horioka puzzle and a higher degree of capital mobility among OECD countries. Duran and Ferreira-Lopes (2022) also examined the impact of the 2008 global financial crisis on the Feldstein–Horioka puzzle. Using a GMM estimator, they obtained results supporting the hypothesis of this research, indicating that the degree of capital mobility declined after the crisis.

However, there are also studies suggesting that capital mobility increased following the global financial crisis. Research on the South African economy conducted by Phiri (2017) showed that estimates of the saving retention coefficient were 0.59 and statistically significant for the full sample, and 0.64 and statistically significant for the pre-crisis period. By contrast, in the post-crisis period, the coefficient was only 0.22 and statistically insignificant. This suggests that the degree of capital mobility increased in the post-crisis period. This outcome can be explained by the specific characteristics of the region under study and, as the author notes, may be related to capital injections into emerging markets as economies began to recover from the crisis (Phiri, 2017).

Thus, after a careful review of the post-crisis literature, including research studies on the OECD countries, we can clearly observe a trend of studies that tell us that before the crisis, the degree of capital mobility was high enough for some researchers to conclude even the complete absence of the Feldstein–Horioka paradox, but after the crisis, most researchers found a return/reinforcement of this puzzle and a decrease in the level of capital mobility accordingly.

1.6 Methodological approaches

In this subsection, the table below summarises all the studies included in this paper that used different econometric models to estimate the degree of capital mobility. Table 1 presents the periods studied, the set of countries, the methodology, the values obtained for the saving retention rate, and the main findings.

Table 1. Studies of the Feldstein–Horioka puzzle and their findings

Authors	Period	Country	Methodology	Estimate of β	Major findings
Feldstein and Horioka (1980)	1960–1974	21 OECD	Cross-section	0.85 to 0.95	Evidence of low capital mobility.
Feldstein (1983)	1960–1979	17 OECD	Cross-section	from 0.779 to 0.993	Evidence of low capital mobility. The study extended the original sample by five years and confirmed the FH findings.
Tesar (1991)	1960–1986 1960–1974 1975–1986	23 OECD	Cross-section	0.840 0.870 0.810	Evidence of low capital mobility.
Feldstein and Bacchetta (1991)	1960–1986	23 OECD	Cross-section	from 0.607 to 0.911	This work confirmed the original Feldstein–Horioka finding, but weaker in subsequent years, which may indicate an increased level of market integration.

Authors	Period	Country	Methodology	Estimate of β	Major findings
Obstfeld and Rogoff (2000)	1990–1997	24 OECD	Cross-section	0.60	The saving retention coefficient is much smaller than in the original Feldstein–Horioka study, but still not enough to conclude a high degree of capital mobility.
Coakley, Fuertes, and Spagnolo (2001)	1980Q1 to 2000Q4	12 OECD	Panel Mean Group	0.32	This work supports the ideas of long-term capital movement and global financial market cooperation. Increased capital mobility in global financial markets.
Giannone and Lenza (2010)	1970–1999 1970–1979 1980–1989 1990–1999 1980–1999	24 OECD	FAPR	0.34 0.50 0.21 0.22 0.18	This work supports the ideas of long-term capital movement and global financial market cooperation. Increased capital mobility in global financial markets.
Katsimi and Moutos (2007)	1986–2002 1986–1990 1991–1995 1996–2000 1997-2002	25 OECD	OLS	0.572 0.611 0.702 0.372 0.261	Adding human capital investment does not significantly change the Feldstein–Horioka finding.
Di Iorio and Fachin (2007)	1960–2002	12 EU	FMOLS	from 0.590 to 1.030	Bootstrap stability tests accepted cointegration.

Authors	Period	Country	Methodology	Estimate of β	Major findings
Fouquau, Hurlin, and Rabaud (2008)	1960–2000	24 OECD	PSTR	0.710 0.704 0.526	Significant variation in the level of capital mobility among OECD countries.
Rao, Tamazian and Kumar (2009)	1960–2007	12 OECD	*REM* *GMM* *SGMM*	0.501 0.461 0.570	The FH puzzle does not vanish and still exists in a considerably weaker form.
Kumar and Rao (2011)	1960–2007	13 OECD	Pedroni estimation method	from 0.115 to 0.742	Following economic uncertainty in the 1970s and the Bretton Woods and Maastricht agreements, the degree of capital mobility has increased significantly.
Katsimi and Zoega (2016)	1997–2007 2008–2014	30 OECD	OLS and IV	from 0.076 to 0.197 and from 0.279 to 0.424	The 2008 global financial crisis indeed affected the degree of capital mobility among OECD countries.
But and Morley (2017)	1980–2003 2004–2008 2008–2012	27 OECD	Pooled OLS	0.57 -0.35 0.75	In the period before the crisis, the FHc is negative due to high capital mobility and the Feldstein–Horioka coefficient remains high post crisis among OECD countries.

Authors	Period	Country	Methodology	Estimate of β	Major findings
Phiri (2017)	1960Q1–2016Q4 1960Q1–2008Q3 2008Q4–2016Q4	South Africa	MTAR-TEC	0.59 0.64 0.22	The results suggest an increase in international capital mobility from the pre-crisis to post-crisis periods.
Kaur and Sarin (2018)	1980–1997 1998–2015	8 Asian countries	FMOLS DOLS	0.872–0.968 (FMOLS) 0.871–0.985 (DOLS)	The degree of capital mobility after the Asian crisis increased indicating greater liberalisation of capital flows in the researched countries.
Duran and Ferreira-Lopes (2022)	1996–2016	13 largest countries (measured by GDP)	GMM Fixed Effects	0.56	The FH conundrum is becoming much more apparent in the post-global financial crisis period.

Source: Modified table from Rao, Tamazian and Kumar (2009), with additional data collected by the author.

2. Methodology

This section specifies the variables and the rationale for their selection, the data collected for this project and the justification for their selection, as well as the econometric models and techniques used in the analysis. The methodology includes descriptive statistics, various econometric tests, figures, tables, and estimations of different econometric models.

2.1 Research design and sample

The purpose of this paper is to test and compare whether the Feldstein–Horioka puzzle persists before and after the 2008–2009 global financial crisis for 22 OECD countries. Annual data on gross domestic saving (% of GDP) and gross capital formation (% of GDP) for a period of 51 years, from 1971 to 2021, were used. The choice of OECD countries was motivated by data availability and by the fact that these countries were included in the original seminal study conducted by Feldstein and Horioka (1980). The selection of the time period was also determined by data availability. During the drafting of this paper, it was decided to estimate the regressions by dividing the sample into four sub-periods: the full sample (1971–2021), the historical period (1971–1994), the fourteen years prior to the crisis (1995–2008), and the fourteen years following the crisis (2008–2021). This approach is based on the methodology used by But and Morley (2017).

2.2 Data and variables

All data were obtained from publicly available sources, namely the World Bank Indicators. The data were then converted into the required format using Microsoft Excel, allowing them to be subsequently analysed in EViews and GRETL. The estimated regression is specified as follows:

$$\left(\frac{I}{Y}\right)_{it} = \alpha + \beta\left(\frac{S}{Y}\right)_{it} + \varepsilon_{it} \quad (3)$$

where:

$\left(\frac{I}{Y}\right)_{it}$ – is the ratio of gross capital formation (formerly gross domestic investment, consisting of expenditures to replenish the fixed assets of the economy plus net changes in inventories) to country's *i* gross domestic product (GDP at purchasers' prices, defined as the sum of gross value added of all resident producers in the economy plus any taxes on

products and minus any subsidies not included in the value of products) in period *t* (World Bank, n.d.-a), and

$\left(\frac{S}{Y}\right)_{it}$ – is the country's I ratio of gross domestic saving (calculated as GDP minus final consumption expenditure (total consumption)) to gross domestic product (World Bank, n.d.-b);
α – is the intercept;
β – is the slope coefficient (FHc); and
ε_{it} – is the error term.

Based on the hypothesis of this study, which posits that the 2008 global financial crisis affected the economies of 22 OECD countries by reducing their degree of capital mobility, we expect the saving retention coefficient to be far from zero (at least greater than 0.2), to be statistically significant, and to increase substantially in in the period following the 2008 global financial crisis.

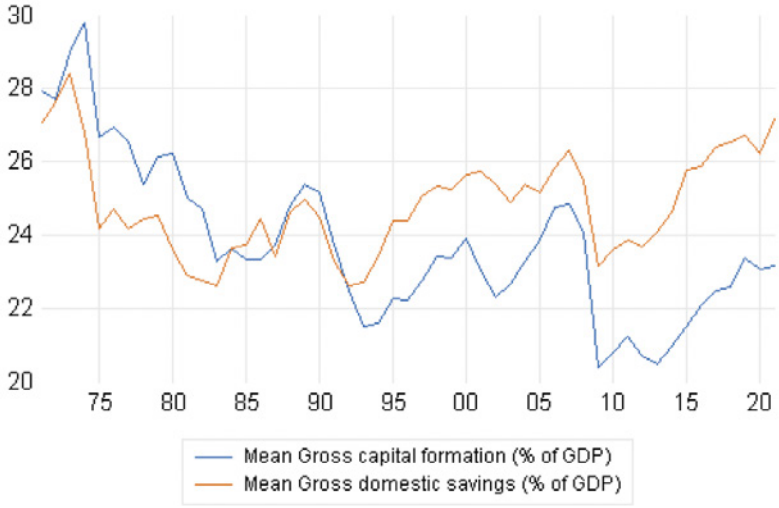

Figure 3. Means of GDI (% of GDP) and GDS (% of GDP) for 1971–2021
Source: World Bank Indicators.

Figure 3 illustrates the evolution of gross domestic capital formation and gross domestic saving rates over the period 1971–2021 for the 22 OECD countries. During the global financial crisis of 2008, both rates declined, followed by a gradual recovery to their initial levels and subsequently exceeding their pre-crisis values.

2.3 Descriptive statistics

Table 2. Descriptive statistics

	Panel A: Investment ratio					**Panel B: Savings ratio**				
	Mean	Standard deviation	Skewness	Kurtosis	Jarque–Bera test (p-value)	Mean	Standard deviation	Skewness	Kurtosis	Jarque-Bera test (p-value)
Australia	0.27	0.02	0.07	-0.04	0.98	0.26	0.02	1.14	1.66	0.00
Austria	0.26	0.02	1.22	1.12	0.00	0.27	0.02	0.56	0.19	0.26
Belgium	0.24	0.03	0.22	0.12	0.80	0.25	0.03	-0.44	0.37	0.38
Canada	0.22	0.02	-0.34	-1.00	0.21	0.23	0.02	-0.55	0.16	0.27
Denmark	0.22	0.02	0.40	-0.05	0.50	0.25	0.03	-0.57	-0.49	0.19
Finland	0.25	0.04	0.89	0.65	0.02	0.27	0.04	-0.38	-0.99	0.19
France	0.23	0.02	0.69	0.48	0.11	0.23	0.02	1.36	1.55	0.00
Germany	0.23	0.03	0.82	1.04	0.02	0.24	0.03	-0.37	-0.71	0.33
Greece	0.25	0.08	0.27	0.11	0.73	0.17	0.07	0.70	-0.10	0.13
Iceland	0.24	0.06	0.76	0.03	0.09	0.24	0.04	0.41	-0.61	0.33
Ireland	0.25	0.07	1.90	5.89	0.00	0.31	0.14	0.60	-0.40	0.18
Italy	0.21	0.03	0.53	0.53	0.23	0.22	0.02	0.01	-0.04	1.00
Japan	0.30	0.05	0.38	-0.83	0.26	0.30	0.05	0.00	-0.82	0.49
Luxembourg	0.21	0.02	0.31	-0.60	0.45	0.41	0.08	-0.23	-1.26	0.15

	Panel A: Investment ratio					Panel B: Savings ratio				
Netherlands	0.22	0.02	0.49	1.22	0.07	0.28	0.02	-0.33	-0.23	0.60
New Zealand	0.24	0.03	1.20	4.31	0.00	0.24	0.02	-0.35	-0.40	0.50
Portugal	0.25	0.05	0.03	-0.56	0.71	0.18	0.03	0.38	0.33	0.48
Spain	0.24	0.04	0.19	-0.82	0.42	0.23	0.02	0.28	-0.47	0.57
Sweden	0.25	0.03	0.59	-0.27	0.21	0.27	0.02	-0.62	-0.15	0.19
Turkey	0.23	0.05	-0.13	-1.10	0.26	0.26	0.05	0.18	-0.34	0.78
United Kingdom	0.20	0.03	0.78	-0.50	0.06	0.15	0.02	-0.35	0.36	0.51
United States	0.22	0.02	-0.22	-0.02	0.81	0.20	0.02	-0.09	-0.74	0.54
Mean	**0.24**	**0.04**	**0.50**	**0.44**	**0.31**	**0.25**	**0.04**	**0.06**	**-0.14**	**0.37**

Source: Author's own estimation.

Table 2 presents the descriptive statistics for the variables used in the analysis. The table is divided into two panels: Panel A reports statistics for the investment ratio. while Panel B reports statistics for the saving ratio. Each panel includes the mean, standard deviation, skewness, kurtosis, and the Jarque-Bera test p-value. The table covers Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Portugal, Spain, Sweden, Turkey, United Kingdom, and United States. Each country is associated with numerical values corresponding to each column in both panels. The bottom row reports the average values for each column in both panels.

In Table 2, it can be observed that the average value of the investment ratio among these countries is 0.25, while the average value of the saving ratio is 0.24, i.e. the two values are almost identical. The table also shows that the lowest average value of the investment ratio is 0.20 for the United Kingdom, whereas the highest average value is recorded for Japan at 0.30. In the case of the saving ratio, the minimum average value is again observed for the United Kingdom, at 0.15, while the highest

average value, 0.41, is recorded for Luxembourg. This indicates that the dispersion in the saving ratio is greater. The high saving rate observed for Luxembourg can be attributed to the fact that the country is often considered a tax haven among European countries and has one of the highest levels of GDP per capita in the world. As for Japan, which has the second-highest saving rate after Luxembourg, as discussed in the literature review section, population ageing affects saving behaviour such that an older population tends to save more. Japan, as a country with one of the oldest populations in the world, supports this hypothesis.

3. Results and analysis

Before selecting an appropriate regression model, it is necessary to conduct several preliminary tests. Following Yersh (2022, 2024) and Beck and Yersh (2024), a test for cross-sectional dependence in panel data is first conducted using EViews.

3.1 Cross-section dependence test

(a)

Table 3. Cross-section dependence test for I/Y

Variable: I/Y			
Null Hypothesis: No cross-section dependence (correlation)			
Period: 1971–2021			
Cross-sections: 22			
Test	**Statistic**	**d.f.**	**Probability**
Breusch–Pagan	2954.515	231	0.0000
Pesaran scaled LM	126.7094	–	0.0000
Bias-corrected scaled LM	126.4894	–	0.0000
Pesaran CD	38.36634	–	0.0000

Source: Author's own estimation.

(b)

Table 4. Cross-section dependence test for S/Y

Variable: S/Y			
Null Hypothesis: No cross-section dependence (correlation)			
Period: 1971–2021			
Cross-sections: 22			
Test	**Statistic**	**d.f.**	**Probability**
Breusch–Pagan	2350.483	231	0.0000
Pesaran scaled LM	98.60728	–	0.0000
Bias-corrected scaled LM	98.38728	–	0.0000
Pesaran CD	17.58446	–	0.0000

Source: Author's own estimation.

Having performed cross-section dependence test in EViews, Tables 3 and 4 show that all test statistics have p-values equal to zero, i.e. below the 10% significance level. This provides strong evidence of cross-sectional dependence in both variables. We therefore proceed to unit root testing in order to determine whether the variables are stationary in levels.

3.2 Unit root test

Since cross-sectional dependence is present in the variables, unit root tests suitable for cross-sectional dependent panel data are applied. Three such tests are available in EViews: PANIC, CADF, and CIPS. The first two are not suitable, as they give us information on idiosyncratic components (ADF unit root tests for specific cross-sections). Therefore, Table 5 reports the results of the Pesaran CIPS test, using the modified Akaike criteria and eight lags for both variables:

Table 5. CIPS test (P-values)

	CIPS	$CIPS_{\mu}$	$CIPS_{\mu,t}$
I/Y	>=0.10	>=0.10	>=0.10
d(I/Y)	<0.01***	<0.01***	<0.01***
S/Y	>=0.10	>=0.10	>=0.10
d(S/Y)	<0.01***	<0.01***	<0.01***

Note: Unit root test. *** denotes significance below the 1% significance level; ** below the 5% level; and * below the 10% level.
Source: Author's own estimation.

Table 5 shows the p-values of the CIPS test for two variables: the investment ratio and the savings ratio. The test was first conducted in levels. For both S/Y (savings ratio) and I/Y, the p-values in all three

specifications—without a constant, with a constant, and with a constant and trend—were greater than 10%, and thus the null hypothesis of a unit root could not be rejected. Therefore, the variables are considered non-stationary in levels, and first differences of both variables were taken. In this case, all three configurations of the test for both variables yielded p-values below the 1% statistical significance level, allowing rejection of the null hypothesis of a unit root and indicating that the variables are stationary in first differences. The fact that both variables share the same order of integration suggests that they may be cointegrated; consequently, the next step is to conduct a panel cointegration test.

3.3 Panel cointegration test

Table 6. Pedroni residual cointegration test for d(I/Y) and d(S/Y)

			Weighted	
	Statistic	**Probability**	**Statistic**	**Probability**
Panel	-0.40328	0.6566	-4.71119	1.0000
Panel	-28.0455	0.0000	-25.2339	0.0000
Panel	-29.6727	0.0000	-29.7422	0.0000
Panel	-24.7614	0.0000	-28.2724	0.0000
Group	-21.8386	0.0000		
Group	-32.6616	0.0000		
Group	-29.2164	0.0000		

Source: Author's own estimation.

We now turn to the panel cointegration test, namely the Pedroni Residual Cointegration Test, which is the panel cointegration test available in EViews. The results are reported in Table 6, and most of the p-values are equal to zero, allowing rejection of the null hypothesis of

no cointegration. We therefore have sufficient evidence to conclude that cointegration exists among the variables in the model.

Given the presence of cointegration, standard panel OLS estimation would be inconsistent; nevertheless, it is estimated for comparison purposes. In addition, a fully modified ordinary least squares (FMOLS) model is estimated, following Di Iorio and Fachin (2007) and Kaur and Sarin (2018) in the presence of cointegration; a dynamic ordinary least squares (DOLS) model is estimated, following Kaur and Sarin (2018) in the presence of cointegration; and a system generalised method of moments (SGMM) model is estimated, following Rao, Tamazian and Kumar (2009).

3.4 Panel ordinary least squares

We now proceed to the next stage of the analysis and use the first differences of the variables. We begin by estimating the first model using the basic estimator, panel ordinary least squares, implemented in EViews for the period 1972–2021 (one year less, owing to the use of first differences).

Table 7. Panel OLS model estimation results

Estimator: Panel OLS							
Period: full sample (1972–2021)				**Period: historical period (1972–1994)**			
Coefficient	Values	t-Statistic	Probability	Coefficient	Values	t-Statistic	Probability
α	-0.00096	-1.47623	0.1402	α	-0.002200	-2.241607	0.0254**
β	0.355088	9.105397	0.0000***	β	0.348534	6.910922	0.0000***
R-squared: 0.07				R-squared: 0.09			

Estimator: Panel OLS							
Period: pre-crisis period (1995–2008)				**Period: post-crisis period (2008–2021)**			
Coefficient	Values	t-Statistic	Probability	Coefficient	Values	t-Statistic	Probability
α	0.001385	1.747425	0.0816*	α	-0.001452	-0.967999	0.3338
β	0.281392	4.430269	0.0000***	β	0.394076	4.069146	0.0001***
R-squared: 0.06				R-squared: 0.05			

Note: Model estimation results. *** denotes significance below the 1% significance level; ** below the 5% level; and * below the 10% level.
Source: Author's own estimation.

We are interested in the beta coefficient for the full sample (1971–2021), which is equal to 0.355 and is substantially smaller than the value reported in the original study. The R-squared is 0.07, and the p-value of the Feldstein–Horioka coefficient (β) is equal to zero, indicating statistical significance at the 1% level. It is also worth noting that the saving retention coefficient, although relatively small compared with that obtained in the original study, remains far from zero in absolute terms and does not differ statistically from one across the examined time samples. Table 7 also shows that the value of the beta coefficient in the historical period is lower than in the pre-crisis period. Furthermore, the coefficient increases from 0.281 to 0.394 in the post-crisis period, exceeding its value in both the historical period and the full sample. The R-squared values for all periods under study are low; however, this is not a concern, as these results are not intended for inference but are used as a benchmark.

Overall, the results of this estimation support the hypothesis of this study, indicating that the Feldstein–Horioka puzzle exists for the 22 OECD countries and that its strength increased after the 2008 global financial crisis.

3.5 Fully modified ordinary least squares (FM-OLS)

Next, the FMOLS model is estimated. Due to estimator characteristics, EViews omits one additional year, so the full sample and historical period now begin in 1973. The estimation results are presented in Table 8.

Table 8. FM-OLS model estimation results

Estimator: FM-OLS							
Period: full sample (1973–2021)				**Period: historical period (1973–1994)**			
Coefficient	Values	t-Statistic	Probability	Coefficient	Values	t-Statistic	Probability
α	-	-	-	α	-	-	-
β	0.383075	10.98868	0.0000***	β	0.354185	7.409962	0.0000***
R-squared: 0.07				R-squared: 0.10			
Estimator: FM-OLS							
Period: pre-crisis period (1995–2008)				**Period: post-crisis period (2008–2021)**			
Coefficient	Values	t-Statistic	Probability	Coefficient	Values	t-Statistic	Probability
α	-	-	-	α	-	-	-
β	0.254375	3.577951	0.0004***	β	0.490541	5.920110	0.0000***
R-squared: 0.13				R-squared: 0.13			

Note: Model estimation results. *** denotes significance below the 1% significance level; ** below the 5% level; and * below the 10% level.
Source: own estimation.

In Table 8, it can be observed that the FMOLS estimation results are similar to those obtained from the Panel OLS estimation (see Table 7), at least in terms of the pattern of changes in the correlation coefficient between domestic investment and domestic saving (β). The intercept term (α) is not reported for this estimator due to its features. Furthermore, the R-squared values in this estimation are higher across all periods, indicating that this model is better suited to describing the relationship between domestic saving and capital formation. The p-values of all Feldstein–Horioka coefficients are below the 1% significance level, indicating that the coefficients are statistically different from one. Overall, these results support the hypothesis of this study that the Feldstein–Horioka puzzle exists for the 22 OECD countries and that its strength increased after the 2008 global financial crisis.

3.6 Dynamic ordinary least squares (D-OLS)

Next, the regression is estimated using the dynamic ordinary least squares (D-OLS) method in EViews. Due to the characteristics of this estimator, the years 1972–1973 and 2021 were excluded from the full sample, resulting in a reduction in the number of observations for all sub-periods except the pre-crisis period.

Table 9. D-OLS model estimation results

Estimator: D-OLS							
Period: full sample (1974–2020)				**Period: historical period (1974–1994)**			
Coefficient	Values	t-Statistic	Probability	Coefficient	Values	t-Statistic	Probability
α	-	-	-	α	-	-	-
β	0.609004	8.216091	0.0000***	β	0.555089	4.307912	0.0000***
R-squared: 0.27				R-squared: 0.44			

Estimator: D-OLS							
Period: pre-crisis period (1995–2008)				**Period: post-crisis period (2008–2020)**			
Coefficient	Values	t-Statistic	Probability	Coefficient	Values	t-Statistic	Probability
α	-	-	-	α	-	-	-
β	0.205146	0.985007	0.3258	β	0.875295	5.480777	0.0000***
R-squared: 0.36				R-squared: 0.39			

Note: Model estimation results. *** denotes significance below the 1% significance level; ** below the 5% level; and * below the 10% level.
Source: Author's own estimation.

It can be directly observed that the R-squared value reported in Table 9 is substantially higher than those in Tables 7 and 8, which is a good indicator that this model provides a better description of the relationship between domestic investment and domestic savings. This model also ensures the strongest support for the hypothesis of this paper, as the coefficient for the full sample is relatively high compared with previous results (see Tables 7 and 8), with a value of 0.61, and is statistically significant. In the historical period, the saving retention coefficient is equal to 0.56, while in the pre-crisis period it declines to the lowest value obtained across all estimations, namely 0.21, and is not statistically different from zero. This finding is consistent with the assumption that the degree of capital mobility increased prior to the crisis and declined thereafter. In the post-crisis period, the coefficient increases to 0.88 and is statistically significant at the 1% level, which may indicate a sharp decline in capital mobility among OECD countries. These results are also consistent with the findings of Duran and Ferreira-Lopes (2022), But and Morley (2017), and Katsimi and Zoega (2016).

3.7 System generalised method of moments (SGMM)

To estimate the SGMM model, GRETL is used. The same data are employed, namely the first differences of gross capital formation and gross saving, using a one-step estimation procedure. The essence of this method is that, in addition to the basic set of equations in first differences, it also incorporates lags of the variables in levels and first differences as regressors. As a result, an additional coefficient for the lagged dependent variable is obtained (Bond, Hoeffler and Temple, 2001). In this specification, the Feldstein–Horioka coefficient is denoted as β_1, while the coefficient of the lagged investment ratio is denoted as β_2 in Table 10. As in previous estimations, the years 1972–1973 and 2021 are omitted.

Table 10. SGMM model estimation results

Estimator: SGMM							
Period: full sample (1974–2021)				**Period: historical period (1974–1994)**			
Coefficient	Values	z	P-value	Coefficient	Values	z	P-value
α	−0.0938594	−3.276	0.0011***	α	−0.220110	−4.713	2.44e--06***
β_1	0.345936	2.812	0.0049***	β_1	0.328291	1.792	0.0732*
β_2	−0.0440026	−0.9389	0.3478	β_2	−0.0186963	−0.3344	0.7381

Estimator: SGMM							
Period: pre-crisis period (1995–2008)				**Period: post-crisis period (2008–2020)**			
Coefficient	Values	z	P-value	Coefficient	Values	z	P-value
α	0.116803	2.313	0.0207**	α	−0.134911	−2.776	0.0055***
β_1	0.326826	2.406	0.0161**	β_1	0.355883	2.446	0.0144**
β_2	0.00184867	0.02121	0.9831	β_2	−0.107774	−1.518	0.1290

Note: Model estimation results. *** denotes significance below the 1% significance level; ** below the 5% level; and * below the 10% level.
Source: Author's own estimation.

For this estimator, the results reported in Table 10 show smaller fluctuations in the saving retention coefficient compared with the other estimators. Nevertheless, the general pattern of increasing capital mobility in the pre-crisis period and decreasing capital mobility in the post-crisis period remains evident, consistent with the previous estimations. Accordingly, this estimation, together with the Panel OLS, FM-OLS, and D-OLS model estimations, supports the hypothesis of this study, although less strongly than, for example, the D-OLS estimation (see Table 9).

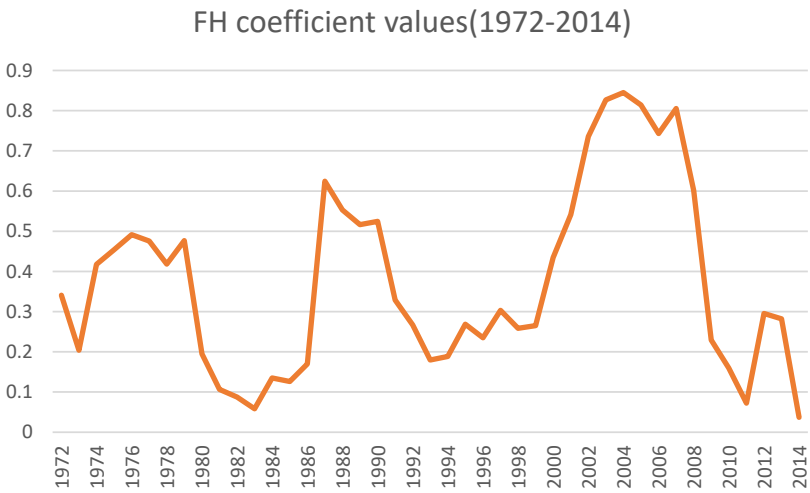

Figure 4. Rolling Windows SGMM Estimation (8 Years)
Source: Author's own estimation.

Table 11 summarises the results of the four estimations discussed in the preceding subsection. The pattern of change in the degree of capital mobility is clearly observed across all estimators, allowing us to conclude that the hypothesis of this study is supported. To further illustrate the changes in the Feldstein–Horioka coefficient, a figure is presented below. It was constructed using eight-year periods (so-called 'rolling windows') in order to capture business cycle dynamics (Duran and Ferreira-Lopes, 2022). For this figure, the SGMM estimator was applied to data from 1972 to 2021, with 2014 as the final starting year. Figure 4 shows a pronounced increase in the Feldstein–Horioka coefficient once 2008 is included in the rolling windows, which further supports the hypothesis of this study.

3.8 Compilation of the results

Table 11. Results' compilation

	POLS				SGMM			
	Full sample	**Historical period**	**Pre-crisis**	**Post-crisis**	**Full sample**	**Historical period**	**Pre-crisis**	**Post-crisis**
Beta	0.355088	0.348534	0.281392	0.394076	0.345936	0.328291	0.326826	0.355883
P-value	0.0000***	0.0000***	0.0000***	0.0001***	0.0049***	0.0732*	0.0161**	0.0144**
	FMOLS				**DOLS**			
	Full sample	**Historical period**	**Pre-crisis**	**Post-crisis**	**Full sample**	**Historical period**	**Pre-crisis**	**Post-crisis**
Beta	0.383075	0.354185	0.254375	0.490541	0.609004	0.555089	0.205146	0.875295
P-value	0.0000***	0.0000***	0.0004***	0.0000***	0.0000***	0.0000***	0.3258	0.0000***

Note: compilation of the model estimation results. *** denotes significance below the 1% significance level; ** below the 5% level; and * below the 10% level

Source: Author's own estimation.

Conclusion

In summarising the results of this project, several important conclusions can be drawn. First, the findings confirm the presence of the Feldstein–Horioka puzzle among OECD countries. Although the saving retention coefficient is substantially smaller than in the original study, it remains far from zero, indicating that capital is not perfectly mobile among the countries examined. Second, the global financial crisis had a significant impact on the degree of capital mobility. Consistent with the main hypothesis of this study, this impact was negative, implying a reduction in capital mobility. This result is also in line with several studies discussed in the literature review section, i.e. Katsimi and Zoega (2016), But and Morley (2017), and Duran and Ferreira-Lopes (2022).

ABSTRACT

This paper focuses on testing for the presence of, and comparing the validity of, the Feldstein–Horioka Paradox for 22 selected OECD countries before and after the 2008 global financial crisis. The main hypothesis of this study is that the Feldstein–Horioka Paradox did not exist, or was present in a much weaker form, among the 22 OECD countries in the period preceding the 2008 global financial crisis than in the original study by Feldstein and Horioka (1980), and that the 2008 global financial crisis brought back the Feldstein–Horioka Puzzle in a stronger form than before. After regressing the panel data using the variables of domestic gross savings and domestic gross investment, as well as conducting cross-sectional dependence, unit root, and cointegration tests, the estimators most suitable for the given situation were selected; this choice was based on the reviewed literature. The results of all regressions clearly show a pattern that supports the hypothesis of this paper, namely a gradual increase in the degree of capital mobility, indicating the absence of the Feldstein–Horioka paradox, followed by a fall in the degree of capital mobility in the post-crisis period, implying the return of the puzzle. In addition, various graphs were used to confirm the hypothesis.

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Chapter IV

The Role of Foreign Direct Investment in the E-Commerce Sector

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Introduction

The rise of e-commerce has revolutionised how people shop and do business around the world. As more people have gained access to the internet, mobile devices, and social media platforms, the e-commerce industry has expanded rapidly in recent years. According to eMarketer (2022), global e-commerce sales increased from $5.5 trillion in 2022 to $7.4 trillion in 2025. Consumers have become increasingly familiar with purchasing online, which has raised demand for e-commerce products and services. Consequently, e-commerce companies seek to capitalise on this demand and have made significant investments in marketing, supply chain management, and new technologies.

Foreign direct investment is also contributing significantly to the expansion of the e-commerce industry. Many international corporations have invested in e-commerce companies in recent years, particularly in emerging markets where there is considerable potential for growth. One example, which is discussed further in this research, is Amazon's successful investment in an Arabian company, Souq. Continued investments in small and medium-sized enterprises by large companies such as Amazon or eBay not only provide financial support but also offer valuable resources and expertise to help these businesses develop and prosper. Consequently, such investments can be beneficial both to individual companies and to the wider community, as they may create opportunities for innovation, economic growth, and job creation. Furthermore, the support of large corporations can enhance the reputation and credibility of small businesses, opening doors to new partnerships and customers. Nevertheless, FDI also poses certain challenges that must be carefully considered by policymakers and industry stakeholders, as it can significantly disrupt market competitiveness.

That is why the purpose of this academic article is to examine the role of FDI in the e-commerce sector. This research reviews existing literature based on earlier works by Budd, Konings and Slaughter (2005), Napiórkowski (2017), Kim (2019), and others. The author uses pre-existing research in the fields of finance and economics, information on businesses actively engaged in foreign investment in the online retail sector, as well as relevant articles and literature, to accomplish the objectives of this study and address the stated research question.

Another important step is dedicated to empirical research into the role of FDI in the e-commerce sphere. This section includes a case study of FDI in the e-commerce sector in India, aiming to address the research question of this article: Is foreign direct investment a significant factor in the development of the e-commerce sector in India? To answer this question, the author analyses the effects of FDI in Indian e-commerce and adds relevant information to the discussion; moreover, this section reviews antimonopolistic regulations imposed by the Indian government to improve competitiveness in the e-commerce market.

1. Literature review

1.1 The impact of FDI on the e-commerce sector and economy of the host country

To start with, the role of labour and the job market is significant in FDI in the e-commerce sector, since foreign investment in e-commerce may substantially increase employment, promote economic growth, and generally result in new job opportunities within the sector. Wage differentials have been a key factor distinguishing foreign corporations from domestic companies. In fact, according to Heyman, Sjöholm and Tingvall (2007), depending on the country under consideration, the wage gap between domestic and foreign corporations varies from approximately 10% to 70%. This considerable difference may be explained by several arguments proposed in the literature. For instance, due to lease agreements between foreign businesses and their employees, higher productivity and the resulting greater profitability of international affiliates may lead to higher wages (Budd, Konings and Slaughter, 2005). Additionally, Fosfuri, Motta and Rønde (2001) propose that, in order to avoid employee turnover that could lead to knowledge spillovers and competitive advantages for domestic competitors, foreign businesses may offer a wage premium. While both explanations help to clarify why foreign companies tend to pay higher wages compared with domestic ones, they focus primarily on production-related factors and overlook other social considerations that are particularly relevant in the e-commerce sphere. Nevertheless, Lipsey and Sjöholm (2004) suggest that international corporations may also find it difficult to locate and recruit high-quality workers without having to offer a wage premium, due to limited familiarity with the local labour market. Napiórkowski (2017) acknowledges this argument and further suggests that workers who prefer employment in domestic companies may need to be compensated in order to disregard such preferences. For example, some individuals may favour employment with domestic e-commerce companies for reasons such as cultural familiarity or language, meaning that multinational corporations, such as Amazon or eBay,

must offer higher wages to attract employees, despite their technological leadership and strong income and benefits packages.

The role of the labour market is indeed crucial; however, job training is also a vital component of FDI related to the labour market. As Javorcik (2014) notes, if a foreign affiliate offers more opportunities for training and professional development than a local company, employment there may be more fulfilling from the employee's perspective. Indeed, advanced managerial techniques, technologies, and knowledge are frequently introduced by foreign businesses, and these can be transferred to the local workforce through training programmes. According to available evidence supporting this view, foreign-owned businesses in the Czech Republic invested 4.6 times more in recruitment and training than domestic businesses (Filer, Schneider and Svejnar, 1995). This demonstrates that foreign companies are more inclined to invest in staff training and in developing highly skilled professionals capable of undertaking more complex tasks in the domestic market. Notably, Borensztein, De Gregorio and Lee (1998) recognise this phenomenon and further suggest that efforts to improve education and training not only strengthen the growth effects of FDI in developing countries but are also likely to attract greater FDI inflows.

In addition to the labour market factor, technological development has been a major driver of the expansion of e-commerce, and inflows of foreign capital through FDI have significantly shaped the technological infrastructure of the industry. Napiórkowski (2017) argues that technology spillovers from FDI have a positive impact on the GDP of the host country and refers to the study by Liu, Agbola and Dzator (2016), which finds that technology is primarily transferred to domestic businesses in the Chinese electronics industry through foreign investment. The positive impact of technology diffusion resulting in increased production is also discussed by Jordaan, Douw and Qiang (2020), who infer that productivity spillovers occur when domestic companies adopt these technologies and improve their performance. Indeed, productivity spillovers may arise, and in the context of e-commerce, technology may not only improve business operations through automated order fulfilment

and inventory management but also enhance customer experience by providing personalised recommendations or real-time customer support. Denisia (2010), who argues that foreign direct investment leads to spillovers of advanced technologies to local enterprises, also emphasises the importance of technology transfer. Productivity spillovers can occur through several channels; for example, the demonstration effect enables domestic businesses to learn about and adopt the technological practices of multinational affiliates (Jordaan, Douw and Qiang, 2020). Another channel is inter-company labour mobility, whereby domestic businesses benefit from hiring former employees of multinational affiliates who bring valuable knowledge, expertise, and experience gained while working for foreign-owned corporations (Jordaan, Douw and Qiang, 2020).

It is worth mentioning the phenomenon of the 'gap' between the economies of investing countries and the host country, which may have different effects on FDI depending on how wide or narrow this gap is. Jordaan, Douw and Qiang (2020) argue that the size of technological differences between foreign and domestic companies, in other words, the technological gap, influences the nature and intensity of productivity spillovers. Productivity spillovers between FDI and local suppliers are unlikely when there are significant technological gaps between them; however, a very small technological difference between domestic and foreign enterprises may also limit suppliers' opportunities to learn, thereby reducing potential productivity spillovers (Jordaan, Douw and Qiang, 2020). Notably, Napiórkowski (2017) also comments on the existence of this 'gap' and refers to the work of Liu, Agbola and Dzator (2016), who find that the impact of FDI is more limited when productivity differences are more pronounced. Hence, both authors support the view that the greater the technological gap, the more difficult it is for productivity spillovers to occur, highlighting the importance of sufficient absorptive capacity among local companies.

Knowledge transfer is another vital component of FDI's influence on the host country's economy, and on the e-commerce sector in particular, as it is essential to the development and success of subsidiaries. Beata Javorcik (2014) argues that 'multinationals are heavily involved in the

creation of new knowledge through their engagement in research and development (R&D) activities.' According to her study, in 2002, 700 companies—98% of which were multinational corporations—accounted for 69% of global business R&D and 46% of total worldwide R&D expenditure (Javorcik, 2014). In the context of e-commerce, foreign affiliates may benefit from the parent company's expertise and best practices; for example, companies can transfer marketing strategies proven to be effective in the home market, which foreign affiliates may then adapt to local markets. Through knowledge sharing, subsidiaries may develop a more skilled and motivated workforce while also gaining a better understanding of the local market. In his 2017 work on the role of FDI in economic growth, Napiórkowski (2017) finds that host-country economic development is significantly influenced by knowledge and know-how spillovers from FDI, and also notes a correlation between the magnitude of such spillovers and the degree of innovation among domestic businesses. External knowledge may encourage businesses to increase investment in innovation, and the resulting rise in innovative output can ultimately enhance productivity (Vujanović *et al.*, 2022). However, as Vujanović *et al.* (2022) assert, the value of foreign knowledge is likely to increase further due to the high costs of financing innovation, particularly in regions with elevated borrowing costs.

Finally, the competition factor is also crucial when considering FDI and company entry, since the effect on competition depends on how a foreign company plans to enter the host market. As Klimenko and Qu (2017) point out, multinational enterprises (MNEs) possess technological control and, as a result, influence both the level of market competition in the host country and the extent to which their affiliates in the host country benefit from the transfer of advanced technology. Their argument that technological capability affects competition helps explain why local markets often become more competitive following the entry of foreign affiliates, particularly in the e-commerce sector. Klimenko and Qu (2017) further assert that foreign entry has a competitive impact only in the case of greenfield investment. Under greenfield entry, incentives for technology transfer are reduced, as such transfers would encourage

incumbent companies to compete more aggressively, thereby harming the MNE's profits. In addition, the authors also claim that MNEs pursuing cross-border mergers and acquisitions are more inclined to transfer costly technology due to the substantially larger user base attracted by this mode of entry (Klimenko and Qu, 2017).

1.2 Example of Amazon in the UAE – the successful FDI in the e-commerce sphere

In May 2019, the US giant Amazon officially launched Amazon.ae in the United Arab Emirates, nearly two years after acquiring the regional e-commerce platform Souq.com for $580 million (Buller, 2019). Amazon.ae (2019) stated that 'Amazon.ae brings together Souq's local know-how and Amazon's global expertise, something we believe will be of significant benefit to UAE customers.' The launch of the Middle Eastern marketplace had a noticeable impact on Amazon's revenues, which rose by 9% year on year to $16.2 billion in the second quarter of 2019 (Kim, 2019). Furthermore, as Buller (2019) reports, Amazon's Attention score increased by 7.3 points in a single month, rising from 19.1 in April to 26.4 by the end of May 2019. These factors demonstrate that Amazon's launch campaign in April 2019 achieved the intended effect in terms of consumer awareness and engagement.

However, behind this success lies a carefully constructed plan that Amazon implemented gradually. Amazon did not immediately take over the Arabian company but allowed it to continue operating under the Souq brand, rebranding it only two years later. According to Stefano Ferro, general partner at branding consultancy CLAY Branding in Dubai, Amazon initially supported Souq as a sign of respect for its existing customer base, but later asserted full ownership and, as a result, replaced Souq in the minds of consumers (Buller, 2019). In addition, Stephen King, a professor of media at Middlesex University in Dubai, comments that Amazon's approach is particularly distinctive due to the way it personalises user interaction; this makes it easier to build a strong connection quickly and enhances the service convenience by not rebranding the

associated business from scratch, but instead substituting it with the Amazon brand (Buller, 2019). Both commentators agree that Amazon's transition was executed smoothly and that, before Souq was fully phased out, the process occurred gradually, with both brands used simultaneously over a period of time.

2. Empirical research – case study of FDI in the e-commerce sector in India

2.1 The influence of FDI in the e-commerce sector in India

The e-commerce industry is expanding at an extremely rapid rate, and such remarkable results have been achieved mainly due to the country's efforts to develop and globalise its economy. In fact, Rajappa (2022) argues that India became more open to foreign investment after adopting a new economic strategy in 1991 that placed greater emphasis on economic growth and globalisation. As can be observed, one of the main driving forces behind this policy change was the integration of the national economy in order to provide domestic industries with the ability to learn, adapt, and innovate, thereby establishing a stable long-term foundation. As a result, between November 2014 and November 2017, foreign direct investment in retail e-commerce in southern and northern India amounted to $3.3 billion (Rajappa, 2022). The growth of e-commerce businesses has been driven primarily by the emergence of numerous start-ups, as well as the availability of competitively priced smartphones and low-cost data plans. Several companies, including Amazon, Flipkart, Walmart, eBay, Snapdeal, Paytm, Mobikwik, Redbus, Ola, and Airtel, operate in this sector of the economy, and many of them include foreign ownership stakes (Rajappa, 2022).

Notably, with the support of sustained foreign investment, India overtook Canada to become the eighth-largest e-commerce market in 2020, generating revenues of $50 billion and ranking behind only

France (IBEF, 2022). Moreover, IBEF (2022) asserts that private equity and venture capital (PE/VC)[4] investments totalling $15 billion were made in India's e-commerce sector in 2021, representing a 5.4-fold increase compared with the previous year and the highest investment value ever recorded in the industry. Several large corporations actively promote and develop new projects through substantial investments. For instance, Amazon introduced Prime Video Channels in India in September 2021; according to the company, Prime members benefit from a seamless experience and access to a range of well-known video streaming providers through Prime Video Channels (IBEF, 2022). In the following year, Amazon India launched the One District One Product (ODOP) Bazaar on its platform in February 2022 to promote micro-, small,- and medium--sized enterprises (MSMEs) (IBEF, 2022). These developments indicate that the US technology giant has a strong interest in the expansion of the Indian e-commerce market, with the aim of capitalising on its new initiatives. In this context, Amazon Pay received capital amounting to $368.62 million in three separate instalments, while Amazon Wholesale, the business-to-business segment, received $49.06 million in investment in 2020 (IBEF, 2022). Similarly, Rajappa (2022) reports that another major American retailer, Walmart, invested $560 million of its total $1.2 billion in Flipkart[5] in 2020, and that Flipkart's value increased from $21 billion at the time of its acquisition in 2018 to $24.9 billion in 2020. With investment support from Walmart, Flipkart announced an expansion of its grocery services in January 2022, extending coverage to 1,800 towns across India; subsequently, in February 2022, Flipkart introduced a 'sell-back programmeprogram' enabling the trade-in of mobile phones (IBEF, 2022).

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[4] Capital invested in a business that is not publicly listed or traded is known as private equity (PE), while the funding provided to start-ups or other young enterprises that exhibit significant potential for long-term growth is referred to as venture capital (VC) (Wang, 2022).

[5] An Indian e-commerce company, Flipkart Private Limited, was founded in 2007 and has since become the largest Indian online marketplace, rivaling Amazon as a global market leader (Hitbullseye, 2023).

2.2 Antimonopolistic policy regulations implemented by the Indian government

As mentioned earlier in the first section, the competition factor is crucial in the e-commerce sector, and considering the influence of FDI, different MNEs may implement aggressive market attraction tactics, disrupt the local market's competitive balance, and potentially engage in monopolistic behaviour. In fact, in 2012, the Indian government has faced this issue and introduced anti-monopolistic policy regulations aimed at restoring competitive equilibrium. Legal Window (2017) argues that online e-commerce companies such as Flipkart and Amazon promote sales and sourcing through their sellers; moreover, customers purchasing goods from these sellers enjoy a range of additional benefits, including fast delivery, discounts, and cashback offers. Since the new FDI regulations seek to restrict the anti-competitive behaviour of these e-commerce organisations, changes to FDI policy are expected to have a negative effect on both e-commerce enterprises and related companies (Legal Window, 2017).

According to the guidelines for FDI in the e-commerce sector, while 100% FDI is allowed under the marketplace model, no FDI is permitted under the inventory-based model (Neer L Bhagat & Co., 2020). In other words, an India-based company with Indian ownership and control that operates as an online marketplace for buying and selling goods may accept foreign investment without limitations or prior approval from the Reserve Bank of India; by contrast, a foreign company may establish a wholly owned subsidiary operating within the marketplace model framework (Kamble and Walvekar, 2017). Moreover, Legal Window (2017) asserts that online retail companies operating under an inventory-based model and selling directly to customers are not permitted to receive FDI from foreign corporations, and vendors affiliated with Amazon and Flipkart are not allowed to sell their goods on the company's website.

Under the policy restrictions, Rajappa (2022) notes that a marketplace entity cannot allow a single vendor or any of its affiliated companies to account for more than 25% of its online sales; furthermore, the prices at

which goods or services are sold should not be influenced by the direct or indirect actions of market participants. The guidelines also emphasise that large e-commerce platforms, such as Amazon or Flipkart, are not permitted to offer substantial discounts to customers under FDI policy rules, and brand owners may no longer require exclusive arrangements with large sellers (Legal Window, 2017).

Taking into consideration the guidelines imposed by the Indian government, the main objectives of the 2012 FDI policy regulations are clear, as they are specifically aimed at preventing companies from engaging in anti-competitive behaviour and promoting the growth of small-scale commercial entities. Neer L Bhagat & Co. (2020) note that offline sellers have complained that they are unable to compete with the large discounts and other incentives that e-commerce platforms with access to FDI can offer through affiliated vendors. The majority of consumers purchase online to take advantage of discounts and unique products that may not be available from other online retailers or brick-and-mortar[6] stores (Neer L Bhagat & Co., 2020). In fact, Rajappa (2022) claims that e-commerce companies in India have allegedly pressured vendors operating on their platforms to reduce the prices of their goods and offer them at discounted rates. Large companies would later compensate sellers for the price difference; this was the primary mechanism through which significant discounting was exercised in e-commerce. Notably, in many cases, the seller would become a subsidiary of the e-commerce company in order to ensure that the reimbursement process was carried out in a timely manner (Rajappa, 2022). According to Rajappa (2022), Amazon referred to this practice as 'promotional finance', and it served as a means of recouping marketing expenses; in fact, the US technology giant recorded these reimbursements as customer service expenditures rather than losses. Consequently, such practices may have a significantly negative effect not only on overall market competition but also on the growth and profitability of small businesses in the e-commerce sector.

[6] The term 'brick-and-mortar' refers to a traditional business that serves customers at a physical location, as opposed to operating online (Collins Dictionary, 2023).

Overall, changes to FDI policy are important because their enforcement is expected to limit the commercial flexibility exercised by e-commerce platforms and require them to remain neutral towards all sellers (Neer L Bhagat & Co., 2020).

The policy regulations appear to be strategically aimed at achieving beneficial outcomes, thereby potentially supporting continued expansion within the e-commerce sector. One of the main advantages of such policies is the attempt to prevent the extinction of small online retail companies and brick-and-mortar stores. Sardar (2014) argues that small business owners often lack the expertise necessary to compete with established online retailers and are therefore unlikely to withstand intense competition. The displacement of small stores represents a significant challenge. Moreover, these policies may also helps address unemployment concerns, since small enterprises and Kirana stores[7] are among the main employers in the country, and the continued use of business-to--consumer e-commerce under an inventory-based model is expected to have a significant negative effect on these store owners and potentially lead to widespread unemployment (Sardar, 2014). Nevertheless, such antimonopolistic policies may also have adverse effects that could affect both the market and consumers. First, limitations on foreign investment under the inventory-based model may restrict the growth and expansion of e-commerce enterprises. As a result, domestic businesses may outperform international competitors on a level playing field, leading to a less diverse market and potentially fewer options for consumers.

Despite the introduction of policy regulations, major e-commerce giants have been involved in disputes regarding alleged violations of these rules. Choudhury (2014) reports that, in 2014, Amazon India faced accusations of breaching FDI regulations by selling goods directly to customers rather than through registered vendors. Following the initiation of a commercial tax investigation in Karnataka, several vendors were issued notices instructing them to cease storing their goods in

[7] Kirana shops are establishments that provide goods for everyday needs and commonly purchased groceries (Instor, 2018).

Amazon's warehouses; in fact, the tax authority claims that Amazon should be required to pay value-added tax (VAT) instead of service tax due to the ownership of goods stored in its fulfilment centres (Choudhury, 2014). Amazon strongly denies owning any of the goods stored at these facilities, and investigations into alleged price-fixing practices on the platform are still ongoing.

Conclusion

To summarise the discussion thus far, foreign direct investment plays a significant role in the growth of the e-commerce industry worldwide. With the increasing use of technology and internet access, e-commerce has emerged as a key sector for FDI. In this context, it is essential to understand the role of FDI in the e-commerce sector, as well as the rationale behind the decisions of policymakers, investors, and companies seeking to capitalise on the potential offered by this rapidly developing industry. The importance of foreign direct investment in e-commerce has been the subject of considerable research and analysis, and the present study contributes to this literature by examining various aspects of FDI and its effectss on the e-commerce industry.

This paper has first analysed the influence of foreign investment in the context of e-commerce and the host country's economy and found that labour and job training, technology, and knowledge clearly affect the productivity and working environment of domestic businesses. Moreover, the level of competition rises significantly as MNEs enter the local market, and domestic companies become more willing to improve and outperform foreign affiliates. Nevertheless, foreign companies retain advantages in terms of advanced technology and know-how that domestic companies often lack due to market imperfections and differences in company size.

With regard to empirical research, this paper conducted a case study on the role of FDI in the Indian e-commerce sector in order to address the research question: Is foreign direct investment a significant factor in the development of the e-commerce sector in India? To answer this

question, the article analyses the level of FDI in e-commerce and evaluates its impact on economic growth, competition, and innovation within the sector. In addition, the study examines antimonopolistic policy regulations implemented by the Indian government to maintain fair competition and assesses how these regulations affect foreign investors and domestic businesses.

Evidence reported by Rajappa (2022) indicates that both southern and northern India received $3.3 billion in FDI in retail e-commerce between November 2014 and November 2017, and that India's retail sector employed approximately 8% of the labour force, equivalent to 35 million people, in 2020 while contributing $800 billion to the country's GDP.

ABSTRACT

Today, nearly everyone engages in e-commerce from the comfort of their own home. The e-commerce market has grown significantly, evolving from a simple marketing platform into a complex ecosystem that includes supply chain management, logistics, and payment systems. In fact, the growth of the e-commerce sector is also being considerably boosted by foreign direct investment, and it has recently become a significant engine of not only global economic growth but also the online retail sector in particular. This is why the aim of this study is to analyse the role of foreign direct investment (FDI) in the e-commerce sphere. To achieve this goal, the author reviews the existing literature and also conducts a case study as empirical research on the significance of FDI in the e-commerce sector in India in order to answer the question posed in this paper. As a result, it is demonstrated that FDI has a significant impact on the e-commerce sector in India.

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Chapter V

The Deflation of Prices in the Mainland China as a Result of the Liquidity Crisis in FDI Considering the Japanese Bubble Economy and the South Asian Economic Crisis of 1997

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Introduction

For the past thirty years, the People's Republic of China (socialist mainland) has been studied extensively as a textbook example of economic transformation from an agricultural economy into an industrial one. This transformation has made China, once one of the most depressed economies in the region, a world leader in both production volume and economic growth among developing countries. Moreover, the country, which was notoriously known for failures in many respects during

the economic transition to communism and for general isolationism towards the Western world—seen as a century-long tradition—has currently grown into one of the primary holders of foreign capital in the form of FDI. This could be considered a logical consequence of China's trade surpluses and relatively fixed exchange rates. This arrangement guarantees investors, both domestic and foreign, an unprecedented level of stability, and over the last 20 years the country has been able to accumulate trillions of dollars in both cash and financial instruments (Ray, 2002). However, does this mean that such economic arrangements are primarily beneficial for both investors and the Chinese economy?

It can be argued that this situation creates a perception of stability which might be able to ease general expectations of a potential crisis in both the short- and long-term perspectives and could generate a relatively passive market response. However, what would happen if the system proved to be 'doomed', or at least rather unstable? The events of the last five years have demonstrated that this may indeed be the case, as the country has faced numerous systemic, political, financial, and social risks and challenges, which have had significant consequences for both foreign investors and domestic consumers (Leahy, 2023). In other words, what would happen to the Chinese economy if the overall volume of trade started stagnating, while the inflow of foreign capital turned negative? Theoretically, as seen in cases of smaller import-based economies, such a situation would generate pressure on the central bank and on credit interest rates. It would force the government to choose between two unfavourable options: abandoning the fixed exchange rate regime (commonly referred to as 'the peg') to the dollar or depleting reserves to maintain the peg for as long as possible. The situation in China, however, takes a rather interesting turn, as even though the Chinese government agreed to depreciate its currency in order to preserve reserves, the country began to accumulate foreign capital through debt, both municipal and public (Garcia-Herrero and Xia, 2014). This policy, in the short term, helps to avoid a catastrophic outflow of foreign investment but, at the same time, does not resolve the downturn in the market for private

debt obligations. Foreign investors were particularly displeased with the case of the Evergrande corporation, when the Chinese real estate giant became *de facto* nationalised and its foreign debt expropriated (Venkat, 2023). This leads to the logical question of whether the Chinese market has faced its own 'too big to fail' case, with a government that would rather default on foreign obligations of its companies than bail them out, or whether this represents a classic case of mismanagement based on unrealistic assumptions of the Chinese Communist Party—a situation that could set the Chinese economy back by around 50 years in terms of financial market development.

To answer these questions, a thorough analysis of the literature concerning Chinese economic development will be conducted. As a first point of comparison, the case of Thailand will be analysed due to similarities in economic policies, as well as similar causes underlying the South Asian economic crisis of 1997, which was mainly driven by investment outflows and subsequent currency devaluation. The Japanese economic miracle will be analysed as a second major case of economic development, owing to its heavy dependence on infrastructural projects and FDI as major sources of economic growth. At the same time, similarly to the Chinese deflationary experience, the Japanese economy observed a significant inflow of FDI associated with high interest rates and investor optimism, which led to economic overheating. Consequently, the Japanese economy faced an asset bubble which, due to a number of domestic factors and policies, resulted in deflation. By comparing both cases, as well as the background of Chinese economic development in recent years, a set of detrimental parameters that may have a direct influence on deflation will be identified.

The second part of the analysis consists of a methodological analysis to identify the most common and practical ways to examine the hypothesis of the dissertation by means of an econometric model. At this stage we will focus on identifying the key variables that are most likely to influence the main dependent variable, inflation, together with FDI and total reserves. The presented information will enable the formulation of basic predictions concerning the nature of the relationship that may or

may not exist between the independent and dependent variables. Finally, we will present the econometric model, drawing on the summarised information regarding both the parameters and econometric specification of the model based on monthly time series. Furthermore, as a next step in the methodology, we will draft a table containing the variables used in the econometric modelling, along with their structure, abbreviations, constructions, and data sources.

In the third part of the work, we will test the methodology using all the theoretical material and the econometric model developed to determine whether the hypothesis of this paper should be accepted or rejected. This process will be carried out through analysis of the model results, significance values, and, most importantly, coefficient values.

Finally, using all the accumulated information above, conclusions will be drawn regarding the practical and theoretical findings of this paper and how they may be improved or expanded in future research.

1. Literature review

China as a nation has a long-standing political tradition, but what influence does such a history have on modern-day China and its 'communist' experiment, and what are its interconnections with other states and their economic development in the context of Chinese economic policies? In this section, we will provide a long-term analysis of both China and its rival economies in the Asian region to determine whether China is already experiencing a relatively common situation for regional markets, or whether the Chinese case presents sufficient signs of unconventionality to indicate the unique nature of Chinese deflation. To this end, a brief review of Chinese political history will be provided, focusing on the last 50 years of Chinese reforms to identify the main factors behind Beijing's economic success and its transition from isolationism towards a heavily regulated private market.

1.1. The history of the Chinese economic boom and the influence of domestic monetary policies on the Forex market

The Chinese state as a political entity has a millennium-long history of economic development, wars, and expansion, which can be largely summarised as a typical development path for many imperial states of the early seventeenth century. However, what is quite unusual in comparison with European monarchies of the period is the unprecedented scale of the bureaucratic apparatus under the centralised control of the emperor himself. In the seventeenth century, this provided Chinese monarchs with a strong presence in provincial affairs and allowed them to implement efficient reforms on the spot; however, in the following centuries, it proved to be a major weakness of the state itself (Zelin, 2023). By the 1911 Revolution, the Chinese monarchy had faced a number of political issues, such as population growth, the rising political power of regional bureaucrats, rejection of political reforms, and numerous military failures, which resulted in widespread dissatisfaction with a system that was barely able to meet the needs of its 400 million population. As a result, in 1911, the Chinese peasantry, inspired by the example of France, overthrew the monarchy in favour of a republic, with Chinese nationalists as the primary force behind the revolution. However, the success of the revolution proved to be short-lived, as the newly established government found itself largely powerless. Having limited political capacity, it was overthrown by the military and former bureaucratic elites, who continued to maintain strong influence over provincial affairs (Wong, 1977). The Chinese state then entered a period of political fragmentation, recorded in history as the Warlords' Era.

By the end of the Chinese Civil War in 1949, the Chinese economy had experienced more than thirty years of devastation and destruction associated with enormous losses caused by political instability and numerous armed conflicts across the country. This presented the newly established communist government on the mainland with highly unfavourable initial conditions, as the majority of the Chinese

economy—except for Manchuria and Shanghai (a former extraterritorial city under European rule)—remained dependent on agriculture and natural resource extraction as the main sources of income. To overcome this issue, in the early 1950s, the Chinese government sought to benefit from its political ties with Moscow and the newly established socialist bloc in Eastern Europe by participating in the Molotov Plan, a Soviet substitute for the Marshall Plan, as well as by creating numerous bilateral arrangements with socialist states in Europe that showed strong interest in Chinese natural resources needed for their industrial economies (Chen and Zofka, 2022). However, the results of such assistance remain debatable, as on the one hand, China was able to organise an extensive transfer of knowledge alongside the development of industrial capacity and infrastructure, while, on the other hand, this assistance remained heavily dependent on Moscow, which by the end of the 1950s began to view Beijing as a potential rival rather than an ally (Lüthi, 2008). Although the Chinese state was able to enter a recovery stage following the period of post-war devastation, in 1958, the government initiated the policy of the Great Leap Forward, with an aim to accelerate industrialisation within the following four years,. Its main goal was to increase Chinese production levels; however, due to collectivisation and natural factors, it resulted in famine on an unprecedented scale and a collapse in both agricultural and industrial output per capita (Li and Yang, 2005). In other words, the Great Leap Forward was an unsuccessful attempt by the Chinese government to transition the economy from agriculture to heavy industry while maintaining a labour-inefficient peasant system in the agricultural sector. The policy itself proved to be a political delusion of the Chinese elite that turned into a major economic catastrophe. Without developed light industries or a sustainable agricultural policy, this situation contributed to the conditions for false urbanisation and a collapse in agricultural production (Liu, 2022). As a result, over the following two decades, the Chinese economy entered a prolonged period of economic stagnation, which the country was able to overcome only in the late 1970s with the rise of a new generation of partocrats in the Chinese communist government.

The 1978–1989 period of Chinese history is often considered relatively uneventful, as even though China was finally able to free itself from persistent instability and failed long-term policies—despite their short-term support of GDP growth—the economy continued to suffer from unstable economic cycles and a lack of public confidence in the long--term perspective. This relatively short 11-year period laid the foundation for the Chinese economy's subsequent success and its position within modern value chains, which helped Chinese businesses and enterprises establish themselves in international markets (Andrabi, 2015). The fundamental role in these rapid economic reforms is usually associated with Deng Xiaoping as one of the most prominent and influential political figures of the Chinese Communist Party during this period; however, there is no unanimous view regarding the scale of his direct involvement in the reforms. As noted by Ezra Vogel (2011), Xiaoping, as the paramount leader of communist China, can be seen more as a manager than a reformer, as he viewed economic policies first and foremost as a tool for implementing the Party's political agenda rather than an independent means of improving citizens' economic well-being. At the same time, it should not be overlooked that, despite the lack of novelty or long-term vision in the approach to China's economic challenges under Deng's leadership, the country implemented numerous political programmes primarily oriented towards creating incentives within the state-owned sector. These included the dismantling of collectivised farms (which allowed individual farmers to lease farmland), abolition of rigid price regulation in favour of a dual-track pricing system (where goods produced above plan quotas were sold at market prices), creation of special economic zones, and re-establishment of economic and political relations with the Western world (Naughton, 2011). In other words, Deng Xiaoping's greatest contribution as a leader of his era can be summarised as the successful implementation of capitalist practises within the Chinese economic framework while simultaneously maintaining a political structure that remained highly centralised and regulated through state planning. A political arrangement that, to a certain extent, might appear similar was implemented in socialist Yugoslavia, where Josip Broz Tito introduced

a mixed-market approach. However, this political model proved to be heavily imbalanced, as it created significant disparities in development between different regions of the state. With foreign currency disparities emerging as the primary issue for member-state economies, most foreign capital was generated in the service-based economies of the North rather than in the capital-intensive industrial economies of the South (Flaherty, 1988). Nevertheless, this case is not directly comparable to China, as over time, and particularly following Tito's death in the 1980s, the Yugoslav economic system entered a severe economic crisis and eventual collapse due to decentralisation efforts supported by regional political elites, whereas the Chinese government was able to maintain reforms and extensively capitalise on the benefits provided by special economic zones as centres of innovation and industrial production of technological goods. The promotion of foreign investment in labour-intensive industries enabled China to overcome its technological lag in comparison with other developing economies (Wu, Liu and Huang, 2021). In the early 1990s, the Chinese economy entered a new stage of development, associated with Deng's retirement and political struggles between different factions of the Chinese Communist Party (CCP), which ultimately led to the establishment of a government of political reformers advocating a higher degree of economic transformation across other sectors of the Chinese economy. As a result, during this period, the Chinese economy entered a phase of globalisation, mainly associated with privatisation, state investment in infrastructure development, and new corporate legislation.

After over 40 years, the Chinese government was able to overcome economic instability and achieve stable economic growth before entering the period of the 1990s, but what were the exact factors that enabled such accelerated economic growth within just a decade? It could be assumed that the primary credit for this rapid economic growth may be attributed to the rising level of foreign direct investment (FDI) in developing economies, which grew to around 20% of global capital flows in the 1990s (Loungani and Razin, 2001). The reasons behind such a rapid transition remain a subject of speculation concerning both the nature of FDI and

the motivations behind changes in the composition of capital flows, leading to the question of whether the inflow of FDI should be understood as a result of Chinese liberalisation of domestic capital markets or as part of a broader economic trend during the period. Since 1989, the Chinese government has undertaken several reform steps despite the prevailing conservatism of the state apparatus regarding the political implications of special economic zones, while continuing to maintain a state-controlled planned economy with numerous state monopolies as its backbone. In this context, the partial privatisation of state-owned enterprises, together with new corporate legislation that permitted foreign companies to enter markets previously monopolised by the state, can be seen as steps that facilitated a wave of foreign direct investment into the Chinese economy (Ye, 2009). This dynamic continued throughout the 1990s, when, due to numerous financial crises and currency devaluations elsewhere, China was able to establish itself as a safe haven for foreign investors among developing markets, largely because of its reactionary approach to maintaining a fixed exchange rate between the Chinese yuan and the dollar, despite the potential costs (Bloomberg, 2017). Moreover, another beneficial development can be observed in relation to Chinese public debt, which since 1994 experienced sharp growth at the municipal level. Despite the government's formal ban on financing regional budgets through municipal bonds, local governments pursued extensive investment campaigns campaign through state-organised enterprises that issued borrowing to finance development projects of local authorities. Chinese local authorities used borrowing, including foreign borrowing, as a means to finance municipal infrastructure projects, which were in turn used as collateral (Zhou, 2013). Although such an economic policy could be seen as an extreme form of risk-taking due to its heavy dependence on future economic growth, it also generated an important signal of confidence for foreign investors. By engaging in extensive borrowing for the purpose of infrastructural development, the Chinese government sent a strong signal of its commitment to maintaining economic growth by creating logistical connections between regions and playing a fundamental role in the processes of urbanisation and industrialisation.

This approach is consistent with the theoretical findings of Das *et al.* (2010), who provide an extensive framework demonstrating that effective management of public debt plays an important role in fostering financial stability. Consequently, the stability created by the combination of market expansion in formerly state-regulated sectors and rising levels of state borrowing raises an important logical question: how efficiently were investment funds used by the state in infrastructure development, and can increased foreign investment be considered the sole source of economic growth?

From a theoretical perspective, both Neoclassical and New Keynesian models are generally supportive of public debt as a driver of economic growth. In neoclassical theory, public debt leads to long-term growth in private investment and consumption and, as a result, to an increase in output levels. New Keynesian theory, which is more focused on the short-run effects of public debt, similarly treats it as government investment, assumed to have a positive influence on the income multiplier by generating higher income levels for individuals employed in government projects. As investigated by Ramey (2020), who employs econometric modelling in his analysis, increases in government spending associated with rising levels of public capital were found to have a limited effect on economic productivity in the short term. This situation is commonly explained by the fact that investment in infrastructural projects has a stronger positive effect on economic multipliers in the long run rather than in the short run. The most common explanation for this divergence is associated with the productivity of invested capital and the influence of time lags, namely the time required to integrate newly created infrastructure into the economy.

When it comes to government policy, infrastructural development can be considered a means of addressing existing economic inequalities between different regions of the country, while also creating a long-term foundation for economic growth. However, from a long-term perspective, can the state treat this type of infrastructural investment as a means of achieving sustainable economic growth, or are its effects merely temporary? On the one hand, an industrial approach to infrastructural

investment can be seen as relying on a finite resource that is likely to experience diminishing returns over time, as the number of potential development projects gradually declines. A textbook case of such development is the Chinese railway system, which by the end of 2010 had established direct rail connections between all major regional centres, including remote regions such as Tibet and Xinjiang (Abdenur, Santoro and Folly, 2021). On the other hand, the potential for economic investment in the Chinese construction market can be considered effectively unlimited, as following the housing reform of 1998, a private real estate market emerged. This initiative consisted of a set of legislative arrangements created by the Chinese government to overcome the state's inability to provide housing for the growing population of major industrial cities such as Beijing and Shanghai through the development of a private real estate market. Within just a few years of its introduction, the private market experienced a housing boom in terms of both prices and supply (Songcheng, 2021), and the Chinese real estate market was perceived as a source of virtually unlimited economic growth within the Chinese economy. The trend has been accelerated by mass migration from less developed regions of the country, creating constant demand for housing. This dynamic can be considered a major explanatory factor behind the stability of Chinese markets, which stands in contrast to European and American real estate markets, as over the last 20 years China's real estate sector has proven to be relatively resistant to economic fluctuations. Price formation has been found to be more dependent on preference shocks in demand rather than on the economic cycle itself (He *et al.*, 2017). Though the economic stability achieved in China can be seen as an interesting example of accelerated economic growth, in light of the 2008 US financial crisis, it could also be argued that the Chinese economy represents a case of speculative demand and real estate price inflation driven by both private and public factors. This assumption is partially confirmed by Keohane (2017), who estimates that in 2017 the ten largest developers in China directly controlled 25% of the entire real estate market, while the share controlled by the largest market players was expected to increase to 35% by 2022, indicating a potential oligopolistic tendency

in the market. Moreover, the financial reforms undertaken by China in the area of municipal debt, together with a declining working-age population, could potentially result in a market downturn in the future, as it is common practice for municipal governments to engage in land speculation to address budgetary deficits. In other words, the Chinese real estate market can be viewed as a case of rapid economic growth achieved through continuously rising demand and prices resulting from limited supply. However, does this mean that such a market is protected from systemic instabilities faced by China? Is there any mechanism that would discourage or even punish market participants, both private and public, for attempts to maximises profits through speculation or oversupply that could jeopardise long-term market equilibrium? The answer to this potential scenario can be considered negative, as Chinese authorities maintain a reactionary approach towards potential speculation in the market. For market participants, such escalation may result in a short-term increase in supply, which should lead to higher real estate prices, but in the long-term could be alleviated by potential price ceilings imposed by the Chinese state, whose primary concern is maintaining housing supply for the broader population. Thus, even though the housing market in China may attempt to achieve economies of scale by maintaining optimal production levels while minimising costs, such an initiative may fail, as it would be constrained by reactionary Chinese government interventions that prioritise stable or declining housing prices. Consequently, an uncontrolled increase in supply could result in a cost trap for real estate companies, as under increasing oligopolistic competition, the only way for companies to attract a larger customer base may be through lower production costs relative to market prices. In theory, cost minimisation could have been achieved through economies of scale; however, in the face of rising land costs together with more aggressive demand from rival companies, this would instead result in diminishing returns on investment and declining profit margins. Eventually, such a scenario may lead to uncontrolled debt accumulation and bankruptcy, as illustrated by the case of the Chinese property developer Evergrande, which defaulted on its foreign debts in early 2021 (Tham, Zhu and Jim,

2023). Such underperformance of the private sector could be seen as expected, since despite general market liberalisation, the Chinese state continued to maintain strict price regulation policies to limit speculation and price surges. Yet, it may be viewed as a catastrophe, as it reveals the substantial dependence of the Chinese market on foreign investment as a source of economic growth and infrastructure development. It also demonstrates that despite attempts by the Chinese authorities to reduce corporate indebtedness, these policies proved largely ineffective: declining prices and asset values, together with decreasing demand for housing, generated liquidity problems and transformed previously functional and profitable enterprises into heavily indebted companies holding largely devalued assets portfolios (Dorn, 2023). Consequently, it can be stated that the Chinese economy employed an extensive urbanisation strategy through infrastructural development to promote migration from rural regions, resulting in a transition towards industrial production as the dominant sector of the economy. These dynamics led to rising demand for housing, which the Chinese government attempted to address through the development of a strong private sector. However, restrictive policies and the oligopolistic nature of real estate developers, who sought to acquire greater control over the market, resulted in the default of several of the largest market players. This set a broader trend of economic stagnation that had a direct negative effect on the ability of Chinese authorities to implement socialist policies, as well as on consumers, who faced deflation with a direct impact on consumption.

How severe could the implications of such a crisis be for the entire economy, given that China is primarily characterised as the world's second-largest economy based on exports of final goods and technological components to both developed and developing countries? Since the 1980s, the Chinese government has undertaken extensive industrialisation and privatisation efforts as a means of stimulating economic development and attracting foreign investment to the Chinese market. Yet, what were the exact political decisions that transformed Chinese industries into international trading giants in terms of both imports and exports? From the perspective of Ricardian theory, trade is generally

explained as an exchange between states that occurs due to differences in technology, resource endowment, demand structures, economies of scale, or political frameworks. If we apply these basic assumptions to China, it can be argued that during the period of modernisation and the early years of the Chinese economic miracle, China possessed a strong resource endowment relative to developed economies. Another major advantage was the political environment and population structure, which provided an ideal foundation for economies of scale. Thus, according to Ricardian trade theory, China possessed an ideal combination of factors for the inflow of foreign direct investment and rapid industrial development. However, this economic theory may be considered idealistic, as it assumes that countries engage primarily in the exchange of goods (barter) rather than in the exchange of domestic and foreign currencies for goods and services provided in both economies. The basic Ricardian assumptions allow us to attribute rapid economic growth to the expansion in China's trade share and its growing volume due to a number of favourable factors. Nevertheless, the model does not explain such a prolonged period of economic growth, which could hardly be achieved within a Ricardian framework solely through economies of scale. Over time, economies of scale tend to exhibit diminishing returns on investment once a critical threshold is reached. With respect to fiscal stability, how was the Chinese state able to maintain domestic currency stability and its parity with foreign currencies in order to benefit from both foreign investment inflows and trade without facing appreciation? It could be assumed that the Chinese economy would not face potential downturns from the inflow of foreign capital and currencies, as in basic trade theory such currency surpluses are typically used as instruments facilitating trade. Investment, despite its fixed nature in the short term, is converted in the long term into assets or financial instruments, which generally have a limited effect on the foreign exchange market. This approach, however, does not account for protectionism and mercantilism, which are characteristic of centralised states such as China. The Chinese government, with its centralised approach, is highly restrictive toward the flow of foreign capital and has implemented numerous financial controls

on capital and foreign currency outflows. Is it possible to achieve monetary stability in the foreign exchange market if the government favours a reactive response to capital flows rather than a liberal approach? Can such a restrictive strategy serve as an effective tool to prevent domestic currency devaluation through the accumulation of foreign reserves?

The most typical solution in such a case is a mixed exchange rate system, commonly referred to as a peg. However, what are the main assumptions behind a peg, and how did the Chinese economy evolve toward such an arrangement? In contrast to fixed exchange rates, which are usually defined as an arrangement in which the central bank maintains the exchange rate within a specific interval, under a peg the domestic currency is typically fixed to a basket of foreign currencies at a previously determined par value. By creating a fixed arrangement with a stronger foreign currency or a set of currencies, the central bank can reduce volatility and inflationary risk, as well as narrow the fluctuation range of the domestic currency (Moreno, 2001). Despite these positive aspects, it would be noteworthy to analyse what are the primary requirements for a properly functioning peg, and how did China adopt the peg as its primary exchange rate arrangement in the long run.

First of all, the Chinese central bank decided to adopt a peg as its primary policy for the foreign exchange market in 1994, during a period of extensive economic growth mainly associated with the rise of domestic exports, in other words, a period when the Chinese economy began to face appreciation pressure linked to a growing inflow of foreign capital. This situation can be described as appreciation, whereby the domestic currency increases in value relative to currencies operating under floating exchange rate regimes. Such a trend may lead to a decline in the comparative advantage of Chinese goods in the short run and potentially create a theoretical basis for convergence with foreign currencies in the long run in terms of factor costs of production and, consequently, goods prices. This development can be particularly risky for a developing economy, as it could result in declining purchasing power parity of foreign currency. A reduction in the role of investment and its impact on development projects would also eliminate potential profits that economic agents might

generate from exchange rate differentials. To prevent such a negative scenario and to maintain economic growth that was heavily dependent on foreign investment and trade, it was crucial for the Chinese government at this stage to maintain fixed exchange rate parity. What were the major challenges the country faced in relation to the foreign exchange market and its reforms? The primary issue for the Chinese foreign exchange market in the 1990s was the system of dual exchange rates, an arrangement in which the Chinese government offered higher exchange rates in swap markets compared to the official foreign exchange market. This policy was used as a temporary measure designed to limit potential losses for foreign investors by introducing fixed long-term exchange rates that might otherwise have arisen due to government-led depreciation of spot exchange rates, which had served as a major source of financial instability for the authorities (Morrison and Labonte, 2011). This policy ended in 1994, when the People's Bank of China set the exchange rate at 8.28 yuan (RMB) per US dollar. By the early 2000s, Chinese economic policies began to face growing dissatisfaction from Western governments, which viewed these measures as excessive and discriminatory. Policies that were initially perceived as stabilisation efforts against potential appreciation gradually evolved into aggressive protectionism, resulting in China's deep penetration into numerous high value-added industries. Meanwhile, the growing share of, and dependence on, Chinese goods led to trade deficits for China's primary trading partners (Barboza and Kahn, 2005). In 2005, the Chinese government attempted to liberalise the peg by making it more flexible in response to market fluctuations. The People's Bank of China believed that abandoning currency protectionism and adopting a more liberal stance toward currency appreciation would encourage a more competitive approach to trade and reduce pressures on the balance of payments of its major trading partners (Investment Executive, 2005). However, despite the appreciation and the positive influence these policies had on both trade and the value of the yuan, the trend proved short-lived. In response to the 2008 global financial crisis, the People's Bank of China decided to halt currency appreciation and restore the peg for an unspecified period, as the country experienced a decline

in trade volumes alongside a fall in foreign direct investment. Finally, in 2010, following post-crisis recovery, the Chinese government returned to a more liberal exchange rate approach, which continued to show signs of appreciation until 2015. In that year, the Chinese currency began to experience a much higher degree of volatility, resembling a floating exchange rate regime. As noted by numerous economists, despite these measures, the Chinese government continued to pursue a contractionary exchange rate policy by conducting a number of interventions since 2010, primarily aimed at currency depreciation. This policy, together with the global COVID-19 pandemic in 2020, allowed Chinese authorities to maintain the currency at a relatively undervalued level compared with that of the global economy, supporting trade growth (Reuters, 2023).

To sum up, it can be said that over the last 30 years, the Chinese government has achieved a remarkable transformation of the Chinese economy through the liberalisation of a heavily centralised, state-controlled system. The primary milestones of this policy were privatisation and the introduction of foreign direct investment, which in turn boosted the process of industrialisation supported by extensive modernisation efforts at both regional and national levels. Yet, can these economic successes be primarily associated with a specific set of economic factors and advantages typical of centralised economies and strong state control? Or perhaps the Chinese success can be better explained by cultural factors that provided the country with a comparative advantage over its neighbouring nations. Alternatively, can the Chinese case be viewed as a successful exploitation of global economic trends of the new millennium, which the country was able to utilise through reforms? To address these questions, further analysis will focus on similar cases of economic booms and fixed exchange rate regimes in Asia, as well as their influence on domestic economic development and foreign capital flows.

1.2. The historical review of fixed exchange rates (pegs) and their major failures: the example of South Asia (1997 crisis)

The beginning of the 1980s brought numerous economic challenges to the global economy. Political turmoil in the Middle East, together with the Islamic Revolution in Iran, resulted in an unprecedented shortage of oil, the scale of which developed economies had not experienced since the 1940s. As a result, in 1981, the majority of European and American states faced some of the highest levels of unemployment, inflation, and interest rates, leading to stagflation—a phenomenon characterised by simultaneous increases in unemployment and inflation. This economic slowdown was a logical consequence of the decade-long oil crisis that began in 1973, when several Arab nations imposed oil embargoes on heavily dependent industrial economies in the West, making developed countries increasingly reliant on Iranian and Soviet oil supplies. However, these alternatives proved temporary, as after 1979 the United States and its allies imposed oil embargoes on Iran and the Soviet Union in response to weapons proliferation. Consequently, the highly industrialised economies of the United States and Europe found themselves effectively constrained by oil shortages, as domestic production was insufficient to meet internal demand. Production and transportation costs surged, leading to inflation on an unprecedented scale and a contraction of economic activity. Numerous private enterprises went bankrupt, unable to operate under rising production costs, while an extensive wave of inflation eroded domestic capital stocks, resulting in shortages of credit and investment (Bogage and Whalen, 2022). Even though the American economy preserved the dollar's status as the primary international currency, the crisis generated strong incentives for reform and for the expansion of economic ties with developing economies in Asia, South America, and Africa (Frank, 1984). The crisis also created new opportunities for developing Asian economies, which introduced favourable conditions and higher investment returns to attract foreign capital. The most prominent examples of states that benefited from this transformation were Southeast Asian countries, such as Thailand.

Being one of the few Asian nations that were able to avoid major destruction during the Second World War, together with long-lasting periods of political instability that were common among many of Thailand's neighbours, such as Myanmar, Laos, Cambodia, and Malaysia (Neher, 1975), Thailand was able to enter the era of post-war restoration as a relatively stable, resource-abundant agricultural economy with a strong institutional foundation for industrialisation. In contrast to the Asian Tigers, however, the local government decided to maintain a more liberal market-oriented approach rather than a planned industrial development strategy. The main goal of this policy was to attract foreign capital and expertise through FDI. As a result, in the 1960s, Thailand became one of the most rapidly developing countries in the world, with high GDP growth and rising productivity levels, which led to a major wave of industrialisation accompanied by urbanisation (Phongpaichit, 1980). The main objectives of these policies were the creation of a middle class and the reduction of poverty, which remained a persistent issue in rural areas due to overpopulation and limited access to arable land. The government sought to achieve income redistribution through labour flows from rural areas to urban centres. This represented a considerable success for the Thai government, as, similarly to the Asian Tigers, it was able to attract foreign investors and producers by offering relatively cheap and productive labour compared to developed European economies. Nevertheless, despite short-term success in terms of economic growth and industrialisation, the long-term effects on the Thai economy proved to be temporary.

Even with significant economic progress in terms of urbanisation and labour diversification towards cities, the government found itself in an unfavourable position, as industrialisation efforts were heavily concentrated on urban expansion, while urban regions still lacked sufficient infrastructure to accommodate newly arriving workers. Consequently, although the economy benefited from rising industrial production, it remained strongly dependent on agricultural output as the primary source of exports (Robinson *et al.*, 1991). However, the government's ambition to establish a strong industrial base for consumer goods production created a major dilemma for the economy. Rather than specialising in

areas of comparative advantage, the government maintained a diversified approach to satisfying domestic demand through domestic supply. This scenario undermined market efficiency due to extensive state intervention through numerous state-owned or state-regulated enterprises. Despite the country's ability to produce the higher value-added goods, it faced additional challenges, as a nationwide campaign to promote education among the general population became largely ineffective due to the low quality of educational programmes. The educational sphere itself suffered from a lack of state investment and underdeveloped educational infrastructure. Thus, the country was unable to provide sufficient investment in the development of human capital, which in turn led to dependence on low-skilled labour as the primary source of international competitiveness and the main engine of industrialisation. This created an ideal set of conditions for the stagnation of economic development and the emergence of a potential middle-income trap. After reaching the highest productivity threshold achievable through unskilled labour, the economy was likely to experience a sharp decline in growth rates due to the inability of both government and businesses to accelerate growth through the development of more complex industries. As a result, the country faced an economic slowdown without a general decline in income levels, which remained relatively stable. If the country were to experience such a sustained decline in economic growth, this could have negative consequences for the economy; in that case how could the government continue to maintain a rapid growth strategy under declining production rates?

It is important to note that such an economic decline can be considered problematic, as it indicates a persistent deviation from the projected growth path that might otherwise have been achieved. In the case of a developing economy, such a decline may be interpreted as a temporary setback or an irrelevant economic fluctuation. Alternatively, as in the case of Thailand, it can be seen as part of a broader economic trend associated with the slowdown of its main trading partners, namely the industrialised economies of the West, which were experiencing periods of economic contraction. However, such a situation could form the basis

for economic instability, as in a diversified economy with a strong state presence, it may create overdependence on government subsidies to sustain declining industries. Such an economic slowdown could be mitigated through inflows of foreign direct investment (FDI). Thus, despite the general slowdown, growth rates in the Thai economy remained among the highest in the world, which, combined with slower growth in the United States and Western Europe, led to a substantial inflow of foreign capital. Consequently, despite the initial underperformance of the economy in the early 1980s, the government was able to ensure a steady flow of foreign capital that allowed the economy to reaccelerate GDP growth and increase gross national product and income per capita (Wiboonchutikula, 1984). As a result, Thailand came to be seen as a newly emerging Asian Tiger, whose economic power was expected to continue rising in the coming years as the country experienced a significant expansion of its middle class. Yet, despite the government's ability to reaccelerate economic growth, the development of Thai industries remained limited at the national level and heavily concentrated around major population centres such as Bangkok. The country also began to face significant imbalances within its educational system, which was unable to serve as an efficient source of high-skilled labour. In the long run, this led to declining labour efficiency and deteriorating product quality, while production costs continued to rise. In 1997, the Thai economy became the starting point of the Asian financial crisis, resulting in one of the most rapid episodes of currency devaluation in the modern history of Asian economies (Warr, 1997).

It is perhaps worth analysing what the primary reasons for such currency devaluation and economic decline were, despite the broader crisis in Thai industrial production.[8] As noted by Sharma (2023), the primary cause of the economic crisis was the Thai government's decision to abandon the peg of the baht to the US dollar, which triggered widespread market panic and the devaluation of the domestic currency. Foreign

[8] For more see Beck (2014, 2019, 2020, 2021a, 2021b, and 2021c), Beck and Jackson (2024), and Beck and Nzimande (2023).

investors, having lost confidence in the Thai economy, began to withdraw their funds, thereby exposing the economy to currency depreciation and economic contraction. As regards the underlying reasons that led to the establishment of the peg in the first place, Disyatat, Pongsaparn, and Waiquamdee (2005) argue that since the 1980s the Thai government had pursued a fixed exchange rate policy as a means of reducing exchange rate risk and maximising inflows of foreign capital through both trade and investment. This view is supported by the empirical findings of Dueker and Fischer (2001), who analysed the Thai peg in comparison with the Austrian peg to the German mark. Their study found that, by focusing on maintaining a tight exchange rate, the Thai government effectively implemented a strong form of inflation targeting. The policy was found to be largely ineffective, as enormous inflows of foreign capital, supplemented by high returns on investment, created inflationary pressure. Moreover, despite establishing a seemingly successful peg with the dollar, the Thai government failed to identify major issues arising in the domestic capital market, such as the growing current account deficit, overinflation in the real estate sector, and unstable equity prices. These were clear signs of financial instability, largely driven by aggressive short-term foreign currency borrowing. Furthermore, such fiscal pressures resulted in currency and maturity mismatches within Thai commercial banks, which were the primary beneficiaries of the rapid build-up of short-term debt obligations. The country experienced a loss of confidence among foreign investors, who began withdrawing funds from the Thai economy due to rising concerns about the risk of a financial meltdown (Sharma, 2002). Following a sharp increase in short-term borrowing by both private and state-owned enterprises, foreign investors, fearing economic overheating, started to withdraw their capital from Thailand. This capital outflow triggered a chain reaction, forcing the Bank of Thailand to abandon the peg arrangement as demand for foreign currency exceeded the capacity of the central bank's reserves. Consequently, this inability to defend the peg led to full-scale market panic, as investors, facing a rapid decline in the value of the domestic currency against major foreign currencies, began demanding repayment

of short-term liabilities. Thus, the government confronted the risk of moral hazard and economic decline, while the country entered a spiral of currency devaluation and economic contraction driven by the withdrawal of foreign investment.

It can be concluded that a peg can serve as an effective mechanism for achieving currency stability and boosting investor confidence. However, it must be recognised that such an arrangement is heavily dependent on the state's ability to regulate the market through a highly limited set of policy instruments, as well as on investor confidence in the credibility of the government. A peg without the trust of financial institutions is ineffective, as it will not be perceived as credible. Conversely, an ostensibly efficient peg based on false assumptions or opportunistic behaviour may itself become a source of economic imbalance and potentially lead to macroeconomic instability. Support for this conclusion can be found in the case of Argentina, which was forced to abandon its hard peg in 1998 due to severe currency overvaluation driven by the appreciation of the US dollar, its primary anchor currency (Nataraj and Sahoo, 2003). The situation led to a decline in the country's exports, while the economy faced overvaluation due to the appreciation of its anchor currency, which in turn caused major solvency issues for the country's financial institutions. The currency board was forced to engage in bailout practices through currency borrowing to domestic banks, using Argentinian bonds as collateral. Furthermore, this development led to a drastic decline in national foreign currency reserves and resulted in the inability of the currency board to maintain peg stability without undermining overall economic stability (De La Torre *et al.*, 2003). Faced with a general decline in foreign reserves together with a decreasing real value of the currency, the currency board, fearing potential inflation, decided to abandon the peg in favour of a floating exchange rate regime. This decision resulted in market panic and economic stagnation due to the outflow of foreign capital and the depreciation of the currency. The scenario described above leads to an ironic conclusion regarding the nature of fixed exchange rates and their volatility. The peg itself can be seen as a beneficial arrangement that may function effectively under certain

conditions; however, due to its ambiguous nature, it can also serve as a major constraint on economic policy and a source of governmental neglect. Eventually, when left under-regulated for a prolonged period, fixed exchange rate regimes may turn into severe economic vulnerabilities that ultimately jeopardise the peg itself.

The issue regarding the main consequences for an economy when major economic actors face currency devaluation or economic slowdown, while the domestic economy simultaneously experiences rapid expansion due to liberalisation of currency and capital flows requires further analysis. To this end, we will examine the case of the Japanese economy, as it faced a significant asset price bubble, despite liberal exchange rates and relatively balanced economic policies.[9]

1.3. Japanese economic boom and the Heisei bubble as a case study of a similar economic crisis

Japan can be regarded as an exceptional case study of post-war economic development followed by decline driven by the asset price bubble the country experienced in the late 1980s. As argued by Shiratsuka (2003), long-term price stability, combined with optimistic expectations regarding future economic fundamentals, led to the formation of unsubstantiated and irrational positive expectations resembling market euphoria. This, in turn, laid the foundation for a price bubble in the economy. The crisis represents a typical example of how overvaluation, reinforced by excessive optimism and blind confidence among market participants, can lead to rapid economic growth in the short term but result in prolonged economic stagnation in the long run, following the collapse of the asset bubble.

With regard to the precise factors that contributed to such an optimistic perception of the Japanese economy, and to the applicability of these insights to the case of contemporary China, it is important to identify

[9] For more see Afonso *et al.* (2024), Beck (2022 and 2023), Beck and Okhrimenko (2024), and Beck and Yersh (2024).

the key underlying causes. To begin with, one of the most fundamental causes of the Japanese economic crisis is believed to have been related to currency valuation. As argued by Ching Tat Tse (2021), the primary reason behind the crisis can be traced to the Plaza Accord and its long-lasting effects on the appreciation of the Japanese yen against the dollar. This policy was used by the US government as a means of reducing trade deficits that had emerged during the period of dollar appreciation in the 1980s. The Japanese government was then forced to pursue monetary expansion and lower interest rates in order to achieve currency depreciation and stimulate higher levels of consumption, thereby reducing the excessive volume of capital held by banks as deposits. This assumption was based on the idea that lower interest rates would encourage consumers to spend more on high-value manufactured goods and would reduce the financial burden on manufacturing industries. In reality, however, lower interest rates combined with inflation produced a markedly different outcome, as Japanese consumers began to engage in investment activities by aggressively purchasing stocks and real estate. Even though the Japanese government was able to accommodate the imbalance created by the Plaza Accord, it failed to recognise that lower interest rates, when combined with monetary expansion, could generate inflation. Moreover, high inflation levels were perceived by society as a long-term disincentive to consumption and a source of instability, while also encouraging increased liquidity driven by rising asset prices associated with higher investment volumes (Siebert, 1999).

The next step in analysing this case is to determine what were the long-term factors that led to such massive levels of investment in infrastructure and stock markets. To address this question, it is useful to consider Japanese economic history during the second half of the twentieth century. After the Second World War, Japan was devastated, having experienced a massive bombing campaign that resulted in the near-total destruction of the country's industrial complex and economy, which until then had been heavily militarised. As a result, the newly established democratic government in 1946 faced the considerable challenge of reconstructing the Japanese economy (Pape, 1993). Under these

unfavourable conditions, the Japanese government chose to adopt an aggressive form of the Keynesian model, albeit with certain national-level adaptations. The so-called Ishidashi Keynesian policy was heavily centred on eliminating the monetary overhang that had formed in the post-war years through the stimulation of priority goods production. This approach was primarily implemented through internal borrowing from the Bank of Japan to domestic producers. However, such a policy exhibited significant drawbacks, including potential price instability and an increased velocity of money resulting from the expanding money supply (Hamada and Kasuya, 1992). Even though these policies had a positive effect on Japan's early economic development, it is argued that they remained highly autarkic and protectionist in nature, as they were heavily centred on subsidies to industrial producers and price controls. Such an arrangement arguably served as one of the causes of the recession during the establishment of the Dodge Line (Sugita, 2019). The Dodge Line, an American financial and contractionary policy designed to stabilise the Japanese economy and overcome post-war inflation, played a decisive role in shaping the foundations of the modern Japanese economy. It established the economic conditions for a transition towards an open market economy through tight budgetary controls, fixed exchange rates, and a contraction of the money supply. Despite the recession associated with this transition, Japan was able to establish itself as an independent economic actor in the international market. Moreover, in the early 1950s, the country re-established trade relationships with several foreign partners, such as the United States, South Korea, and Taiwan, supported in part by the outbreak of the Korean War. Furthermore, the recovery of light textile industries led to technological and financial booms in 1957 and 1961, respectively, while the Japanese economy experienced a substantial inflow of foreign investment through capital investment in the Japanese stock market (Sakata, 1969). This situation was largely driven by the relative stability of the country's business cycles, rapid development of industrial structures, and stock price volatility associated with the Japanese corporate approach to debt. At the same time, as argued by Arestis, Demetriades and Luintel (2001), the role of the stock market as

a source of economic growth is often overstated, as despite its importance for debt accumulation and corporate development, banks continued to serve as the primary financial institutions.

In this regard it is important to determine what factors enabled Japan to sustain the level of economic growth achieved through foreign investment in its stock market and financial institutions. With this in mind, a useful approach is to analyse the primary trends experienced by the country during the 1970s. As stated by Harris (1982), Japan underwent a significant social transformation during this period, associated with rapid urbanisation and the expansion of the Pacific industrial belt, driven by large-scale migration from rural regions. This process resulted in a major shift in population structure, such that by 1980 nearly 76% of the population resided in major urban centres. Similarly to the United Kingdom in the nineteenth century, the Japanese economy experienced a substantial inflow of labour into industrial sectors through rural-to--urban migration (Williamson, 1988). This migration of labour resources played a major role as an accelerator of sustained economic growth. However, it is important to examine how Japan was able to achieve such a swift transition from a primarily rural population to an urbanisation rate of nearly 76% within just a single decade. As stated by Pradhan, Arvin, and Nair (2021), the urbanisation process can have a positive influence on the economy through population migration. Without adequate transportation and information and communication technology (ICT) infrastructure, urbanisation may lead to negative economic consequences, such as the formation of slums, diseconomies of scale, and congestion. To achieve efficient urbanisation, a government must provide a favourable foundation for the creation of new infrastructure or the improvement of existing infrastructure within the economy. In the case of Japan, the government under Prime Minister Kakuei Tanaka advocated a large-scale transformation of the Japanese archipelago through extensive infrastructural projects. This policy aimed to decentralise the economy through the construction of expressways, high-speed railways, and bridges, which were intended to act as stimuli to prevent the outflow of capital and human resources from rural areas (Sargent, 1973). However, despite the

economically benevolent objectives of this policy, the Tanaka Plan was never fully implemented to the extent originally intended. As argued by Simonis (1974), in the context of infrastructural development, a key aspect of such policies lies in balancing investment between public and private goods. Japan represents a typical case of imbalance in favour of enterprise-oriented investments, such as roads, harbours, airports, and railways. This contributed to a more rapid rate of urbanisation compared to other economies. Ironically, the plan, which aimed to reduce economic disparities between Japanese regions by promoting economic activity, ultimately reinforced the economic dominance of urban and industrial centres. The architect of the plan later became one of the most successful, yet corrupt, politicians in modern Japanese history (Watanabe, 1993).

The Japanese government entered the 1980s with a high budget deficit, which it traditionally attempted to address through the issuance of deficit-financing bonds. This decision made Japan one of the most heavily indebted industrial economies in the world (Suzuki, 1999). Years of debt accumulation, combined with the previously mentioned Plaza Accord and rising asset price inflation, led to the economic boom of 1986, the longest economic expansion the country experienced in its modern history since the Second World War (Noguchi, 1994). Consequently, when Japan entered a new era in 1989, economic expectations among much of the population were highly optimistic. In reality, however, the Japanese economy began to experience a slowdown, reflected in stagnating economic growth rates (Lincoln, 2011). Furthermore, market liberalisation, supplemented by the expansion of foreign credit accessible to Japanese businesses, led to the uncontrolled growth of credit extended by both Japanese banks and corporations. This expansion became a source of overvaluation and long-term instability, as Asian corporate culture encouraged reliance on credit as a primary source of funding for companies' financial activities (Allen and Gale, 1999). The country entered a vicious cycle in which declining economic growth, combined with a growing debt burden, became heavily dependent on the value of assets held by financial institutions. It was common practice to use such assets as collateral, which meant that it was only a matter

of time before financial institutions became insolvent, either due to a lack of liquidity or a catastrophic decline in the value of their investment portfolios (John, 2022). This scenario materialised in 1990, when, due to severe asset overpricing, the Japanese economy faced a massive deflation of stock and asset prices. The decline in asset values caused the bankruptcy of two of Japan's largest investment banks and led to the collapse of numerous excessive loans. High levels of excessive debt and leverage remained a serious problem for many financial institutions. The country entered a prolonged period of economic stagnation, which Japanese economists later termed the 'lost decade'. This period continues to play a detrimental role in Japan's economic development to this day (Abe, 2010). The most persistent legacy of the bubble economy, however, was deflation, which for the last 25 years has served as a symbol of the country's struggle with post-crisis recovery. It has also been a key reason for decades of ultra-loose monetary policy and prolonged periods of slow economic growth (Kihara, 2023).

To sum up, the case of Japan is particularly instructive, as it presents an apt example of economic development heavily centred on economic booms driven by inflows of foreign capital and substantial state spending on infrastructural projects. It provides an important background for discussion regarding the efficiency of such a growth model and the consequences that may arise when it is misused. A rapid decline in foreign direct investment, combined with monetary excess, led to a decade-long period of deflation and stagnant economic growth. This case illustrates how overly optimistic expectations among domestic consumers, reinforced by positive perceptions among foreign investors, can give rise to periods of economic euphoria. Such conditions may also lead to complacency among investors and state authorities in addressing emerging economic challenges. Finally, it demonstrates that currency fluctuations and exchange rate regimes can act as sources of major economic downturns: if left uncontrolled, excessively controlled, or misaligned—as in the case of the Plaza Accord—countries involved may face severe economic depreciation driven by currency overvaluation and excessive liquidity.

2. Methodology

In this section, we conduct a brief analysis of the literature on econometric models, data sources, and the most appropriate econometric tests to identify a model suitable for testing the hypothesis of this paper. The main hypothesis is that outflows of foreign direct investment (FDI) from China were a direct cause of the country's deflation and economic slowdown in recent years. With regard to the subject literature, we present an economic synthesis of recent econometric theories concerning the role of FDI as a driver of economic growth, as well as the potential drawbacks it may bring to the economy. Lastly, all the discussed findings and theories are summarised in the final econometric model. This model serves as the primary framework for the econometric analysis of the paper's hypothesis that a direct relationship exists between investment outflows and deflation.

When it comes to FDI, its effect on developing economies is usually regarded as positive, as it helps to promote economic development and growth. Moreover, it creates a background for the development of domestic investment and human capital (Makki and Somwaru, 2004). As argued by Benetrix, Pallan, and Panizza (2023), since the 1990s FDI has been found to have a relatively limited effect in countries with underdeveloped financial depth and low levels of human capital. This situation is mainly attributed to the rising role of global value chains (GVCs) and globalisation in general. Furthermore, in their research they present several solutions for the econometric model, which was designed to incorporate numerous domestic factors such as domestically accumulated savings, education, and human capital. These parameters were considered additional factors that could amplify the effect of FDI. On the one hand, such conclusions may be seen as a diversification of the theoretical approach towards FDI and its influence. On the other hand, such results mainly arise from the assumption that FDI cannot be fully realised, despite its positive effects, as it requires an adequate institutional framework and a skilled population to maximise the economic potential of investment. In this regard it is crucial to determine what are the most

common ways in which FDI penetrates an economy, and how does the institutional environment, or rather the lack of it, influence national economic development. When FDI is considered as an investment tool, its primary goal is to establish an economic presence in a foreign market, and it can usually be divided into two subcategories: vertical and horizontal. By its nature, horizontal FDI is presented as a direct expansion of a company through the relocation of production to another country. This strategy is typically explained by the resource-seeking behaviour of companies, together with cost minimisation, which allows a company to establish itself in the market. However, one of the negative aspects of this approach is that it exposes the company to numerous domestic factors, such as economic growth, exchange rates, education levels, and the quality of state institutions. When it comes to vertical FDI, it is mainly presented as cost-seeking, as its primary goal is to establish the production of goods in countries with lower production costs in order to achieve economies of scale in both domestic and international contexts. Such an approach is more dependent on the host country, which is tasked with the creation of production facilities by local workers from scratch. In both cases, multinational corporations have a strong incentive to pursue FDI to expand their production abroad, either by creating new production facilities or by relocating existing ones. The only exception to this pattern is forward FDI, which is centred on the sale of goods from the parent company in the host country through imports. These conclusions are supported by the findings of Ramondo, Rappaport, and Ruhl (2011), who found that horizontal FDI was the most prevalent mode of FDI among American multinational companies, in contrast to vertical FDI, based on input–output data from 77 American enterprises. This allows us to conclude that the institutional environment plays a crucial role in FDI, as it facilitates smoother and more efficient penetration of foreign enterprises into the economy. The above statement is further supported by the analysis of Mwatti (2022), who argues that the government of Tanzania, despite being able to benefit from the positive effects of FDI, has failed to maximise these effects in terms of both efficiency and scale due to underdeveloped financial institutions and legislation. Thus, in

both theoretical and empirical terms, the relationship between FDI and economic growth is positive.

However, when it comes to inflation, what is the relationship between FDI and the inflation rate within an economy? From one point of view, inflation has a strong negative correlation with FDI, as it leads to higher production costs as well as a decline in potential profits that investors could generate in a given country. It may also act as a driver of FDI, as it motivates investors and multinational corporations to hedge their risks by investing in economies with lower inflation levels than those in their home countries (Sayek, 2009). This arrangement, by contrast, helps foreign entities mitigate the negative effects of inflation. However, from the perspective of the host country, it is generally argued in theoretical literature that high inflation serves as a major deterrent to FDI. It may lead to depreciation of the domestic currency as well as a decline in asset prices denominated in foreign currencies, with such assets being the most vulnerable segment of the domestic market (Takefman, 2022). Yet, moderate levels of inflation may have an opposite effect, serving as a motivating factor for multinational corporations. Inflation can thus be viewed as an indicator of strong domestic economic expansion driven by rising production and consumption levels. Depending on the level of inflation in the economy, FDI may either increase or decline in line with investors' efforts to minimise their exposure to economic risks.

Another step in our analysis is to examine the precise relationship between foreign investment and deflation, given this strong correlation between inflation and FDI. From a logical point of view, the relationship between deflation and FDI should be seen as a negative one, as an increase in FDI raises the amount of capital in the economy and creates inflationary pressure. Moreover, this assumption is supported by the research of Kokkores, Kottaridi, and Pantelidis (2017), who state that deflation in numerous EU Member States has led to a decline in FDI. However, as shown in their econometric analysis, deflation cannot be regarded as the sole reason for FDI outflows. At the same time, as argued by Calvo (2014), the main factor explaining fluctuations in FDI can be identified as investors' expectations. In his work, he maintains that this approach

provides an extensive justification for numerous financial shocks, as it allows them to be explained through the concepts of Sudden Stop and Sudden Flood. The Sudden Flood concept refers to a situation in which an economy experiences a surge of foreign capital through long-term liabilities due to rising investor confidence. At the same time, the Sudden Stop concept describes a situation in which, due to a loss of confidence, foreign investors trigger a fire sale of long-term assets. This situation makes the economy extremely vulnerable to output collapse and welfare redistribution. However, paradoxical as it may seem, the author argues that the primary source of such economic fragility can be attributed to the uncontrolled growth of long-maturity investment resulting from a Sudden Flood. An economy may become vulnerable to FDI due to its inability to maintain long-term investor confidence, which ultimately results in economic slowdown. It can thus be proposed that FDI itself, or rather its outflow driven by a loss of confidence, may be seen as a cause of deflation. This conclusion is supported by the case of China, where a loss of investor confidence led, for the first time in history, to a negative net flow of investment (Kawate, 2023). This development became evident from 2022 onwards, when the country began to experience a decline in investor trust due to concerns about spillover effects and economic contraction (Reuters, 2023).

It could be argued that confidence may act as a catalyst for deflation. However, it is important to identify the specific factors, aside from public debt, that may undermine investor confidence. End *et al.* (2015) suggest that deflation has a direct impact on the value of public debt relative to GDP, as this process arises from a deterioration in interest rate and GDP growth differentials. As the economy contracts, a country faces increasing debt pressure associated with higher interest rates and economic slowdown. At the same time, as proposed by Brooks and Quising (2002), deflation may result from a rise in personal savings due to declining consumption volumes, as consumers expect prices to continue falling in the short run. A decline in private consumption may thus lead to an accumulation of private equity and potentially result in an excess of investment. It could therefore be stated that confidence, despite being

one of the key parameters for explaining fluctuations in investment volumes, continues to exert a strong influence on the structure of capital markets (Smith, 2006). This leads to a logical question: what is the role of public spending allocation in deflation, given the monetary pressure it creates on both private and public finances? When it comes to public debt, it is evident that deflation itself makes the acquisition of additional funds, such as debt obligations, more financially burdensome. The role of public spending remains fundamental to economic stability through government purchases and social benefits. It is reasonable to assume that a rising burden of public debt will not necessarily diminish the volume and scale of funds allocated to various financial programmes and services provided by the state. Such an arrangement may lead to persistent financial instability, as it forces the state to continue borrowing from the market at its own risk while exposing the economy to lower output levels (Palley, 2010). This conclusion is generally supported by the practical example of the Chinese government, which, despite its financial difficulties, made a long-term commitment to expand budgetary spending in 2024 (Bloomberg, 2024). Such a development may be regarded as paradoxical, as despite significant exposure to deflation and FDI outflows, the Chinese government continued to pursue an expansionary fiscal policy, particularly with respect to military spending (Wong and Arredy, 2024). This can be considered a key explanation for the financial instability that has emerged from the combination of deflation and extensive budgetary spending (He, 2023).

Consequently, based on the methodological analysis presented above, the following econometric model can be generated:

$$Inflation = \alpha_0 + \alpha_1 \cdot FDI + \alpha_2 \cdot CurC + \alpha_3 \cdot RRPP + \\ + \alpha_4 \cdot Con + \alpha_5 \cdot Res + \alpha_6 \cdot Def + \varepsilon$$

The first parameter, inflation, is the dependent variable, while FDI, Currency Conversion, Real Residential Property Prices, Consumer Confidence, Total Reserves, and National Defence expenditures are represented as independent parameters. The primary assumption behind the

potential use of the CPI as the main indicator of inflationary pressure in the economy is that it provides a fair measure of inflation competitiveness (Shaban *et al.*, 2019), thereby making it possible to analyse how changes in interest rates influence product prices and consumer consumption in general. However, due to the non-stationary nature of the CPI, the inflation rate and its month-to-month percentage change were used as the primary dependent variable. This decision allows the application of linear regression to estimate future inflation values, similarly to the approach of Kandil (2013), who applies Box–Jenkins methodology and linear regression to estimate future inflation in Egypt. When it comes to FDI, it is presented as a balance-of-payments component reflecting investment flows in the Chinese economy. When it comes to currency conversion, this parameter is used to assess the purchasing power parity of the Chinese economy and its influence on the CPI, as well as on the volume of trade with other nations (Ahmad and Ali, 1999). Real Residential Property Prices will be used as a measure of the level of domestic investment, as they represent real market factors that have a direct correlation with price formation (Belke and Kiel, 2017). To present a more complete picture of domestic capital markets, consumer confidence will be used as another explanatory parameter reflecting the willingness of market participants to invest in long-term assets such as housing (Lemmon and Portniguina, 2006). Furthermore, total reserves will be used as a measure to analyse the efficiency of government monetary policies and the structure of budgetary spending, together with their impact on inflation (Khan, 1979). Finally, we will use national defence spending as an example of excess budgetary expenditure that has a limited influence on economic growth but a strong influence on inflation through the budget and state debt (Star *et al.*, 1984). In addition, as a technical parameter, the error term ε will be introduced into the model to minimise potential deviations of the core results.

Table 1. Information about the econometric variables

Variables:	Abbreviation:	Construction:	Source:
Inflation	----------	Inflation rates for the Chinese economy presented on a monthly basis	https://tradingeconomics.com/china/core-inflation-rate
Foreign Direct Investment	FDI	Net value of foreign direct investment into the economy in current USD values	https://data.worldbank.org/indicator/BN.KLT.DINV.CD?locations=CN
Currency Conversion	CurC	Spot exchange rate for US dollar to yuan, monthly data	https://fred.stlouisfed.org/series/CCUSSP02CNM650N
Real Residential Property Prices	RRPP	Index of housing affordability in China, where 2010 = 100	https://fred.stlouisfed.org/series/QCNR628BIS
Consumer Opinion Surveys	Con	A consumer opinion survey, where 100% represents a medium for moderate confidence	https://fred.stlouisfed.org/series/CSCICP02CNM460S
Total Reserves excluding Taiwan	Res; TotRes	Total currency and gold reserves for China, monthly data	https://fred.stlouisfed.org/series/TRESEGTWM194N
National Defense Consumption Expenditures	Def	Military expenditure by China in current USD values	https://data.worldbank.org/indicator/MS.MIL.XPND.CD?locations=CN

The timeframe used in this analysis concentrates on the period from the beginning of the pandemic in December 2019, when the first cases were reported in China, until December 2023. The timeframe chosen for this analysis is mainly associated with the economic slowdown the country faced due to the COVID-19 pandemic, which played a major role in the decline of major real estate market companies (Leun and Soo, 2024). The frequency of the analysed dataset is set as monthly data for the selected parameters over the analysed period, which allows us to observe China's economic cycle more consistently and in greater detail. As a result, the paper analyses 48 time periods in the Chinese economy over the last

four years, which serves as a typical case of a microeconomic approach. Moreover, as sources of data for the analysis, the databases of the Federal Reserve System of the United States and the World Bank were used due to their extensive coverage of the Chinese economy. Finally, the accumulated dataset is used to conduct an econometric analysis to reject or support the hypothesis of the paper.

3. Empirical analysis

In this section, several econometric analyses and tests are applied to examine how different economic parameters influence the CPI and the inflation rate of the Chinese economy. As the primary source of analysis, time-series data are used due to their flexibility and ability to generate a large and efficient amount of information. This approach is based on the research of Gjika, Puka and Zacaj (2018), who use time-series data to model CPI for countries in the Balkan region, such as Albania. In their approach, CPI time-series data are used to predict future values of the parameter and assess its influence on the economy. At the same time, it is commonly argued that the use of ordinary least squares (OLS) with time-series data may lead to inconsistent estimation due to non-stationarity, spurious relationships, and temporal dependence (Bhatta, Byanjankar and Adhikari, 2022). Thus, it is generally agreed that OLS should be used as a primary tool for time-series analysis only when the data are stationary. In cases of non-stationarity, the most appropriate methods for time-series analysis include vector autoregression, cointegration techniques, and volatility models. It is argued that despite the potential limitations arising from the finite dataset, the unit root test may serve as an efficient determinant for selecting the appropriate econometric test. Finally, with regard to the practical use of VAR models, it is commonly accepted that they are an efficient tool for time-series analysis and forecasting (Abdullah, 2021). To avoid potential issues arising from a non-stationary parameter such as CPI, the inflation rate for China is used as the main dependent variable.

To begin with, the standard OLS test was conducted using robust standard errors (HAC) and the White test for heteroskedasticity.

Model 1. OLS, using observations 2019:12-2023:12 (T = 49)

Dependent variable: Inflation rate
coefficient std. error t-ratio p-value
---
const 0.0704411 0.0325202 2.166 0.0360 **
CurrencyConversi~ -0.00138463 0.00201347 -0.6877 0.4954
RealResidentialP~ -1.35467e-05 1.41285e-05 -0.9588 0.3431
ConsumerOpinionS~ 9.90024e-05 6.47955e-05 1.528 0.1340
Foreigndirectinv~ 0.00000 0.00000 8.099 4.07e-10 ***
TotalReservesexc~ -1.46216e-13 0.00000 -3.877 0.0004 ***
Nationaldefensec~ 0.00000 0.00000 0.4921 0.6252
Mean dependent var 0.008061 S.D. dependent var 0.003556
Sum squared resid 0.000225 S.E. of regression 0.002313
R-squared 0.629810 Adjusted R-squared 0.576926
F(6, 42) 11.90922 P-value(F) 9.15e-08
Log-likelihood 231.6467 Akaike criterion -449.2934
Schwarz criterion -436.0507 Hannan-Quinn -444.2691
rho 0.507224 Durbin-Watson 0.941239
Excluding the constant, the p-value was highest for variable 8 (Nationaldefenseconsumptionex)
White's test for heteroskedasticity: -
Null hypothesis: heteroskedasticity not present
Test statistic: LM = 27.4757
with p-value = P(Chi-square(27) > 27.4757) = 0.43837

Based on the White test for heteroskedasticity, it was estimated that the presented results are not significant enough to reject the null hypothesis that heteroskedasticity is not present. Thus, the standard deviation of the model's variables over the observed period can be considered constant. When it comes to the R-square of the model, it is estimated that the presented variables explain 63% of the variance in the dependent variable. These results are found to be relatively strong, as they decline only marginally to 57.7% in the Adjusted R-square, which accounts for the number of variables included in the model. The p-values of the presented model were found to be below zero, which allows the conclusion that the null hypothesis of the F-test can be rejected and that there is statistical significance between the means. The F-value confirms that the presented parameters are not equal to zero. The log-likelihood of the data shows a high degree of goodness of fit, while the values of the information criteria indicate results that may suggest a relatively mediocre or limited goodness of fit for the presented dataset. Furthermore, with respect to the rho value, it can be observed that the model presents a relatively high degree of association between the variables, as it was estimated to be equal to 50.7%. Based on the results of the Durbin–Watson test, it can be concluded that the model shows signs of positive autocorrelation. This situation is considered a common issue for short-term time-series models with fewer than 50 observations (Bence, 1995).

As regards the results of the parameter tests, we can infer that the analysis produced mixed results. It was estimated that, of the six independent variables, only two were found to be significant, excluding the constant. The results show that Foreign Direct Investment and Total Reserves exhibit the highest level of significance at the 1% level. A one--unit increase in FDI was found to lead to no increase or to a slight decline in inflation, while the growth of foreign reserves leads to a decline in the inflation rate. In other words, the primary assumption of the hypothesis that a rising volume of state-held reserves leads to a decline in consumer welfare may be considered partially valid. Currency Conversion and Real Residential Prices were found to be insignificant, suggesting that these variables have a limited or no influence on inflation. Both Currency

Conversion and Real Residential Prices have negative coefficient values, which indicates a potentially detrimental economic effect on consumer welfare. Such results allow one to assume that currency conversion has a strong influence on consumer well-being due to its fundamental role in trade and price formation for goods. However, when it comes to residential prices, they appear to have a relatively limited influence on consumer well-being due to their constrained effect on consumption choices, price regulation, and oversupply (Dougherty and Van Order, 1982). Other insignificant parameters were Consumer Opinion and Military Spending, which allows one to assume that these variables have a very limited influence on inflation, or that their impact on the dependent variable cannot be observed directly, as they require time to reveal their full effect on the economy. This may indicate that the structure of government spending has an indirect connection to consumer spending and price formation due to the centralized nature of the economy. As such, it suggests that government spending may not be perceived as a credible source of well--being for the population, and that the use of proxies such as military spending may be statistically irrelevant. This conclusion may be seen as a shift from the classical paradigm, which treats an increase in military spending in developed economies as a displacement of public funds (Rizzi, 2019). Furthermore, with regard to public confidence, it can be assumed that its implications are quite limited due to potential convergence with international trends. This issue has been addressed by Rauh (2020), who provides a historical outline showing that trust in OECD governments has remained low over the last decade. In other words, the economic crisis in China may have contributed to a decline in public confidence due to prolonged exposure to international an economic slowdown and domestic economic depression. Moreover, the introduction of the non--stationary CPI parameter into the model may lead to improvements in the parameter values for consumer opinion and enhance both the rho and R-square values.

As a result, it may be concluded that the model requires some additional improvements with respect to the insignificant parameters. The most typical solution for time-sensitive parameters such as budgetary

spending and public confidence is the use of time lags. This method is commonly used as an efficient alternative to the ADF-GLS to improve the performance of datasets that exhibit a seasonal unit root (Castro, Osborn and Taylor, 2016). This conclusion is supported by the empirical evaluation of Surakhi *et al.* (2021), who analysed the use of time lags in time-series analysis. They determined that the application of Long Short-Term Memory (LSTM) models to optimise the number of time lags offers significant potential for predicting future parameter values. This assumption is particularly relevant for time-sensitive data that may not exert a direct influence on the economy in the short run but may generate effects over time. Accordingly, the OLS test for the model was conducted with time lags applied to Consumer Opinion and Defense Spending.

Model 3. OLS, using observations 2020:05–2023:12 (T = 44)

Dependent variable: Inflation rate
coefficient std. error t-ratio p-value
---
const -0.0259806 0.0610919 -0.4253 0.6740
CurrencyConversi~ 0.00355842 0.00373298 0.9532 0.3489
RealResidentialP~ -8.84162e-06 2.04640e-05 -0.4321 0.6691
ConsumerOpinionS~ 0.000187408 0.000106137 1.766 0.0888 *
ConsumerOpinio~_1 -2.36568e-05 0.000127077 -0.1862 0.8537
ConsumerOpinio~_2 2.35752e-05 0.000122156 0.1930 0.8484
ConsumerOpinio~_3 2.70951e-05 0.000113878 0.2379 0.8137
ConsumerOpinio~_4 -5.23097e-05 0.000114535 -0.4567 0.6515
ConsumerOpinio~_5 0.000174050 9.05141e-05 1.923 0.0651 *
Foreigndirectinv~ 0.00000 0.00000 5.297 1.37e-05 ***
TotalReservesexc~ 0.00000 0.00000 -0.8149 0.4223
Nationaldefensec~ 0.00000 0.00000 -1.500 0.1452
Nationaldefens~_1 0.00000 0.00000 1.347 0.1891

Nationaldefens~_2 0.00000 0.00000 -0.2842 0.7784
Nationaldefens~_3 0.00000 0.00000 -0.4226 0.6760
Nationaldefens~_4 0.00000 0.00000 0.5483 0.5880
Nationaldefens~_5 0.00000 0.00000 0.06174 0.9512
Mean dependent var 0.007568 S.D. dependent var 0.003358
Sum squared resid 0.000160 S.E. of regression 0.002436
R-squared 0.669463 Adjusted R-squared 0.473589
F(16, 27) 3.417827 P-value(F) 0.002396
Log-likelihood 213.0729 Akaike criterion -392.1458
Schwarz criterion -361.8146 Hannan-Quinn -380.8975
rho 0.536433 Durbin-Watson 0.915256
Excluding the constant, the p-value was highest for variable 20 (Nationaldefensec-onsumptione_5)
Test for addition of variables -
Null hypothesis: parameters are zero for the variables
ConsumerPriceIndexAllItems
Test statistic: F(1, 26) = 0.629826
with p-value = P(F(1, 26) > 0.629826) = 0.434602

Based on this test, it can be observed that the value of the R-squared has increased to 66.9%, indicating a higher explanatory power of the model. The adjusted R-squared value is equal to 47.3%, which indicates an approximately 10% decline in explanatory power due to the increase in the number of independent variables. With regard to the F-value, it indicates that the presented model is statistically significant and that the parameters are not jointly equal to zero. The p-value allows us to conclude that there is statistical significance among the variables. As for the log-likelihood, it is observed that, in comparison to Model 1, the goodness of fit has decreased but remained relatively high, while the information criteria have partially improved. Finally, the rho value has increased, indicating a higher sensitivity of the dependent variable to

movements in the independent variables, which is supported by a minor increase in autocorrelation. This finding is supported by the White test, which indicates that the data do not exhibit statistically significant heteroskedasticity.

When it comes to the results of the dataset, it can be observed that the introduction of lags for the two previously insignificant time-sensitive parameters produced somewhat unexpected results. To begin with, National Defence spending was found to be statistically insignificant at all lag levels, while consumer confidence was found to be significant only at the fifth lag. However, these improvements were not sufficient to eliminate another drawback, as both Currency Conversion and Real Property Prices remained insignificant. This outcome may be explained by the limited amount of data available to exploit these parameters efficiently or by the effects of introducing multiple time lags. Despite increasing the significance of defence spending and public confidence, the use of numerous lags may have created disturbances due to the short time horizon of the dataset (Gripp *et al.*, 2021). Although the approach generated some significant results, it may have negatively affected the temporal dynamics of the model. Foreign Direct Investment, however, continued to display strong results, remaining significant at the 1% level. This finding supports the hypothesis that there is a direct connection between the volume of foreign investment and inflation. With regard to the coefficient values, national defence spending was found to have no influence at any time lag. This finding supports the hypothesis that defence spending plays a mixed role with respect to public consumption in both the short and long run. Despite having no primary effect on public consumption in the medium run, it may still exert a positive influence on the model, which could be explained by the Keynesian multiplier. This concept suggests that public spending directly and indirectly returns to the economy in the form of consumption by both individuals and companies involved in public contracts (Ono, 2011). Regarding consumer opinion, the only significant lagged parameter was found to have a positive effect on inflation. This result indicates that, in the long run, consumers are likely to adjust their expectations upward based on the assumption

that the government will implement effective policies to overcome the effects of a depression or crisis. In other words, consumers appear more likely to exhibit optimistic rather than pessimistic expectations.

Consequently, the introduction of time lags brought significance to previously insignificant parameters. This effect improved the explanatory power of the independent variables presented in the model, but it also led to a decline in the significance of some parameters. Furthermore, the use of time lags was found to have a negative influence on model efficiency, as it led to the generation of a large number of parameters that are highly correlated with each other. As a result, up to 10% of the model's explanatory power was lost, as reflected in the adjusted R-square, due to the excessive number of parameters. This creates a major trade--off: whether the inclusion of lags is important for the relevance of the model, or whether their use should be minimized to increase the pure explanatory power of the model. One possible solution would be the use of logarithms for the insignificant parameters, as this would make them more responsive compared to lagged parameters. However, the use of logarithms could create a higher risk of heteroskedasticity and autocorrelation, as it would effectively generate additional parameters that predict future values of the model (Luetkepol and Xu, 2009). It may therefore be concluded that the logarithmic transformation of parameters may serve as an appropriate solution to mitigate the effects of time lags, but it may also have a substantial influence on overall model performance.

Model 4. OLS, using observations 2020:05-2023:07 (T = 39)

Dependent variable: Inflation rate
coefficient std. error t-ratio p-value
---
const -1.09645 0.222933 -4.918 6.42e-05 ***
ConsumerOpinionS~ 6.43903e-05 8.61647e-05 0.7473 0.4628

ConsumerOpinio~_1 -4.43319e-05 9.59102e-05 -0.4622 0.6485
ConsumerOpinio~_2 -9.92912e-06 9.22790e-05 -0.1076 0.9153
ConsumerOpinio~_3 -2.66374e-05 8.70304e-05 -0.3061 0.7624
ConsumerOpinio~_4 -5.31784e-05 8.80499e-05 -0.6040 0.5520
ConsumerOpinio~_5 4.81073e-05 7.60374e-05 0.6327 0.5335
Foreigndirectinv~ 1.30642e-13 0.00000 8.652 1.57e-08 ***
TotalReservesexc~ -1.07405e-13 0.00000 -2.032 0.0544 *
Nationaldefensec~ 0.00000 0.00000 -2.453 0.0225 **
Nationaldefens~_1 0.00000 0.00000 1.591 0.1260
Nationaldefens~_2 0.00000 0.00000 -0.2745 0.7862
Nationaldefens~_3 0.00000 0.00000 -0.09921 0.9219
Nationaldefens~_4 0.00000 0.00000 -0.03197 0.9748
Nationaldefens~_5 0.00000 0.00000 -0.5973 0.5564
l_CurrencyConver~ 0.0259186 0.0207511 1.249 0.2248
l_RealResidentia~ 0.236887 0.0478904 4.946 6.00e-05 ***
Mean dependent var 0.007667 S.D. dependent var 0.003542
Sum squared resid 0.000074 S.E. of regression 0.001833
R-squared 0.844976 Adjusted R-squared 0.732232
F(16, 22) 7.494610 P-value(F) 0.000014
Log-likelihood 201.6018 Akaike criterion -369.2036
Schwarz criterion -340.9231 Hannan-Quinn -359.0568
rho 0.127861 Durbin-Watson 1.591166
Excluding the constant, the p-value was highest for variable 19 (Nationaldefenseconsumptione_4)
White's test for heteroskedasticity:
Null hypothesis: heteroskedasticity not present
Test statistic: LM = 32.4119
with p-value = P(Chi-square(32) > 32.4119) = 0.446449

Using these assumptions, test Model 4 was created, with Currency Conversion and Real Residential Prices presented as logarithmic parameters. As a result, the explanatory power of the model has increased by nearly 18%, with the R-square equal to 84.5%. However, despite this increase in explanatory power, the adjusted R-square indicates that up to 11% of the model's explanatory power is attributable to the number of parameters included. The F-value remains unchanged, as does the P-value, which indicates that the model continues to be significant, with no parameters equal to zero. The absolute value of the log-likelihood has decreased in comparison to Model 2, which indicates that the presented parameters exhibit a better goodness of fit. Furthermore, with respect to the information criteria, all values show a degree of decline, which may indicate that the model has potentially lost some explanatory power. Meanwhile, rho has decreased by 40%, indicating a reduction in model sensitivity compared to Model 3. However, despite this decline in sensitivity, the Durbin–Watson statistic has increased relative to Model 2, which indicates a general reduction in autocorrelation. Finally, with regard to heteroskedasticity, based on the White test, Model 4 does not exhibit heteroskedasticity.

With regard to the parameters, it can be observed that the improvement in the values of Real Residential Prices was accompanied by a decline in core parameters such as Total Reserves. This may represent an ironic situation, as the improvement of previously insignificant parameters may have contributed to the improvement of the National Defense parameter. The values of the newly significant parameters are also noteworthy. The logarithmic version of Real Residential Prices was found to be significant at the 1% level and to exert a strong positive influence on inflation. Currency Conversion, however, was found to be insignificant, with a mainly positive influence on inflation values. There has been a major change in the parameter values, which has several interesting theoretical implications. Based on the estimated values, Real Residential Prices play a major positive role in consumers' consumption and confidence in the long run. This conclusion supports the idea that the purchase of real estate is a major investment by consumers, which

has a positive influence on economic development and inflation. Moreover, it can also serve as an indicator of public confidence, as it requires either the accumulation of funds or reliance on the country's financial institutions. Regarding Currency Conversion, an increase in conversion rates is associated with higher inflation values. This development may indicate that, in the long-run perspective, Currency Conversion has a positive influence on consumers' confidence and consumption, since China is heavily dependent on imports. Chinese consumers are more vulnerable to changes in currency exchange rates due to the country's supply being heavily based on both imports and exports of goods. With regard to the remaining significant parameters, National Defence Spending, adjusted for time lags, remained significant in its core value, while Consumer Confidence remained insignificant. In addition, an interesting development can be observed in the value of the constant, which became more negative in comparison to Model 3, with its significance remaining at the 1% level.

Based on the results of Model 4, it can be concluded that a major trade-off can be observed between the use of lags and logarithms. While the use of lags presents a general decline in the values of rho, as well as a strong dependence on the number of observations rather than their quality in a limited time series, this decline in values can be seen as insignificant, as despite the extensive use of time lags, the model itself has shown notable improvements with respect to issues such as autocorrelation and the R-square value. This outcome indicates that the presented models cannot generate sufficient significance for the inclusion of time-sensitive parameters. It could be, therefore, considered a logical conclusion to return to the starting point of the research, namely Model 1. However, such a decision may have potential negative effects on the model's residuals, which showed relatively limited variation in Model 4. Such an approach may be useful for analysing the potential use of logarithmic functions in the linear model to improve the performance of factors such as Real Residential Prices and Currency Conversion. Thus, the adjusted test for Model 1, in which both mentioned parameters were substituted with their logarithmic counterparts, was conducted. However,

the results obtained from this approach were found to be questionable, as the use of logarithms in the original model without time lags for other parameters led to the complete insignificance of Total Reserves and Currency Conversion. With respect to the significant parameters, only FDI, Real Residential Prices, and National Defence Spending continued to exhibit statistical significance in the model. This change can be seen as an improvement in comparison to the previous models, but it remains highly questionable. When it comes to several technical parameters, the model represents only a slight improvement compared to Model 4. Following this analysis, it appears to be a logical solution that the most efficient way to improve the model at this stage is the elimination of the most problematic and persistently insignificant parameters, such as Consumer Opinion and National Defence Spending.

Model 6. OLS, using observations 2019:12–2023:12 (T = 49)

Dependent variable: Inflation rate
coefficient std. error t-ratio p-value
---
const 0.102728 0.0127261 8.072 2.71e-10 ***
Foreigndirectinv~ 0.00000 0.00000 7.785 7.09e-10 ***
TotalReservesexc~ -1.77063e-13 0.00000 -7.341 3.19e-09 ***
CurrencyConversi~ -0.00298700 0.00113509 -2.632 0.0116 **
Mean dependent var 0.008061 S.D. dependent var 0.003556
Sum squared resid 0.000247 S.E. of regression 0.002345
R-squared 0.592216 Adjusted R-squared 0.565031
F(3, 45) 21.78419 P-value(F) 7.29e-09
Log-likelihood 229.2770 Akaike criterion -450.5540
Schwarz criterion -442.9868 Hannan-Quinn -447.6830
rho 0.588162 Durbin-Watson 0.802104

White's test for heteroskedasticity:
Null hypothesis: heteroskedasticity not present
Test statistic: LM = 13.3614
with p-value = P(Chi-square(9) > 13.3614) = 0.146923

As a result, Model 6 was generated. From the R-square values, it can be observed that the elimination of both parameters did not result in any major change in the explanatory power of the model, which remains at 59.2%. In comparison to Model 1, the Adjusted R-square has decreased by 1%. This result suggests that the elimination of additional parameters improved the model when adjusted for the number of parameters. Regarding the F-value and P-value, it can be seen that both tests exhibit only minor changes in comparison to Model 1. Thus, the model remains statistically significant, and the estimated parameters are not equal to zero. With respect to the log-likelihood, the value has increased slightly and is equal to 229.3. However, the values of the information criteria in comparison to Model 1 increased marginally. This situation presents a rather interesting conclusion regarding Model 6, as it is the first case in which both the log-likelihood and the information criteria have shown signs of minor improvement in their values. With respect to the rho and Durbin–Watson tests, neither shows major changes compared to the original model. The model explains up to 58.8% of the variation in the dependent variable, while the Durbin–Watson statistic indicates the presence of positive autocorrelation. In addition, with regard to heteroskedasticity, the elimination of the two parameters led to a decline in the test statistic by up to 29%. The test value of 14.6% remains above the 5% threshold, indicating that model provides only limited evidence for the presence of heteroskedasticity.

With regard to the results presented by the parameters in the model, a major improvement in significance levels has occurred. Of the three parameters, excluding the constant, FDI and Total Reserves were found to be significant at the 1% level, while Currency Conversion was found to be significant at the 5% level. This outcome can be seen as a major

improvement compared to Model 1, in which Currency Conversion was insignificant at all levels. Regarding the coefficient values, Currency Conversion and FDI were found to have a negative influence on the CPI, while FDI was found to have a neutral effect on inflation. Currency Conversion was also found to have a limited influence on inflation, which indicates that exchange rates do not have a strong impact on individual consumption. In contrast, the level of Total Reserves was found to have the strongest influence on individual consumption, which supports the idea that excessive capital accumulation is harmful to the real economy. This relationship can most commonly be explained by the deflationary pressure generated by reserves within the economy. Overall, both Currency Conversion and FDI can be seen as parameters that exert a positive influence on individual consumption, as they promote economic growth, trade, and, most importantly, higher consumer purchasing power. Thus, Model 6 appears to be the most efficient, encompassing a range of socio-economic parameters related to inflation and the influence exerted by various factors.

In summary, following the previously formulated methodology, several tests were conducted to analyse the potential relationships that exist between independent and dependent parameters. The results indicate that the majority of the presented data were found to be significant. The analysis also allowed for the identification of a set of numerical and theoretical connections within the Chinese economy. The relationship between the national total reserves and consumers' well-being was found to be negative, supporting one of the paper's hypotheses that excessive capital accumulation in the economy is one of the primary factors behind deflation. Real residential prices were found to have a limited but insignificant positive effect on consumers' propensity to consume, which can be explained by the possibility of market overheating. This outcome resulted from the aggressive expansion of developers in the domestic market, who invested considerable amounts of funds and resources in the real estate sector. Even when accounting for speculative demand and the trend of price inflation driven by constantly expanding demand, the real estate market collapsed without a government bailout. This ultimately created

a vacuum-like situation, resulting in an vast number of housing projects that could not be completed or sold due to low or negative profit margins. By creating an environment of housing oversupply, the government contributed to a liquidity crisis that led to the depreciation of housing market values. Given the limited economic influence of real residential prices on inflation rates, the real estate market cannot be defined as one of the major causes of inflation. The case of currency conversion is more complex, as it serves as an indicator of consumers' purchasing power and of how beneficial trade is for the general population. The results indicate that currency conversion has a negative influence on inflation, suggesting strong benefits for Chinese consumers derived from trade through arbitrage and exchange rate mechanisms. Thus, the Chinese authorities were able to achieve a level of currency conversion that was highly beneficial for domestic consumers. Nevertheless, despite the optimistic effects that currency conversion had on consumer well-being, it remains unclear how this factor influences the volume of imports and exports in the economy. With respect to FDI, the results suggest a neutral influence on inflation, as the inflow of foreign investment exerted an indirect effect on consumption rates. This finding highlights the importance of foreign capital inflows for the economy and their influence on domestic consumption through economic multipliers. It also supports the general notion that investment is highly dependent on a set of internal economic factors, as well as the sudden stop hypothesis, which suggests that a decline in economic performance may trigger an uncontrolled outflow of capital and negatively affect consumption. Overall, the observations and findings presented above support the main hypothesis of this paper: that an outflow of FDI may result in deflation. This outflow was driven by an uncontrolled rise in total reserves and a decline in economic growth in the Chinese economy.

Conclusion

In this paper, the topic of the Chinese deflationary crisis was discussed. As a primary hypothesis for the analysis, the real estate crisis of the

Chinese economy was examined, most notably the case of the Evergrande real estate developer. The company accounted for up to 5% of the entire Chinese housing market, and its bankruptcy led to a chain of events resulting in full-scale market panic. To provide a more extensive and comprehensive picture of the crisis and assess whether it had precedents in other countries in the region, the cases of Japan and Thailand were analysed. Using a synthesis of the material, it was determined that in both of these Asian economies there was an immense inflow of FDI associated with post-war economic development as well as infrastructural projects. In Thailand, this was reflected in capital inflows into manufacturing industries, which experienced one of the highest rates of economic growth in the region. Similarly, Japan experienced a strong economic boom in manufacturing goods and infrastructure. In both cases, this created a long-term environment for continuous economic growth above the average of developed nations and generated higher returns on investment. Both economies consequently experienced a major inflow of capital, supported by a set of different economic arrangements such as fixed exchange rates or high interest rates offered by private enterprises. This led to long-term capital accumulation and subsequent inflation of the economy, represented by high asset market values. The inflow of foreign capital contributed to the creation of asset bubbles driven by speculative demand. Ultimately, major capital outflows triggered economic crises and slowdowns, following the collapse of private investment markets. In Thailand, this resulted in severe currency devaluation, while Japan faced a deflationary gap. Based on these observations, the hypothesis was formulated that the Chinese deflationary crisis can be explained by FDI outflows, supplemented by currency depreciation as an accelerating factor. More specifically, capital outflows led to a decline in the real value of the currency, reflected in purchasing power parity and public consumption. This assumption was based on the fact that the Chinese economy experienced a major outflow of foreign investment due to the insolvency of one of the country's largest real estate developers.

To investigate this question and achieve practical results, an econometric model for inflation rates was developed to estimate how an inflow

or outflow of FDI affects the level of consumption in the economy through consumer goods prices. As additional factors, the influence of Real Estate Prices, Currency Conversion, Total Reserves, Public Opinion, and National Defence Spending was analysed. The results indicate that some of these factors had a direct influence on the economic well-being of the population and its consumption choices, as reflected in inflation. With regard to Public Opinion and National Defence Spending, these parameters had no influence on inflation in the short run due to the time-sensitive nature of the data. Real Estate Prices and Currency Conversion were found to have positive but partially limited or no effects on individual consumption and inflation in general, which can be explained by oversupply in the real estate market and the strict exchange rate policy. Regarding FDI and Total Reserves, both parameters had a direct influence on inflation rates and consumers' propensity to consume. Of these two variables, Total Reserves were found to have a negative effect on inflation and consumption prices, which may indicate the presence of deflationary pressure. In contrast, FDI was estimated to have a neutral influence on the economy, supporting the consensus that foreign investment has a mixed effect on economic outcomes. It also suggests that an inverse relationship may exist, as capital outflows can act as a major factor contributing to deflation. Overall, based on the presented information, it can be concluded that deflation in the Chinese economy emerged due to multiple factors. The first factor was the outflow of FDI caused by the default of a major real estate developer, followed by market panic, which resulted in an extensive outflow of foreign capital by investors. The second factor was associated with Chinese monetary policy, namely the aggressive expansion of foreign currency reserves, which is typically linked to rising inflationary pressure. The third factor, related to Currency Conversion, can be seen as an accelerator, as it created conditions for the outflow of substantial amounts of capital from the economy. This also generated strong depreciation pressure on the Chinese currency, which the government was forced to address to maintain the fixed exchange rate policy. Thus, capital outflows compelled the government to implement a contractionary fiscal policy to sustain the fixed exchange rate regime,

resulting in a decline in both private and public funds. The final factor considered in the analysis is Real Residential Prices, which were found to have a positive but statistically insignificant effect on inflation. This outcome may be explained by a substantial decline in real estate values for sale. In sum, the above-mentioned findings support the hypothesis that the outflow of FDI is one of the primary factors behind Chinese deflation. However, the deflationary pressure faced by the economy was not solely driven by FDI outflows but was accelerated by numerous domestic factors as well as the fiscal policies of the state.

The major issues encountered during the writing of the paper can be divided into several subcategories. The first issue lies in the divergent approaches to FDI as an economic parameter in the literature. On the one hand, FDI is commonly accepted as a positive factor for the economy, as the globalisation of capital has created more opportunities for investment in developing economies. On the other hand, based on the cases of Japan and Thailand presented above, FDI was found to constitute a major background factor for economic crises due to the overheating of national debt markets. Speculative demand and optimistic expectations therefore created a destabilising 'time bomb' effect. The issue of causality between FDI and deflation remains relatively underdeveloped and contested, as much of the existing literature considers the structure of the economy and economic policies to be the primary drivers of inflation. For example, in Japan, deflation was typically attributed to extensive budgetary spending on infrastructure and labour culture in the corporate sector, which led to a major liquidity crisis. This crisis resulted in an economic slowdown and a decline in interest rates due to corporate and state interests in maintaining low unemployment levels. The second major issue was the lack of data for numerous parameters in the short- and long-term perspectives. This issue is strongly associated with the secrecy and potential bias of data in highly centralised economies, as the state apparatus may conceal or alter data presenting unfavourable economic trends. Nevertheless, despite the potential issues arising from the limited transparency of the Chinese state, the use of several key economic indicators proved

sufficiently effective for testing the paper's hypothesis. In response, datasets concerning inflation, investment, public spending, and, to some extent, public confidence were constructed. The model was found to be reasonably reliable despite some issues related to autocorrelation and the explanatory power of certain parameters. Finally, the most significant remaining issue was the inability to efficiently include Public Opinion and National Defence Spending as statistically significant parameters, along with minor autocorrelation concerns. These results indicate that the inclusion of time-sensitive parameters remains problematic, as even though their inclusion may provide some additional explanatory value to the model, they still require time lags to reveal their full effect. This creates a classical trade-off between the precision of the model's performance and the quality of the data used.

In conclusion, future economic papers dedicated to deflation in China may consider analysing the social background that preceded the crisis, as well as the role of the Chinese banking system. Historically, the Chinese economy has been characterised by a high level of private savings, mainly driven by social and cultural factors (Gao, 2022). However, the exact ways in which this influences the country's economic development remain unclear. The majority of Chinese banks are state-owned enterprises under the direct or partial control of the government. This raises the question of whether the funds acquired by such institutions are efficiently allocated within the economy as investment, or whether the Chinese government uses the banking system as a mechanism for crowding out additional funds. Indicators of consumer confidence based on private assessments and public spending were found to be insignificant in the model. Therefore, future research should concentrate on China's budgetary structure, particularly capital-intensive sectors such as defence and social benefits. The relationship between budgetary spending and social perceptions of economic prosperity, and its broader influence on the Chinese economy, thus remains open for further investigation.

ABSTRACT

In this paper, the topic of deflation in the Chinese economy has been analysed, as well as relevant cases within the Asian region. Primary examples for comparison with the current economic crisis in China, namely the cases of Thailand during the South Asian Economic Crisis, and Japan during the Bubble Economy period, have been discussed. It was found that, similarly to the Japanese case, China pursued aggressive economic expansion by means of infrastructural projects, both private and public. Moreover, similarly to the case of Thailand, the Chinese government has pursued a strong fixed exchange rate regime ('a peg'). As a result of following both sets of approaches, the Chinese economy was able to capitalise on the inflow of FDI to boost economic growth. At the same time, it developed a rather fragile economic structure, primarily based on confidence and private assessments of China's economic prospects. Consequently, this led to the formulation of the hypothesis that the Chinese economy, having grown dependent on FDI, faced major deflation due to the outflow of foreign capital. This event occurred after the default of one of the country's major real estate developers. Based on these hypotheses, a dataset was created to analyse the influence of FDI and other factors on the rate of inflation. It was found that the extensive accumulation of reserves by the Chinese government, as well as the decline in FDI (following the principle of reverse causality), have a direct influence on the formation of inflation rates within the economy.

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Chapter VI

The Impact of Monetary Policy on Financial Markets: Insights from the 2008 Financial Crisis

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Introduction

The global economic crisis of 2008 represents a turning point in recent economic history. It not only shattered investors' confidence and capital markets but also laid bare the brittleness and inadequacy of the traditional monetary policy framework. Before the crisis, central banks mainly used conventional instruments such as the target overnight policy rate, open market operations, and reserve requirements to influence the level of aggregate demand (Simpson, 2014). However, these tools proved insufficient in an environment of contracting credit, distressed banks, and rapidly falling asset values. Central banks therefore resorted to unconventional instruments—most notably quantitative easing (QE)—to restore stability and liquidity to the financial system.

Moreover, recent research highlights that the interaction between sovereign debt and financial institutions generated 'doom loops' that exacerbated the severity of the crisis and made the use of traditional policy instruments to mitigate systemic risks more difficult (Farhi and Tirole, 2018). This reflected not merely a liquidity shortage, but widespread balance-sheet risks across sectors.

The crisis was not solely the product of poor risk management or flawed regulation. Rather, it demonstrated how inextricably linked monetary policy, financial innovation, and market functioning had become. The extensive reliance on leverage and the skyrocketing popularity of securitised instruments such as mortgage-backed securities (MBSs) and collateralised debt obligations (CDOs) contributed to a labyrinthine and highly fragile financial system. The collapse of asset prices, combined with the operation of the financial accelerator, then transformed the downturn into a deeper financial crisis. Risk-management tools such as derivatives and hedging, previously relegated to the background, became essential during periods of extreme uncertainty.

In this essay, we seek to critically review how monetary policy, both conventional and unconventional, operated during and after the 2008 crisis in conjunction with financial markets. We examine why QE became a necessary structural departure from traditional policies to address impaired monetary conditions, examines the yield curve and its implications for market conditions, and analyse the effects of leverage and risk-taking behaviour on financial instability. We also explore the mechanisms of price bubbles and the financial accelerator, and how they amplify the effects of policy decisions. Finally, in this paper, we focus on the role of risk management tools and macroprudential oversight in safeguarding financial stability. In doing so, we incorporate a broader set of empirical and theoretical perspectives, including more recent contributions that emphasise risk perception, intermediaries' balance sheets, and macro-financial cycles (Claessens, Kose and Terrones, 2011; Borio and Zhu, 2008; Rey, 2013).

Furthermore, the increased recognition of the vulnerability of economic growth paths implies that even phases of apparent growth can conceal

macroeconomic imbalances, which must be addressed from a macroprudential rather than a purely stabilisation-oriented perspective (Adrian, Boyarchenko and Giannone, 2019; Hanson, Stein and Kashyap, 2011).

With this broader lens, we can begin to appreciate the full extent to which monetary interventions and equilibrium financial market outcomes are interconnected through dynamic feedback loops.

1. Traditional monetary policy: principles and peculiarities

Securitised banking accelerated financial fragility under these conditions, as short-term funding markets such as repos developed as direct or indirect components of the system and became susceptible to runs, thereby propagating systemic stress (Gorton and Metrick, 2012). This made it more difficult to stabilise financial markets using traditional policy instruments.

Moreover, conventional monetary instruments do not address underlying financial fragilities. These fragilities are structural and lie outside the scope of traditional interest rate policy, particularly in circumstances characterised by banks with impaired loan books, widespread mispricing of credit, and shattered investor confidence. As Cukierman (2013) observes, this crisis pushed central banks, in their search for alternative means to support markets and rebuild trust, to innovate and experiment to an unprecedented extent.

This policy-ineffectiveness gap also highlights the importance of macroprudential regulation, whose objective is to manage systemic risk and preserve financial stability, an idea emphasised by Hanson, Stein and Kashyap (2011) and Bianchi and Mendoza (2018). These authors suggest that monetary and macroprudential policies, when combined, may be more effective in managing the nonlinear credit cycle and the early warning signs of excessive risk-taking.

These constraints appear particularly binding in light of recent studies showing that the interest rate-lending relationship weakens in low-rate

regimes. Borio and Gambacorta (2017) find that further reductions in short-term policy rates are less effective in stimulating lending growth when nominal interest rates are already at or near zero. This nonlinearity arises because, at low rates, bank margins are compressed, reducing both the ability and the willingness of banks to lend. In this sense, standard rate-based policy is most effective precisely when reliance on it is least desirable.

Furthermore, Borio and Zhu (2008) argue that monetary policy affects not only the volume of credit but also the perception and pricing of risk. Lower interest rates may lead banks to underestimate risk and, in their search for yield, extend credit to lower-quality borrowers. This mechanism, referred to as the risk-taking channel, has important implications for financial stability. Consequently, the orthodox policy regime must be evaluated not only in terms of its short-run macroeconomic effects, but also with regard to its long-run impact on financial sector behaviour and risk dynamics.

Finally, Adrian, Boyarchenko and Giannone (2019) show that financial vulnerabilities can dampen growth, a condition described as 'vulnerable growth', in which economic expansions are fragile and potentially rapidly reversible. This requires policies to be sensitive to the specific financial sector environment, in addition to standard macroeconomic variables.

2. Quantitative easing – its use and implementation

Unconventional monetary policies, specifically QE, became vital in bypassing these limitations. Research by Joyce *et al.* (2012) as well as Krishnamurthy and Vissing-Jorgensen (2011) emphasises that QE works by directly affecting long-term interest rates and by increasing liquidity beyond what traditional rate cuts can achieve.

Quantitative easing represents a departure from conventional monetary policy. While traditional tools operate through short-term interest rates, QE involves the large-scale purchase of assets—usually government bonds or mortgage-backed securities—by central banks.

The goal is to reduce long-term interest rates, spur borrowing, and restore market functioning. As discussed by Chodorow-Reich (2014), the aim of QE is to loosen credit conditions by directly influencing the prices and yields of long-maturity assets.

There are various transmission channels through which QE operates. Most importantly, it acts on expectations: central banks signal their willingness to support the economy through the absorption of long-term debt, which flattens the yield curve and helps sustain investor confidence. According to Agarwal (2024), this is referred to as the 'expectation channel', in which rising asset prices and declining yields signal improving credit conditions. Consequently, businesses and consumers become more willing to borrow, invest, and consume, thereby accelerating the recovery.

The need for QE during 2008 reflected the failure of conventional instruments. Short-term rates had been pushed to their zero lower bound (Mishkin, 2009; Cukierman, 2013), constraining policymakers' ability to adjust short-term interest rates. Hence, QE did not emerge as a preference but as a necessity in response to market dislocation. Indeed, as described by Bernanke (2012), large-scale asset purchases (LSAPs) were deployed explicitly to exert downward pressure on long-term rates and promote broader financial accommodation. These purchases helped to bolster mortgage markets, lower borrowing costs, and unfreeze credit markets.

In addition, QE served as a tool to counter deflationary forces. As asset values plummeted and credit conditions tightened, deflation emerged as a serious risk. Through large-scale asset purchases, central banks effectively committed to preventing further declines in inflation expectations. Hildebrand (2006) further emphasised how QE helped to steer the yield curve, flattening both short- and long-term interest rates and encouraging longer-horizon investment.

Recent research has supported the view that QE has meaningful effects on financial markets. Gertler and Karadi (2011) show that asset purchases may be particularly effective when financial intermediaries are capital constrained, as they ease credit frictions and enhance the flow of funds. In addition, Brunnermeier and Sannikov (2014) provide a balanced

and descriptive perspective on central bank interventions, arguing that policy analysis should take into account financial amplification mechanisms, namely how changes in credit conditions feed into asset prices and risk-taking behaviour.

The yield curve is a primary channel through which these effects materialise. As a key indicator of the monetary policy stance, it behaves differently when QE is in operation. While conventional interest rate policy primarily affects the short end of the curve, QE influences the entire maturity spectrum. By suppressing long-term yields, QE flattens the yield curve, thereby signalling a commitment to sustained policy support. As Simpson (2014) observes, a compressed yield curve under QE lowers risk premia and encourages borrowing in sectors such as housing and business investment.

Additionally, QE has indirectly affected international capital flows and risk appetites. Some argue that the global financial cycle, shaped by monetary conditions in the core of the world economy, constrains national autonomy in the conduct of monetary policy (Rey, 2013). In the U.S., QE, for example, spurred capital flows into emerging markets that influenced domestic credit conditions in these countries, even in the absence of changes in local policy rates. This international dimension illustrates the far-reaching impact of unconventional monetary instruments.

Essentially, the importance of QE lies not only in its primary market effects but also in its role as an explanatory framework linking monetary policy intent to broader financial behaviour. It serves as a reminder that monetary policy in the modern economy must extend beyond short-term interest rates and account for longer-term yields, market psychology, and the dynamics of the financial system.

3. The financial fragility: leverage, MBSs, and CDOs

Leverage—the use of borrowed funds to amplify investment returns—was central to the financial excesses that led to the 2008 crisis. As highlighted by Vithessonthi and Tongurai (2013), leverage is a double-edged

mechanism: it can enhance profitability during boom periods, but it also increases vulnerability during downturns. In the lead-up to the crisis, many banks pursued aggressive leverage, taking on high-yield investments under the mistaken assumption that risk was minimal. Once asset prices began to decline, losses were amplified, rapidly eroding capital and destabilising institutions. Bailey (2005) links this excessive leverage to the heightened systemic risk that ultimately contributed to the failure of major financial institutions.

MBSs were a particularly important conduit within this fragile structure. These instruments, which pooled home loans and sold the resulting cash flows, were initially marketed as low-risk and diversified assets. However, the expansion of subprime lending and the deterioration in mortgage quality (Gupta and Agarwal, 2017) rendered MBSs highly vulnerable to default. Demand for MBSs became so strong that financial institutions relaxed lending standards, extending credit to borrowers with weak credit histories. As housing prices declined, the MBS market collapsed, resulting in substantial investor losses and threatening the solvency of institutions holding these securities.

Systemic risk was also amplified by the rise of CDOs. These complex instruments pooled various types of debt, including MBSs, and sold them to investors according to tranche-specific risk levels. CDOs were intended to disperse risk, but ultimately they concentrated it within a set of opaque and highly leveraged structures. Cloyne *et al.* (2023) argue that these dynamics made it difficult for investors, and even regulators, to assess the true extent of exposure embedded in the financial system. When the housing market collapsed, widespread defaults affected even the ostensibly 'safe' tranches, generating contagion that spread beyond the mortgage sector (Chodorow-Reich, 2014).

Leverage and the rise of securitised finance did not emerge spontaneously in an unregulated or unaccountable market. Rather, the low-interest-rate environment of the early 2000s generated a pronounced search for yield among investors. With traditional monetary instruments constrained by the zero lower bound, riskier assets became more attractive. Mishkin (2009) describes how persistently low interest rates led to

excessive borrowing and speculative lending. QE, as Hildebrand (2006) points out, stabilised markets, but it also had the unintended effect of reinforcing a cycle of risk-taking by anchoring long-term yields at low levels.

As per Altunbas, Gambacorta and Marques-Ibanez (2010), banks with weak capital bases are inclined to expand their risk-taking activity under conditions of abnormally low interest rates. In contrast, Gambacorta (2009) emphasises that prolonged low-rate environments lead banks to relax lending criteria and converge towards riskier activities, thereby increasing systemic fragility.

It is also worth noting, as argued by Borio and Zhu (2008), that low interest rates distort the perception and pricing of risk by raising the value of leverage and effectively placing a long option on financial intermediaries, thereby encouraging the extension of credit to subprime borrowers. This risk-tolerant environment, abetted by a permissive regulatory environment, contributed to the rapid creation of complex financial instruments such as CDOs, which even institutional investors struggled to understand. From this perspective, monetary policy exerted an indirect yet significant influence in creating the conditions that amplified the severity of the crisis.

More generally, in a broader macroeconomic study on the relationship between real interest rates and leverage, Dell'Ariccia, Laeven and Marquez (2014) document that low real interest rates lead to higher leverage and weaker lending standards, particularly when banks operate in competitive markets.

The 'balance sheet capacity' of financial intermediaries highlights the role played by these actors, as shown by Adrian and Shin (2010). As central banks cut interest rates, intermediaries naturally levered up their balance sheets, amplifying leverage and contributing to the formation of asset bubbles. However, this expansion rendered the system more vulnerable to shocks, as even small declines in asset values required rapid deleveraging. In addition to improved supervision of leverage and derivatives, institutional reforms are needed to realign incentives within the financial system (Acharya and Richardson, 2009).

Put simply, financial fragility during the crisis was not an accident born of misjudged risk; it was the result of a system architecture that rewarded short-term returns at the expense of long-term stability. Monetary policy, financial innovation, and regulatory blind spots, in other words, combined to form a perfect storm.

4. Price bubbles and the financial accelerator

Bubbles occur when asset prices rise far beyond their intrinsic or fundamental value, usually fuelled by speculative enthusiasm, in which investors become overconfident and ignore risk. These bubbles, as Gupta and Agarwal (2017) contend, grow quickly and then collapse suddenly, causing severe financial disruptions. The housing bubble of the mid-2000s is a classic example—prices were driven up by cheap credit, lax regulation, and investor exuberance. When sentiment shifted, prices collapsed, leading to widespread defaults, particularly in the subprime mortgage sector. Bubbles are also self-reinforcing through excess liquidity when interest rates are maintained below their natural levels. Investors in search of returns pile into high-yield assets, pushing prices well above sustainable levels. As argued by Borio and Zhu (2008), low interest rates not only make borrowing cheap; they also distort risk perceptions and thereby encourage speculative investment. Thus, monetary policy does more than merely stabilise economic activity; it may also contribute to financial imbalances. This is also important because the process is global. According to Rey (2013), the global financial cycle constrains national monetary policy autonomy. As in other large advanced economies operating under ultra-loose monetary policy, such as QE, capital spills across borders and inflates credit and asset prices, even in economies that otherwise appear financially sound.

Asset prices fall further through the operation of the financial accelerator when a speculative bubble bursts. As Bernanke, Gertler and Gilchrist (1996) argue, a decline in asset values erodes the net worth of borrowers, thereby increasing the external finance premium—the cost of external

borrowing relative to internal funds. When lenders perceive higher risk, they charge higher interest rates or restrict access to credit. As credit contracts, investment and consumption dampen, driving asset prices and output even lower. The result is a self-reinforcing spiral of deleveraging and macroeconomic contraction. This mechanism was central to the 2008 financial crisis, in which falling house prices and balance-sheet impairments triggered a severe credit freeze and a deep recession.

Cukierman (2013) stresses that the interconnection between declining asset prices and a tightening of credit functioned as a vicious circle. Banks, already suffering asset losses, came under increased capital pressure and curtailed lending even further. This credit squeeze, in turn, depressed investment and consumption, leading to a more severe recession. The financial accelerator thus transforms an otherwise limited correction into a systemic crisis.

Claessens, Kose and Terrones (2011) demonstrate that financial cycles—particularly credit booms—tend to exhibit longer durations and greater amplitudes than standard business cycles. When financial and business cycles coincide, as they did in 2008, the resulting recession is significantly more severe. They argue that macroprudential measures should complement monetary policy in order to moderate these synchronised cycles and prevent large feedback effects from exacerbating shocks. Brunnermeier and Sannikov (2016) provide further evidence for this intuition through a model characterised by endogenous risk that accumulates during periods of favourable economic conditions as a result of rising leverage and optimism. In such frameworks, small shocks can generate sizeable macro-financial contractions due to nonlinear feedback effects. Stabilisation policies should therefore focus on systemic risk alongside output gaps. The consequences of these dynamics were catastrophic. As Bouis *et al.* (2013) note, the downturn evolved from a bursting bubble into widespread wealth destruction and a severe credit shock, resulting in a deep and protracted recession. Taffler, Agarwal and Obring (2024) further argue that narratives contributed to the subprime mortgage boom by fostering greed during upswings and panic during downturns.

In terms of policy, the events of 2008 revealed a strong need for earlier intervention and stronger regulatory oversight. Asset price misalignments should be monitored, and macroprudential controls tightened during booms to prevent the build-up of destabilising imbalances. Cerutti, Claessens and Laeven (2015) in turn provide evidence that borrower-targeted macroprudential instruments, such as loan-to-value or debt service-to-income limits, are particularly effective in slowing credit growth during boom periods. These instruments act as circuit breakers that curb leverage and help shield the financial system from abrupt corrections.

Furthermore, Arakelyan, Gersl and Schindler (2023) show that macroprudential measures are most effective when applied countercyclically, particularly during episodes of excessive risk-taking. Their findings indicate that an adaptive and flexible regulatory approach, rather than fixed regulation, is better suited to managing the financial cycle. As credit expands and vulnerabilities accumulate, policymakers must not only ensure adequate liquidity but also actively discourage excessive speculation.

To conclude, price bubbles and the financial accelerator play a central role in amplifying government-sustainable fiscal crises. Monetary policy that is insufficiently calibrated can foster conditions conducive to bubble formation. When such bubbles burst, the financial accelerator transforms market corrections into severe economic downturns. Only by making financial stability an explicit objective of monetary policy frameworks, and by taking macroprudential regulation seriously, can future crises be effectively contained.

5. Using derivatives and hedging strategies for risk management

Financial instruments known as derivatives, whose value depends on the performance of underlying assets, indices, or interest rates, play various roles in financial markets. They can be used for speculation, arbitrage, or, especially during periods of crisis, for hedging risk. Greenberger (2010)

contends that, when employed prudently, derivatives can hedge against risk by enabling investors to manage price exposure and stabilise income streams when markets are uncertain.

During the 2008 crisis, derivatives were both a contributor to the problem and a key part of the solution. Complex instruments such as credit default swaps (CDSs) spread risk through markets that were not only opaque but also lightly regulated. By contrast, more conventional derivatives—including futures and options—helped some investors limit their downside exposure. Bae and Kwon (2020) also show that investors employing hedging strategies were better able to preserve capital during periods of extreme market volatility. For example, investors who purchased put options were able to insure their portfolios against falling asset prices and thereby minimise potential losses.

At its core, hedging is a method of mitigating unwanted risk by taking offsetting positions. As exemplified by Brunnermeier and Sannikov (2016), the financial system is inherently nonlinear: small shocks can generate large effects when intermediaries are highly leveraged. In such an environment, hedging becomes more than a portfolio-level choice and instead a systemic necessity for stabilising market reactions. It reduces forced asset sales, margin spirals, and panic-driven feedback loops. Gertler and Karadi (2011) further argue that when banks are capital constrained, the use of hedging strategies and central bank interventions can mitigate the severity of financial market dysfunction. Derivatives thus serve not only as tools for protecting small retail investors but also as mechanisms for maintaining liquidity and confidence in the financial system as a whole.

Effective hedging requires a nuanced understanding of correlations, pricing models, and risk metrics. It also depends on the cost of protection, as high premiums can render hedging prohibitively expensive. Adrian and Shin (2010) emphasise that the vulnerability of financial intermediaries to changes in leverage and funding conditions implies that, even when well-designed hedges are in place, weakly capitalised intermediaries may continue to pose systemic risks. Risk management must therefore be accompanied by adequate capital and liquidity regulation.

Monetary policy aims to stabilise macroeconomic conditions, while hedging provides individual agents with tools for managing risk at the micro level. These two layers must interact. During the 2008 crisis, central banks expanded QE to inject liquidity, but this alone did not eliminate volatility. Investors and institutions were therefore required to hedge idiosyncratic risks independently. Cerutti, Claessens and Laeven (2015) demonstrate that macroprudential instruments are most effective when combined with micro-level risk buffers and tools, such as capital surcharges, liquidity coverage requirements, or derivatives-based protection. This comprehensive approach strengthens the financial system and reduces the transmission of stress across markets. In addition, financial booms are often accompanied by rapid credit and asset expansion that obscures underlying fragilities (Claessens, Kose and Terrones, 2011). During such periods, risk tends to be underestimated both in the conduct of monetary policy and in investor behaviour. Derivatives can also be used to stress-test exposures and enhance resilience, even when headline indicators appear relatively benign.

However, overreliance on derivatives, or their mispricing, can also be destabilising. Acharya and Richardson (2009) caution against the use of derivatives in the absence of transparency and under distorted incentive structures. Where such conditions prevail, as occurred in the trading of synthetic CDOs and CDSs, derivatives do not mitigate but rather aggravate systemic risk. To ensure that derivatives contribute to financial stability, regulatory oversight should require that they are appropriately priced, cleared through central counterparties, and subject to margin requirements.

Derivatives and hedging played an important role in managing risks around the 2008 crisis. This has not been their only function, however: when employed properly, they provide protection against investor losses and act as a form of distributed insurance that enhances market functioning. Their integration into the broader monetary and prudential architecture is therefore critical to maintaining a sound financial system.

6. Synthesis: linkages between monetary policy, financial instruments and market dynamics

Interactions between monetary policy and financial markets are multifaceted, involving both direct and indirect transmission channels. During the 2008 crisis, QE reshaped the yield curve by compressing long-term interest rates, thereby improving credit availability and supporting investment (Simpson, 2014). By flattening the yield curve, QE signalled sustained monetary support and helped lay the groundwork for recovery. However, the very low yields generated also encouraged investors to seek higher returns in riskier assets, inadvertently incentivising leverage and contributing to asset price inflation (Hildebrand, 2006).

Recent studies have extended this understanding. Bernanke (2012) emphasises that QE operates not only through yield compression but also by shaping expectations. When major central banks communicate prolonged policy support, risk premia decline, encouraging greater risk-taking. Gertler and Karadi (2011) further note that when financial intermediaries are constrained, such policy measures are particularly effective in restoring activity in credit markets. In this sense, QE alters not only funding costs but also the broader environment in which financial decisions are made.

Nevertheless, these policy gains involve important trade-offs. Borio and Gambacorta (2017) find that at very low interest rates, the stimulatory effects of monetary policy weaken. Net interest margins are compressed, reducing bank profitability and making institutions more reluctant to lend, particularly to riskier borrowers. As a result, the very mechanisms designed to stimulate credit can, over time, undermine their own effectiveness, reflecting a nonlinear relationship that challenges traditional policy assumptions.

Meanwhile, financial instruments such as mortgage-backed securities (MBSs) and collateralised debt obligations (CDOs) emerged as important conduits through which risk was redistributed. With conventional monetary policy becoming less effective, extended periods of low interest rates incentivised a search for yield. Capital flowed into complex structured

instruments offering high returns but opaque risks. When the housing market collapsed, these instruments imploded, fuelling systemic fragility.

Dell'Ariccia, Laeven and Marquez (2014) demonstrate that in low--interest-rate environments, increased bank competition weakens lending standards and leads to widespread mispricing of risk. Borio and Zhu (2008) similarly argue that accommodative monetary policy distorts risk perception, which in turn spurs credit expansions that often prove unsustainable. In this way, monetary policy can foster the very conditions that leave financial systems vulnerable to shocks.

These interactions between policy, risk-taking, and fragility were amplified by the financial accelerator. As asset prices fell and collateral values diminished, credit became unavailable and forced asset sales followed. This hastened the collapse and amplified the initial shock. Bouis *et al.* (2013) refer to this dynamic as 'mechanical amplification', whereby even relatively small price adjustments can escalate into a systemic crisis.

Claessens, Kose and Terrones (2011) point out that financial cycles, particularly those driven by credit and housing markets, are longer and more volatile than conventional business cycles. When these cycles coincide with economic contractions, their destabilising effects are significantly magnified. This underscores the importance of incorporating financial surveillance into monetary policy considerations. Blanchard, Dell'Ariccia and Mauro (2010) suggest that central banks should adopt a 'fuller' framework that uses indicators of financial soundness alongside inflation targeting, although the specific formulations differ widely. Supervisory variables such as leverage, asset price growth, and credit expansion should be assessed in addition to traditional policy objectives. This shift calls for closer cooperation between monetary and supervisory authorities.

The international dimension is equally important. Monetary easing in core economies, particularly the United States, can generate global capital flows that transmit financial conditions across borders (Rey, 2013). As a result, financial systems in countries with independent monetary policy frameworks may nonetheless be overwhelmed by external shocks.

This 'global financial cycle' implies that national policy cannot be analysed in isolation.

Risk-management tools serve as a hedge against these shifts. Derivatives and hedging instruments offer investors decentralised means of mitigating downside risks. Adrian and Shin (2010) argue that, in an environment where financial intermediaries are vulnerable to leverage and funding conditions, such tools can help strengthen balance sheets and contain contagion. However, they must be applied within an appropriate regulatory framework to avoid the creation of new risks. Acharya and Richardson (2009) contend that stabilising forces need to be reinstated, and that both market discipline and structural reform must be strengthened. This includes improved capital buffers, greater disclosure of derivative exposures, and tighter controls on securitised products. Without such measures, the feedback loops that magnified the 2008 crisis could re-emerge.

In summary, the accumulating evidence points to the conclusion that monetary policy, financial innovation, and market behaviour can no longer be viewed as separate domains, but rather as parts of a dynamic and interconnected system. QE succeeded in easing short-term funding conditions, but it also influenced longer-term risk-taking behaviour and leverage. Structured products, facilitated by easy credit and poor risk pricing, transmitted and amplified financial shocks. Excessive leverage and inadequate regulation rendered markets vulnerable, while the financial accelerator intensified the downturn. A more resilient system requires multiple layers of protection: accommodative yet vigilant central bank policy, pre-emptive macroprudential supervision, and the broad use of risk-mitigating instruments. As shown by Cerutti, Claessens and Laeven (2015), the combination of borrower-based macroprudential policies with stronger institutional risk buffers offers a viable path towards more stable financial conditions.

7. Policy implications and future research directions

The 2008 financial crisis fundamentally altered how economists and policymakers view monetary policy. Conventional tools—such as changes in interest rates—proved insufficient to address system-wide financial dysfunction. In the post-crisis period, central banks have made use of unconventional measures such as QE to directly inject liquidity into markets. The long-term impact of these tools, however, remains under examination. As Cukierman (2013) suggests, future policy frameworks will need to weigh traditional rate-based instruments against extraordinary measures that temporarily stabilise markets during periods of extreme stress.

The emphasis of recent research has been on adaptive and flexible monetary policy. Blanchard, Dell'Ariccia and Mauro (2010) argue that central banks should be given revised or expanded mandates that incorporate financial stability as a core objective. This implies that 'real-time indicators' such as credit expansion, leverage ratios, and asset price inflation ought to be the drivers of policy action. Both Simpson (2014) and Hildebrand (2006) support this comprehensive approach, arguing that macroprudential tools must complement interest rate policy in achieving overall stabilisation.

Borio and Zhu (2008) suggest the development of monetary frameworks that recognise that interest rates affect not only the demand for goods and services but also perceptions of financial risk. When interest rates are very low, the cost of leverage declines, encouraging borrowing and speculative activity. Hence, monetary easing should be accompanied by measures that restrain risk-taking, such as capital buffers, loan-to-value (LTV) limits, and other borrower-based instruments. These measures help to modulate the credit cycle without destabilising the macroeconomic recovery process.

In addition, Cerutti, Claessens and Laeven (2015) find that borrower-oriented macroprudential policies are more effective than those focused on financial institutions. The use of loan-to-income (LTI) or debt-service ratio caps can help curb household over-indebtedness during upswings

and dampen downturns. They also show that these tools are most effective when implemented in a countercyclical and politically independent manner.

This focus on capital flow management tools in relation to the financial cycle is further developed by Arakelyan, Gersl and Schindler (2023), who stress the need to tailor such instruments to different phases of the financial cycle. The early introduction of capital controls during periods of excessive credit growth, particularly in emerging economies, is shown to be especially beneficial. Their analysis suggests that the timing of regulation is as important as its design.

While central banks operate primarily at the macroeconomic level, effective risk management remains essential at the micro level. Institutional strategies continue to rely heavily on derivatives and hedging. Adrian and Shin (2010) argue that the heightened sensitivity of banks and non-bank financial institutions to funding shocks and leverage cycles can be mitigated through effective hedging of systemic feedback mechanisms. Such strategies employ options, futures, and credit derivatives to manage risk in rapidly changing market conditions.

Brunnermeier and Sannikov (2014) emphasise that financial fragility develops endogenously over time. As such, monetary policy should not merely react to crises but should lean against credit booms and exuberance. They propose a stabilisation framework that targets both real output and systemic risk.

There is also the role of education to consider. Knowledge of risk and an understanding of how such instruments operate, i.e. financial literacy regarding instruments such as MBSs and CDOs, can help investors make more informed decisions. Bailey (2005) and Vithessonthi and Tongurai (2013) advocate regulatory transparency and investor education to enhance robustness. The failure to understand or price risk correctly was a significant factor in the 2008 crisis; addressing this shortcoming through improved disclosure and supervision can help promote systemic stability.

Future research can further explore the scope of the monetary transmission mechanism and its interaction with financial stability. Rey (2013)

argues that monetary independence is increasingly constrained by the global financial cycle. Understanding how QE and other policy instruments transmit across international capital markets will therefore be crucial for effective policy coordination. This is particularly important for small open economies operating within global liquidity conditions.

Gertler and Karadi (2011) suggest that future models should incorporate credit market frictions and intermediary constraints in order to better capture the observable limits of monetary policy. Claessens, Kose and Terrones (2011) likewise emphasise the need for greater attention to financial cycles, particularly the ways in which macroeconomic shocks are transmitted through amplification mechanisms linked to leverage, interconnections, and feedback effects, both within and across financial systems. The integration of macroprudential supervision with monetary policy instruments is therefore essential. Cerutti, Claessens and Laeven (2015), together with Acharya and Richardson (2009), argue for closer institutional cooperation among central banks, regulators, and market participants. This includes the development of real-time data systems capable of signalling excessive leverage, maturity mismatches, or overheated asset prices well before they evolve into crises.

Finally, the way forward for monetary policy is likely to involve recognising its integration with financial structures, investor sentiment, and international capital movements. A mixed approach—combining traditional policy levers, unconventional tools such as QE, macroprudential oversight, and risk-sensitive regulation—offers the best prospect for building a more stable financial architecture. As argued by Taffler, Agarwal and Obring (2024) and Brunnermeier and Sannikov (2014), resilience must be embedded in the institutional design and behaviour but also through attitudes.

Conclusion

The 2008 financial crisis remains a formative episode, revealing both deep weaknesses in the global financial system and the limitations of

conventional monetary policy tools. Traditional instruments, particularly interest rates and open market operations, proved ineffective at the zero lower bound. As a result, central banks turned to quantitative easing, an unconventional policy designed to lower long-term interest rates, restore liquidity, and stabilise market expectations.

Although QE helped buoy economic activity and soothe financial markets, it also produced unintended effects. By flattening the yield curve, it lowered risk-free returns, which encouraged investors to shift into higher-yielding investments (often involving greater leverage or exposure to poorly understood securities such as MBSs and CDOs). These dynamics suggested the need to rethink how monetary policy affects not only aggregate demand but also the financial sector and systemic risk.

Empirical findings by Bernanke (2012), Gertler and Karadi (2011), and Brunnermeier and Sannikov (2014) support the argument that such unconventional measures help mitigate credit constraints, especially when intermediaries are distressed. They also show, however, that these tools must be deployed cautiously, based on automating risk borne with the extremely reckless behaviour of investors. Monetary conditions that promote recovery may therefore also sow the seeds of future disequilibrium if left in place for too long.

It is crucial to understand the interplay between monetary policy and financial fragility. As Borio and Zhu (2008), and Altunbas, Gambacorta and Marques-Ibanez (2010) argue, persistently low interest rates can excessively distort risk perceptions and encourage borrowing beyond sustainable levels, allowing vulnerabilities to accumulate. Supported by this environment, structured products were central to the transmission and amplification of the crisis.

When asset bubbles burst, the financial accelerator is triggered, substantially worsening economic outcomes. Falling asset values reduce collateral, restrict access to credit, and deepen recessions. Claessens, Kose and Terrones (2011), as well as Hansen (2018) argue that unmanaged financial cycles intensify economic fluctuations and prolong downturns. This creates a pressing need for monetary authorities to incorporate indicators of the financial cycle into their policy frameworks.

Derivatives and hedging instruments also acted as important shock absorbers during the crisis. Adrian and Shin (2010) examine how aggregate risk in the financial system affects intermediated credit provision, while Arregui *et al.* (2015) suggest that, when combined with sound macroprudential regulation, these instruments can reduce feedback effects and systemic risk. The effectiveness of such approaches, however, depends on appropriate oversight, transparency, and investor education.

In the future, monetary frameworks will need to be more flexible and multifaceted. Borio and Gambacorta (2017) suggest that it is time to reconsider the dominant stabilisation-only ethos of inflation targeting and to elevate financial stability to a co-equal policy objective. This would entail greater reliance on macroprudential instruments, borrower-targeted regulation, and more timely intervention.

Rey (2013) reminds us that monetary policy is not conducted in a vacuum, showing how global capital movements transmit policy actions across borders and constrain national autonomy. This degree of integration calls for improved cooperation among central banks and more robust mechanisms for global financial regulation.

The 2008 crisis serves as a template not only for what went wrong, but also for what can be reimagined. A sound financial system should be equipped with robust monetary instruments, an orderly credit system, and effective measures for risk management and forward-looking supervision. As Acharya and Richardson (2009) and Taffler, Agarwal and Obring (2024) argue, fostering resilience is as much a matter of institutional design as it is of behavioural awareness.

Viewed through this broader lens, monetary policy is not merely a tool for stabilising inflation and output; it is also a force that shapes financial behaviour, risk aversion, and systemic resilience. Avoiding future crises therefore requires a broader policy architecture that links monetary intervention with financial regulation, macroeconomic objectives, and institutional prudence.

ABSTRACT

The 2008 financial crisis exposed the fragility of the global financial system and revealed the limitations of traditional monetary policy. Central banks resorted to unconventional tools, most prominently quantitative easing (QE), to restore liquidity and stabilise markets. The purpose of this essay is to discuss the ways in which monetary policy, in its different forms, has influenced financial markets during times of crisis. It also explains QE in depth, compares it with standard monetary policy, and includes a comparison of yield curves, followed by an explanation of leverage, mortgage-backed securities and collateralised debt obligations, and the original reasons why these instruments proved so dangerous during the crisis. The essay further examines the phenomenon of price bubbles and the financial accelerator, with an emphasis on exploring the drivers, implications, and relationships between the financial accelerator and monetary policy. Finally, it presents risk-management techniques that can be supported by derivatives and hedging in order to provide a cushion for investors during difficult times.

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Chapter VII

Change Management in the Era of Technological Advancements

Dmytro Melnykovych

Introduction

Today, technology is developing at an unprecedented speed, revolutionising many sectors and thereby forcing organisations to adapt rapidly. The change management process has become more complex because, in addition to internal change, organisations must also introduce advanced technologies. Companies seek to remain competitive and improve productivity; therefore, the interaction between organisational change and technological innovation is increasingly important. This article explores the nuances of change management in the era of technological advancements and examines how world-renowned organisations cope with the challenges associated with implementing change.

The research question of the article is: how do organisations effectively manage change processes amidst rapid technological advancements? Through this question we seek to analyse strategies and examples from existing organisations that enable businesses to successfully adapt to technological innovation. The main hypothesis of the article is that

organisations which integrate technological advancements into their change management processes achieve greater success and higher levels of employee satisfaction. This hypothesis suggests that embedding technology within change management leads to improved outcomes for companies and increased engagement among employees.

1. Introduction to change management in the era of technological advancements

1.1 Overview of change management

In the era of rapid technological advancements, change management has become essential for organisations to effectively adapt and thrive in a dynamic environment. Change management is inevitable and plays a crucial role in enabling companies to implement changes smoothly and with minimal disruption, particularly in the context of technological progress. Such transitions can be challenging for employees, and they must be adequately prepared for it. There are various change management models that also contribute to improving employee well-being and the work environment.

Change management is important for several reasons:

- Globalisation and the rapid development of technology force organisations to respond to external pressures; therefore, external factors play a significant role in organisational change. Ignoring such factors can jeopardise a company's success, as demonstrated by Nokia (Buehring, 2023). Nokia was once the largest mobile phone company in the world, but it nearly went out of business because it failed to keep pace with changes in mobile technology. For instance, when Apple introduced the fingerprint feature on its phones, Nokia considered it a poor idea and did not implement a similar feature. As a result, Nokia's products became less attractive to consumers, and its market share declined rapidly (Gaudet, 2023).

- Change management helps organisations anticipate and respond to customer needs, which represent a constant challenge for any company. Moreover, it enables employees to develop methods to understand customer needs more quickly than competitors (Tiefensee, 2022).
- The effective implementation of change helps reduce losses and costs, thereby lowering risks and increasing productivity and profitability for the company.

The entire organisation is often affected by change, and the change management process provides employees with the knowledge and resources required to adopt change smoothly. It also involves establishing guidelines and ensuring that everyone understands their responsibilities during this new phase (Buehring, 2023).

1.2 Example of using a change management model

As companies grow, changes become inevitable and can be difficult to implement without negative consequences. This is a complex process that requires trained personnel and an appropriate approach. To address this, several established change management models can guide organisations by providing a structured strategy (Sharma, 2022).

In this regard, one of the most widely used models, due to its three--phase structure, is Lewin's 3-Stage Model of Change, developed by Kurt Lewin. In this model, large-scale change is broken down into more manageable stages:

1. Unfreeze
2. Change
3. Refreeze

First, the 'Unfreeze' stage involves examining the existing processes and analysing how they can be improved, ensuring that all those affected by the change understand the need for it. Second, the 'Change' stage focuses on implementing the proposed changes and guiding relevant stakeholders throughout the process. Finally, after successful implementation and positive feedback from employees, the organisation 'Refreezes' the new strategy to ensure long-term stability (Sharma, 2022).

One of the best examples of implementing Lewin's change management model is Netflix.

- Unfreezing Stage
  Netflix convinced employees to move away from the DVD-by-mail rental model by explaining the benefits of switching to a video streaming service (Singla, 2022). Company leaders focused on addressing competitive threats and the need to adapt to a changing market environment (Hastings and Meyer, 2020).
- Change Stage
  In 2007, Netflix, in addition to its DVD rental business, introduced an online video streaming option (Singla, 2022). Furthermore, in response to changing customer needs, Netflix continually expanded its content library (Hastings and Meyer, 2020).
- Refreezing Stage
  To ensure a smooth transition to the new model, Netflix provided employees with training and resources, and the company later consolidated the changes. By making the streaming service its primary business and eventually discontinuing the DVD rental programme, the leadership successfully completed the transition process (Hastings and Meyer, 2020). Change management models provide the assistance and guidance needed during periods of change. Moreover, employees play a key role in implementing and supporting change; therefore, it is important to focus on employees at every stage of the process in order to increase the likelihood of successful change implementation (Sharma, 2022).

2. Technological and organisational challenges

Technology has played a key role in enabling companies to expand globally, with e-commerce platforms and online marketplaces allowing businesses to sell to customers around the world.

As technology advances, cybercrime also increases, including such practices as data breaches, phishing attacks, and ransomware attacks.

Therefore, to protect data and reduce cyber threats, it is necessary to continuously invest in cybersecurity measures. Outdated infrastructure and systems also hinder the adoption of modern technologies and can lead to difficulties in transitioning to new digital solutions (Olmstead, 2024).

Another challenge is that digital transformation requires significant investment in technology, skills, and resources, which not all companies can afford (Olmstead, 2024).

There are also organisational challenges. Employees may resist change due to fear of the unknown, which can lead to a loss of confidence and negatively affect performance. To address this issue, leaders should clearly explain why changes are necessary in order to foster a desire for change, and to support employees throughout the entire change process (Change Strategists, 2024). On the other hand, implementing too many changes simultaneously can be detrimental to employees and may lead to fatigue and resistance.

In order to maintain employee engagement, organisations need to incorporate rewards and incentives, such as salary bonuses and leaderboards, into training programmes. When properly integrated, these measures can help companies create a more supportive, collaborative, and productive work environment, thereby promoting continuous learning, innovation, and employee satisfaction.

3. Best practices and recommendations in the company

3.1 Case study

This case study examines IBM's history, effectiveness, and a specific example of its successful use of change management. Since its founding more than a century ago, the company has embraced several changes and implemented change management strategies to ensure smooth transitions.

International Business Machines (IBM) is an American multinational technology company founded in 1911, and before the middle of the twentieth century, IBM was a major supplier, providing hardware, software, and services to clients in over 170 countries. However, the company decided to make modifications as a result of three main factors:

(1) As the market shifted away from mainframe computers, IBM decided to focus more strongly on software in order to adapt to this major change and to evolving market conditions. The company began to actively invest in the development of new technologies and to establish collaborations to expand its offerings.

(2) While expanding its business into 170 countries worldwide, IBM encountered cultural differences that led to various challenges. To address these issues, the company had to adapt its business practices to local markets and workforces without compromising its global brand and corporate identity.

(3) In the 1990s, IBM faced intense competition, as this period marked the peak development of companies such as Intel and Microsoft in the fields of software and personal computers. This competition prompted IBM to adapt and further shift its focus towards software, investing in the development of new innovations capable of competing with emerging technologies.

As regards IBM's results following the successful implementation of these changes, the company's investments in new developments, in cooperation with other businesses, helped consolidate its position in the market amid rapid technological development. Owing to its more flexible business approach, IBM was able to adapt quickly to changing markets and customer needs. The company's timely transition to software and consulting increased its profits. Paying close attention to customer service and developing new services to meet customer expectations increased customer loyalty and attracted new customers (Abbas, 2023).

3.2 Recommendations for companies in the era of technological advancements

Today, artificial intelligence is transforming financial, automotive, retail, and other sectors, and plays a key role in improving business efficiency and customer service by enabling personalised services. One emerging development is generative artificial intelligence, which represents the next stage in the evolution of artificial intelligence. It enables the creation of new content, such as text-based conversations, images, music, and complex code. Generative artificial intelligence can be trained in programming languages, generate music based on individual preferences, and perform a wide range of tasks by applying learned data to new problems. For example, it can learn English vocabulary and use it as a basis for creating music. Therefore, it is important for organisations to implement generative artificial intelligence for various purposes, including chatbots, multimedia content creation, product development, and design.

Apple has released Vision Pro, which combines advanced functions, while Meta has achieved success in this area through the creation of the Metaverse as a fully immersive virtual world and its mission to make virtual reality technology more accessible through its Oculus Quest 3 and Meta Quest models.

With the release of new technologies by established companies, demand for spatial computing devices is increasing, and these technologies can also be used to provide training in which participants can practise and acquire new knowledge without risk. This allows doctors to practise procedures without fear of making mistakes and engineers to create and test prototype models while conserving resources.

With the introduction of new technologies, as well as geopolitical tensions and other security risks, it is necessary to ensure robust cybersecurity, particularly through systems that provide reliable data protection. Organisations need to pay close attention to data privacy and train employees in cybersecurity practices.

Conclusion

This article accurately and effectively addresses the research question by demonstrating how global organisations manage change processes in a fast-paced technological environment. The IBM case study illustrates this particularly well. The company made timely decisions regarding change and managed them effectively through the adoption of new technologies and investments in employee training. Moreover, the evidence presented in this article confirms the hypothesis that organisations which incorporate technological advancements into their change management processes achieve greater success and higher levels of employee satisfaction.

The introduction of new technologies has both advantages and disadvantages, as artificial intelligence, virtual and augmented reality, and cloud computing can increase efficiency and expand market reach. On the other hand, the rapid growth in demand for technology gives rise to challenges such as cybersecurity risks, increased resource allocation, and employee resistance to change.

Additional challenges may arise from various organisational factors, including internal policies, local laws, language barriers, and cultural differences. Companies must proactively identify and overcome these barriers by providing appropriate training and support to address them.

ABSTRACT

This article delves into the process of managing change in the age of technology, exploring the challenges, opportunities, and strategies adopted by organisations to effectively guide a company through change in a dynamic environment. One of the main objectives of the study is to understand how companies adapt to technological change and organisational challenges, with the aim of highlighting successful approaches and providing recommendations for businesses seeking to develop in an environment of rapid technological evolution.

Using a qualitative research approach, this study draws on academic research, literature reviews, other peer-reviewed sources, and case studies

from companies such as IBM, Amazon, Netflix, and Apple. By analysing this body of material, the study provides valuable insights into the complex interplay between technological innovation, organisational dynamics, and change management practices in the era of technological advancement.

The study's main findings and recommendations highlight the importance of fostering an innovative and collaborative culture, effectively aligning technological initiatives with organisational goals, and responding proactively to technological change. Furthermore, through case studies and expert analysis, it illustrates how innovative businesses have addressed technological disruption by embracing innovation, investing in workforce development and engagement, and cultivating a culture of continuous learning and adaptation.

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Chapter VIII

Gen Z's Perception of Leadership: A Study of Their Role Models and Influential Figures

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Introduction

Generation Z ('Gen Z'), born between 1996 and 2012, is reshaping societal and workplace dynamics. As they enter the workforce, their unique perspectives and priorities challenge traditional norms, requiring businesses and leaders to adapt. This generation, characterised by digital fluency, activism, and a demand for inclusivity, evaluates leadership differently from its predecessors. Leaders for Gen Z are not confined to conventional titles such as politicians or CEOs. They include activists, social media influencers, and public figures who inspire through actions and align with Gen Z's values. This report investigates the qualities Gen Z seeks in leaders, their preferred leadership styles, and the role of cultural and generational differences in shaping their perceptions.

This research addresses the question: What is the perception of leaders from a Generation Z perspective? It tests two hypotheses: first, that Gen Z prioritises transparency, adaptability, and inclusivity in leaders; second, that their role models extend beyond traditional figures to encompass diverse, modern influencers.

1. Literature review

Researchers examine leadership styles suitable for all generations, with a particular focus on Generation Z. This involves analysing historical leadership styles and generational traits to understand Gen Z's unique perspective on leadership. This section is divided into three parts: a historical overview of leadership styles (1.1), an exploration of generational characteristics (1.2), and an analysis of Gen Z's values, differences, and evolution in leadership perception (1.3).

1.1. Leadership theories and changes in leadership styles during history

Leadership has evolved significantly over time, shaped by historical, cultural, and societal changes. Early theories, such as Carlyle's Great Man Theory, emphasised inherent traits such as charisma and courage, suggesting leaders are born, not made (Carlyle, 1841). This view, however, was criticised by Herbert Spencer, who argued that societal and cultural factors are equally critical in shaping leaders (Spencer, 1873).

Stogdill's Trait Theory expanded the discussion by integrating inherent traits with situational adaptability. For instance, leaders may need decisiveness during crises but empathy in team-building contexts. Behavioural theories, such as Blake and Mouton's Managerial Grid (Blake and Mouton, 1964), introduced the concepts of task-oriented and people-oriented leadership styles, paving the way for modern understandings of leadership as dynamic and multifaceted (Stogdill, 1974).

Transformational leadership introduced a renewed focus on intrinsic motivation, innovation, and adaptability—qualities particularly resonant with Gen Z. Leaders such as Nelson Mandela and Martin Luther King Jr. epitomise this style, inspiring collaboration and a shared vision. Today, leadership theories integrate elements from different eras, with models such as servant leadership emphasising team-oriented and inclusive approaches, aligning closely with Gen Z's values (Bass, 1985).

1.2 Defining characteristics of generations and the importance of Generation Z

Generations are typically shaped by shared historical and cultural experiences. Gen Z is characterised by its exposure to rapid technological advancements, economic instability, and social activism. This generation values diversity, mental health awareness, and sustainability. Unlike Millennials, who emphasise work–life balance, Gen Z prioritises financial stability and career growth while demanding meaningful, purpose-driven work. For example, studies have shown that 75% of Gen Z employees expect their employers to take a stand on social issues, reflecting their alignment with values-driven organisational cultures (Oliver Wyman Forum, 2023).

1.3 Difference between previous generations and Gen Z in the workplace, and aspects influencing Gen Z in choosing a leader

Gen Z's pragmatic approach to work contrasts with Millennials' idealism. They value direct feedback, inclusivity, and leaders who address social and environmental issues. Unlike Baby Boomers or Gen X, who often viewed leadership through hierarchical structures, Gen Z prefers flatter organisational models where collaboration and inclusivity are prioritised. Their scepticism towards traditional authority figures underscores the need for leaders to be authentic and transparent. For instance, leaders who openly acknowledge their challenges and

demonstrate vulnerability tend to build stronger connections with this generation, emphasising the importance of relatability in modern leadership (Robinson, 2023).

To conclude, there is a gap between Gen Z and previous generations, particularly in the workplace, communication, and leadership. In addition, the era of social media may create confusion when choosing whom to follow as a role model. For this reason, they tend to turn to close individuals, particularly family members. Moreover, in the workplace, they are unlikely to remain loyal to a leader or role model who deceives them in any way. To avoid the risk of becoming a lost generation, leaders and talent managers should carefully adapt their approaches to doing business and engaging with employees in order to better understand Generation Z and respond to their expectations, as they represent *the* emerging workforce.

2. Methodology

2.1 Research strategy

A mixed-methods approach was employed to capture the multifaceted nature of Gen Z's leadership perceptions. This approach combined a quantitative survey, which included multiple-choice and scaled questions, with qualitative open-ended questions to explore individual perspectives in greater depth. Quantitative data provided broad trends and demographic patterns, while qualitative responses offered nuanced insights into Gen Z's views on leadership. The survey was distributed through diverse channels, including social media platforms, university networks, and email lists, ensuring global representation across regions such as Europe, Africa, and Asia. The inclusion of questions on leadership qualities, role models, and workplace expectations enabled a comprehensive understanding of the generational mindset. Data analysis was conducted using tools such as Excel and AI-driven software to identify recurring themes and correlations, enhancing the reliability and depth of the findings. The

survey included both qualitative and quantitative questions and targeted respondents aged 16–27 globally. Questions explored leadership qualities, styles, and role models. The survey ensured diversity in demographics, including ethnicity, education, and occupation.

2.2 Method of research

Data collection

The survey reached respondents through social media platforms, university networks, and professional contacts, yielding 153 responses. The survey included questions such as:

What qualities do you value most in a leader? Who are your role models or influential leaders? What leadership style do you prefer (e.g., coaching, democratic, authoritarian)? What leadership traits do you find ineffective or negative? How does your cultural background influence your perception of leadership?

Analysis tools such as Excel and AI-assisted software were used to identify patterns and preferences, revealing recurring themes and trends in the data.

3. Research results

3.1 Background information

Gender: 53% female, 47% male. **Age**: Predominantly 20–25 years old. **Education**: Most respondents held bachelor's or master's degrees, offering a well-informed perspective. **Geography**: Respondents were primarily from Europe (44.6%) and Africa (33.7%), ensuring diverse cultural insights.

3.2 Perceptions of leadership

The survey highlighted that parents were overwhelmingly perceived as role models, with 83.2% of respondents citing them as leaders. This finding reflects the importance of personal and relatable figures in Gen Z's perception of leadership. High-ranking public figures such as Steve Jobs (48.5%) and Elon Musk (47.5%) were also viewed as leaders due to their innovation and influence. Additionally, Prophet Mohammed (47.5%) was acknowledged for his moral and ethical guidance.

When asked about leadership qualities, respondents favoured inclusivity (69.3%), inspiration (54.5%), and transparency (53.5%). These preferences align with Gen Z's value-driven ethos and their expectation that leaders demonstrate authenticity and lead by example.

Leadership styles also revealed a preference for coaching leadership (52%) as the most effective, followed by democratic leadership (40.6%) and adaptive leadership (33.7%). These styles reflect a desire for participatory and empathetic leadership.

3.3 Negative leadership traits

Respondents strongly disapproved of authoritarianism and the misuse of power. Figures such as Vladimir Putin (68.3%) and Adolf Hitler (66.3%) were identified as negative leaders, signifying a clear rejection of oppressive and autocratic approaches. Additionally, poor work–life balance and a lack of inclusivity were cited as significant deterrents to effective leadership.

4. Discussion

4.1 Interpretation of results

The survey revealed diverse perspectives on leadership among Generation Z. Respondents often identified parents and family members as leaders

due to their formative influence, life lessons, and values. However, generational gaps and shifting family dynamics have led some respondents to reject this view, favouring peers or public figures instead. Professors were another commonly cited group, valued for their direct communication, storytelling abilities, and adaptability, which align with Gen Z's preferences for openness and relatability. Friends and colleagues were acknowledged for small-scale leadership in everyday challenges but were often perceived as lacking the experience and vision that Gen Z associates with broader leadership roles.

Charismatic figures such as Muhammad Ali, Steve Jobs, and prophets such as Muhammad and Jesus Christ were frequently cited for their transformational impact and values-driven actions. Controversial figures such as Elon Musk were admired for their innovation and criticised for perceived impracticality. Political leaders such as Mandela and Martin Luther King were praised for their activism and charisma, while authoritarian figures such as Putin and Hitler were recognised as leaders due to their power and influence but not regarded as role models. This highlights Gen Z's preference for leaders who balance impact with ethical behaviour, valuing trust, inclusivity, and work–life balance over pure authority or status.

4.2 Factors influencing perception

Gen Z evaluates leadership through actions rather than words, prioritising visible and meaningful efforts. Social media plays a critical role in bridging the gap between leaders and their followers. Trust is a significant factor, with many influencers failing to meet Gen Z's expectations due to perceived inauthenticity or commercial motives. Figures such as Andrew Tate and Simon Sinek gained respect for their distinctive communication styles and relatability, while celebrities such as Selena Gomez and Rihanna demonstrated leadership by sharing personal struggles and values.

Inclusivity and transparency are pivotal. Gen Z values leaders who embrace diversity beyond token gestures, ensuring equal acceptance across cultures, ethnicities, and lifestyles. They expect leaders to share

aspects of their personal lives, breaking down barriers between professional and social spheres to build trust. Figures such as Motaz Azaiza exemplify proactive leadership, contrasting with perceived passivity from individuals such as Greta Thunberg. Gen Z uses social media to scrutinise leaders, seeking authenticity, adaptability, and ethical consistency.

4.3 Influence of culture and social values

Cultural and societal norms significantly shape leadership perceptions. In regions with high power distance, such as Africa, the Middle East, and parts of Asia, authoritarian styles may still be accepted due to traditional hierarchies. Conversely, Nordic countries value autonomy, favouring leaders who delegate and empower rather than micromanage. Historical and cultural context also influences the recognition of leaders, with figures such as Mandela resonating more strongly in regions familiar with their struggles.

Universal values, such as justice and human rights, unify Gen Z's perceptions of leadership. Leaders who embody ethical values, transparency, and activism, such as Mandela or King Hassan II, are widely respected. However, the trust gap with politicians remains, driven by historical failures and perceived inaction. Gen Z favours activists and ordinary individuals over traditional political figures, viewing them as more relatable and effective in addressing societal issues.

4.4 Influence of leadership perception concerning political leaders

Generation Z is sceptical of political leadership, often viewing politicians as out of touch or untrustworthy. Figures such as Putin and Hitler are acknowledged for their ability to mobilise others but are criticised for unethical actions. In contrast, leaders such as Mandela and Martin Luther King are admired for their commitment to justice and human rights, which resonates with Gen Z's values.

This generation's disillusionment with politicians stems from a history of unmet promises and passive leadership. Leaders who fail to act decisively on pressing issues, such as climate change or social justice, lose credibility. The lack of role models in politics creates a gap between societal needs and governmental action, increasing the risk of future tensions between Gen Z and political systems.

4.5 Leadership in the workplace and leadership styles

In the workplace, Generation Z seeks empathetic leaders who embrace innovation and work–life balance. They value inclusivity and equality, rejecting rigid hierarchies and outdated norms. Flexibility and empowerment are critical, with Gen Z expecting opportunities to contribute creatively and influence decision-making.

Preferred leadership styles include coaching, as well as democratic, charismatic, and adaptive approaches. These styles emphasise collaboration, transparency, and personal growth. Figures such as Steve Jobs are admired for inspiring innovation, while inclusive leaders such as Simon Sinek foster trust through communication and empowerment. Conversely, authoritarian and absentee leadership styles are rejected due to their lack of engagement and rigid structures.

Work–life balance is a priority for Gen Z, with many willing to leave positions that do not align with their values. They demand leaders who respect mental health, equality, and individuality. Companies must adapt to these expectations to retain and inspire this generation, fostering a culture of collaboration and innovation.

4.6 Changes in leadership and its styles

Gen Z advocates for more inclusive and people-oriented leadership. They seek leaders who communicate openly, represent diverse backgrounds, and actively support societal and environmental causes. Women and emerging leaders should have greater visibility, reflecting the generation's commitment to equality and innovation.

Leadership must evolve to meet Gen Z's expectations by embracing a transformational approach that prioritises transparency, collaboration, and inclusivity. Leaders should take an active stance on global issues, setting an example through action rather than rhetoric. By aligning leadership styles with these values, organisations and societies can better engage and inspire the next generation.

Conclusion

This report explored how Generation Z perceives leadership, addressing the research question: What is the perception of leaders from a Gen Z perspective? For Gen Z, a leader is someone who demonstrates qualities such as communication, transparency, empathy, and action, aligns with their values, and contributes positively to their community. While leaders may range from family members to influencers, Gen Z expects meaningful engagement and authenticity.

The study confirmed that Gen Z prioritises transparency, adaptability, and inclusivity in leaders and does not limit leadership to politicians or CEOs. This generation rejects outdated norms, seeking relatable, open, and diverse leaders who foster respectful and inclusive environments. They value simplicity in leadership styles while expecting complex decision-making on global and societal issues.

Gen Z actively pushes for change, readily categorising leaders as 'good' or 'bad' based on their actions and values. They are open to diverse and unconventional leaders but demand recognition and understanding of their perspectives. Leadership for Gen Z must embrace collaboration, transparency, and social impact while addressing trust deficits, particularly in digital communication.

Ultimately, leadership for Generation Z is about creating shared purpose, fostering inclusion, and making meaningful decisions. By adapting to these expectations, leaders can bridge generational gaps and inspire a generation prepared to lead itself if necessary.

ABSTRACT

This report examines Generation Z's perception of leadership, focusing on the qualities, values, and styles they prioritise, as well as their role models and influential figures. Utilising a mixed-methods approach, a survey was conducted to gather qualitative and quantitative insights. The findings suggest that Gen Z values transparency, adaptability, and inclusivity in leaders and views non-traditional figures, such as activists and influencers, as equally influential as traditional political and business leaders. This study explores how cultural and social factors shape their leadership preferences and the implications for organisations aiming to engage this emerging workforce.

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Chapter IX

How Climate Change Affects Global Income Inequality

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Introduction

Climate change is the long-term change in atmospheric temperature due to rising concentrations of greenhouse gases resulting from human activities, mostly the burning of fossil fuels. The current speed of carbon dioxide increase in the atmosphere, one of the main greenhouse gases, is 250 times faster than during the last Ice Age. The current average surface temperature is 1.2°C above the pre-industrial level. The consequences of climate change, mostly driven by activities over the past 40 years, include global temperature rise, warming oceans, melting ice sheets, sea level rise, glacial retreat, decreased snow cover, ocean acidification, extreme events, and declining Arctic sea ice. Climate change affects not only the environment, but also international justice.

The responsibility of the Global North, OECD members, and European Union countries, which are listed in the Appendix, for climate change

was analysed by Hickel (2020), who econometrically estimated national responsibilities, measured in terms of each country's overshoot of emitted carbon dioxide as a proportion of total national overshoots. The results show that the USA is responsible for 40% of excess carbon emissions. The USA and the EU-28 together are responsible for 69%, while the G8 countries (the USA, EU-28, Russia, Japan, and Canada) are together responsible for 85% of these emissions. Meanwhile, most of the world's countries (108 out of 202) are in climate credit. India is in credit by 90 billion tonnes of CO_2, or 34% of the total credit. China is in credit by 29 billion tonnes of CO_2 (Hickel, 2020). The results are in line with earlier work by Aamaas, Peters and Fuglestvedt (2013).

The main international climate change agreement is the Paris Agreement, signed by 196 parties and adopted in 2016, with the goal of limiting global warming to below 2°C, preferably 1.5°C.

Combining a simple climate–carbon-cycle model with estimated ranges for key climate system properties, the analysis suggests that limiting warming to 1.5°C is not yet a geophysical impossibility but is likely to require delivery on strengthened pledges for 2030, followed by challengingly deep and rapid mitigation (Millar *et al.*, 2017).

The topic of quantifying the effect of climate change on the future distribution of wealth across countries is highly prominent among economists and climate researchers, reflecting the strong need to design and evaluate climate mitigation and adaptation measures to prevent damaging consequences.

This paper aims to analyse how climate change affects future inequalities across countries up to 2100 through the impacts of mitigation costs, damage factors, and their joint effects.

The structure of the thesis is described as follows:

The first section of the paper ('Literature Review and Theoretical Background') is devoted to a discussion of the existing literature on how climate change affects the distribution of income across countries. This part provides theoretical and empirical evidence that climate change affects poorer countries more, making them poorer in the future. The second section ('Methodology and Data Description') surveys the

methodology used to build scenarios, describes the data and variables chosen, and discusses the general features, as well as the advantages and disadvantages, of the applied numerical approach. Moreover, the limitations of the methods used are presented. The third section ('Empirical Results and Discussion') includes a discussion of the empirical results obtained and an analysis of the projection results. In total, the paper aims to build scenarios for, on average, 156 countries in all regions of the world for the period 2020–2100.

The paper analyses inequality under various emission pathways as combinations of socioeconomic scenarios and representative emission pathways, leading to the conclusion that lower emissions are associated with lower levels of inequality under the strongest damage estimates.

1. Literature Review and theoretical background of the research

This section attempts to provide an overview of theoretical and empirical developments in economic growth and its dependence on a changing climate.

1.1 The consequences of climate change appear first in developing regions

The consequences of climate change are severe and uneven. The poorest regions have been affected by climate change first and most strongly. King and Harrington (2018) applied a signal-to-noise ratio, where the signal is defined as the average model warming of annual temperatures at each location between 1.5 and 2°C, and the noise is defined as the average model standard deviation of annual temperatures in a pre-industrial climate, and found that the most pronounced climate damages are likely to occur in tropical areas, where the poorest regions tend to be located, between 1.5 and 2°C of global warming. By contrast, extratropical areas, where the wealthiest regions of the world are located,

have lower signal-to-noise ratios, indicating greater year-to-year temperature variability, and are better adapted to a more variable climate (King and Harrington, 2018).

Although land and high-latitude regions experience larger warming signals than the global mean, variability in daily temperatures over oceans and low-latitude regions is significantly lower, thereby resulting in the earlier emergence of more frequent high-temperature extremes (Harrington *et al.*, 2016). Higher temperatures have wide-ranging effects in poor nations, reducing agricultural output, industrial output, and aggregate investment, and increasing political instability (Dell, Jones and Olken, 2012).

As a result, anthropogenic climate forcing has decreased economic growth in countries in the low latitudes and increased economic growth in countries in the high latitudes (Hawkins and Sutton, 2012).

1.2 How does climate change affect global economic inequality?

1.2.1 Developing regions bear the cost of climate damages the most

Climate change slows the reduction of economic inequality between countries through climate-related damages. The work by Taconet, Méjean and Guivarch (2020) demonstrates that, in many scenarios, inequalities among countries continue to decline for a few years or decades, but as climate change impacts gradually occur, they may outweigh the forecasted economic catch-up of low-income countries, and inequalities may rise again as a result. The consequences that poor countries face as a result of climate damage may reverse the declining inequality trend under some combinations of socioeconomic pathways. Moreover, by analysing inequality levels under various emission pathways, the study found that lower emissions are associated with lower levels of inequality.

Applying nonlinear temperature–GDP response functions with historical and natural climate model simulations, the study by Diffenbaugh

and Burke (2019) found that, over the 1961–2010 period, of the 36 countries whose historical emissions are between 10 and 100 tonnes of CO_2 per capita, 34 (94%) suffered negative economic impacts, with a median impact of –24% of economic growth. In contrast, of the 19 countries whose historical emissions exceed 300 tonnes of CO_2 per capita, 14 (74%) benefited from global warming, with a median benefit of +13% across those 14 countries (Diffenbaugh and Burke, 2019).

By conducting damage evaluation, the paper by Burke, Hsiang and Miguel (2015) found that average income in the poorest 40% of countries would decline by 75% in 2100 relative to a world without climate change, while the richest 20% would experience slight gains, as they tend to have cooler average climates. These results differ from earlier findings, according to which the median poor country's income would be about 50% lower than it would have been without climate change, with no significant impact on rich countries (Dell, Jones and Olken, 2012). The work by Burke, Hsiang and Miguel (2015) also found that, by 2100, unmitigated climate change will make 77% of countries poorer in per capita terms than they would be without climate change, potentially making them poorer than they are today, depending on assumed secular growth rates. Moreover, under high baseline growth and unmitigated climate change, the study projects that 5% of countries will be poorer in 2100 than today, while under low baseline growth this share rises to 43% (Burke, Hsiang and Miguel, 2015).

1.2.2 The economic impacts of mitigation policies

Mitigation costs are the costs associated with reducing greenhouse gas emissions. Carbon taxes and low-carbon technologies are the main instruments of mitigation policy. However, developed regions have better technological capabilities and greater financial capacity to implement mitigation policies. Moreover, low-carbon technologies that increase energy efficiency are more expensive than fossil fuels. Therefore, mitigation costs are heavier for low-income countries than for rich countries, as their production is more carbon intensive, meaning that developing

countries lose a greater percentage of GDP for the same amount of reduced CO_2 emissions (Krey, 2014; Edenhofer *et al.*, 2014).

Implementing a global carbon price through taxation or intergovernmental emissions trading would significantly reduce exports of agricultural goods and other energy-intensive products from developing regions. The work by Hussein, Hertel and Golub (2013) examined the link between climate change mitigation policies and poverty across seven socioeconomic groups by analysing a scenario in which a carbon tax is introduced not only in developed regions but also in developing ones. The results show that the introduction of a carbon tax as a mitigation policy tool would result in increased poverty in all 14 analysed developing countries (Hussein, Hertel and Golub, 2013).

1.3 Measurement of income inequality: Gini coefficient

The most common measure used to compute global income inequality between countries is the Gini index, in which 0 stands for perfect distribution of wealth and 1 stands for perfect inequality. The coefficient was first developed by Corrado Gini in 1912 and can be graphically represented by the Lorenz curve.

The study by Lakner and Milanovic (2015) examined within-country inequality at the global level over the period 1988–2008. The results show that the level of global inequality remains high, with a Gini of around 70%, and while inequality appears to have declined in the most recent years, these changes are probably not robust to plausible standard errors (Lakner and Milanovic, 2015).

Given the denotations in Figure 1, the Gini coefficient is defined as:

$$Gini = \frac{A}{A+B}. \quad (1)$$

The Gini coefficient takes values from 0 to 1. The closer the value is to 1, the higher the income inequality, while 0 indicates perfect income equality, meaning that each member of a society or each country has exactly the same income.

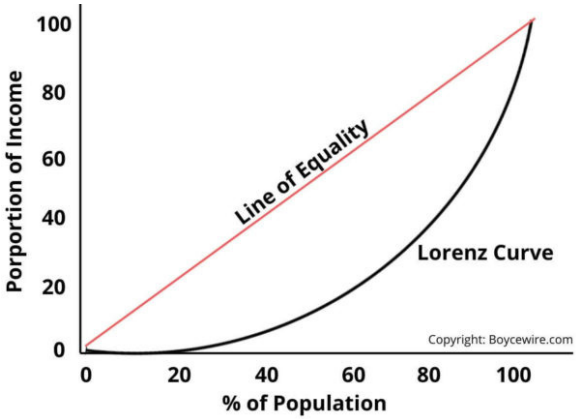

Figure 1. Lorenz curve and the line of equality

1.4 Integrated assessment models

Integrated assessment models (IAMs) are cost–benefit economic models that use simplified assumptions to estimate mitigation costs and future climate damages in order to analyse the economic impacts of climate change, including empirical, dynamic, non-linear models and interactions between the climate and the economy. They are used to derive optimal emissions pathways by balancing the costs of mitigation with the benefits of avoided damages.

AIM/GCE (Asian-Pacific Integrated Model), MESSAGE-GLOBIUM (energy system), and REMIND (Regional Model of Investment and Development) are energy–economy models with the goal of finding the optimal mix of investments in the economy and the energy sectors of each model region, given a set of population, technology, policy, and climate constraints. WITCH assumes exogenous GDP growth.

IMAGE and GCAM include endogenous growth modules with pathways that are not affected by mitigation policies and thus do not change according to the RCP.

1.5 Climate damage models

The Dynamic Integrated Climate–Economy (DICE) and RICE (Regional DICE) models are among the integrated assessment models developed by William Nordhaus (1991). Initially, the DICE model aimed to estimate the costs of reducing carbon dioxide emissions as well as future costs from climate change damages (Nordhaus, 1991). However, the modern version is based on neoclassical economic growth, meaning that economies invest in capital, education, and technologies, thereby reducing consumption today to increase consumption in the future. The RICE model explores optimal greenhouse gas emission paths across different regions and is determined using the Negishi approach, in which regions are aggregated using time- and region-specific weights subject to budget constraints (Nordhaus, 2017). The most recent version of the model is DICE-2016R2.

The Climate Framework for Uncertainty, Negotiation and Distribution (FUND) is another integrated assessment model developed by David Anthoff and Richard Tol. The model has been used to study cost-effective, efficient, feasible, and equitable climate policy. It differs from other integrated assessment models in its more detailed representation of sectoral and regional economic impacts of climate change, distinguishing 16 major regions of the world (Appendix).

2. Methodology and data description

2.1 Data description

To calculate the future state of income distribution across countries, we build scenarios based on six factors: socioeconomic assumptions (SSPs), representative concentration pathways (RCPs), mitigation costs from the AIM/GCE model, temperature responses for different RCPs, and climate change damage factors. All variables and their data sources are listed in Table 1 below.

Table 1. The list of variables used in the study

Variable	Levers	Source of the data
Representative Concentration Pathways (RCPs)	3 pathways: RCP 2.6, RCP 4.5, RCP 6.0	SSP database
Socioeconomic pathways (SSPs)	5 pathways: SSP1, SSP2, SSP3, SSP4, SSP5	SSP database
Mitigation costs	AIM/GCE	SSP database
Temperature response	Medium (mean)	CMIP5
Damage factor	DICE2016R model	DICE2016R database

2.1.1 Socioeconomic pathways (SSP)

Socioeconomic pathways (SSPs) are pathways based on the future state of socioeconomic factors such as population, economic growth, education, urbanisation, and the rate of technological development in the twenty-first century, initially published in 2016 by the Intergovernmental Panel on Climate Change (IPCC). The pathways are developed without accounting for climate change damages and climate policy. While in some narratives it is easier to mitigate and adapt to climate change, in others it is more difficult, with different challenges for mitigation and adaptation.

There are different SSP narratives: SSP1, SSP2, SSP3, SSP4, and SSP5. SSP1 stands for sustainable and inclusive development, with reductions in both within- and across-country inequality and low challenges for mitigation and adaptation; SSP2, the so-called 'middle of the road' scenario, follows historical patterns, where income growth and inequality proceed with intermediate challenges for mitigation and adaptation; SSP3 represents regional rivalry, in which domestic growth and development inequalities worsen over time, with high challenges for mitigation and adaptation; SSP4 is referred to as the inequality pathway, with low mitigation and high adaptation challenges; SSP5 is the fossil-fuelled development scenario, characterised by rapid global economic growth leading to the exploitation of natural resources, with high mitigation and low adaptation challenges. SSP1 and SSP5 project rapid economic

growth; however, SSP1 is a more sustainable projection, while SSP5 leads to high greenhouse gas emissions. SSP3 and SSP4 are pessimistic narratives with increasing inequalities over time. SSP growth projections for all countries assume no climate policy and no climate change impacts. Therefore, to build more realistic scenarios of the future world, researchers developed representative concentration pathways based on how different mitigation scenarios could be achieved under different socioeconomic pathways.

2.1.2 Representative concentration pathways (RCPs)

Representative Concentration Pathways (RCPs) were developed as mitigation targets for different levels of greenhouse gas concentrations resulting in specific climate outcomes and were developed by the Intergovernmental Panel on Climate Change (IPCC), which includes more than 1,300 scientists from the United States and other countries. They are designed as projections of land and energy use, economic activity, energy sources, and other socioeconomic factors. Representative Concentration Pathways (RCPs) include time series of emissions and concentrations of the full suite of greenhouse gases (GHGs), aerosols, and chemically active gases, with radiative forcing targets corresponding to each RCP.

Four pathways were developed: RCP8.5 (high emissions, 'business as usual'); RCP6.0, in which radiative forcing is stabilised at approximately 6.0 W m^{-2} after 2100 (peaking around 2080 and then declining); RCP4.5, in which radiative forcing is stabilised at approximately 4.5 W m^{-2} after 2100 (peaking around 2040 and then declining); and RCP2.6 (declining by 2020 and reaching zero by 2100). Representative Concentration Pathways show climate projections of future outcomes up to 2100.

RCPs were developed to predict future pathways of the main drivers of climate change, using both climate-related models and economic models of costs, such as integrated assessment models. These pathways have been studied in papers by Masui *et al.* (2011) and Thomson *et al.* (2011).

SSP-RCP matrix with IAM

The combination of currently available data on socioeconomic pathways and representative concentration pathways results in 12 SSP–RCP combinations, including SSP1-2.6, SSP1-4.5, SSP2-2.6, SSP2-4.5, SSP2-6.0, SSP3-4.5, SSP3-6.0, SSP4-2.6, SSP4-4.5, SSP5-2.6, SSP5-4.5, and SSP5--6.0 matrices for 152 countries.

2.1.3 Mitigation costs

IAM scenarios are based on SSP predictions. Mitigation costs, expressed as reductions in GDP per capita, result from SSP scenario factors such as economic activity, urbanisation, and population growth. SSP scenarios combined with integrated assessment models (IAMs) were developed and transformed into quantitative projections of the future effects of mitigation strategies for five main world regions (listed in the Appendix): OECD and European countries; countries from the Reforming Economies of Eastern Europe and the former Soviet Union; most Asian countries, with the exception of the Middle East, Japan, and former Soviet Union states; countries of the Middle East and Africa; and countries of Latin America and the Caribbean, up to 2100. To calculate mitigation costs for 152 countries, we compute the proportion of each country's GDP per capita in 2019 (baseline) relative to the sum of GDP per capita across the entire region in which the country is located, and then distribute regional mitigation costs according to each country's GDP per capita.

$$MITIGATION\_COST = \frac{GDPpercap}{\sum GDPpercap} \cdot \cdot \sum MITIGATION\_COST \quad (2),$$

where variable MITIGATION_COST is the mitigation costs calculated for each country, GDPpercap is GDP per capita for each country, ΣGDPpercap is the sum of the GDP per capita in the region in which the country is located, and ΣMITIGATION_COST represents mitigation costs calculated for each region.

2.1.4 Damage costs

In the analysis, the damage coefficient on temperature squared from the DICE2016R model is used and is equal to 0.00276.

2.1.5 Temperature response

The mean temperature response is used to represent how climate change sensitivity differs across SSP–RCP combinations. Mean temperature responses are taken from the CMIP5 (Coupled Model Intercomparison Project Phase 5) database. CMIP5 is a modelling framework designed to provide projections of future climate change and includes contributions from 20 climate modelling groups. The mean temperature response is provided for RCPs 2.6, 4.5, 6.0, and 8.5 up to 2100, with the highest values corresponding to the RCP8.5 scenario. We assume that temperature increases linearly over time in each scenario from the base year to 2100.

2.2 Methodology

2.2.1 Calculating the future economic growth

To calculate predictions of future GDP per capita for each country under a given SSP–RCP scenario for each year, we use mitigation costs, a damage factor coefficient, mean temperature response, and baseline GDP per capita. Future GDP is given by the following equation:

$$Y_{t,SSP\_RCP} = MITIGATION\_COST_{t,SSP\text{-}RCP} \cdot \\ \cdot \Omega(MEAN\_TEMPERATURE_{t,SSP\text{-}RCP}) \cdot Y_{baseline,2019} \quad (3),$$

where the MITIGATION_COST variable is the mitigation factor for each country, Ω(MEAN_TEMPERATURE$_t$) is the damage factor corresponding to the country's mean temperature in year t, GDP_PERCAP, and

GDP per capita refers to GDP per capita in 2019. We exclude countries for which initial GDP data are unavailable.[10]

2.2.2 Measuring the Gini coefficient

According to the existing literature, there are three possible ways of computing income inequality. The first is a comparison of countries' income without accounting for population size and can be described as an unweighted inequality comparison. The second is a population-weighted comparison of countries' income. The third approach compares income within and across countries. In this study, we use the first approach to calculate the Gini coefficient.[11]

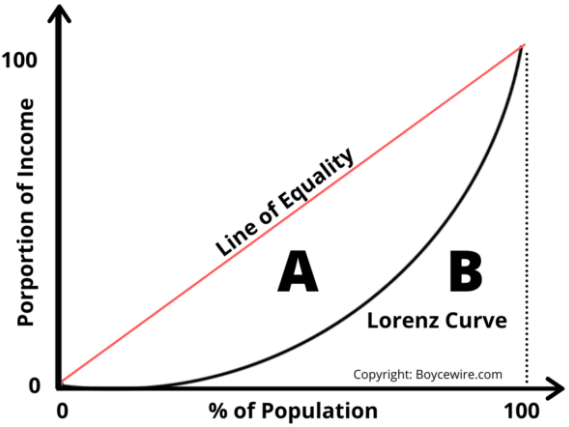

Figure 2. Lorenz curve and the line of equality in the calculation of the Gini coefficient

[10] For more see Beck (2014, 2019, 2020, 2021a, and 2021b).

[11] For more see Beck (2021c, 2022, 2023), Beck and Jackson (2024), Beck and Nzimande (2023), Beck and Okhrimenko (2024), Beck and Yersh (2024).

To calculate the Gini coefficient for each SSP–RCP combination, we first calculate the cumulative percentage of GDP per capita for each country relative to the total GDP per capita of the region in which the country is located, ranking countries from the least wealthy to the wealthiest.

Then, the area under the Lorenz curve is calculated as the mean of the upper and lower bounds multiplied by the width of the area under the curve and can be described by the following equation:

$$Area\_B = \sum \frac{CUM\_\%\_GDPpercap_n + CUM\_\%\_GDPpercap_{n-1}}{2} \cdot \frac{1}{n} \quad (4),$$

where CUM_%_CDPpercap is the cumulative percentage of GDP per capita for countries corresponding to their rank, and n is the number of observations.

Area A is the area between the line of equality and the Lorenz curve and is calculated as follows:

$$Area_A = 0.5 - Area_B \quad (5),$$

where the value **0.5** corresponds to the area under the line of equality.

The final step is to calculate the Gini coefficient, which is given by the following formula:

$$GINI_{SSP\text{-}RCP} = \frac{0.5}{Area\_A_{SSP\text{-}RCP}} \quad (6),$$

where $Area\_A_{SSP\text{-}RCP}$ is the area between the line of equality and the Lorenz curve for each SSP–RCP combination, and 0.5 represents the area under the line of equality.[12]

[12] For more see Beck and Nzimande (2023), Beck and Okhrimenko (2024), and Beck and Yersh (2024).

3. Empirical results and discussion

3.1 Empirical results

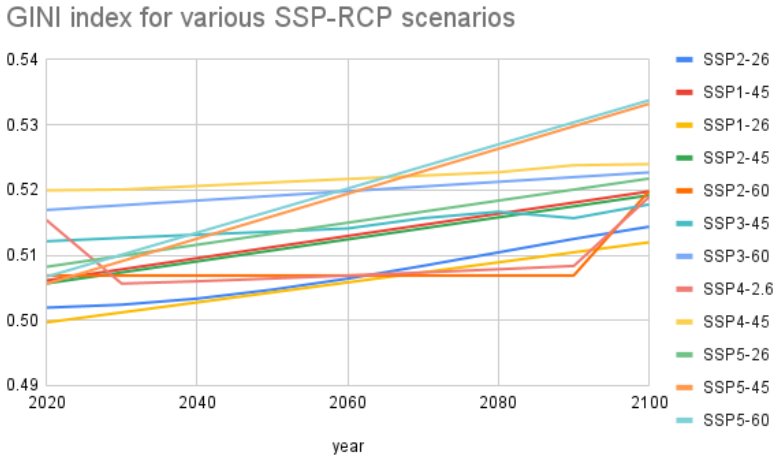

Figure 3. Gini index for vatious SSP-RCP scenarios

Figure 3 illustrates the evolution of the Gini index over time for the various SSP–RCP scenarios resulting from our analysis. Based on the results presented in the figure, we can conclude that inequality is consistently lower across all SSP projections under the RCP2.6 pathway, indicating that limiting radiative forcing to 2.6 W m^{-2} results in a more equal outcome across scenarios. The best performing scenario under RCP2.6 is SSP1-2.6, with a Gini coefficient of 0.4993709333 in 2100, while the worst is SSP5-2.6, which is characterised by a high level of emissions, with a Gini coefficient of 0.5217543429. These results are in line with previous studies discussed in the Literature Review section.

The SSP5 pathway, the so-called fossil-fuelled development or 'Taking the Highway' narrative, results in the most unequal world at each level of emissions, with radiative forcing of 2.6 W m^{-2}; 4.5 W m^{-2}; and 6.0 W m^{-2}.

SSP4 is characterised by high socioeconomic inequality, with limited investement in human capital and greater reliance on carbon-intensive fossil fuel energy sources, and with mitigation and adaptation policies implemented only in middle- and high-income countries. The results show that under RCP2.6 the Gini coefficient in 2100 is equal to 0.518917737987295, compared with 0.4993709333 for SSP1-2.6, implying that many low-income countries are left behind, resulting in higher international inequality.

3.2 Discussion

Based on the results of the paper, we conclude that under scenarios of higher carbon emissions and faster climate change, the Gini coefficient between low-income and high-income countries is higher. We also find that anthropogenic climate forcing of 4.5 W m^{-2} and 6.0 W m^{-2} increases economic inequality between countries. These findings are consistent with previous studies discussed in the Literature Review section.

Nevertheless, this paper has limitations that could be addressed in future research. First, the Gini index provides only a relative measure of inequality and therefore does not capture the absolute situation of the poorest. Second, additional mitigation cost models could be included in the analysis to obtain more comprehensive results.

Conclusions

Climate change has affected income distribution between countries in recent years and continues to increase economic differences between low- and high-income countries. The main driving force is the bell-shaped relationship between temperature and economic growth, whereby global warming increases growth in cooler countries and decreases growth in warmer countries. The work of many researchers has shown that the most severe consequences of climate change damages are likely to occur

in tropical areas, where the poorest countries are located. Moreover, in low-latitude regions, damages are expected to occur earlier than in high-latitude regions. Climate damages reduce economic catch-up between low- and high-income countries under many socioeconomic and emissions pathway scenarios, resulting in rising inequality between these groups. Studies examining how climate change has already affected income distribution between countries show that countries with the lowest emissions have suffered negative economic impacts, while countries with the highest historical emissions have benefited from rising temperatures. In this paper, we demonstrate that the most equal scenario for socioeconomic development is the sustainability pathway SSP1-2.6, which limits radiative forcing to 2.6 W m^{-2} through cooperation among countries to mitigate and adapt to the consequences of climate change.

ABSTRACT

There is growing evidence that climate change affects inequalities between countries, in that increasing temperatures reduce economic activity in low-income countries and slow the catch-up of economic growth. Moreover, given that rich countries, located in the coolest regions, are responsible for most past greenhouse gas emissions, there is evidence that they benefit in warm years. In contrast, the warmest regions, where the poorest countries are located, suffer the most because of high adaptation costs and substantial damages from weather extremes and high temperatures. The aim of this paper is to evaluate how global warming has affected the recent evolution of inequality across countries using economic models such as integrated assessment models and damage factors taken from damage models. By conducting numerical analysis for the future distribution of income across, on average, 156 countries, we find that in all socioeconomic scenarios, limiting radiative forcing to 4.5 W m^{-2} will result in a more equal world.

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Appendix

List of countries used in the estimation.

R5.2OECD = Includes the OECD-90, as well as EU Member States and candidates.

Albania	**Finland**	**Luxembourg**	**Slovenia**
Australia	France	Malta	Spain
Austria	Germany	Montenegro	Sweden
Belgium	Greece	Netherlands	Switzerland
Bosnia and Herzegovina	Guam	New Zealand	Macedonia
Bulgaria	Hungary	New Zealand	Turkey
Canada	Iceland	Poland	United Kingdom
Croatia	Ireland	Portugal	United States of America
Cyprus	Italy	Puerto Rico	
Czech Republic	Japan	Romania	
Denmark	Latvia	Serbia	
Estonia	Lithuania	Slovakia	

R5.2REF = Countries from the Reforming Economies of Eastern Europe and the Former Soviet Union.

Armenia	**Georgia**	**Moldova**	**Turkmenistan**
Azerbaijan	Kazakhstan	Russian Federation	Ukraine
Belarus	Kyrgyzstan	Tajikistan	Uzbekistan

R5.2ASIA = The region includes most Asian countries with the exception of the Middle East, Japan and former Soviet Union states.

Afghanistan	**French Polynesia**	**Myanmar**	**Singapore**
Bangladesh	India	Nepal	Solomon Islands
Bhutan	Indonesia	New Caledonia	Sri Lanka
Brunei Darussalam	Lao	Pakistan	Taiwan
Cambodia	Malaysia	Papua New Guinea	Thailand
China	Maldives	Philippines	Timor-Leste
Korea	Micronesia	Republic of Korea	Vanuatu
Fiji	Mongolia	Samoa	Viet Nam

R5.2MAF = This region includes countries of the Middle East and Africa.

Algeria	**Guinea**	**Occupied Palestinian Territory**
Angola	Guinea-Bissau	Oman
Bahrain	Iran	Qatar
Benin	Iraq	Rwanda
Botswana	Israel	Réunion
Burkina Faso	Jordan	Saudi Arabia
Burundi	Kenya	Senegal
Cameroon	Kuwait	Sierra Leone
Cape Verde	Lebanon	Somalia
Central African Republic	Lesotho	South Africa
Chad	Liberia	South Sudan
Comoros	Libyan Arab Jamahiriya	Sudan
Congo	Madagascar	Swaziland
Côte d'Ivoire	Malawi	Syrian Arab Republic

Congo	Mali	Togo
Djibouti	Mauritania	Tunisia
Egypt	Mauritius	Uganda
Equatorial Guinea	Mayotte	United Arab Emirates
Eritrea	Morocco	United Republic of Tanzania
Ethiopia	Mozambique	Western Sahara
Gabon	Namibia	Yemen
Gambia	Niger	Zambia
Ghana	Nigeria	Zimbabwe

R5.2LAM = This region includes countries of Latin America and the Caribbean.

Argentina	**Costa Rica**	**Guyana**	**Peru**
Aruba	Cuba	Haiti	Suriname
Bahamas	Dominican Republic	Honduras	Trinidad and Tobago
Barbados	Ecuador	Jamaica	United States Virgin Islands
Belize	El Salvador	Martinique	Uruguay
Bolivia	French Guiana	Mexico	Venezuela
Brazil	Grenada	Nicaragua	
Chile	Guadeloupe	Panama	
Colombia	Guatemala	Paraguay	

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Chapter X

Influence of Eco Labels on Consumer Purchasing Decisions in the Cosmetics Industry

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Introduction

In recent years, the global cosmetics industry has undergone a notable shift towards sustainability and environmental consciousness. This transformation has been driven by growing consumer awareness of the environmental and health impacts of beauty products. Among the various factors influencing consumer behaviour, the presence of eco labels on cosmetic products has emerged as a significant determinant of purchasing decisions. However, some consumers are poorly informed—or not informed at all—about the exact characteristics of an eco-friendly cosmetic product. This lack of awareness creates opportunities for companies to engage in greenwashing, thereby profiting from their customers' low awareness.

Eco labels, which certify that products meet specific environmental standards, serve as a crucial tool for consumers seeking to make environmentally responsible choices. These labels often indicate that a product is made from natural or organic ingredients, is cruelty-free, or features biodegradable or recyclable packaging. As such, eco labels provide a straightforward way for consumers to identify products that align with their values of sustainability and ethical consumption.

Despite their growing prevalence, a gap remains as regards understanding the extent to which eco labels influence consumer purchasing decisions in the cosmetics industry. This study aims to address this gap by exploring the impact of eco labels on consumer behaviour, and examining whether such labels genuinely drive purchases, or whether other factors—such as price, brand reputation, or product efficacy—play a more significant role.

The importance of this research lies in its potential to inform companies, marketers, and policymakers about the effectiveness of eco labels in promoting sustainable consumption. By analysing consumer attitudes and behaviours, the study aims to provide insights into how eco labels can be leveraged to enhance marketing strategies and support environmental goals.

The research problem addressed in this study is the investigation of perceptions regarding the influence of ecological labelling on consumer behaviour. Specifically, the study is guided by the following question: What influences people's decisions to buy eco-friendly cosmetics?

From this research question, the following hypotheses are formulated:

H1: Eco labelling encourages more people to purchase cosmetic products.

H2: Eco labelling does not encourage more people to purchase cosmetic products.

Through a literature review and online survey, an in-depth analysis is conducted. This thesis may serve as a foundation for future research related to consumer purchasing decisions in the cosmetics industry, as there is currently a lack of similar existing studies. Ultimately, the study

seeks to answer the critical question: Does the eco label influence people to buy cosmetic products?

1. Methodology

The survey questionnaire captures information on various aspects of cosmetic products. It includes closed-ended questions in single- and multiple-choice formats. Participants are also asked to evaluate each aspect and, at the end of each section, may provide additional comments in a field labelled 'other'. These quantitative data offer numerical insights into how various factors influence consumer purchasing decisions.

Once the survey responses are collected, the data are subjected to descriptive analysis. Quantitative data, such as Likert scale ratings and numerical responses, are analysed using basic statistical techniques to identify trends and patterns in consumer perception. Open-ended responses are analysed using thematic or content analysis, which involves identifying recurring themes or categories and organising them into meaningful clusters. This research design and methodology are intended to contribute to the existing literature on consumer behaviour and to provide valuable insights for the global cosmetics industry. The findings aim to inform not only understanding of ecological factors but also other considerations relevant to consumer behaviour.

The sampling strategy employed in this research study is a non-probability sampling approach, specifically convenience sampling. Convenience sampling involves selecting participants based on their accessibility and willingness to participate. The survey is distributed through social media, targeting active consumers on these platforms. The convenience sampling method was deemed appropriate for several reasons, considering the study's research objectives.

Firstly, this method is cost-effective and time-efficient, which is advantageous given the constraints of resources and time typically associated with thesis research. It allows for quick data collection by

reaching many potential participants through widely used platforms such as social media.

Secondly, convenience sampling enables the researcher to gather data from diverse participants. The research explores the perceptions of e-commerce reliability among consumers from different regions. By utilising social media channels, the survey can reach a broad audience across different countries. This ensures that the sample includes participants from various geographic locations, which is essential for capturing the diversity of consumer perspectives across countries.

However, it is essential to note that convenience sampling has limitations that should be acknowledged. The sample may not fully represent the entire population of consumers, as it relies on the accessibility and willingness of participants to respond to the survey. The sample may be biased towards individuals who are more active on social media platforms or who have a specific interest in cosmetics or ecological topics. This potential bias should be considered when interpreting and generalising the findings to the broader population.

In conclusion, using convenience sampling in this study was appropriate, considering the research objectives and constraints. It allowed for efficient data collection from various consumers, providing insights into their perceptions of consumer decision-making. The convenience sampling approach aligns with the exploratory nature of the research and facilitates the analysis of descriptive data to uncover patterns and trends.

2. Results

As this study follows an exploratory research design, the focus is on testing specific hypotheses and understanding the phenomena. Therefore, the analysis primarily employs descriptive statistical methods, aiming to summarise and describe the data rather than conduct inferential analyses or test for statistical significance. The analysis findings are presented using charts and graphs to effectively communicate the results.

Overall, the data analysis involves descriptive statistical methods and thematic analysis of qualitative responses. This approach aligns with the exploratory nature of the research, aiming to gain a deeper understanding of the relationship between eco-labelling and consumer behaviour. The author received 108 responses from participants in the study and used descriptive analysis techniques to interpret the data.

The research findings reveal key insights into consumer behaviour and the influence of eco-labels in the cosmetics industry. The survey of 108 respondents demonstrates a growing consumer interest in eco-friendly products, with 64.8% purchasing cosmetics with eco-labels occasionally, and 25.9% doing so often. However, consistent adoption remains limited, with only 2.8% always choosing eco-labelled products. This reflects a general preference, but also highlights barriers such as price, availability, and scepticism about authenticity.

Attributes such as cruelty-free certification and natural or organic ingredients are among the most influential factors for consumers, receiving high importance ratings. In contrast, aspects such as reducing carbon footprints and water usage received more moderate or mixed responses. Interestingly, while 77.8% of respondents expressed a desire for more eco-friendly brands, only 17.6% consistently read labels or check for recyclable packaging before purchasing. This discrepancy between intention and action underscores the need for better consumer education and clearer, more trustworthy eco-labelling practices.

In conclusion, while eco-labels have significant potential to influence consumer behaviour, their effectiveness depends on overcoming scepticism and making sustainable products more accessible and transparent. These findings can guide businesses in aligning their strategies with consumer preferences while promoting environmental responsibility.

3. Discussion

The survey revealed significant insights into the attributes consumers value when purchasing eco-friendly cosmetics. The highest ratings were

observed for attributes such as 'cruelty-free (no animal testing)' and 'natural and organic ingredients'. A substantial portion of respondents rated these attributes as highly important, with over 50% assigning them a rating of 8 or higher on a scale from 1 to 10. This indicates a strong preference for products that are ethically produced and composed of natural ingredients, reflecting growing consumer awareness and concern for animal welfare and personal health.

In contrast, attributes such as 'reduced water usage' and 'carbon footprint reduction' received more mixed ratings. While a considerable number of respondents rated these attributes as moderately important, a significant portion also rated them as of low importance. This suggests that, although environmental impact is a concern for many consumers, it may not be as immediate or compelling a factor as cruelty-free practices or natural ingredients.

The survey data showed that a majority of respondents (64.8%) sometimes purchase cosmetic products with eco labels, while 25.9% do so often. Only 2.8% always purchase eco-labelled products, and 6.5% never do. These findings suggest that while there is a general inclination towards eco-labelled products, consistent and habitual purchasing remains limited. This may be due to several factors, including the higher prices of eco-labelled products, limited availability, or consumer scepticism about the authenticity of eco claims.

A significant finding from the survey was the level of consumer awareness and scepticism regarding eco labels. While 77.8% of respondents expressed a desire to see more eco-friendly cosmetic brands in the future, only 17.6% reported that they always check the list of ingredients and the recyclability of packaging before buying cosmetics. This discrepancy highlights a gap between consumer intentions and actual purchasing behaviour, possibly driven by scepticism about the veracity of eco claims and a lack of clear, trustworthy information.

Conclusion

The present study aimed to explore the decision-making processes of consumers from around the world and the influence of eco-labels on their choices through an exploratory approach. The research findings shed light on various aspects related to the factors that influence consumer behaviour, how companies advertise their products, how they engage in greenwashing, and which reliable eco-certifications should be considered by consumers when making a purchasing decision.

By analysing an online survey conducted by the author of the thesis, the first hypothesis can be supported, indicating that eco-labelling encourages more people to purchase cosmetic products. The findings concerning ethical and sustainable brand practices demonstrate that individuals care about responsible conduct of brands. In addition, the results regarding the frequency of purchasing cosmetic products with 'eco' labels indicate that only 6.5% of respondents stated that they never buy cosmetics with ecological labels, which is a relatively low proportion. As the remaining respondents indicated that they purchase eco-labelled cosmetics sometimes, often, or always, this suggests that they are interested in ecological initiatives and that companies are performing well in terms of product design and marketing. Furthermore, the final survey question was designed to determine whether consumers are open to more eco initiatives in the cosmetics industry in the near future. The results show that 77.8% of respondents would like to see even more ecological cosmetic products, while only 21.3% do not care, suggesting that in the coming years the demand for, and consequently the supply of, eco-friendly cosmetics will rise steadily.

However, when analysing the results concerning what consumers consider when buying an eco-friendly cosmetic product, this issue must be taken into account. This is due to the fact that only 17.6% of respondents claimed that they always read the list of ingredients and check whether the packaging is recyclable before purchasing cosmetics. This is a relatively low proportion. Especially considering that an even larger proportion of respondents, namely 23.1%, never carefully read product

characteristics, this gives brands the opportunity to engage in greenwashing successfully. It is evident that almost 60% of consumers, to some extent, try to do their best and sometimes they check certain aspects; however, this lack of knowledge still leaves room for manipulation and unfair practices by corporations.

Also, this thesis answers the research question (what influences people's decisions to buy eco-friendly cosmetics) by identifying key factors that shape consumer purchasing decisions regarding eco-friendly cosmetics. Eco labels influence purchasing decisions, especially for cruelty-free and natural or organic products. However, their overall impact is moderated by consumer scepticism and the need for more transparent information. There is a notable gap between consumers' desire for eco-friendly products and their actual purchasing behaviour, which is influenced by scepticism about eco labels. In addition, the recyclability of packaging after use is an important factor for consumers. In comparison with other factors such as quality, price, and recommendations, sustainable brand practices do not occupy the highest positions in this ranking; however, their overall importance can be described as moderate to relatively high.

Additionally, there are several limitations associated with this online survey. The population in this research study refers to the entire group of individuals the researcher is interested in studying, which in this case is the overall consumer population. However, due to practical limitations such as time, cost, and accessibility, collecting data from the entire population is often not feasible. Therefore, a sample was taken from the population, representing a subset of individuals from the larger population. In this study, the sample was selected using a non-probability sampling technique. Surveys were conducted via Google Forms and distributed through social media channels targeted at consumers. A sample size of 108 respondents was obtained for data collection. In addition, consumer responses may be inaccurate, insufficiently considered, or highly subjective and simplified. It is also very difficult to organise tests to assess respondents' actual knowledge of ecological certifications.

Therefore, the findings of this survey should be interpreted critically in light of these limitations.

As stated earlier, there is a promising future for eco-friendly cosmetics, and the more fairly and transparently companies operate, the more favourable the situation will become, leaving less room for greenwashing pursued solely for the purpose of increasing profits. The author hopes that ecological programmes for children and young people will be implemented in practice, thereby improving knowledge among the next generation. Furthermore, clear information about genuinely natural and ecological products, as well as trustworthy certifications, should be widely available across the media. In this way, adults and senior consumers can also be better informed.

This research may help both companies and other researchers to understand current consumer trends and may be used to inform future innovations and approaches to customers. Accordingly, the contribution of this work lies in providing an in-depth analysis of the fast-growing beauty industry, for which limited comparable research currently exists.

ABSTRACT

Since environmental awareness is an important part of everyday life, this thesis explores one of the most relevant contemporary philosophies—environmental awareness—and its impact on consumer behaviour. It affects one of the largest industries: the cosmetics sector and its consumers. The research question addressed is whether the 'eco' label encourages consumers to purchase cosmetics. In this way, the philosophy of conscious consumption becomes part of an individual's life and influences their choices. Like any philosophy, ecological awareness affects not only a person's thinking and outlook, but also their consumer decisions—particularly the choice of ecological cosmetics, which reflect care for the environment. A tool for answering the research question and testing the proposed hypothesis is the conducting and analysis of a survey of cosmetics consumers, aimed at determining the extent to which consumers pay attention to the 'eco' label, whether environmental

values and consciousness influence purchasing decisions, and whether buyers tend to choose producers that support environmental protection and ethical production.

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Chapter XI

The Impact of Mimetic Desire on Brand Recognition through the Film Industry

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Introduction

Effective brand recognition is critical for organisations to succeed in today's increasingly competitive industry. Marketers must understand the factors that influence consumer behaviour and brand perceptions in order to design effective strategies. Mimetic desire and its impact on brand awareness is one such factor that has received substantial attention

The study aims to validate the hypothesis that the choice of a product is associated with a positive attitude towards the person or character being advertised, and that affection for the character serves as the trigger for mimetic desire to purchase a product or service. The research provides insights into the influence of mimetic desire on brand recognition within the film industry. By examining Girard's Mimetic Theory,

analysing product placement, and conducting empirical research, the study aims to contribute to an improved understanding of consumer behaviour and its implications for effective brand recognition.

1. Effect of mimetic desire on behaviour of people

1.1.Girard's Mimetic Theory

Mimetic theory, a comprehensive concept addressing relations between people as well as the origins of society and culture, was proposed by R. Girard. 'Girardianism' emerged through the interpretation and reinterpretation of Girard's writings. His theory is most fully and comprehensively presented by Kirwan (2005) and Palaver (2013). Many authors have sought to build bridges between Girard's ideas and those of other prominent philosophers, such as J. Derrida or Y. Kristeva, for example in the works of McKenna (1992) and Reineke (1997), respectively. In the field of psychology and neuropsychiatry, one of the main successors of Girard's work is J.-M. Ugurlyan (1978), who examines interpersonal relationships from the perspective of mimetic desire.

In general, Girard identifies a more comprehensive character of mimesis. The subject studied by Girard is the origin and development of conflicts between individuals and nations. Girard's mimetic theory is based on three concepts, which he successively outlined in three voluminous works published between 1961 and 1978 and which have since been developed and popularised by his followers.

1. Mimetic desire. At the source of human conflict, according to Girard, lies mimetic, that is, imitative desire: we desire what or whom someone else has already desired. The model being imitated is called the 'mediator', the intermediary between the desiring subject and the desired object. The mediator can be 'external', that is, absolutely remote and inaccessible to rivalry, or an 'internal' mediator, which is located close to the subject of desire and therefore simultaneously excites desire and prevents its fulfilment.

2. The conflict of mimetic desires intensifies, resulting in an endless process of vendetta. The participants in the conflict forget about stable relationships between people; instead of society as a whole, they see only a specific enemy-rival against whom revenge must be taken immediately. People in traditional societies use an extreme means to overcome this stage – the sacrifice of a 'scapegoat'.

3. Sacralisation of the victim. At the next stage, when the conflict has already been extinguished at the cost of killing an innocent victim, people attempt to rid themselves of the horror through which they have survived this murder. Once again, the mechanism of non-recognition is triggered: the former victim is sacralised; from a bearer of mimetic contagion, they become a giver of blessings.

A central issue of Girard's theory is that desire arises and gains direction from the desires of others. The desirability of a fashion item to an individual is noted and established by the desires of others for the product. When another person is perceived as desiring a product, an individual becomes aware of its desirability—a fashion trend has begun. The infectious nature of mimetic desire can readily be observed in the marketplace. Once the desirability of a specific fashion is communicated, mimetic desire for the item can be generated in others. The resulting rivalry between an individual in whom mimetic desire has developed and the object or rival of that desire necessarily leads to an escalation of tension.

Girard leads us to the idea that mimetic theory, by revealing the foundations of social institutions and, at the same time, the foundations of the subject, exposes violence. Therefore, consideration of Girard's concept should not be of a narrow nature, but should be situated within a broader panorama of examining mimetic power and analysing the discursive practices through which the modern subject is constituted. As already noted, the idea of mimetic desire does not encompass all types of imitative behaviour—people may imitate not only the desires of others, but also, for example, the essence or being of their chosen model. On the other hand, the fatalism of Girard's narrative appears exaggerated: although imitative desires undoubtedly exist and are today persistently

stimulated by advertising and popular culture, subsequent developments do not necessarily unfold in the manner Girard describes.

1.2. Belonging to a group as a factor in buying

Girard believed that mimetic desire could be a catalyst for social learning, much in the same way that children look to their caregivers to model behaviour. People tend to assume that they are making decisions based on purely rational factors; however, they are not entirely rational, as they are highly social and often fail to recognise how the desires of others shape their own. Social media, in particular, has fuelled mimesis because, by its very structure, it encourages imitation. Twitter, with retweets, likes, and content going viral, appears to exemplify this dynamic, suggesting that social media strongly reinforces mimetic behaviour.

Two desires directed towards the same object are inevitably competitive. Such conflict resulting from imitation is called 'mimetic rivalry'. For Girard, there are two possibilities for how desire is mediated: (a) externally, when 'the distance is sufficient to eliminate any contact between the mediator and the subject'; (b) internally, where the mediator is not separated from the desiring subject and 'thus is more liable to become a rival in the latter's attempts to attain an object'. In the case of external mediation, the subject openly proclaims the true nature of their desire and shares the same values as the model. In the case of internal mediation, imitation is unconscious or deliberately concealed by the subject.

Girard shows how mimetic desire is directed towards the effacement of differences between rivals (undifferentiation). The mediator who previously encouraged the subject to imitate them suddenly becomes a rival and an obstacle. At the heart of mimetic rivalry lies a double imperative: the mediator's demand is the command 'imitate me', yet this message is coupled with a warning, 'do not imitate me'. Thus, the source of conflict is the presence of this contradictory double imperative. The intensification of violence can reach the level of social and cultural order, absorbing not only individuals but entire communities.

1.4 Emotional signal-stimulus

According to Girard, mimesis acts as a fundamental phenomenon of interhuman relations in which everyone imitates everyone else. He divides mimesis into two modes: (1) appropriation mimesis; (2) metaphysical desire. The mimesis of appropriation, at the level of external manifestation, can be characterised as the desire to own what another owns. Yet, from Girard's perspective, appropriation mimesis is not merely a desire to obtain an object of envy, but a mechanism for imitating the desire of another. Thus, mimesis draws in an increasing number of participants, forming a society in which individuals do not possess their own desires but instead imitate the desires of others.

When relating the above theory to brand formation and identity, it becomes clear that the psychological aspect of the brand category is based on four components: emotional, evaluative, rational, and behavioural. Furthermore, a brand as a psychological construct has several forms of manifestation through complexes of associations with the branded product, expectations, and reputation. The psychological aspect of the brand is grounded in the study of the perception of branded products, in particular the communicative dimension of brand promotion and the characteristics of sign-symbolic reality as perceived at the individual level.

Based on this, psychological science highlights the following features of an effective brand: public recognition and sharing of brand values; brand assimilation; an identical associative array; and an emotional dominant of choice. A brand is a psychologically enriched entity if its structure includes composite elements and individuality. Additionally, a dominant feature is the psychological positioning of the brand on a fundamental characteristic of a product or service, which encompasses all essential properties of the brand offer, including image, cultural content, and psychotype.

In interpersonal encounters, especially with strangers, people use facial cues to form impressions of others. In this context, a growing body of literature has documented the role of facial trustworthiness in social perception and behaviour. For example, people invest more money in

partners whose facial features are perceived as more trustworthy (van't Wout and Sanfey, 2008), and men with greater facial width are less trusted and are also more likely to exploit their partners (Stirrat and Perrett, 2010). Given the importance of trust for interpersonal relationships and their outcomes, we hypothesised that target trustworthiness may also play a key moderating role in mimetic desires. Of interest, contrasting predictions can be made with regard to the influence of target trustworthiness in this effect.

A first possibility (additive effect) is that mimetic desire represents a special case of evaluative conditioning. The neutral object may be conceptualised as a conditioned stimulus, and target trustworthiness and attention orientation as unconditioned stimuli. If one assumes that trustworthiness is more positive than untrustworthiness and that approach is more positive than avoidance, then an additive effect may be observed in the conditioning of the stimulus, resulting in the most positive evaluation for stimuli gazed at by trustworthy targets and the most negative evaluation for stimuli gazed away from by untrustworthy targets.

A second possibility (reversal effect), however, is that mimetic desire is observed for trustworthy targets (the classic effect) but reversed for untrustworthy targets, with the most positive evaluations for stimuli gazed at by trustworthy targets or gazed away from by untrustworthy targets (Heider and Simmel, 1944).

Of importance, whereas the first (additive) prediction does not involve making assumptions about the target's internal states or motives, the second (reversal) prediction posits that mimetic desires are based on such inferences. Given the strong social dimension involved in the mimetic desire paradigm, we predicted that participants would be likely to draw inferences about the internal state of the orienting target. Therefore, we expected a reversal of the effect for objects associated with untrustworthy targets.

However, in order to gain more information on these inferences, additional metrics are required. Thus, we measured participants' need for cognition (NFC) (Cacioppo, Petty and Kao, 1984), which corresponds to a tendency 'to engage in and to enjoy thinking' (Cacioppo and Petty, 1982,

p. 116). A number of attitude change studies have shown that heuristic thinking is enhanced under low NFC levels (Cacioppo *et al.*, 1996; Chaiken, 1987; Haugtvedt, Petty and Cacioppo, 1992). Hence, obtaining a larger reversal effect under high NFC levels would be consistent with the view that facial trustworthiness is processed analytically in this paradigm. Conversely, obtaining a larger reversal effect under low NFC levels would be more consistent with the view that facial trustworthiness is processed heuristically.

Recent research has stressed the spontaneous use of facial trustworthiness in information processing and decision-making. For instance, Schul, Mayo and Burnstein (2004) showed that exposure to an untrustworthy face facilitates automatic responses to incongruent prime–target associations in a speeded word categorisation task. Finally, individuals with low NFC demonstrate higher sensitivity to source trustworthiness in forming attitudes (Priester and Petty, 1995; Priester and Petty, 2003). Based on this literature, we tentatively predicted that the reversal effect, if found, would be larger under low rather than high NFC levels.

2. Product placement

2.1 The importance of product placement in marketing communications

The market is becoming increasingly saturated with information regarding product and service offers. As a result, the processes of developing customer demand and satisfying it are growing more complex, since audiences are becoming more knowledgeable and selective, which raises the standards for advertising (Holovchuk and Chornokon, 2018).

This has led to the understanding that it is necessary to guide the consumer towards an idea while leaving space for independent analysis, in the absence of direct appeals, slogans, and emphases (Lykholat, Veresklya and Melnyk, 2021). This has encouraged the search for innovative ways to capture consumer attention. Today, the use of hidden

advertising, namely one of its forms – product placement – is becoming increasingly frequent. Hidden advertising is defined as the paid publication or broadcast of materials that resemble regular news or commentary but are, in fact, paid advertising. While direct advertising primarily aims to increase sales, covert advertising seeks to shape key image positions and attitudes towards the advertising object among the target audience (Holovchuk and Chornokon, 2018). Among all forms of hidden advertising, product placement was the first to appear; its essence lies in the fact that the advertised product is mentioned in a book or shown in a movie, music video, or TV series (Kulchytska and Myskovets, 2013; Lehu, 2009). Most experts agree that product placement as a targeted marketing tool emerged in the early twentieth century, owing to the skilful integration of the product into the plot of the *Popeye the Sailor* cartoon by Fleischer Studios (Figure 2.1) (Newell, Salmon and Chang, 2006).

Children and adolescents are the most susceptible to external psychological influence, adopting everything from behaviour to food preferences from their favourite cartoons and movie characters. It is estimated that 80% of advertising aimed at children promotes unhealthy products such as carbonated drinks, juices, hamburgers, chips, and chocolate (Holovchuk and Stadnyk, 2017).

Furthermore, the effectiveness of product placement remains controversial, as intrusive or poorly integrated placement may cause consumer irritation and, as a result, lead to the opposite effect, namely rejection of the advertised product. In some cases, dissatisfaction even concerns perceived changes in the 'tastes' of the main character (Figure 2.2). Therefore, successful hidden advertising is relatively rare and largely depends on the scenario, as illustrated by the placement of the Audi car brand and Converse shoes in the movie *I, Robot* (Figure 2.3).

In economically developed countries, the use of this means of communication has long been regulated. In particular, in 2007, the European Commission adopted a directive that defines product placement as a form of audiovisual communication using an image or mention of a product, service, or its trademark in such a way that it can be recognised, in exchange for payment or similar compensation. According

to this document, product placement does not have a direct influence on the purchase of a product or service, for example through the use of direct advertising slogans (which distinguishes it from advertising) (European Parliament, 2010).

Consequently, product placement contributes to an increase in trust, harmoniously combines image and product advertising within the plot of a work of art, and thus becomes an important tool of marketing communications. The unambiguous and positive perception of the product--object of product placement by viewers in different countries, as carriers of different cultures, is often the subject of serious scientific research. Any dissonances and differences in consumer perception are subjected to in-depth analysis in order to avoid them in the future.

2.2 Types of product placement

Product placement can have a psychological impact on both adults and children. However, it is evident that children's unformed psyche is particularly susceptible to the influence of vivid television images, which is actively exploited by producers and advertisers. It has been found that teenagers are more likely to trust product placement messages than traditional advertising. The mechanism of product placement's impact is explained by the fact that a person is relaxed while watching their favourite movie or TV programme. This creates a favourable background for memorising an attractive and timely brand.

There are three main types of product placement. The first is visual product placement, in which the audience can see the logo, product, or service within the frame. Not all directors and producers use product placement in their films. For example, Quentin Tarantino's films feature a fictional cigarette brand called Red Apple, which does not exist in reality (Figure 2.4). This is done deliberately to avoid advertising a specific brand (Danyliuk, 2021). Nevertheless, real brands, such as Coca-Cola, can still often be seen in films. The cult film *Blade Runner* depicts a future in which a famous drink is advertised on large screens, with the message: 'Coca-Cola will be here in a hundred years' (Figure 2.5).

The second type is verbal product placement, which is divided into two subtypes: verbal (a phrase that promotes a product) and non-verbal (a sound that is an inherent feature of a product).

Verbal product placement includes not only the mention of a brand by characters, but also the musical accompaniment of a movie or TV series, which represents product placement by a music band. For example, the music of the band Tito and Tarantula became the soundtrack for Quentin Tarantino's film *From Dusk Till Dawn* (Danyliuk, 2021).

The third type of product placement is kinetic product placement, which involves the interaction of an actor with a product. The kinetic type implies that the brand is actively used by characters in a movie or TV series. It may even resemble a form of costume parody. Kinetic product placement is considered the most effective and memorable type; however, it is also the most difficult to implement, as it is challenging to integrate advertising organically into the plot (Lykholat, Veresklya and Melnyk, 2021).

Another type, or rather a subtype, is dynamic advertising, in which a marketer can specify the placement, duration, and target audience (Russell and Belch, 2005). However, it is not sufficient to limit analysis to the formal characteristics alone. One of the most important criteria is the relevance of the advertised product to the narrative scenario and the degree of their mutual integration (Russell, 2002). Due to the diversity of ways in which product placement is used and the variation of its forms, significant difficulties arise in its legal regulation. Overall, it is often difficult to prove that the inclusion of trademarks in audiovisual content is intended to draw attention to the advertised object and to create or maintain interest in its promotion.

2.3. Creating a culture of behaviour through product placement

One of the most significant factors in the influence of product placement on consumers' minds is the psychological identification of an individual with a character who is presented in a highly positive light. By placing

a product in the hands or mouth of a character, product placement activates mechanisms of identification and the desire to imitate. Imaginary comparison of oneself with the hero of a TV programme or movie, imagining oneself in their place or in a similar situation, evokes a specific emotional response. This phenomenon is referred to as 'celebrity worship syndrome' (Maksymenko, Kuzikova, 2019). This psychological condition makes individuals partially or completely dependent on their idol, a tendency that is effectively exploited by marketers selling various types of products associated with celebrities at the peak of their fame. For example, in the movie *Top Gun*, Tom Cruise's character serves in the U.S. Air Force and appears particularly attractive wearing Ray-Ban sunglasses (Figure 2.6). Following the movie's release, sales of the brand increased by 40%, and a large number of young people enlisted in the US Army. International psychological studies indicate that approximately one third of the population in developed countries suffers from celebrity imitation syndrome (Holovchuk, 2017).

Public figures can shape fashion trends and influence the tastes of millions of fans who follow the lives of stars. For example, on the day of John F. Kennedy's inauguration, his wife Jacqueline wore a round pillbox hat made especially for this occasion (Figure 2.8). Jacqueline held the hat with her hand, which caused a small dent that was visible in all photographs taken that day. Very quickly, hats with a specially made dent 'like Jacqueline's' appeared in the most expensive stores and adorned the heads of American fashionistas. Imitating celebrities who play leading roles in popular movies does not always contribute exclusively to increased sales; in some cases, it has a negative impact. For example, in the movie *It Happened One Night* (1934), the main male role was played by the legendary American actor Clark Gable, widely known for his leading role in the movie *Gone with the Wind* (Figure 2.9). In one scene, his character is staying in a motel, and when he takes off his shirt to go to bed, he is not wearing an undershirt. This contradicted the prevailing consumer tradition of the time. As a result of the widespread viewing and discussion of this scene, sales of men's T-shirts reportedly declined sharply.

All in all, product placement is becoming an increasingly popular way of reaching potential customers who are already oversaturated with the influence of commercials. To achieve the goal of influencing the target audience, advertisers use product placement as a more effective and, in some cases, more economical method, which can produce substantial results if implemented correctly. Given the significant scope of product placement, it can be argued that this marketing tool has evolved into an industry that adapts advertising media to specific types of messages, creating content that enables the establishment and demonstration of a close connection with the target audience.

3. Research design and methodology

3.1. The essence and organisation of the study

To determine whether individuals tend to prefer products advertised by popular figures, a questionnaire (Appendix B) and an experiment (Appendix A) were used. A total of 100 respondents participated in the study. Respondents were conditionally divided into the following groups (20 people in each group): children aged 6–12, boys aged 13–19, girls aged 13–19, adult men aged 20 and older, and adult women aged 20 and older. The survey was conducted using the Google Forms platform, in Ukrainian. For this empirical study, the author was primarily interested in the gender and age of respondents; however, the remaining questions in the first section, concerning personal information, were included so that the database collected in this experiment would be suitable for subsequent research.

The first stage involved the experiment. Respondents from the 'Children' group participated only in the experiment part. Their tasks were to evaluate the characters of the cartoons *Bee Movie* (2007), *Zootopia* (2016), and *The Simpsons* (1989); watch selected excerpts from these cartoons that included product placement (*Bee Movie* – Vibram shoes, *Zootopia* – iPhone, *The Simpsons* – Coca-Cola drink); and choose from

three groups of pictures the product they would select for themselves. Each group of pictures referred to a specific video; within each group there was a product advertised through product placement and a similar alternative product. In the children's group, these included Coca-Cola (option 3) and its alternatives, iPhone (option 2) and its alternatives, and Vibram shoes (option 3) and their alternatives (Figure 3.1).

The tasks of the 'Teenagers' group were to evaluate the individuals playing the main roles: Lady Gaga in the video *Poker Face* (2010), Drake in the video *Hotline Bling* (2016), Hunter Schafer in the TV series *Euphoria* (since 2019), and Will Smith in the film *I, Robot* (2004); watch selected excerpts from these audiovisual works that included product placement; and choose from three groups of pictures the product they would select for themselves. For adolescents, these included Converse sneakers (option 2) and their alternatives, a Jordan T-shirt (option 3) and its alternatives, Dr. Dre headphones (option 2) and their alternatives, and Kappa sweatshirts (option 3) and their alternatives (Figure 3.2).

The objectives of the 'Adults' group were to evaluate the individuals playing the main roles: Tilda Swinton in *A Bigger Splash*, Sarah Jessica Parker in *And Just Like That*, Daniel Craig in *007: Spectre*, and Colin Farrell in *The Gentlemen*; watch selected excerpts from these audiovisual works that included product placement; and choose from three groups of pictures the product they would select for themselves. For adults, these included Lonsdale tracksuits and their alternatives, Aston Martin cars and their alternatives, Manolo Blahnik shoes and their alternatives, and Dior glasses and their alternatives (Figure 3.3). Across all groups, 5.8% of respondents chose the option 'I do not like the character/actor/performer', and this percentage was therefore taken into account as an estimation error. After the experiment, a survey was conducted among respondents aged 13 and older, that is, the 'Teenagers' and 'Adults' groups, in order to assess whether hidden advertising is effective and whether a positive attitude towards a person influences the desire to purchase. A total of 100 respondents were surveyed. The questionnaire is presented in Appendix B.

3.2 Results of the experiment

Among children, the advertised product was chosen in 46.7% of cases. This relatively high percentage can be explained by the fact that children are strongly influenced by advertising and tend to believe most of what they see on television or in movies without critically analysing product quality. Adult men chose the advertised product in 21.25% of cases, while teenage boys did so in 47.5% of cases. This substantial difference between the groups can be attributed to the fact that adult men tend to base their choices on technical characteristics, convenience, and personal preference. For adolescents, the opinions of others are more important, as they seek self-actualisation through the purchase of advertised products. As a result, adolescents are more likely to choose prestigious goods rather than those that are more practical or comfortable for them.

The situation among women and adolescent girls is similar to the results for men and adolescent boys, though with a smaller discrepancy: adult women chose the product whose brand was demonstrated in the movie in 25% of cases, while adolescent girls did so in 28.75% of cases. In most cases, adult women tend to be more selective and place greater importance on value for money, whereas younger girls are more inclined to follow fashion trends and desire what a celebrity uses.

Taking into account the 5.8% of respondents who selected the option 'I do not like the character/actor/performer', it can be stated that 33.3% of respondents confirmed the hypothesis that the choice of a product is associated with a positive attitude towards the person or character being advertised, which serves as a trigger for mimetic desire to purchase a product or service.

Therefore, as can be seen from the analysis of different consumer groups, product placement has the greatest psychological impact on the subconscious of children. It is easier to persuade them to purchase a particular product because children often lack a clearly formed opinion when choosing goods and tend to believe what they are shown in movies and advertising. Hidden advertising has the least psychological impact on the older generation, as adults usually have a well-defined position

when choosing expensive goods and rely not on advertising, but on logic and the expediency of the purchase. The experiment involved certain luxury goods, which require consumers to reflect more carefully before buying and to rationalise their choice. Naturally, the results may differ if the impact of product placement is examined for other product categories, such as basic necessities (food, hygiene). After the experiment, the topic of the study was explained to the respondents, and they were asked to provide their answers.

3.3. Results of the survey

According to respondents, the most common factors shaping consumer behaviour are quality, price, experience, advice from friends, and feedback from other customers. The majority of respondents, namely 82%, were familiar with the term 'product placement'. After the second question, information about this tool was provided, and respondents were asked to give examples of hidden advertising they had previously noticed in movies, TV series, and similar media. The majority of respondents assessed their reaction to direct commercials as neutral (63.75%), while 30% reported a negative attitude. Respondents rated their reaction to hidden advertising as neutral in 58.75% of cases, while 33.75% expressed a positive attitude. The proportion of respondents with a negative attitude was lower, at 7.5%.

When discussing how product placement affects their attitude towards a brand, the majority of respondents (47.5%) indicated a positive effect, 30% indicated a negative effect, and 22.5% indicated a neutral effect. In response to the question of whether advertising placed, for example, in a feature film is more effective than traditional commercials, respondents' opinions were distributed as follows: 53.75% believed that hidden advertising placed in a movie or TV show is more effective than commercials; 33.75% believed that either advertising placed in a feature film or TV show is much more effective than commercials, or that commercials are always more effective and memorable than advertising placed in films or TV shows; and 12.5% of respondents were unable to answer this question.

In 73.75% of cases, respondents stated that hidden advertising arouses emotional interest. A further 18.75% were undecided. Finally, only 7.5% of the total number of respondents were convinced that hidden advertising does not affect interest in a brand. The majority of respondents, namely 77.5%, believe that when a product is advertised by a movie protagonist, it generates greater interest and trust among consumers, provided that the movie is popular or the protagonist is well known. Only 10% indicated that trust can be inspired solely by the characteristics of the product itself, while 12.5% of respondents found it difficult to answer this question.

When asked whether product placement should be banned, the majority of respondents (95%) answered 'No', explaining that it helps them navigate the market of goods and services. None of the respondents (0%) believed that it is a waste of time, while 5% found it difficult to answer this question.

The survey also included an open-ended question concerning the social consequences of the further development of product placement. The responses to this question are presented in Appendix C.

The key question in the survey was the final one regarding whether respondents believed that interest in a product depends on its advertising by an authoritative person. The majority of respondents, namely 77.5%, answered that when a product is advertised by the main character of a film, it arouses greater interest and trust among consumers. The results of the experiment confirm this view. Consequently, it can be stated that a positive attitude towards an actor, character, or performer directly affects attitudes towards the advertised brand and preferences for a particular product.

Conclusion

According to Girard, the source of human conflict lies in mimesis, or imitative desire: individuals desire what or whom someone else has already desired. A central issue Girard's theory is that all desire is mimetic in nature. Desire arises and takes direction from the desires of others.

The desirability of a fashion item for an individual is identified and established by the desire of another for the product. When another person is perceived as desiring a product, as indicated by their effort to obtain the product or possess it, the individual becomes aware of its desirability, signalling the emergence of a fashion trend.

The infectious nature of mimetic desire can be readily observed in the marketplace. Once the desirability of a particular fashion is communicated, for example through its purchase and subsequent display by an individual or through marketing activities, mimetic desire for the product may be triggered in others. Thus, from Girard's perspective, individuals desire what others already desire or possess, and this desire for possession may intensify into a desire to become the other.

We analysed a marketing communications tool, namely product placement, and looked for manifestations of mimesis in the viewer–star relationship. The technology of hidden advertising affects people through artistic images, which greatly facilitates the process of influencing consumers. Producers of goods and services promote their products using methods in which the consumer is not only unaware of the psychological influence directed at them, but may even be misled about the objectivity and freedom of choice.

It is the natural inclination of people towards institutions, the desire to adapt, and the desire to be like everyone else in order not to be rejected by their environment that allows marketing technologies, and product placement in particular, to manipulate consumer opinions and introduce standards of behaviour, consumption, lifestyle, and fashion to the masses. Mental comparison of oneself with a TV programme or movie character, imagining oneself in their place or in a similar situation, can give rise to 'celebrity imitation syndrome'. There are many examples in which a famous person demonstrates a particular product on screen for a few seconds, provoking a several-fold increase in sales.

In the third section, we conducted an experiment and a survey among three age groups: children under 12, adolescents aged 13 to 19, and adults aged 20 and older. The results were as follows. Children are highly influenced by advertising and tend to believe almost everything they see on

television or in films without analysing product quality. Adults, in most cases, are more meticulous when choosing clothes, shoes, accessories, appliances, and so on, and value for money is important to them, while young people—teenagers—are more inclined to follow fashion trends and want what a celebrity uses. The experiment showed that children would want to buy a product demonstrated by a character they like in 46.7% of cases, teenagers in 38.1% of cases, and adults in 23.1% of cases.

The survey showed that hidden advertising in films is more effective than commercials, that hidden advertising arouses emotional interest in people, and that 77.5% of respondents reported that when a product is advertised by the main character of a film, it generates greater interest and trust among consumers. The results of the experiment confirm this hypothesis.

ABSTRACT

This research examines the impact of mimetic desire on brand recognition within the film industry, specifically focusing on the use of product placement as a marketing tool. Product placement emerges as an innovative strategy whereby specific products, works, or services are strategically integrated into movies, TV series, songs, or television programmes in order to exert psychological influence on consumers. This study argues that product placement offers distinct advantages over conventional advertising, as it seamlessly embeds brands into the fabric of media content, circumventing disruptive interruptions and overt appeals to action. By examining the role of mimetic desire and its implications for brand recognition within the film industry, this research contributes to a deeper understanding of the effectiveness and potential of product placement as a strategic marketing tool.

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Appendices

Appendix A

Experiment for the 'Children' group

Greetings! We would like to ask you to take part in a small experiment related to research on advertising. Thank you in advance for your help!

Instructions for participating in the experiment:

Please evaluate your attitude towards the following characters:

1. Bee
   a. I like this character.
   b. I have a neutral attitude.
   c. I do not like this character.
2. The Hare
   a. I like this character.
   b. I have a neutral attitude.
   c. I do not like this character.
3. Bart Simpson
   a. I like this character.
   b. I have a neutral attitude.
   c. I do not like this character.

Carefully watch these cartoon excerpts once (three excerpts are provided):

1. 'Bee Movie' (00:21:02–00:21:22).
2. 'Zootopia' (01:06:32–01:07:40).
3. 'The Simpsons' S19E13 (00:18:48–00:19:22).

Now you have to choose a product from a certain category that you like the most or that you would like to have right now (options for shoes, phones, and drinks from different companies are provided).

Experiment for the 'Teenager' group

Greetings! We are asking you to take part in an experiment and a survey. We will disclose the topic after the experiment is completed so that you do not develop a biased opinion or make biased choices during the experiment. We guarantee the confidentiality of the information you provide. Thank you in advance for your help in conducting this research!

Instructions for participating in the experiment:

Please rate your attitude towards the following people (photos are provided):

1. Stefani Joanne Angelina Germanotta (Lady Gaga)
   a. I do like this performer.
   b. I have a neutral attitude.
   c. I do not like this performer.
2. Aubrey Drake Graham (Drake)
   a. I do like this performer.
   b. I have a neutral attitude.
   c. I do not like this performer.
3. Hunter Schafer (Jules)
   a. I do like this actress.
   b. I have a neutral attitude.
   c. I do not like this actress.
4. Will Smith
   a. I do like this actor.
   b. I have a neutral attitude.
   c. I do not like this actor.

Watch the following excerpts from a movie, cartoon, TV series, or clip (excerpts provided) carefully once:

1. Clip Lady Gaga 'Poker Face' (1:15–2:02).
2. TV series 'Euphoria' S1E2 (33:42–34:35).
3. Movie 'I, Robot' (00:02:15-00:03:20).
4. Clip Drake 'Hotline Bling'(3:24–3:59).

Now your task is to choose the product from a given category that you like the most or that you would like to have at present (options include headphones, sweatshirts, T-shirts, and sneakers from various brands).

Experiment for the 'Adults' group

Greetings! We are asking you to take part in an experiment and a survey. We will disclose the topic after the experiment is completed so that you do not develop a biased opinion or make biased choices during the experiment. We guarantee the confidentiality of the information you provide. Thank you in advance for your help in conducting this research!

Instructions for participating in the experiment:

Please rate your attitude towards the following people (photos are provided):

1. Colin James Farrell
   a. I do like this actor.
   b. I have a neutral attitude.
   c. I do not like this actor.
2. Daniel Craig
   a. I do like this actor.
   b. I have a neutral attitude.
   c. I do not like this actor.
3. Sarah Jessica Parker
   a. I do like this actress.
   b. I have a neutral attitude.
   c. I do not like this actress.
4. Tilda Swinton
   a. I do like this actress.
   b. I have a neutral attitude.
   c. I do not like this actress.

Watch the following excerpts from a movie, cartoon, TV series, or clip (excerpts provided) carefully once:

1. Movie 'The Bigger Splash' (00:38:03–00:38:53).
2. TV series 'And Just Like That' S1E1 (27:55–29:11).
3. Movie '007: Spectre' (00:29:09–00:30:20).
4. Movie 'The Gentlemen' (01:39:58–01:41:01).

Now your task is to choose the product from a given category that you like the most or that you would like to have at present (options include suits, cars, shoes, and glasses from different brands).

Appendix B

Questionnaire for the 'Teenagers' and 'Adults' groups

Now that you have taken part in the experiment, you are asked to read the survey and answer the questions contained therein. As you may have noticed, the experiment examines the relationship between attitudes towards a character who advertises a product and people's interest in that product. The survey and the experiment are designed to study the impact of direct and indirect advertising, as well as attitudes towards them, and to investigate the influence of indirect advertising on the human subconscious.

Instructions for participating in the experiment:

Read the answer options where they are provided, then tick the box corresponding to your answer. In some questions, you may provide your own response.

Please indicate your gender.
- Male
- Female

How old are you?
- 20–24
- 25–30
- 31–35
- 35+

What is your main activity at the moment?
- Student
- Working
- Combining study with work

If you are a student, please indicate which specialisation you are studying.

_____

If you work, please indicate in indicate the field in which you are employed.

_____

1. In your opinion, what are the most important factors that influence consumer behaviour?
   a. Advice from friends
   b. Reviews from other buyers
   c. Price of the product
   d. Quality of the product
   e. Advertising on the Internet/TV
   f. Use of the product by a popular person
   g. Independent experience

Your own answer:_____

2. Have you heard of the term 'product placement'?
   a. Yes
   b. No
   c. Hard to say

Product placement is a form of hidden advertising in video content that visually, audibly, or kinetically (through interaction with an object) presents branded products or services.

Please give an example of product placement if you have encountered it in a film, TV series, video, or clip (even if you are not certain that it was product placement). If you cannot recall an example, you may skip the question.

Place to answer:_____

3. What is your reaction to direct commercials, for example, on TV or YouTube?
   a. Positive
   b. Negative
   c. Neutral
4. What is your reaction to hidden advertising integration (product placement) in video content?
   a. Positive
   b. Negative
   c. Neutral
5. Does product placement affect your attitude towards the brand?
   a. It does
   b. It does not
   c. Hard to say
6. What do you think is more effective: hidden advertising (product placement) or direct commercials (on TV or YouTube)?
   a. Hidden advertising
   b. Commercials
   c. Hard to say
7. In your opinion, does hidden advertising evoke emotional interest in people?
   a. Yes, it does
   b. No, it does not
   c. Hard to say
8. In your opinion, does interest in a product depend on its advertising by an influential person?
   a. Yes, it depends directly
   b. No, it does not
   c. Hard to say

9. Do you think product placement should be banned?
   a. Yes
   b. No
   c. Hard to say
10. What social consequences do you think the further development of advertising technologies may lead to? (For example, monopolisation of a certain type of product; people no longer making independent choices, etc.)
    Your own answer:_____

Appendix C

1. It will lead to nothing.
2. People will stop making their own choices of products.
3. It can lead to the same things for everyone, because people will have the same thing, watching the same ads.
4. This is just a new branch of advertising development, it will influence consumers in the same way as direct advertising has influenced consumers in the past. I don't think it will affect the market in any way.
5. There will be more competition.
6. Everyone should still have their own choice of what to wear, what to use, etc.
7. Will lead to total capitalism, for example, brushing your teeth twice a day, big companies want to sell twice as much toothpaste.
8. To a negative perception of advertising by customers as such, which will make it even more difficult for marketers and businesses to engage customers and make advertising unobtrusive.
9. People are likely to stop making their own choices of goods.
10. People's opinions will increasingly be formed based on what they see online. Due to the influence of external factors, people will subconsciously choose a product they have already seen somewhere without even realising it. People will tend to buy similar products because

they are not guided by their own preferences and interests, but by those imposed by advertising.

11. To some extent, this can really lead to the monopolisation of not only a certain type of product, but also the brand itself.
12. In my opinion, this will simply make advertising less annoying.
13. I support the opinion stated in the question that people will stop making their own choices.
14. Nothing will change, people who are familiar with advertising and how it works will be able to think about any of its manifestations anyway.
15. I think that over time, most people (if not all) will become the maximum 'victims of marketing', as they say. And this is quite sad, because people will probably not buy what they like, but will buy what they have been sold (better advertised).
16. Because of neurolink and 5g, what we 'want' to buy later will be in our heads.
17. Deterioration in the quality of goods
18. We can see the result right now. People stand in lines at Starbucks, upgrade their phones every year, go to the movies to see movies that were shoved down their throats before they saw the previous one. People visit Paris and New York, Milan and Vegas, when there are an infinite number of interesting, beautiful, and colourful places that you can't visit in a lifetime. There are many examples of the impact of advertising and they are all around us.
19. I think that people will start choosing goods thinking that they preferred a certain product on their own, when they could have seen this product in the form of product placement without paying attention to it.
20. To monopolisation of new markets.
21. By improving the segregation of goods, monopolists will keep a niche and many people will continue to buy their product.
22. This is a natural development that must exist, and I think it will lead to positive changes in society.

23. In my opinion, product placement is ok, even when it is 'hidden', only when it is not shown in a very pretentious way, either say directly that it is pp or do it in a more elegant way. On the other hand, I think that at the moment the progress in the sphere of PR is great, and every year people come up with something new. I don't think it can cause very serious consequences.
24. Great impact on people, limited choice, impact on small businesses.
25. They will not think about what they really need.
26. They will stop making choices on their own.
27. The growth of product knowledge of a large audience, things they probably did not know about, help in the household, various life hacks.
28. This will lead to the fact that only something new on the market will be of interest, and everything else will be forgotten if it is not advertised.
29. It will lead to an unconscious choice of goods that you see in TV shows and then buy without thinking.
30. It depends on a person's consumer habits and self-control. If a person is quite susceptible to emotional shopping, excessive advertising will have a negative impact on them. If a person clearly understands his or her needs and desires, then any intrusive advertising of an unnecessary product will simply pass him or her by.

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Chapter XII

Kryzys po pandemii COVID-19 a decyzje konsumpcyjne Polaków

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CHAPTER ABSTRACT

The Post-Pandemic Crisis and Consumer Decision-Making in Poland

The chapter analyzes the impact of the COVID-19 pandemic on consumer decision-making in Poland and its socio-economic consequences. It indicates that the condition of societies and economies in crisis situations is strongly linked to citizens' consumption choices. As a result of the pandemic, significant changes occurred in the structure of expenditures and purchasing priorities of Poles, driven by economic shock and income instability. Consumers began to focus on essential goods, such as food and media. At the same time, their economic awareness increased, both in relation to current expenditures and long-term personal financial management.

Poles became more critical of product quality and prices, and saving as well as seeking cheaper alternatives became an important factor in purchasing decisions. Additionally, rising inflation deepened the financial caution of households and increased the need for expenditure planning. In response to economic difficulties, greater interest also emerged in alternative forms of employment, such as self-employment and economic migration. Enterprises had to adapt to the new conditions, including through the development of the e-commerce sector. The chapter also emphasizes the growing importance of financial social responsibility, which has become a significant element in counteracting poverty and social exclusion and an important area of scientific analysis.

Wstęp

Pandemia COVID-19 stanowiła bezprecedensowe wyzwanie dla gospodarki globalnej, w tym także gospodarki Polski. Kryzys zdrowotny, który przerodził się w kryzys ekonomiczny, ukazał stopień wzajemnych powiązań międzynarodowych łańcuchów dostaw, intensywności procesów globalizacyjnych, a także słabości wielu sektorów krajowych rynków.

Jak wskazują przywoływane dane, wybuch pandemii w 2020 roku przyczynił się do spowolnienia gospodarczego w większości państw świata, jednocześnie sięgając średniego spadku realnego PKB o 5,9% w skali Unii Europejskiej (Eurostat, 2021). Mianem „zielonej wyspy" określano na tym tle Polskę, w której pomimo odnotowania spadku PKB o 2,2% kryzys nie sięgnął tak głęboko, jak w przypadku chociażby państw zachodnich. Niemniej skutki pandemii i wywołanych nią restrykcji były wyraźnie odczuwalne w codziennym życiu obywateli. Jednym z najważniejszych aspektów, które uwypukliły globalne konsekwencje pandemii COVID-19, był gwałtowny wzrost niepewności oraz niepokoju wśród podmiotów gospodarczych. Przedsiębiorstwa, aby dostosować się do dynamicznie zmieniających się warunków rynkowych, zmuszone zostały do opracowania nowych, często rewolucyjnych strategii zarządzania ryzykiem, co przejawiło się na przykład poszukiwaniem alternatywnych rynków zbytu czy

digitalizacji procesów biznesowych. Równocześnie wśród konsumentów zauważono istotne zmiany zachowań lub preferencji. Zaczęli oni zwracać większą uwagę na jakość i bezpieczeństwo nabywanych artykułów, a także na stabilność swojego zatrudnienia czy poziom dochodów. Wiele rodzin, jak i jednostek ograniczyło wydatki na dobra wyższego rzędu przeznaczając większą część budżetu na zaspokojenie podstawowych potrzeb. Te wszystkie procesy napędzane dodatkowo ludzkim poczuciem niepewności oraz koniecznością dostosowania się do nowych realiów uwidoczniły, jak istotną rolę odgrywają elastyczność wraz z innowacyjnością zarówno w skali mikro, jak i makroekonomicznej.

W kontekście pandemii COVID-19, szczególne znaczenie przypisuje się takim czynnikom jak destabilizacja dochodów, wzrost bezrobocia czy narastająca niepewność w gospodarstwach domowych. Rodzi to zatem pytanie, czy wspomniane aspekty w sposób istotny przełożyły się na zmianę priorytetów konsumpcyjnych Polaków? W niniejszej pracy dokonano analizy najważniejszych elementów codziennego funkcjonowania, w tym kosztów utrzymania, dynamiki inflacji i dostępu do dóbr czy usług różnego typu, aby ocenić, w jakim stopniu ich przeobrażenia kształtują zachowania (między innymi oszczędnościowe) w społeczeństwie.

Teoretyczne aspekty kryzysu gospodarczego i pandemii COVID-19

Kryzys gospodarczy można rozumieć jako okres gwałtownego załamania dynamiki aktywności ekonomicznej. Spadek ten przejawia się ograniczeniem produkcji, rosnącym bezrobociem, zaburzeniem stabilności finansów publicznych oraz zakłóceniami na rynkach kapitałowych (Jankowski, 2016). W perspektywie historycznej kryzysy tego typu występowały wielokrotnie, przybierając różne formy w zależności od czynników wywołujących je i obszaru, w którym się rozgrywały. Na przestrzeni lat wynikały zarówno z procesów o podłożu strukturalnym (na przykład Wielki Kryzys 1929—1932 czy kryzys naftowy z 1973 roku), jak i finansowym (kryzys z lat 2007—2009), bądź też były wywołane nagłymi wydarzeniami

zewnętrznymi, czego najbardziej aktualnym przykładem jest pandemia COVID-19. Z kolei o samej specyfice kryzysu gospodarczego decyduje w dużej mierze jego zdolność do przenoszenia się z jednego sektora na inny lub z danego kraju na regiony ościenne, co wzmacnia skalę recesji. Zjawisko to było szczególnie dobrze widoczne w przypadku globalnego kryzysu finansowego z lat 2007—2009, a także w trakcie pandemii, gdy gwałtownie wstrzymano produkcję, ograniczono działalność usługową i zamknięto granice, powodując liczne zakłócenia w światowych łańcuchach dostaw. Warto tutaj dodać, że kryzys gospodarczy, choć często wywołuje gwałtowne turbulencje i silne wahania podstawowych wskaźników makroekonomicznych, występuje okresowo i z czasem ustępuje (Jasiński, 2009). Jest on częścią naturalnego cyklu koniunkturalnego, w którym fazy ożywienia przechodzą stopniowo w fazy spowolnienia i recesji, by po osiągnięciu najniższego punktu ponownie kierować się ku wzrostowi.

Z kryzysami gospodarczymi nierozerwalnie wiąże się również kwestia rynku finansowego. W warunkach globalizacji przepływy kapitałowe i zależności między instytucjami finansowymi mogą dodatkowo wzmacniać skalę załamania. Kryzys finansowy definiuje się najczęściej jako stan, w którym instytucje finansowe (banki, fundusze inwestycyjne, ubezpieczyciele) tracą zdolność do regulowania swoich zobowiązań wskutek istotnego spadku wartości aktywów lub masowej niewypłacalności. W takim układzie kluczową rolę odgrywa szybkie postawienie diagnozy, oparte na analizie przyczyn kryzysu (m.in. nadmiernej ekspozycji na ryzykowne kredyty, pęknięcia bańki spekulacyjnej czy załamania zaufania inwestorów). Następnie powinny zostać wdrożone środki mające na celu ograniczenie rozmiarów kryzysu, takie jak: interwencja banku centralnego, dokapitalizowanie sektora bankowego bądź koordynacja działań na poziomie międzynarodowym.

W literaturze wyróżnia się kilka typów kryzysów finansowych, w tym m.in. (Owsiak, 2015):

a. kryzys bankowy—związany z niewypłacalnością banków i zablokowaniem systemu kredytowego;

b. kryzys walutowy—wynikający z gwałtownej utraty zaufania inwestorów do danej waluty, czego efektem jest masowy odpływ kapitału i poważna deprecjacja kursu;
c. kryzys zadłużeniowy—związany z nadmiernym obciążeniem gospodarstw domowych, przedsiębiorstw lub rządów zobowiązaniami finansowymi;
d. kryzys płynnościowy—kiedy na rynku pojawia się drastycznie ograniczona dostępność do pieniądza, co skutkuje nagłym wzrostem kosztu kredytu i trudnościami w regulowaniu bieżących należności;
e. kryzys giełdowy—występuje w sytuacji gwałtownego spadku notowań akcji i innych instrumentów finansowych na rynku kapitałowym, nieraz wywołanego pęknięciem tzw. bańki spekulacyjnej.

Warto podkreślić, że tego typu kryzysy finansowe często współwystępują, wzajemnie się wzmacniając i przenikając do sfery gospodarczej. W rezultacie dochodzi do głębszej recesji, utraty miejsc pracy oraz obniżenia poziomu dobrobytu społecznego.

Pod względem społecznym konsekwencje kryzysu nie ograniczają się wyłącznie do pogorszenia wskaźników makroekonomicznych. Intensyfikacja zjawisk takich jak rosnące bezrobocie, spadek siły nabywczej czy narastające nierówności dochodowe przekłada się na obniżenie poziomu życia oraz pogłębianie istniejących podziałów w społeczeństwie. W praktyce oznacza to, że gospodarstwa domowe stają wobec wyzwań w postaci ograniczonych możliwości zatrudnienia lub konieczności zmiany kwalifikacji zawodowych, a niekiedy wręcz ryzyka utraty dachu nad głową w związku z rosnącymi zobowiązaniami (Krugman, 2012). Dla części obywateli szczególnie dotkliwe jest zjawisko tzw. ubóstwa energetycznego lub żywnościowego, które pokazuje, że problemy ekonomiczne przenikają się z obszarem dobrostanu psychicznego i zdrowotnego. W warunkach kryzysu gospodarka notuje nie tylko ograniczoną aktywność inwestycyjną i konsumpcyjną, lecz także konieczność przewartościowania priorytetów po stronie samych gospodarstw domowych. Zgodnie z koncepcją dobrobytu społecznego, ujmowanego m.in. w definicji M.G. Woźniaka, kluczowe jest nie tylko posiadanie przez społeczeństwo odpowiedniego

zasobu dóbr, lecz także dostępu do edukacji, opieki zdrowotnej, infrastruktury kulturalnej i wolnego czasu (Woźniak, 2008). Kryzysy gospodarcze, szczególnie jeśli wiążą się z szybkim wzrostem bezrobocia oraz niepewnością zatrudnienia, mogą ograniczać ten dobrobyt zarówno w ujęciu materialnym, jak i psychospołecznym.

Nowe wyzwania przyniosła we wspomnianym kontekście pandemia COVID-19, która nie tylko wstrząsnęła światowymi łańcuchami dostaw i czasowo zamroziła całe sektory gospodarki, lecz także uwypukliła problemy społeczne, takie jak brak dostatecznego wsparcia w zakresie opieki zdrowotnej, edukacji zdalnej czy wsparcia psychologicznego. Lockdowny i związane z nimi restrykcje znacząco ograniczyły kontakty społeczne, co w połączeniu z rosnącymi cenami żywności, usług i energii zwiększyło poczucie zagrożenia wśród obywateli. Wielu pracowników stanęło w obliczu utraty stabilnego zatrudnienia, a przedsiębiorstwa zmuszone były dostosować się do dynamicznie zmieniających się warunków i przejść na tryb działalności zdalnej. W rezultacie kryzys gospodarczy wywołany pandemią COVID-19, podobnie jak wcześniejsze recesje wynikające z innych przyczyn, zachwiał nie tylko stabilnością systemu finansowego, ale i perspektywami rozwoju społecznego w przyszłości. W ujęciu długofalowym wydaje się koniecznym wypracowanie mechanizmów wsparcia, które pozwoliłyby minimalizować negatywne skutki podobnych kryzysów zarówno dla najbardziej narażonych grup społecznych, jak i dla ogólnego tempa rozwoju kraju.

Pandemia COVID-19 wywołana w grudniu 2019 roku w Chinach, szybko rozprzestrzeniła się na wszystkie kontynenty, ujawniając zarówno słabości systemów ochrony zdrowia, jak i kruchość światowej gospodarki (Ochani, 2021). W marcu 2020 roku Światowa Organizacja Zdrowia oficjalnie ogłosiła stan pandemii, co skłoniło rządy do wprowadzenia obostrzeń mających na celu ograniczenie transmisji wirusa. Restrykcje te, obejmujące m.in. zamykanie granic, lockdowny, pracę zdalną i ograniczenia w funkcjonowaniu wielu sektorów usługowych (m.in. gastronomii, hotelarstwa, turystyki), zaowocowały drastycznym spadkiem aktywności ekonomicznej w wymiarze globalnym. Ograniczenia przepływu ludzi i towarów wyeksponowały problemy związane z łańcuchami dostaw,

będącymi filarem współczesnej, wysoko zintegrowanej gospodarki. Jednocześnie wzrosła niepewność na rynkach finansowych, co przełożyło się na wahania notowań giełdowych i widoczne osłabienie większości walut. W efekcie wiele gospodarek wpadło w recesję, a kluczowe wskaźniki makroekonomiczne—takie jak stopa bezrobocia czy realne PKB—zaczęły osiągać niepokojące wartości. Według szacunków WHO, do końca 2022 roku na całym świecie potwierdzono około 650 milionów zakażeń, z czego blisko 7 milionów zakończyło się zgonem (World Health Organization), co wskazuje na bezprecedensową skalę wywołanego kryzysu zdrowotno-ekonomicznego.

Decyzje konsumpcyjne

Definicja decyzji konsumpcyjnych zakłada, że są one przejawem aktywności konsumentów polegającej na wyborze konkretnych dóbr, usług lub form spędzania czasu. Obejmują one zarówno planowanie wydatków (budżetowanie), ocenę dostępnych opcji na rynku, jak również analizę potencjalnych kosztów i korzyści wynikających z wejścia w posiadanie czegoś (Szcześniak, 2020). Jednostki i gospodarstwa domowe podejmując decyzje zakupowe kierują się maksymalizacją użyteczności (rozumianej jako subiektywna satysfakcja), co w trudniejszych warunkach gospodarczych może przekładać się na większą ostrożność, rezygnację z dóbr luksusowych czy przesunięcie akcentów na zabezpieczenie podstawowych potrzeb życiowych. W realiach pandemicznych i popandemicznych definicja ta nabrała szczególnego znaczenia. Gwałtowne zmiany w zakresie stabilności dochodów czy dostępności danych dóbr wyraźnie pokazały, że decyzje konsumpcyjne są nie tylko efektem uwarunkowań rynkowych, lecz także dynamicznej rzeczywistości społecznej i ekonomicznej.

Analizując determinanty zachowań konsumenckich, wyróżnia się dwa podstawowe obszary: mikroekonomiczny (dochody, ceny, dostępność kredytów, poziom inflacji) oraz psychospołeczny (motywy i preferencje, wpływ rodziny i znajomych, kultura, nawyki, potrzeba bezpieczeństwa).

W sytuacji załamania gospodarczego, kiedy konsumenci obawiają się utraty pracy lub nieoczekiwanego wzrostu cen, rośnie istotność czynnika psychologicznego. Decydują oni wtedy, jaką wielkość dochodu mają możliwość i chcą przeznaczyć na dane dobro, a jaką oszczędzić (Flynn, 2018). Jednym z przejawów tej zmiany była w czasie pandemii COVID-19 potrzeba wspomnianej 'poduszki finansowej', czyli gromadzenia oszczędności na wypadek dalszych trudności ekonomicznych.

W analizie decyzji konsumenckich należy dodatkowo uwzględnić podział samych dóbr, jaki w nich zachodzi—dobra komplementarne i substytucyjne. Dobra komplementarne, takie jak paliwo i samochód ściśle się uzupełniają, co oznacza, że wzrost ceny jednego z nich przekłada się na spadek popytu na to drugie. Z kolei dobra substytucyjne (na przykład jabłka i gruszki) pełnią zbliżone funkcje, więc podwyższenie ceny jednego z nich skutkuje rosnącym zainteresowaniem tańszą alternatywą (Flynn, 2014). Tego rodzaju zależności, określane mianem efektu cen krzyżowych dowodzą, że rynki są systemem naczyń połączonych, w którym nawet niewielkie zmiany cen mogą wywoływać szersze konsekwencje w zachowaniach nabywców.

Z kolei sama struktura konsumpcji odzwierciedla sposób, w jaki dochody są dzielone między różne kategorie dóbr i usług. Względem tego podziału wyróżnić można dobra podstawowe (żywność, rachunki bieżące) oraz dobra luksusowe (wyjazdy turystyczne, usługi kosmetyczne, artykuły premium). Zgodnie z I Prawem Gossena, im więcej jednostek danego dobra jest konsumowanych, tym wolniej wzrasta całkowita satysfakcja z jego konsumpcji (Wołowiec, 2021). W tym kontekście warto zaznaczyć, że cena kształtuje nie tylko finalną decyzję o zakupie, ale także stopień zaangażowania konsumenta w sam proces nabywczy. Drobne zakupy (na przykład chusteczki higieniczne czy kosmetyki codziennego użytku) są zwykle podejmowane rutynowo, przy relatywnie niskim zaangażowaniu i braku istotnych różnic między markami. Natomiast wydawanie większych kwot, chociażby na samochód lub łódź, wymaga od konsumenta pogłębionej analizy korzyści i kosztów, a także porównania dostępnych opcji. Marka zyskuje tu zatem na znaczeniu, stając się dla wielu kupujących gwarancją określonych cech oraz jakości. Według ujęcia P. Kotlera,

znak firmowy określa zestaw stałych korzyści dostarczanych nabywcy, stąd w zaciętej konkurencji rynkowej przedsiębiorstwa dążą nie tylko do pozyskania nowego klienta, ale też do utrzymania jego lojalności (Kotler, 2006). Obok marki dla konsumentów w coraz większym stopniu liczy się również kraj czy region produkcji, co w obliczu rosnącej świadomości ekologicznej i potrzeby wspierania rodzimej gospodarki może odgrywać rolę czynnika decydującego (Raport, 2013). Ostatecznie można więc powiedzieć, że decyzje nabywcze uzależnione są zarówno od wysokości dochodu i subiektywnego poczucia bezpieczeństwa, jak i od wizerunku marki, indywidualnych oczekiwań czy kulturowego kontekstu konsumpcji.

Decyzje konsumpcyjne Polaków w okresie pandemii COVID-19 i po niej podlegają znaczącym przeobrażeniom. Z jednej strony stanowią reakcję na czynniki ekonomiczne (dochody, ceny, inflację, dostępność kredytów), z drugiej zaś ujawniają wzmocnioną rolę czynników społeczno-psychologicznych (poczucie niepewności, wpływ rodziny i społeczności, postępująca digitalizacja). W konsekwencji struktura konsumpcji przesunęła się wyraźnie w stronę dóbr podstawowych, a skłonność do wydatków na luksus czy rozrywkę została ograniczona. Z perspektywy nauk ekonomicznych i społecznych warto odnotować, że zmiany te nie mają charakteru wyłącznie krótkotrwałego. Mogą prowadzić do wykształcenia się trwalszych wzorców oszczędzania i priorytetyzacji podstawowych potrzeb, zwłaszcza jeśli inflacja i niepewność co do stabilności dochodów utrzymają się na podwyższonym poziomie. Jednocześnie zauważalne jest rosnące znaczenie kanałów internetowych, które przez atrakcyjność cenową, niskie koszty dostawy, łatwość i wygodę płatności czy wcześniejsze pozytywne doświadczenia wpływają na decyzje konsumpcyjne Polek i Polaków (Artefakt, 2021). Dowodzi to stwierdzeniu, że w sytuacjach kryzysowych konsumenci szybko adaptują się do nowych realiów rynku. W tym kontekście rola państwa i instytucji międzynarodowych, a także poziom zaufania obywateli do polityki gospodarczej stają się kluczowymi czynnikami kształtującymi zachowania konsumpcyjne i stabilność ekonomiczną społeczeństwa. W nauce ekonomii zakłada się, że ludzie podejmują decyzje racjonalne, a swoje dochody rozdysponowują w sposób przemyślany (Śleszyńska-Świderska,

2017). Teoria jednak lubi rozmijać się z praktyką i chociaż chciałoby się wierzyć, że jednostki nie podejmują irracjonalnych decyzji, które szkodzą nie tylko im samym, ale i gospodarce, tak się również zawsze nie dzieje.

Wyniki przeprowadzonego badania

Niniejsza praca bazuje na badaniu empirycznym przeprowadzonym w formie ankiety typu CAWI (Computer-Assisted Web Interview), które skierowano do respondentów posiadających polskie obywatelstwo w okresie 4.01.2023—7.04.2023. Głównym przedmiotem analizy był wpływ kryzysu gospodarczego wywołanego i wzmocnionego przez pandemię COVID-19 na decyzje konsumpcyjne Polaków. Celem badania było z kolei nie tylko zidentyfikowanie i zrozumienie przemian w codziennych zachowaniach nabywczych obywateli, lecz także uchwycenie zmian w strukturze wydatków (zarówno w okresie poprzedzającym pandemię, jak i w czasie późniejszym), a ponadto wyodrębnienie czynników społeczno-ekonomicznych kształtujących te procesy.

Praca zakładała następujące tezy:

I. Kryzys gospodarczy po pandemii COVID-19 znacząco wpłynął na decyzje konsumpcyjne Polaków.
II. Poziom zubożenia Polaków gwałtownie wzrósł na przestrzeni ostatnich lat.
III. Polacy zmienili swoje wybory konsumenckie i przyzwyczajenia z powodu sytuacji ekonomicznej w Polsce, wykazując wzrost tendencji do oszczędzania.
IV. Warunki materialne polskich rodzin pogorszyły się w znaczny sposób.
V. Ze względu na wzrost kosztów życia Polacy zostali zmuszeni do zwiększenia zainteresowania poszukiwaniami alternatywnych i stabilniejszych źródeł dochodu.
VI. Wskutek pandemii COVID-19 doszło do zmniejszenia konsumpcji.
VII. Ostatnimi laty zauważalnie zmieniły się priorytety i struktura konsumpcji w Polsce.

VIII. Aktualny kryzys gospodarczy jest bezpośrednim wynikiem globalnej pandemii.
IX. Polacy zaobserwowali wyraźne zmiany w swoim podejściu do konsumpcji.

Kwestionariusz, złożony z 22 pytań zamkniętych jednokrotnego wyboru oraz 3 pytań wielokrotnego wyboru, umożliwił weryfikację hipotez postawionych w pracy i zgromadzenie danych na temat najważniejszych skutków pandemii: skłonności do ograniczania wydatków, zmiany priorytetów w zakupach, a także tendencji do gromadzenia oszczędności. Warto dodać, że respondenci podawali podstawowe informacje demograficzne (wiek, płeć, wykształcenie, miejsce zamieszkania), co pozwoliło wstępnie przeanalizować, na ile czynniki takie jak poziom dochodów czy wykształcenie determinowały konkretne zachowania zakupowe. Wśród 100 respondentów 58 osób stanowiły kobiety, a 42 osoby mężczyźni, zamieszkali na różnych obszarach—31% w miastach 101—500 tysięcy mieszkańców, 25% na wsi, 24% w miastach powyżej 500 tysięcy mieszkańców i 20% w miastach do 100 tysięcy mieszkańców. Jak wspomniano wcześniej, ankietę wypełniło 100 osób, a badanie opatrzono poziomem ufności 95%, przy czym błąd oszacowania wyniósł 9,8%.

Z zebranych odpowiedzi wyłonił się przede wszystkim wyraźny obraz społeczeństwa negatywnie odczuwającego skutki pandemii i recesji gospodarczej. Blisko 87% badanych uznało pandemię COVID-19 za kluczowy czynnik wywołujący występujący wtedy kryzys, wskazując na utratę zatrudnienia, ograniczony dostęp do dóbr i wzrost cen. Jednocześnie 99% respondentów stwierdziło, że za te same pieniądze mogą kupić mniej produktów, co potwierdza teorię o obniżeniu siły nabywczej.

Wykres 1. Zmiany w cenach
Źródło: Opracowanie własne.

Co może się wydać dla niektórych zaskakujące, 76% respondentów zadeklarowało rezygnację z dóbr lub usług wyższej kategorii cenowej, koncentrując się na zaspokajaniu podstawowych potrzeb. W ślad za tym 86% ankietowanych podjęło lub rozważało działania w zakresie gromadzenia rezerw finansowych, obawiając się dalszego pogorszenia koniunktury. Znaczącym wnioskiem jest także to, że 75% uczestników sondażu wykazywało wzmożone zainteresowanie emigracją zarobkową, co świadczyło o poszukiwaniu stabilniejszych źródeł dochodu w obliczu dynamicznego wzrostu cen i obaw o utratę pracy. Ankietowanych zapytano także o same tendencje oszczędnościowe wśród społeczeństwa. Ponad połowa, bo 59% osób biorących udział w badaniu, zaobserwowało skłonności do większej roztropności finansowej wśród Polaków. Jednak 30% nie było w stanie udzielić jednoznacznej odpowiedzi, a kolejne 11% w ogóle nie zauważyło zmian w tej dziedzinie.

Jeśli chodzi o strukturę wydatków, przed wybuchem pandemii COVID-19 wiele gospodarstw domowych przeznaczało sporą część dochodów na potrzeby związane z rozrywką, podróżami czy zakupem artykułów luksusowych, co diametralnie zmieniło się z czasem. Kolejne zadane pytania dotyczyły dwóch różnych zagadnień związanych z podziałem wydatków na poszczególne zakupy z perspektywy czasu. Brzmiały one:

'Na które dobra lub usługi wydawałaś/eś najwięcej pieniędzy przed rozpoczęciem pandemii COVID-19?' oraz *'Na które dobra lub usługi wydajesz najwięcej pieniędzy teraz?'*. Odpowiedzi do pierwszego pytania uplasowały się statystycznie następująco: 75% ankietowanych wskazało artykuły spożywcze, 53%—odzież, 37%—paliwa, 36%—wyjścia towarzyskie, 32%—rachunki, 23%—podróże, 20%—elektronika, 16%—usługi kosmetyczne, 10%—lekarstwa i 8%—spłata kredytu/leasingu. Inaczej jednak wyglądał wykres przedstawiający ich późniejsze wydatki, choć i w tym przypadku najbardziej popularną opcją okazały się artykuły spożywcze (94%). Zauważalnie wzrósł udział głosów na artykuły spożywcze (z 75% do 94%), kolejno na rachunki (z 32% do 61%), paliwa (z 37% do 55%) oraz spłatę zaciągniętych zobowiązań (z 8% do 24%). Wzrost dotyczył także lekarstw (z 10% do 16%). Spadł natomiast procent osób wybierających odzież za główny wydatek w swoim budżecie (z 53% do 32%). Taką samą tendencję zaobserwowano w przypadku wyjść towarzyskich (spadek z 36% do 26%), podróży (z 23% do 13%), elektroniki (z 20% do 13%) i usług kosmetycznych (z 16% do 12%). Następnie zapytano ankietowanych: *'Czy zgodzisz się ze stwierdzeniem, że Polacy zmienili swoje decyzje konsumpcyjne od rozpoczęcia pandemii COVID-19?'*. Poniższy wykres obrazuje ich odpowiedzi.

Wykres 2. Zmiany decyzji konsumpcyjnych od rozpoczęcia pandemii COVID-19
Źródło: Opracowanie własne.

Wyniki przeprowadzonego badania w sposób niebudzący wątpliwości potwierdzają, że kryzys gospodarczy wywołany pandemią COVID-19 znacząco przeobraził decyzje konsumpcyjne Polaków. Przede wszystkim zaobserwowano wyraźny spadek siły nabywczej, który zmusił wiele gospodarstw domowych do zaostrzenia polityki wydatkowej oraz poszukiwania tańszych substytutów dóbr wyższego rzędu. Blisko 90% ankietowanych potwierdziło, że nie tylko oni sami, lecz także ich bliskie otoczenie, zaczęli bardziej selektywnie podchodzić do zakupów, rezygnując z mniej istotnych wydatków i priorytetyzując produkty pierwszej potrzeby. Jednocześnie 96% uczestników sondażu podkreśliło, że pandemia w znacznym stopniu przyspieszyła procesy prowadzące do kryzysu—nawet jeśli pewne trudności rynkowe mogłyby wystąpić i bez pojawienia się wirusa SARS-CoV-2, to pandemia COVID-19 stała się kluczowym katalizatorem tych zawirowań. Choć zastosowana próba badawcza (100 respondentów) w mocno ograniczonym stopniu reprezentowała populację całego kraju, otrzymane rezultaty wyraźnie wskazały na trafność i zasadność zdefiniowanych w pracy tez. Tym samym ukazały potrzebę dalszych, szerzej zakrojonych analiz, które umożliwiłyby pełniejsze zrozumienie długofalowych konsekwencji kryzysu dla polskich rodzin oraz pozwoliły na bieżącą aktualizację strategii biznesowych w warunkach niepewności i zwiększonej zmienności rynkowej. W dłuższej perspektywie mogłoby to ułatwić dostosowanie oferty przedsiębiorstw do nowych realiów, w których to aspekty cenowe i stabilność finansowa decydują o faktycznych wyborach konsumenckich.

Podsumowanie

Również w sytuacjach kryzysowych, jak miało to miejsce w przypadku pandemii COVID-19, kondycja społeczeństw i gospodarek narodowych jest ściśle związana z podejmowanymi przez obywateli decyzjami konsumpcyjnymi. Kryzys wywołany pandemią na całym świecie przyczynił się do powstania szeregu trudności, które dotknęły niemal każdy obszar życia społeczno-gospodarczego. W kontekście Polski, zmiany

w strukturze wydatków i priorytetach zakupowych Polaków spowodowane wstrząsem ekonomicznym i niestabilnością dochodową, były zjawiskiem zasługującym na szczególną uwagę z perspektywy społecznej odpowiedzialności gospodarczej. Przeprowadzone analizy wykazały, że w obliczu spadających dochodów oraz rosnących kosztów życia Polacy zaczęli rekonfigurować swoje strategie konsumpcyjne, koncentrując się na produktach pierwszej potrzeby, takich jak artykuły spożywcze czy media. Równocześnie uświadomili sobie oni, jak istotny stał się wzrost świadomości ekonomicznej—nie tylko w odniesieniu do bieżących wydatków, ale także w kontekście długoterminowego zarządzania finansami osobistymi. Konsumenci stali się bardziej krytyczni wobec jakości i ceny produktów, a kluczowym czynnikiem wpływającym na zakupowe wybory stała się decyzja o oszczędzaniu oraz poszukiwanie zamiennych rozwiązań produktów wyższego rzędu.

Dotkliwym efektem pandemii stał się także wzrost inflacji, który znacząco podwyższył cenę towarów i usług, zmuszając gospodarstwa domowe do dalszej ostrożności finansowej. W tym świetle warto odnotować, że wysoka inflacja przekłada się również na konieczność wzmożonego planowania wydatków oraz na rosnącą popularność alternatywnych form zatrudnienia, takich jak samozatrudnienie czy emigracja zarobkowa. Przedsiębiorstwa, aby utrzymać stabilność finansową, zmuszone zostały do adaptacji, czego wymownym przykładem może być przyspieszony rozwój sektora e-commerce. Należy również podkreślić rolę aspektów społeczno-gospodarczych i ich wpływ na postawy społeczne, w tym na postrzeganą odpowiedzialność finansową. Badania wykazały, że w odpowiedzi na kryzys Polacy stali się bardziej świadomi roli indywidualnych działań konsumpcyjnych w kontekście środowiskowych i gospodarczych przemian strukturalnych. Społeczna odpowiedzialność finansowa nabrała kluczowego znaczenia jako bariera ochronna przed pogłębianiem się ubóstwa i wykluczenia społecznego.

Reasumując należy zauważyć, że kryzys gospodarczy, który dotknął Polskę w wyniku pandemii COVID-19, stworzył nową dynamikę w podejmowaniu decyzji konsumpcyjnych oraz zmianie dotychczasowych wzorców konsumpcji. Zjawiska takie jak te wymagają szczególnej uwagi

i analizy z perspektywy naukowej, ponieważ mają poważne i długoterminowe konsekwencje w zakresie polityki społecznej, ekonomicznej oraz rynku pracy.

STRESZCZENIE

Rozdział analizuje wpływ pandemii COVID-19 na decyzje konsumpcyjne w Polsce oraz ich konsekwencje społeczno-ekonomiczne. Wskazuje, że kondycja społeczeństw i gospodarek w sytuacjach kryzysowych jest silnie powiązana z wyborami konsumenckimi obywateli. Wyniki przeprowadzonego badania potwierdzają, że kryzys gospodarczy wywołany pandemią znacząco przeobraził decyzje konsumpcyjne Polaków. W wyniku pandemii doszło do istotnych zmian w strukturze wydatków i priorytetach zakupowych, co było skutkiem wstrząsu ekonomicznego i niestabilności dochodów. Konsumenci zaczęli koncentrować się na produktach pierwszej potrzeby, takich jak żywność i media. Jednocześnie wzrosła ich świadomość ekonomiczna, zarówno w odniesieniu do bieżących wydatków, jak i długoterminowego zarządzania finansami.

Polacy stali się bardziej krytyczni wobec jakości i cen produktów, a istotnym czynnikiem decyzji zakupowych stała się potrzeba oszczędzania oraz poszukiwanie tańszych alternatyw. Dodatkowo wzrost inflacji pogłębił ostrożność finansową gospodarstw domowych i zwiększył konieczność planowania wydatków. W odpowiedzi na trudności ekonomiczne pojawiło się także większe zainteresowanie alternatywnymi formami zatrudnienia, takimi jak samozatrudnienie i emigracja zarobkowa. Przedsiębiorstwa musiały dostosować się do nowych warunków, m.in. poprzez rozwój sektora e-commerce. Rozdział podkreśla również wzrost znaczenia społecznej odpowiedzialności finansowej, która stała się istotnym elementem przeciwdziałania ubóstwu i wykluczeniu społecznemu oraz ważnym obszarem analiz naukowych.

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Chapter XIII

Forces behind Income Inequality

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Introduction

One of the largest problems facing authorities across both wealthy and impoverished nations is the growing income inequality (hereinafter also referred to as 'income disparity') that has occurred over the past several decades in the majority of countries worldwide. While a healthy economic framework requires a certain, yet limited, degree of disparity in order to create incentives, excessive inequality can be considered an imminent hazard to long-term advancement and economic security (Aghion, Caroli and García-Peñalosa, 1999). Rising inequality prevents innovation and hinders wealth formation, as well as upward mobility across generations. In addition to causing financial meltdowns and societal turmoil, severe disparity further erodes economic stability and long-term equitable development. It should therefore come as no surprise that significant effort has been devoted to determining the causes of this trend and potential ways of managing it, given its detrimental developmental effects.

Therefore, in order to mitigate the emergence of excessive income gaps and formulate an adequate policy response, it is necessary to understand the forces behind the aforementioned phenomenon, which constitutes the primary objective of this research. The study aims to establish connections between various economic, sociopolitical, and demographic variables and income inequality, focusing on both theoretical underpinnings and econometric modelling.

The first part is concerned with the literature review, wherein the definition of income disparity is provided alongside its historical development and associated trends. This part also discusses the effects of income inequality in socioeconomic terms and presents several methods of measuring this variable based on academic literature. The next part explains several determinants of income inequality. The third part regards the process of model specification, wherein several articles on the same topic are assessed and the generalised method of moments (GMM) model is selected for subsequent testing. The GMM model is also derived and discussed in this section. The next part is centred on both baseline (fixed-effects) and GMM modelling, with both pre- and post-estimation tests described to ensure the robustness of the results obtained. Finally, the results are discussed and related to the previously assessed literature.

1. Literature review

1.1 History, trends, and definitions of inequality

According to Maio (2007), economic disparity involves a discrepancy in the distribution of wealth and opportunities among various social groupings. While inequality levels between countries have slightly decreased due to internationalisation, inequality within countries has increased.

As Milanovic (2016) claims, prior to industrialisation, the main causes of wealth disparity in pre-modern societies were predominantly non-economic in nature. Widespread deadly diseases and epidemics lowered

inequality by reducing the number of employees through the extermination of a certain percentage of the population, which increased the earnings of the surviving populace. Wars either widened inequality through invaders engaging in enslavement and pillage or, more frequently, contributed to further disparity by bringing most of the populace to face prolonged periods of starvation.

Milanovic (2012) further notes that between the end of WWII and the beginning of the 1970s, there was a significant uptrend in economic growth and wealth for the majority of individuals in the United States. From the late 1940s to the early 1970s, real incomes roughly doubled after accounting for inflation. Wealth increased rapidly and at an approximately equal pace across all income levels. Although significant, the disparity between those at the top of the income distribution and those at the bottom did not widen noticeably during this period.

At the same time, according to Stone *et al.* (2024), the 1970s saw an upsurge in global income disparities, as worldwide income was divided roughly equally between wealthy and developing nations. Since that time, income levels have gradually converged across nations, with the majority of the population now residing in middle-income countries. Nevertheless, inequality within most countries has increased considerably over the past three decades, particularly in advanced economies.

The previous point is supported by Bengtsson and Waldenström (2018), who state that the 1970s marked the end of a period of mutually beneficial growth, followed by increasing wealth disparity. For those in the highest one percent of the wealth distribution, median income after transfers and taxation doubled during the period 1979–2007 preceding the economic downturn. The middle sixty percent and the lowest twenty percent of the overall distribution experienced substantially lower gains. Collectively, these developments appear to have had a significant impact on the earnings patterns of the most disadvantaged individuals, considerably increasing the magnitude and pace of changes in their recorded earnings and possibly misrepresenting the actual improvement in the quality of living of economically disadvantaged households.

1.2 Effects of income inequality

Before proceeding to the main determinants of income inequality, it is useful to mention the potential effects that this trend has on socio-economic development. According to Dabla-Norris *et al.* (2015), higher levels of income disparity have been linked to lower rates of socially desirable outcomes, such as life expectancy, educational attainment, and upward social mobility. Furthermore, income inequality may contribute to a higher incidence of medical and social issues, including obesity, behavioural disorders, homicide rates, and drug use.

In economic terms, it is evident that over the past century there has been a significant shift in dominant views regarding the contribution of inequality to growth. As Berg and Ostry (2017) argue, according to the classical view articulated by Adam Smith, inequality promotes development and growth. In particular, the classical perspective contends that wealth disparity encourages capital accumulation and, consequently, economic development. This occurs because the aggregate savings rate rises with inequality due to a greater propensity to save among wealthier individuals. On the other hand, according to Maliar, Maliar and Mora (2005), the representative consumer framework, which forms the basis of the neoclassical viewpoint, downplays the importance of inequality in the process of economic development. It implies that although inequality may, in theory, be influenced by growth, economic growth itself remains unaffected by income distribution.

At the same time, the contemporary viewpoint, developed in the second half of the 1980s, contends that expansionary dynamics in a given economy are significantly influenced by income allocation and income inequality itself. This perspective, first presented by Galor and Zeira (1993), emphasises the importance of variation in determining overall economic activity and development. Specifically, the authors argue that because financial markets do not operate perfectly, inequality affects human capital development, income per capita, and the pace of economic expansion. Research has established that, with the exception of the most impoverished societies, income inequality has a negative

impact on human capital accumulation and the trajectory of economic growth.

This can be juxtaposed with the classical framework, which highlighted the benefits of unequal distribution for capital formation and economic advancement. Subsequent developments in this theoretical strand have strengthened the argument that unequal income distribution hinders economic progress and development by placing pressure on policymakers to implement distorting redistributive policies that harm investment and gross domestic product per capita.

Furthermore, mixed approaches have been popular in contemporary research on the effects of income inequality on economic growth. For example, the concept of a unified development model has been proposed by Galor and Moav (2004), taking into account both classical and contemporary economic frameworks. Based on the degree of prosperity of a nation, they claim that income disparity has different effects on economic expansion. Initially, at the start of the growth process, disparity helps the economy thrive because returns on physical capital are higher than those on human capital. When the value of labour becomes increasingly important, disparity lowers economic expansion in subsequent stages of development due to credit constraints. These limitations on access to credit gradually diminish in more advanced phases of development, and future economic expansion is then unlikely to be greatly affected by wealth dispersion.

Furman and Stiglitz (1998) also state that, in general, economic expansion benefits from consumption; nevertheless, as income inequality rises, more wealth shifts to the highest end of the income spectrum, where individuals with greater financial resources are less likely to spend it than those with lower incomes. Wealthier individuals retain anywhere from fifteen to twenty-five percent of their annual income, while those with low incomes tend to spend most of it on goods and services. Consequently, increased inequality reduces consumption in an economy and plays a significant role in secular stagnation, which refers to a prolonged lack of demand relative to total private savings that many prosperous Western nations have been facing since the 2008 financial crisis.

1.3 Measuring inequality

1.3.1 Gini coefficient

Milanovic (1997) writes that the Gini coefficient is an indicator used to depict the level of income inequality within a country or a group of individuals. The aforementioned indicator calculates the degree of disparity within frequency distribution variables. When all observed values are equal, as in the case when the Gini coefficient amounts to zero, there is absolute equality; nevertheless, a Gini coefficient of one (or one hundred percent) indicates the greatest possible disparity. For instance, the value of the Gini coefficient is zero if everyone earns the same amount of income. A Gini coefficient of one, by contrast, means that within a group of individuals, one person possesses all monetary assets or expenditure, whereas everyone else receives nothing.

The Gini coefficient, according to Fellman (2012), is based on the Lorenz curve, where it is reflected as a measure of how much a nation's wealth or income distribution diverges from a uniform distribution. Generally, the Lorenz curve shows accumulated income on the vertical axis and the percentage of the population, ranked by income, on the horizontal axis. Overall, the Lorenz curve frequently refers to an algebraic equation calculated from a limited collection of income-related observations. It is also commonly compared with a diagonal line with a slope of one, which symbolises perfect equality in income distribution; the Lorenz curve is plotted below this line, revealing the actual or projected distribution.

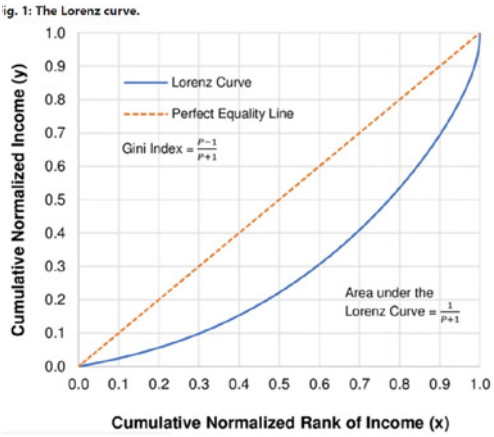

Figure 1. Lorenz Curve
Source: Sitthiyot and Holasut (2021), p. 3.

According to Sen (1977), the general Gini coefficient for a population of size n can be represented as follows:

$$G = \frac{\sum_{i=1}^{n}\sum_{j=1}^{n}\left|x_i - x_j\right|}{2\sum_{i=1}^{n}\sum_{j=1}^{n}x_j} = \\ = \frac{\sum_{i=1}^{n}\sum_{j=1}^{n}\left|x_i - x_j\right|}{2n\sum_{j=1}^{n}x_j} = \frac{\sum_{i=1}^{n}\sum_{j=1}^{n}\left|x_i - x_j\right|}{2n^2\bar{x}} \quad (1).$$

Equation (1) is based on the theory of relative mean difference. Here, x_i and x_j represent given individuals with and – assigned incomes respectively. In order to correct for scale, the mean absolute difference is divided by the average ($\bar{x}$ here) to obtain the relative mean absolute difference.

At the same time, as per Firebaugh (1999), the Gini index, alongside various other inequality measures, can be generalised to a simpler form:

$$I_n = \sum\nolimits_j P_j F\left(r_j\right) \quad (2).$$

In equation (2), I_n is a measure of total inequaity in a given population, P_j is the weight attributed on the basis of total population share,

and $F(r_j)$ is the function indicating the extent to which each unit of r_j deviates from 1.

Furthermore, equation (2) is based on the inequality ratio expressed as

$$r_{\mathrm{j}} = \frac{x_{\mathrm{j}}}{\bar{\mathrm{x}}} \quad (3).$$

In equation (3), $\bar{x}$ represents the mean income of the total population j and x_j denotes the personal income.

According to equation (2), perfect equality is attainable exclusively when $x_j = \bar{x}$, the inequality ratio in equation (3) is equal to one; that is, implying that all incomes in a given population are identical. Thus, it is intuitively clear that greater deviation of r_j from one in equation (2) corresponds to higher levels of inequality within a country.

1.3.2 Generalised entropy index

Shorrocks (1980) denotes the generalised entropy index (GE) as an alternative measure of inequality, which originates from information theory and is generally used as a metric for the redundancy of data. It represents the 'evenness' of income distribution across all levels of the population. The generalised entropy index generally varies from 0 to 0.5, where a value of zero indicates a complete absence of inequality in a given nation, and a value of 0.5 represents 'perfect' inequality (i.e. all income or wealth belongs to a single individual). The GE index has many variations; however, the most common form described by Shorrocks (1980) is the following:

$$GE(\alpha) = \frac{1}{\mathrm{N}_{\alpha}(\alpha - 1)} \sum_{\mathrm{i}=1}^{\mathrm{N}} \left(\frac{y_{\mathrm{i}}}{\bar{\mathrm{y}}}^{\alpha} - 1 \right), \text{where } \alpha \neq 0,1 \quad (4);$$

$$GE(\alpha) = \frac{1}{\mathrm{N}} \sum_{\mathrm{i}=1}^{\mathrm{N}} \frac{y_{\mathrm{i}}}{\bar{\mathrm{y}}} \ln \frac{y_{\mathrm{i}}}{\bar{\mathrm{y}}}, \text{where } \alpha = 1 \quad (5);$$

$$GE(\alpha) = -\frac{1}{\mathrm{N}} \sum_{\mathrm{i}=1}^{\mathrm{N}} \ln \frac{y_{\mathrm{i}}}{\bar{\mathrm{y}}}, \text{where } \alpha = 0 \quad (6).$$

In equations (4), (5), and (6), *N* represents the total number of households in a given population, y_i denotes personal income, and α is the weight variable, which is assigned based on the relative distance between incomes along the overall income distribution curve. Thus, a higher value of α signals stronger sensitivity of the index to higher incomes, whereas a lower α indicates greater sensitivity to the presence of lower incomes in a given population.

1.3.3 Atkinson's welfare index

Biewen and Jenkins (2022) state that this index is derived from the previously discussed generalised entropy index under the assumption of a small α (which implies higher sensitivity to lower-income groups).

As per Atkinson (1970), the welfare-based inequality coefficient can be derived in the following form:

$$A(\varepsilon) = 1 - \left(\frac{1}{N} \sum_{i=1}^{N} \left(\frac{y_i}{\bar{y}} \right)^{1-\varepsilon} \right)^{\frac{1}{1-\varepsilon}}, \text{where } \varepsilon \neq 1 \quad (7);$$

$$A(\varepsilon) = 1 - \frac{\prod_{i=1}^{N} \left(y_i^{\frac{1}{N}} \right)}{\bar{y}}, \text{where } \varepsilon = 1 \quad (8);$$

$$\varepsilon = 1 - \alpha \quad (9);$$

In equations (7) and (8), y_i represents the personal income, *N* denotes the population, and ε is the parameter reflecting inequality aversion. The main premise of this approach is to measure variation in income disparity between nations. Once again, in equation (9), α refers to the weight variable of the generalised entropy index.

Sitthiyot and Holasut (2020) note that the metric helps identify which portion of the overall distribution is most responsible for the observed disparity. By using a coefficient for weighting earnings, the index value may be transformed into a normative metric. Additionally, by selecting the degree of inequality sensitivity appropriately, changes in a particular segment of the income distribution may be assigned greater

significance. As aversion rises, the Atkinson measure becomes more sensitive to changes in the lower part of the income distribution. By contrast, the metric becomes less responsive to shifts in the lower portion of the distribution as aversion to inequality declines and approaches zero. Due to the standard restriction that ε is strictly non-negative, the Atkinson index is of no value for ε values that are highly sensitive to high earnings.

2. Determinants of inequality

2.1 Unemployment

Perhaps the most widespread assumption regarding the possible determinants of inequality is connected with elevated unemployment levels. However, the results of the conducted studies appear to be markedly different. As Saunders (2002) explains, a significant challenge for social safety nets worldwide has been the substantial and persistent rate of unemployment. Due to the effects of poverty and inequality brought about by excessive joblessness, unemployment has reduced the financial base and increased the demand for social services. Comprehensive evidence suggests that unemployment raises the likelihood of poverty and thereby fuels inequality further, with the potential for vicious cycles of poverty and disparity. Additionally, it has a number of detrimental social repercussions for unemployed individuals, their immediate relatives, and the neighbourhoods in which they reside.

The results of the research carried out by Saunders (2002), however, suggest that there is no visible or statistically significant link between unemployment levels and inequality measured by the Gini index. Contrarily, the author hypothesises that the unemployment rate might have an indirect effect on income inequality by disproportionately affecting lower-income households and further contributing to the rising number of impoverished individuals.

Additionally, Cysne (2009) explores the link between income inequality measured by the Gini coefficient and the unemployment

rate, providing evidence that structural unemployment has a positive relationship with inequality. The aforementioned results are supported by González and Menéndez (2000). The authors claim that rising unemployment rates seem to be one of the most notable contributors to widening income gaps.

At the same time, evidence from the research carried out by Martínez, Ayala and Ruiz-Huerta (2003) suggests that there is a limited effect of unemployment on inequality in the majority of OECD countries. While some major structural differences in income distribution are noted within the aforementioned group, unemployment exhibits a positive yet weak relationship with inequality levels.

Most authors, however, suggest that there is primarily an indirect link between the unemployment rate and overall income inequality. The major effect is hypothesised to operate through the direct impact of higher unemployment rates on rising poverty levels.

This hypothesis is suggested and reinforced by Hoynes, Page and Stevens (2005). The authors find that the incidence of poverty rises by 0.4 to 0.7 percentage points for each one-percentage-point increase in unemployment. This effect is likely to directly contribute to growing income inequality. It is widely known that rising unemployment often entails many low-income households losing a substantial share of their disposable income. Taking into account the fact that individuals with lower earnings tend to spend nearly all of their disposable income on basic necessities, with little to no savings, unemployment is likely to push many disadvantaged households and families into poverty and destitution. Therefore, rising unemployment is likely to affect income inequality primarily through the channel of increasing poverty rather than by directly widening disparity gaps.

Furthermore, as per Saunders (2002), unemployment can lead to poverty and, consequently, to income disparity in several ways. First, unemployment over prolonged periods causes incomes to decline, leaving numerous households unable to meet their basic needs. Second, future generations have to bear the burden of labour market exclusion, given that high youth unemployment raises the likelihood of subsequent

poverty. Overall, due to significant disruptions caused by unemployment shocks, many nations continue to be mired in an ongoing cycle of destitution, which leads to widening income gaps.

The negative effects of unemployment continue to be more pronounced for income inequality due to the possibility of already unemployed individuals falling into long-term unemployment, which depletes their finances even further. As Dahliah and Nur (2021) posit, when a person is jobless, their chance of experiencing long-term unemployment increases further. It has been shown that the characteristics of life in impoverished communities generate an environment of poverty, as individuals lack the resources to find and, most importantly, retain work. In general, people who reside in underdeveloped regions face poor housing conditions, underfunded educational institutions, and limited availability of utilities and transportation options. An individual's prospects of relocating and obtaining employment are drastically reduced by these conditions, once again resulting in higher income inequality.

Rising unemployment and, subsequently, poverty become even more dangerous with the emergence of vicious cycles, which continuously affect income inequality. This statement is supported by the research conducted by Meo *et al.* (2018). The authors underscore that although destitution can result from unemployment, it also lowers an individual's chances of finding work. Consequently, many impoverished communities can enter a vicious cycle of attempting to find employment to improve their financial situation, yet failing to do so due to insufficient resources. Unemployment is therefore known to disproportionately affect disadvantaged communities, making it harder for them to secure employment and, ultimately, contributing to higher income inequality.

Therefore, even though there are conflicting results regarding the significance of unemployment rates for income disparity, most studies show either a positive direct relationship between the two variables or a positive indirect one operating through the channel of poverty. It is reasonable to expect a positive relationship between the unemployment rate and the Gini coefficient in the econometric estimation.

2.2 Income taxation

The opinions on the general effect of income taxation on inequality have been more uniform compared to those expressed regarding unemployment. However, the research has mostly been limited by insufficient availability of data on exact income taxation rates for some countries.

Sarker (2009) explains that the largest portion of funding available to authorities for redistributive purposes, which is essential to reducing economic inequality, comes primarily from taxation. Since the marginal utility of money decreases with affluence, redistribution is economically justified, as those in need gain far more from additional earnings compared to the wealthy. Nonetheless, starting from the end of the 1970s, there has been a significant reevaluation of redistribution strategies. This shift contributed to the 'trickle-down' theory, which holds that tax breaks for the wealthiest will benefit everyone, gaining traction among policymakers.

Ciminelli *et al.* (2019) claim that, in general, the taxation code has a significant impact on how money is distributed. Through direct taxes (income taxation, social security contributions, and municipal duties), monetary benefits, and indirect taxation on purchased items, taxes affect household earnings and redistribute wealth. The distribution of financial resources among families is influenced by taxation and benefits; thus, income disparity is often reduced as a result of higher income taxes.

As Poterba (2007) argues, even without other adjustments, an increasingly progressive taxation system would lessen income disparity. Although federal taxes have increased in progressiveness in the United States, they began to decrease after 2001 when compared to pre-tax earnings. The impact of federal taxation on income inequality has largely remained unchanged, as the lower average tax rate has partially offset the equalising effects of greater tax progressiveness. After taxes, inequality measured by the Gini index has generally been lower compared to its pre-tax level.

Alstadsæter, Johannesen and Zucman (2019) write that a major contributing factor to the rise in earnings disparities has been the

reduction in tax progressivity, which has been exacerbated by the increasing prevalence of tax evasion. Multinational actors in offshore-based tax havens have built an intricate worldwide network of shell companies that may conceal income from taxing authorities. According to more recent studies, the wealthiest individuals primarily utilise offshore jurisdictions. As a result, taxing the richest individuals, who belong to the mentioned category, would significantly reduce income inequality and increase the amount of resources available for redistributive purposes.

A similar approach has been adopted by Leigh (2008). The author writes that the degree to which income disparity is reduced by taxation is indicated by the difference between the pre-tax and post-tax income Gini coefficients. Taxation is known to balance earnings to a greater extent when coupled with higher initial disparity. As taxation, expressed as a percentage of income, decreased more noticeably for families with higher earnings than for those with lower incomes, income disparity lessened throughout the 1980s. The difference between pre- and post--tax earnings disparities, however, increased as the government taxation system became more progressive beginning in the 1990s.

Furthermore, according to Akgun, Cournède and Fournier (2017), income taxation levied by the government tends to lessen disparity, since top earners face greater median tax burdens compared to the general population. However, the moderating impact of taxation has remained almost unchanged compared to pre-1980 levels. As a result, the gap between the rich and the poor has grown both before and after taxes. Expanding income disparity has not been exacerbated by taxation; at the same time, income disparity has not been reduced by taxation measures either.

The research conducted on OECD countries by Joumard, Pisu and Bloch (2013) also indicates a negative relationship between taxation and income inequality. The report underlines that disparities within income distribution with respect to taxable earnings are usually reduced through taxation and transfer payments. Nevertheless, the impact differs among OECD nations. Taxation, in general, is known to have a distributional effect depending on the magnitude, composition, and progressiveness

of each underlying element. Since they concentrate more heavily on income taxation, which tends to be more progressive in comparison to other duties, certain nations with comparatively modest taxation and benefit structures, such as Australia, attain a distributional effect similar to that of nations like Germany, which are characterised by considerably higher levies and transfer expenditures.

As the median top earnings tax rate for OECD nations has dropped drastically, personal income tax progressiveness has also markedly decreased in the Western world. According to a fairly recent study by the International Monetary Fund (2017), equalisation via taxation was able to counteract approximately 60% of the growth in market inequality between 1985 and 1995. However, thereafter, it has not been able to keep up with the continual rise in disparity. Furthermore, Hope and Limberg (2020) have discovered that fiscal adjustments have drastically raised pre-tax wealth disparities while exhibiting no discernible impact on economic development in a sample of 18 OECD nations spanning 50 years.

Not all types of taxation tend to have a negative relationship with income disparity levels. According to Dabla-Norris *et al.* (2015), wealthier individuals pay fewer indirect taxes relative to their earnings; at the same time, they tend to pay more indirect taxes in absolute terms than those with lower incomes. This implies that indirect taxation may widen the income gap. Indirect taxes create disparity because they are considered regressive. However, both indirect and direct taxes have lost some of their progressiveness over the years.

Perhaps a slightly alternative approach is taken by Dianov *et al.* (2022). The authors agree that taxation is crucial for redistributing wealth, but they argue that increasing inequality is a broader issue than merely a technical result of decreasing redistribution. Taxation exhibits diverse effects on income disparities among various European Union nations, even those that are similar with respect to socioeconomic and structural traits. In this sense, it cannot be stated that increasing direct taxes reduces income disparity efficiently and uniformly across all observed countries. This, however, may be connected with differences in taxation systems across nations, as well as with the fact that income disparity

may be influenced by various determinants other than taxation, which makes finding a perfect remedy almost impossible.

Most researchers seem to agree on the strong redistributive impact of direct taxes (most importantly, income taxation) on income inequality. However, the impact of such taxes appears to be much stronger for developing countries. Using the example of Brazil, Luebker (2011) illustrates how governments may utilise taxation and welfare mechanisms to influence the way in which revenues are distributed. Brazil's example demonstrates that there is room for lowering market-based disparity even in emerging nations. Authorities occasionally have to choose between equality and performance; however, such trade-offs are rarely required to be substantial, as equality and effectiveness frequently coexist. Additionally, there does not seem to be a connection between total redistribution and increases in per capita earnings over the past twenty years for the selected group of nations. Germany and Sweden, two countries that have reduced disparities through strong redistribution, tend to perform on par with nations that exhibit higher levels of income disparity yet modest redistribution.

Most researchers agree that increased income taxation, alongside higher direct taxation, is likely to help reduce overall levels of income inequality, as these measures are progressive by nature. It is worth noting, however, that income taxation has become less progressive in recent years, and the effect of such measures generally varies across countries.

2.3 Education

Education is another variable responsible for income disparity through various channels. As Abdullah, Doucouliagos and Manning (2015) write, one of the main elements contributing to economic disparity is the level of education in a given country. According to current research, there is a growing wage disparity between individuals with a bachelor's degree or higher and those with only a high school diploma. Additionally, it is argued that the growing economic gap has a detrimental impact on educational outcomes. These less-educated employees struggle to pay

for their children's college education when their income declines, which leads to another vicious cycle of being trapped in a poor financial situation and being unable to escape it.

Moreover, according to Gregorio and Lee (2003), since the late 1970s, there has been an increasing disparity in income or wages between those with a university degree or higher and those without a college education. Some economists contend that as modern technology has evolved, businesses' demand for higher-skilled and more qualified labour has grown, while the available workforce has remained unchanged or may have even declined. As a result, there has been a shortage of skilled labour, and the overall income gap between skilled and unskilled workers continues to widen.

The aforementioned point can link the effect of education with technological advancement, as discussed by Aghion and Griffith (2024). The authors write that since automated machines have become advanced enough to perform routine and repetitive tasks, modern technology has increased the significance of expertise required for non-routine labour and decreased the value of less specialised tasks. Due to the skill--biased shift in technology, numerous full-time permanent positions with benefits have been replaced by flexible part-time employment without benefits, which is often focused on completing short-term tasks. The aforementioned changes have triggered numerous alterations in work structures and the distribution of income.

Similarly, as noted by Policardo, Punzo and Carrera (2010), the marginal productivity concept, which is a widely accepted economic principle, asserts that those with higher work efficiency rates also receive higher compensation. This occurs because individuals assume that a person's production reflects their value to society. Given that innovation plays a major role in determining the efficiency of various skills and that skill-biased technological change has raised productivity, income disparity has increasingly been justified by this factor.

Carnevale and Rose (2015) also state that limited access to education in the United States has a detrimental effect on overall income inequality in the country. The authors conclude that, since the late 1970s, the wage

disparity between those with a bachelor's degree or higher and those with only a high school diploma has been increasing. Income disparity can be reduced if a nation generates more workers who have completed university education. The results of their research indicate that if twenty million additional individuals with higher education entered the economy, income inequality could be reduced. In general, according to Carnevale and Rose (2015), the supply curve for this category of workers would shift to the right as greater numbers of college graduates become available. At the same time, the supply curve for workers with only a high school education would shift to the left as fewer less-educated individuals are supplied, given an increase in the number of university graduates. As a result, the wage disparity between these groups, and consequently the overall income gap in the United States, may be narrowed.

Similar results have been obtained by Hershbein, Kearney and Summers (2015), who also conducted simulations to examine what would happen if more working-age males attended university. The simulation results indicate a favourable impact on median incomes and employment prospects, with no significant influence on overall income inequality. However, their findings suggest that a rise in academic attainment results in lower disparity in the lower portion of the wage or income distribution.

Nonetheless, the detrimental effect of low education levels on inequality is not limited to the United States. Jeng, Gane and Lages (2019) conducted research encompassing over 50 countries and came to the conclusion that income disparity has an adverse relationship with educational achievement. Spending on secondary education is expected to provide middle- and working-class individuals with greater social mobility, thereby reducing income gaps. Additionally, tertiary education expenditures also tend to exhibit a negative relationship with income inequality as measured by the Gini coefficient, indicating that increased spending on higher education could reduce income disparity.

Moreover, the findings of Cuadrado, Fulmore and Phillips (2019), exploring OECD countries, suggest that, from a long-run perspective, a higher proportion of educated employees is expected to help mitigate income disparity. This would result in lower income disparity, as a greater

supply of competent staff members would naturally reduce the wage premium. The amount of money invested in education is a separate issue discussed in relation to educational disparity. Although the purpose of educational support is to provide opportunities for underprivileged children to attend school, its efficacy is not entirely clear. Equitable access to schooling is required for public education expenditures to reduce income disparity. The proposed explanation for this limited effectiveness is that if lower income- households lack the means to send their children to public schools, simply increasing educational expenditures may not assist those most in need.

Furthermore, Olupona (2023) analyses the effect of education on income disparity based on data from 145 countries with varying median income levels and stages of development. In this research, the overall impact of postsecondary education attendance on the Gini coefficient indicates a negative correlation between inequality and schooling. Data from 145 countries, including high-, middle-, and low-income nations, reveal that educational attainment reduces disparity in middle-income countries but exacerbates it in both high- and low-income countries.

Apart from identifying a persistent link between education availability and income inequality, Coady and Dizioli (2017) also carry out government policy simulations to observe the comparative efficiency of the applied remedies. The results indicate that over the past fifteen years, the expansion of educational opportunities has primarily reduced economic disparity, particularly in developing and emerging nations. While the overall effect on income disparities fluctuates in magnitude across emerging and developing countries, a higher incidence of educational opportunities tends to consistently lower disparity. Moreover, the decline in income inequality is a direct result of the decreasing rate of educational disparity, which is only partially countered by the rising impact of educational attainment on inequality. Unfortunately, greater access to education is associated with an overall increase in income disparities in industrialised nations. This is mainly because the effect of higher levels of educational attainment, which corresponds to steady or rising returns to additional years of schooling, counterbalances the

relatively smaller effect of reducing educational disparities at the lower levels of education inequality observed in industrialised countries.

In terms of policy responses and the success of educational attainment in offsetting the detrimental effects of income disparities, Olupona (2023) states that the initial phases of economic growth exhibit an increase in income disparity. The gap narrows and then widens once again as nations become wealthier, technological innovations develop, and more individuals become educated. Since the recurring cycle of unequal distribution emerges from the moment a given economy starts developing, this finding explicitly shows that education alone cannot equalise disparity over an extended period of time. Notwithstanding the potential financial and economic benefits brought by increased enrolment rates, raising enrolment percentages on their own might not be sufficient to significantly reduce inequality.

Therefore, education financing and its availability in general are likely to have an adverse relationship with income inequality. Researchers support the hypothesis that higher levels of education, particularly among disadvantaged households, are likely to positively influence their ability to find higher-paying employment and subsequently obtain greater disposable income.

2.4 Inflation

Another notable yet sometimes unclear factor affecting income inequality is inflation. According to Monnin (2014), different revenue streams are affected by inflation in different ways. Since families possess a variety of financial resources, the effect of price increases on their overall earnings is also likely to be uneven. The rise in inflation therefore has the potential to alter the income structure by having a varied impact on each family. Labour income and capital gains are the possible pathways through which price increases may raise or reduce income disparity. The fact that salaries have varying degrees of linkage to inflation creates an inflation-sensitivity channel through which changes in price levels may affect the distribution of labour income. Accordingly, remuneration that

is explicitly tied to inflation is better protected against price increases than remuneration that is not. Interest and dividends earned, which constitute capital gains, on the other hand, may provide several ways to hedge against inflation. Nevertheless, entry costs and constraints mean that not all families have identical exposure to capital markets. As a consequence, low-income families are at a disadvantage when attempting to use innovative financial technologies to better protect themselves against inflation. This creates a positive relationship between inflation and income disparity.

In addition, Wimer, Collyer and Jaravel (2019) claim that because inflation fluctuates at different points in the income distribution, several perspectives on the financial situation of individuals who earn modest incomes may be drawn. In recent periods, the lower end of the earnings distribution has experienced higher rates of inflation. The research suggests that inflation beyond a certain point is likely to disproportionately and negatively affect individuals and households with lower incomes. This tendency is therefore likely to lead to rising income inequality in a given country.

Albanesi (2007) also agrees that higher inflation is likely to disproportionately affect economically disadvantaged individuals and households. The author notes that budget allocations for necessities are higher in families with low earnings than in households with higher incomes. This is partially due to the fact that families with low incomes frequently reside in older, more energy-intensive homes and in cooler parts of the nation, both of which require more heating. Additionally, they cannot reduce spending on these factors without suffering serious consequences. These groups are among those with the fewest available budgetary options to withstand price increases. Families with higher incomes may utilise savings or investment portfolios as a hedge against unanticipated price increases. By contrast, the financial opportunities available to families with low incomes are more limited and often do not provide effective protection against price hikes.

The impact of price increases on the overall earnings of households is diverse, as it affects various forms of income in different ways and

households' financial resources differ substantiallyv. Consequently, monetary regulation and its impact on the level of inflation may result in the redistribution of income. The net long-term consequence of contractionary monetary regulation on income disparities is contingent upon the initial rate of inflation, as pointed out by Galli and Hoeven (2001). Income disparities could be mitigated in nations facing high inflationary rates through disinflation. This form of adjustment results in a less rapid erosion of purchasing power through an increase in the real value of financial assets, greater long-term growth via promoted investment, as well as lower real interest rates owing to decreased risk premiums.

The link between inflation and income inequality is found by most researchers to be largely U-shaped; however, the tipping point, as well as the direction of the relationship, appears to be ambiguous. For example, as Nantob (2015) suggests, income disparity is positively and significantly impacted by inflation, meaning that income disparity is correlated with higher inflation. As prices increase, disparity rises as well, reaching a peak at roughly 109 percent inflation before declining once more. Monnin (2014) also discovers a strong inverse relationship between long-term inflation and income disparity. Additionally, the author finds a U-shaped association involving squared long-run inflation and income disparity, showing that there is a positive correlation between the two indicators. Increased inflation is correlated with lower income disparity at lower inflation levels, but higher inflation rates are associated with higher income disparity. The author's estimation of the inflation rate at the tipping point is 13.3 percent, which means that income disparity diminishes when prices rise below this point but grows as inflation exceeds it.

Additionally, Glawe and Wagner (2024) identify a statistically significant inflationary cutoff value of 5.87% at the one percent significance level. If inflation is higher than the mentioned threshold, there is a positive correlation between it and the overall Gini coefficient. The CPI coefficient exhibits a negative sign below the identified limit; however, the findings are not statistically significant. This suggests that price increases primarily contribute to income disparity once inflation rises beyond six percent. In such an instance, the overall Gini index

increases by approximately 0.0097 with an additional one percentage point increase in prices.

Furthermore, as noted by Afonso and Sequeira (2023), it is important to distinguish between within- and across-country income and wage inequalities. However, in the case of inflation, the detrimental effect appears to encompass both types of disparity. Due to its negative impact on specialisation, inflation is shown to increase income gaps across countries; at the same time, the authors note that the exact effect depends on the credit constraints faced by companies and the overall differences in inflation levels across the countries examined.

The non-linear effect of inflation on inequality has been confirmed for most developing nations by Nantob (2015). The author finds that the impact of inflation on income disparity is non-linear yet positive and substantial for most of the observed countries. Additionally, development velocity, openness to trade, and political stability are all affected by inflation; thus, these variables serve as channels through which price growth influences income disparity. According to these findings, governments in emerging nations should be concerned about how political choices affect income redistribution. Finally, because the levels of public debt and international obligations have become relatively high large in emerging nations, these factors may influence the relationship between debt and inflation, while simultaneously affecting the link between price increases and income distribution.

Even though the exact threshold level varies based on the estimates of current researchers, it seems safe to assume that the relationship between inflation and income inequality exhibits a U shape. It is expected that at lower inflation levels, increases in inflation contribute to lower income disparity, while at higher inflation levels beyond a given threshold, the relationship becomes positive, meaning that higher inflation levels are associated with greater income disparity.

2.5 GDP per capita

GDP per capita's effect on income inequality seems intuitive at first; however, the results of research on the topic are highly mixed.[13]

The most notable depiction of the relationship between GDP per capita and income inequality is illustrated by the Kuznets curve. According to Nielsen and Alderson (1997), Kuznets discussed the rise in income disparity, based on various degrees of wealth. According to this idea, as nations advance across different phases of economic growth, they move from a state of relative equality to greater disparity and then back to higher levels of equality. The Kuznets curve, which he used to illustrate this perspective, displays an inverted U-shape relationship between GDP per capita and income disparities. One explanation for such a pattern contends that in the early stages of growth, investment opportunities for wealthy individuals increase, while a flow of inexpensive labour from the countryside into metropolitan areas keeps wages low. In contrast, the major driver of development in nations with established economies is revenue that has already been earned but has yet to be spent. Because less fortunate individuals cannot afford higher education in inefficient financial systems, inequality lowers educational attainment and hinders economic growth.

This perspective, however, has been widely challenged by modern scholars. For example, Hossain (2013) contends that only a very small portion of the inter-country variance in income distribution is explained by Kuznets' theory. Since the relationship between the economic growth rate and income disparity varies across nations, current multinational data panels with initially self-consistent historical series for several countries do not support the existence of a Kuznets curve. The theory is also not supported by the fact that some nations experience a spike in income disparity in conjunction with their stage of economic growth after a predicted earnings threshold, whereas other nations exhibit an adverse correlation between income disparity and the stage of economic growth prior to that threshold.

[13] For more see Beck (2014, 2019, 2020, 2021a, and 2021b)

The study conducted by Causa, de Serres and Ruiz (2014) on the relationship between GDP per capita and income inequality concludes that the effect varies even among OECD countries. For instance, highly developed countries such as Sweden exhibit a strong positive correlation between GDP per capita and income inequality, whereas less developed countries such as Mexico appear to display a negative relationship between these variables.

Some recent studies support the Kuznets hypothesis. Using OECD countries as an example, Francis, Gaysowski and Moen (2018) identify a negative relationship between GDP per capita and income inequality as measured by the Gini coefficient. At the same time, the study found no evidence of an inverted U-shaped relationship.

Monnin (2014) also explores the link between GDP per capita and income inequality, measured by the Gini coefficient, and relates it to Kuznets' theory. The author finds a large nonlinear relationship between income disparity and GDP per capita. In contrast to Kuznets' theory, he discovers a regular U-shaped curve rather than an inverted one. This suggests that, despite an initial decline in disparity at the beginning of the period in question due to a higher degree of economic development and, subsequently, GDP per capita, income disparity increases as levels of economic progress continue to rise.

The findings of Monnin (2014) at first appear to be at odds with Kuznets' idea. According to Kuznets, the pattern of income distribution is cyclical, with disparities rising as people move from older industries to emerging ones in order to benefit from increased efficiency, and falling when the majority of the labor force enters the newly created sector. The fact that industrialised nations may have exited one Kuznets phase and are already in the early stages of another may account for a positive relationship between the stage of economic growth, GDP per capita, and income disparity. Accordingly, increasing disparities associated with economic growth rates may indicate that workers are transitioning from traditional to emerging industries and that these nations are undergoing economic shift.

By contrast, Jauch and Watzka (2015) find a statistically significant effect of GDP per capita on income inequality in a large dataset of

138 developed and developing countries. The authors find no U-shaped relationship in either upright or inverted form and claim that increased GDP per capita is likely to contribute to higher financial development in a given economy, which, in turn, provides greater incentives and capacity for government financial assistance to the most disadvantaged households.

Using the example of the United States, Rubin and Segal (2015) find a positive link between GDP per capita and income inequality as measured by the Gini coefficient. Notably, the authors discover that households with higher levels of disposable income and overall wealth are more sensitive to changes in economic growth and variations in GDP per capita, as they hold most of the country's wealth compared to households in the lower segments of the income distribution.

In general, views regarding the exact nature of the relationship between GDP per capita and income inequality appear contradictory, with some authors even finding no significant relationship at all. Some researchers support Kuznets' theory, while others reject it entirely. Ultimately, both positive and negative relationships may be observed, depending either on the stage of economic development that countries are entering, as suggested by Monnin (2014), or on their overall level of economic development, as argued by Causa, de Serres and Ruiz (2014).

2.6 Other determinants[14]

2.6.1 Government spending

Several other variables have been explored in discussions of the determinants of income inequality; however, in some cases, there has been limited research providing conclusive results. One of the most widely agreed-upon determinants within this group is government spending. Numerous pieces of evidence indicate that, across many nations and

[14] For more see Beck (2021c, 2022, 2023), Beck and Jackson (2024), Beck and Nzimande (2023), Beck and Okhrimenko (2024), Beck and Yersh (2024).

regions worldwide, at least certain forms of government expenditure tend to reduce income disparity. Although many questions have been raised regarding the viability of fiscal stimulus as a redistributive tool, especially in low- and middle-income countries, it is generally acknowledged that the relationship between government expenditure and inequality is complex.

Rhee *et al.* (2014) discover that spending by government institutions on social assistance typically decreases the income gap, although the magnitude of this effect varies greatly depending on how much of these payments are directed toward lower-income groups. Considering political economy factors, the effect on disparity might be negligible if the middle class absorbs the majority of assistance expenditure. This also holds true for indirect subsidy expenditure, which accounts for a large share of overall government spending across numerous developing nations, yet frequently favors upper-income groups more than others. Additionally, it has been demonstrated that, by promoting a more equitable allocation of human resources, federal expenditures on education and healthcare lower income disparities. Nevertheless, the effectiveness of such investments is crucial in determining the magnitude of their impact.

Differentiating between first- and second-round impacts constitutes an important point. For instance, as Bastagli, Coady and Gupta (2015) write, government assistance to families with lower earnings will immediately result in a decrease in the disparity in spending power across households. Contributions may nevertheless eventually cause second-round impacts on domestic market disparities in earnings that could either amplify or counteract the initial benefits. Even without transfers or implicit aid, governmental consumer expenditure could result in significant consequences for disparity in the long run. For example, expenditures on elementary education could lead to an indeterminate and more gradual impact on income disparity. Consequently, depending on the method used to assess income and the time span under consideration, the overall effects of governmental expenditure may vary.

According to Sánchez and Pérez-Corral (2018), the overall level of federal spending on social services is negatively correlated with

income disparity. When the variable of government expenditure is broken down into specific elements, social benefits (in monetary terms) likewise exhibit a negative correlation with income disparity. It is also important to recognise that there may be an interplay between the effect of government spending on income disparity and the socioeconomic characteristics of the nation under study. Using the example of European Union Member States, the authors state that overall federal social spending and the Gini index are negatively correlated. In other words, a decrease in economic disparity may be associated with increased social spending. More precisely, a 0.21–0.45 point decline in the Gini index is anticipated for every percentage point increase in federal social spending. To bring income inequality down to the anticipated threshold, the developing economies of the European Union would need to make significant budgetary adjustments. In member nations with developing economies, health spending is inversely correlated with wealth disparity; in other countries, the relationship is positive. Spending on education has little effect on income disparity. Finally, in both groups of nations, there is a negative correlation between social security spending and income inequality.

Another study conducted by Anderson *et al.* (2017) examines 84 different studies with more than 900 estimations for meta-analysis purposes and demonstrates how various factors influence both the magnitude and the direction of the relationship between governmental expenditure and income disparity. The relationship is often smaller (less adverse) when focusing on the proportion of the poorest twenty percent of households, whereas it is much more pronounced (more adverse) when focused on the share of the wealthiest ten percent of households in a given nation. This implies that the influence of government expenditure on redistribution cannot be experienced uniformly across the distribution, but is instead concentrated in the upper half of the wealth distribution, flowing in the direction of middle-class households.

The findings of Anderson *et al.* (2017) also indicate a slight adverse correlation between government expenditure and income disparity, with the strongest correlation observed for welfare programmes and other

social expenditures, as well as when the income share of the wealthiest population or the Gini coefficient is used as the measure of disparity. Nonetheless, it is crucial to recognise that a variety of other parameters influence both the magnitude and the direction of the observed relationship. Because of these factors, it is challenging to determine whether there is, on average, a substantial correlation for every specific category of government expenditure and income disparity.

Thus, even if the specific effects of government spending are difficult to track and measure, it is still reasonable to expect an adverse correlation between this variable and income disparity.

2.6.2 Political risk and corruption

Lee, Yuan and Ho (2022) state that a nation's level of wealth and, subsequently, its income disparity are influenced by political risk. For example, corruption among politicians, which is a component of political risk, enables government agencies to provide businesses and individuals with potentially valuable information, thereby easing their economic challenges. In addition, political risk enables politicians to allocate government funds to underprivileged groups in order to succeed in elections. The authors view political risk as a significant factor influencing income disparities by employing it as a conduit linking internationalisation and income disparity.

Lee, Lee and Lien (2020) also posit that country and political risk have a small yet noticeable relationship with income inequality, with political risk in particular being associated with a widening income gap. However, as the authors note, due to a lack of literature on the topic, they focus more on the conditional and distributional effects of country and political risks. These variables are likely to lead to rising income disparity by altering the way in which globalisation affects income inequality. Government stability, internal and external conflicts, the incidence of corruption, military involvement in the political process, religious conflicts, the rule of law, racial tensions, and the nature of administration are among the sub-indices of political risk that display positive coefficients, indicating

that countries experiencing increases in these dimensions of political risk also tend to experience worsening income disparity.

As for corruption, Policardo and Carrera (2018) find a two-way relationship between the mentioned variables, concluding that increased levels of corruption may drastically widen the income gap through the presence of a so-called vicious cycle of elevated income disparity and higher levels of corruption occurring simultaneously.

Uslaner (2006) reports similar findings. The author states that a disparity trap is caused by perceptions of increasing inequality, corruption, and a loss of trust in governmental agencies and other powerful actors. Therefore, it is extremely challenging to break free from the cycle of disparity when individuals feel they have no realistic possibility of improving their predicament over time and that corruption is the only route to success. Inequality, distrust, and corruption are all interrelated. Since they are mutually reinforcing in nature, they cannot be readily reversed. There exists a causal relationship between corruption and income disparity, as well as a relationship between corruption and low levels of political trust in a given country.

Although economic performance has been the primary focus of research on the effects of corruption, Gupta, Davoodi and Alonso-Terme (1998) claim that this variable can also have a wide range of distributional effects. Through reduced economic development, skewed taxation regimes that favour wealthy and highly influential individuals, inadequate planning, decreased welfare expenditure, uneven access to schooling, and increased risk in investments made by the less affluent, corruption exacerbates income disparities and poverty. Via the aforementioned channels, excessive and growing levels of corrupt behaviour further widen the income gap. The paper finds that a one standard deviation increase in the growth rate of corruption reduces the income growth of underprivileged individuals by 7.8 percentage points annually.

The distributional effects of political risks and, specifically, corruption have been addressed by Bulut and Çavuşoğlu (2023). The authors argue that there are several ways in which corruption and political risk may worsen income disparity, with one major channel being their

detrimental effect on economic expansion. Economic progress is hindered by corruption because it distorts the allocation of resources, discourages productive activity, and raises the cost of production and transactions. In addition to acting as a tax, corruption hampers the functioning of institutions and structures, lowers investment in human and physical capital, and—above all—increases uncertainty, particularly in the case of decentralised corruption. Because economic development predominantly benefits those in the lower percentiles of the income distribution and narrows the divide between the wealthy and the poor, corruption impedes economic expansion and thereby exacerbates income disparity.

Therefore, political risk is expected to have a positive relationship with income inequality, as political instability may not only widen the income gap directly but also contribute to a variety of distributional effects related, for example, to the relationship between income disparity and globalisation.

2.6.3 Openness to trade

The variable has been widely discussed by many researchers; yet, the obtained results often contradict each other.

In general, the distributional effects of trade are widely assessed by the classical Heckscher–Ohlin model (Ohlin, 1967). It clarifies how production variations, the relative resource endowment of nations, as well as the degree to which people rely on labour or capital income, contribute to inequality arising from open trade. As commercial activity becomes more open in a given country, nations that excel at producing goods intensive in their relatively abundant factors export such products. This concept assumes that a nation's level of development determines how trade accessibility and openness affect income inequality.

Another approach to the topic has been suggested by Stolper and Samuelson (1941). It demonstrates that the real returns to the factors heavily utilised in the manufacture of factor-abundant exported products grow as a result of trade-induced proportional changes in product prices, while the returns to the remaining factors decline. Consequently,

trade openness benefits a nation's abundant factors of production at the expense of its scarce ones. It is anticipated that this would lead to a rise in income disparity and a concentration of wealth toward the wealthiest individuals in developed countries, due to the greater abundance of financial capital and skilled labour. An open economy could help low-cost labour in emerging nations, as it is heavily employed in domestic manufacturing, by raising wages and income levels. Thus, it is anticipated that income disparity would decline in emerging nations.

Roser and Cuaresma (2016) have explored the topic of trade and inequality by employing data collected from 32 industrialised nations between 1963 and 2002. The researchers demonstrate that openness to trade and income disparity have a positive relationship, in accordance with the Stolper–Samuelson principle. Their results imply a favourable correlation between income disparity in advanced economies and imports from emerging economies. At the same time, according to Jaumotte *et al.* (2013), trade liberalisation is inversely related to income disparity. This finding is based on a sample of 20 industrialised and 31 developing nations between 1981 and 2003. Nevertheless, their analysis does not break down the relationship between trade and disparity into advanced and emerging country subgroups. Moreover, when discussing the aforementioned study, Dorn, Fuest and Potrafke (2022) state that, across the full sample of countries examined by Jaumotte *et al.* (2013), the initial findings fail to demonstrate that trade openness affects income disparity.

An adverse relationship between the overall volume of trade and income disparity has been identified by Cerdeiro and Komaromi (2017). The earnings of the wealthiest 10% of the income distribution drop by approximately four percent relative to the earnings of the lowest 10% with each percentage point increase in trade openness. Recognising that the disparity indicators considered in the mentioned paper tend to fluctuate steadily over time, the anticipated influence of trade on the Gini index is often relatively large. It is nevertheless important to note that while the projections suggest that trade yields significant long-term benefits for both economic growth and the reduction of income gaps, they do not explain the mechanisms through which these gains are realised.

More systematic research is therefore necessary to support the design of trade integration-enhancing measures.

At the same time, Aradhyula, Rahman and Seenivasan (2007) report opposing results, showing a positive relationship between trade openness and the income gap. Using panel data instead of the more widely applied cross-sectional approach, the authors find that trade openness raises inequality within a given country, although the degree of inequality growth in response to increasing trade openness appears to be smaller in advanced economies. The authors conclude that trade openness significantly increases inequality in emerging nations but has a much smaller effect in wealthy nations.

Dauth, Findeisen and Suedekum (2014) also underscore that different countries may experience varying impacts of trade liberalisation on income disparity. Specifically, the findings using relative earnings proportions as the dependent variable satisfy the projections of the Stolper–Samuelson theory: across the representative group of underdeveloped and emerging nations, trade liberalisation appears to favour the most impoverished groups by considerably improving their income shares. Openness to trade tends to exacerbate income disparity in developed economies, although this result is likely to be mainly driven by outliers. The authors are therefore unable to substantiate the claim that income disparity in industrialised nations is caused by expanding trade.

Autor, Dorn and Hanson (2013) also agree that both openness to trade and the overall level of trade are likely to contribute to the widening income gap, particularly in developed and advanced economies. However, in some cases, the effect of trade is not direct *per se*, with Chinese imports being largely responsible. As the authors speculate, contrary to popular belief, trade now disturbs labour markets more than in the past. For instance, compared with similar employees in less exposed sectors, employees in the United States and the United Kingdom who were originally engaged in industries facing import competition experienced a reduction in their lifetime earnings due to the rapid expansion of Chinese manufactured imports in the 1990s and 2000s. The effects of these unfavourable labour market outcomes were greatest for those with

low wages. Furthermore, regions in which import-competing companies were concentrated experienced changes in social outcomes and attitudes, alongside declines in wealth and employment rates.

Once again, there is a wide range of studies that contradict one another, which makes it difficult to definitively state which results are likely to be obtained through future model estimations and whether the outcomes will be substantially affected by variables outside the model.

3. Model specification

3.1 Model selection

In order to select a model, numerous studies on a similar topic have been taken into consideration.

Ponce *et al.* (2023) utilise a generalised least squares (GLS) model to examine the spatial determinants of income inequality in 78 nations across several continents over the period 1995–2017. The authors first employed the Hausman test, after which a random effects model was selected as the most suitable. However, the model required corrections for cross-sectional dependence, heteroscedasticity, and autocorrelation, all of which were addressed using a GLS approach. The same model has been applied by Tridico (2018). In order to identify the determinants of income inequality in 25 OECD countries over the period 1990–2013, the author likewise employs a GLS specification incorporating random effects, which is supported by the Hausman test in comparison with the fixed effects alternative.

At the same time, GMM modelling has been utilised more frequently. For instance, Uspri *et al.* (2023) study the effects of inflation and other selected determinants on income inequality using data from 58 provinces of Indonesia over the period 2010–2020. The authors apply both first-difference and system GMM. They argue that time-dependent variation in the data can be handled by using a dynamic panel approach. The GMM technique removes a significant portion of country-specific effects and

treats the dependent variable as an instrument with a lag of at least one period, provided there is no variation over time across any city.

GMM has also been utilised by Nikoloski (2010). The author compiled a panel dataset that includes information on 81 countries selected for the study. Additionally, the data were converted into five-year averages with the aim of addressing a number of drawbacks related to the lack of statistics on income disparity. As a result, up to nine data points per country for the period 1962–2006 were obtained.

3.2 GMM model

3.2.1 General description

The generalised method of moments is a widely used econometric technique for determining parameters in statistical models. As Imbens (2002) writes, among all estimation methods that rely solely on the information contained in the moment conditions, GMM estimators are recognised for being the most consistent and asymptotically normal. In broad terms, it is a technique that determines the parameters of a given model by comparing observed data patterns with theoretical projections. It relies only on specific implications derived from the underlying model, without requiring full knowledge of the data distribution. One particular advantage of the GMM technique is that it provides a straightforward way to evaluate the specification of the proposed model when the number of moment conditions exceeds the number of model parameters in the dataset.

As Imbens (2002) further specifies, in cases where the data distribution is unknown, GMM only has to define a set of moment conditions derived from the assumptions of the model itself. By addressing the issue of multiple moment conditions, providing information about undetermined variables, and enabling variable estimation using values other than sample moments, this technique extends the traditional framework. Furthermore, through the application of the law of large numbers and

the central limit theorem, GMM establishes regularity criteria for a wide range of moment conditions.

Hansen (1982) explains that GMM operates under the assumption that the data y_i, where each observation is a multivariate random variable with n dimensions, are generated by a weakly stationary stochastic process, in which the time average and the cross-sectional average of the observable coincide.

Noteworthy assumptions should be considered before applying GMM testing to any given dataset. Matyas (1999) states that, first of all, the process in the model needs to be dynamic, with previous values influencing the current realisations of the dependent variable. Furthermore, the variable of interest may exhibit unit-specific fixed effects in the dynamic setting, causing certain sampling units to experience faster or more persistent fluctuations in the dependent variable compared to other units.

In addition, as Nikoloski (2010) notes, another assumption is related to the fact that heteroscedasticity and serial correlation may exhibit individual-specific trends in the idiosyncratic disturbances, and that certain regressors may be endogenous. In the model, the idiosyncratic disturbances are assumed to have no correlation across individual observations, while some variables may be predetermined but not strictly exogenous. Furthermore, the dataset should contain a sufficiently large number of observations recorded over a relatively short time dimension (that is, the N amount of observations should be larger than the recorded time period T).

3.2.2 Mathematical formulation

To estimate GMM, one may consider the example provided by Wooldridge (2011). The author underscores that, in order to describe the characteristics of a population, the concept of a moment is essential. For instance, the moment that quantifies the primary trend is the population mean, often represented by μ. One can additionally define the population average as $E(y)$, which stands for the expected value or mean of y, also known as the first moment of y, if y represents an unknown

variable describing the sample of interest. The second moment of *y*, centred around its mean, is referred to as the population variance, which is commonly denoted as either σ^2 or *Var(y)*. A common way to gauge variability in a distribution is to use the variance, often known as the second central moment. In general, the variance is related to a given population's mean in the following way:

$$Var\left(y\right) = E\left[\left(y-\mu\right)^2\right] \quad (10).$$

One can take a specific sample drawn from the entire population to estimate population moments, given that it is uncommon to obtain data for the whole population at once. Based on the further elaboration by Wooldridge (2011), suppose a simple sample of y_i:i =1,...,n with the aforementioned mean of μ. One can then calculate the method of moments estimator, which is simply the sample average of the whole sample: $\overline{y} = \frac{y_1 + y_2 + \cdots + y_n}{n}$. $\bar{y}$ is uniform for μ, assuming random selection of the sample, independent of other characteristics of the underlying population. Furthermore, the most effective linear unbiased predictor of μ is also $\bar{y}$, provided that the population variance is small.

At the same time, according to Hall (2003), GMM requires the application of the method of moments, whereby the true value (θ_0) of a given unknown parameter θ (Kx1 dimensional vector) is approximated based on moment conditions. To do so, one must define a vector-valued function that incorporates both the data points y_i and the parameter θ (here expressed as $f(Y_t,\theta)$), such that the following condition holds:

$$m(\theta_0) \equiv E[f(\mathrm{Y_t}, \theta_0)] = 0 \quad (11).$$

In equation (11), $m(\theta_0)$ represents the function aiming to denote the true value of the undetermined parameter θ, *E* stands for the expected value, and $f(Y_t,\theta_0)$ is a vector-valued function. The latter implies that it is a specific function encompassing data points Y_i and the parameter θ, and its range is an unbounded set of vectors in several dimensions. It is also useful to note that several researchers (e.g. Nielsen (2005))

make a distinction between model variables and included instruments when describing the vector-valued function, which may sometimes be presented as $f(w_t, z_t, \theta)$, where w_t stands for the vector of included variables and z_t is a vector of applied instruments.

In this case, according to Hall (2003), a vector-valued function accepts a given vector as an input, meaning that the function domain dimension can be either one or greater than one. The dimensions of the domain and range of the function are unrelated to each other. Here, it is specified that even though the function $m(\theta_0)$ is identical to the expected value of $f(Y_t, \theta_0)$, it cannot be equal to zero, so that $\theta_0 \neq \theta$.

As mentioned before, the sample average is crucial for setting the GMM framework, with the preliminary aim of incorporating the observed variable into the computation of the parameter true value and substituting the previously outlined expected value with the mean of a given sample. The equation representing this substitution is provided below.

$$\widehat{\mathrm{m}}(\theta) \equiv \frac{1}{\mathrm{t}} \sum_{\mathrm{t}=1}^{\mathrm{T}} \mathrm{f}(\mathrm{Y_i}, \theta) \quad (12)$$

3.2.3 GMM estimator

Based on the findings of Zsohar (2012), it becomes clear that, in order to guarantee that the collected moments of the dataset match the population's moments to the greatest achievable extent, the GMM estimator seeks to identify the parameter vector θ that minimises the function given in equation (12). In other words, the GMM estimator yields accurate estimates of the variables by optimising this criterion function. The estimator converges to the true value of each variable as the sample size approaches infinity. As the volume of data increases, this property is essential to ensure that the estimator continues to produce precise estimates. GMM may yield reliable estimators, regardless of which variables are missing, provided that the moment conditions are satisfied and the instruments are well specified. Essentially, the GMM estimator builds on the law of large numbers to find θ, while making the previously

mentioned function $\widehat{m}(\theta)$ approach zero with *t* approaching infinity. Equation (13) describes the minimisation process discussed above.

$$\hat{\theta} = arg\ min\ (Q_n(\theta)) \quad (13)$$

In this equation, θ^{*} denotes the estimated parameter vector, and $Q_n(\theta)$ represents the criterion function to be minimised.

In turn, according to Zsohar (2012), $Q_n(\theta)$ can be expressed as:

$$\mathrm{Q_n(\theta)} = \left(\frac{1}{\mathrm{t}}\sum_{\mathrm{i=1}}^{\mathrm{T}} f\left(\mathrm{Y_t,\theta}\right)\right)^{\mathrm{T}} \mathrm{W}\left(\frac{1}{\mathrm{t}}\sum_{\mathrm{t=1}}^{\mathrm{T}} f\left(\mathrm{Y_t,\theta}\right)\right) \quad (14)$$

or

$$\mathrm{Q_n}\left(\theta\right) = \widehat{\mathrm{m}}\left(\theta\right)^{\mathrm{T}}\mathrm{W}\widehat{\mathrm{m}}\left(\theta\right) \quad (15).$$

In equation (14), θ is the unknown parameter vector, $f(Y_t, \theta)$ is a vector-valued function representing the moment conditions, and *W* is the weighting matrix calculated for the dataset under consideration. It should also be noted that the function of $\left(\frac{1}{t}\sum_{i=1}^{T} f\left(Y_t, \theta\right)\right)$ is transposed, as indicated by *T*.

Equation (14) can therefore be rearranged into the full expression of the GMM estimator:

$$\hat{\theta} = \arg min((\frac{1}{t}\sum_{t=1}^{T} f(Y_t,\theta))^{T} W\left(\frac{1}{t}\sum_{t=1}^{T} f(Y_t,\theta))\right) \quad (16).$$

3.2.4 Difference GMM

This approach was proposed by Arellano and Bond (1991) and derives its name from the application of first differencing prior to estimation, which is performed with the aim of dealing with fixed effects in a model. The application of the Difference GMM model has a number of benefits. Primarily, the impact that might be specific to a given country in the dataset may be eliminated by defining the regression equation in differences.

Gerry, Lee and Mickiewicz (2008) present an example of the Difference GMM approach based on the following dynamic panel model:

$$lnY_{i,t} = \beta_0 + \beta_1 \ln Y_{i,t-1} + \beta_2 X_{i,t} + c_i + \varepsilon_{i,t} \quad (17).$$

In equation (17), β_0 denotes the intercept, $\beta_{1,2}$ are coefficients, $Y_{i,t}$ represents the dependent variable, $Y_{i,t-1}$ denotes the lagged dependent variable, $x_{i,t}$ represents the set of explanatory variables, c_i captures country-specific effects, and $\varepsilon_{i,t}$ is the error term.

Equation (17) is then transformed using first differencing to eliminate the country-specific effect, yielding equation (18).

$$G_{i,t} = \beta_1[\ln Y_{i,t-1} - \ln Y_{i,t-2}] + \\ +\beta_2[X_{i,t} - X_{i,t-1}] + [\varepsilon_{i,t} - \varepsilon_{i,t-1}] \quad (18)$$

In equation (18), the authors employ $G_{i,t}$ to denote the transformed function of $\ln Y_{i,t} - \ln Y_{i,t-1}$. By applying first differences to equation (17), the country-specific effect is eliminated, which in turn addresses omitted variable bias. At the same time, even though this bias is no longer present in the model, the variables in equation (18) become subject to endogeneity bias due to the correlation of either the transformed dependent variable or the transformed regressors with the new error term. Therefore, appropriate instrument selection is essential in this case. One then assumes that a set of explanatory variables is endogenous, satisfying the following conditions:

$$E(X_{i,t}, \varepsilon_{i,t}) \neq 0 \quad (19);$$

$$E(X_{i,t-1}, \varepsilon_{i,t-1}) \neq 0 \quad (20).$$

Equations (19) and (20) therefore postulate that

$$E(X_{i,t-1}, \varepsilon_{i,t} - \varepsilon_{i,t-1}) \neq 0 \quad (21).$$

Equation (21) further shows the insufficiency of applying only a one-period lag of the explanatory variables as an instrument. As a single lag cannot provide valid instrumentation for the variables in order to satisfy the necessary GMM conditions, this necessitates the application of lags greater than one period, such that

$$E(X_{i,t\text{-}2}, \varepsilon_{i,t} - \varepsilon_{i,t-1}) = 0 \quad (22);$$

$$E(X_{i,t\text{-}2}, X_{i,t} - X_{i,t-1}) \neq 0 \quad (23).$$

Arellano and Bond (1991) further specify that the use of instruments addresses two challenges. The first is the expected endogeneity of the explanatory variables, and the second is the association between the differenced error term and the differenced lagged dependent variables.

3.2.5 System GMM

The GMM estimator described in the previous section is based on differences and is asymptotically consistent, but it exhibits substantial bias in small samples as well as poor asymptotic accuracy, necessitating its complementarity with the regression equation in levels. In addition, when the data under examination closely resemble a random walk, Blundell and Bond (1998) suggest that estimations based on lagged parameters constitute inadequate instruments. In such instances, difference-based GMM performs poorly, as limited-sample bias becomes problematic and the resulting coefficient variances are overestimated, as also shown by Gerry, Lee and Mickiewicz (2008).

The framework for system GMM estimation, as defined by Arellano and Bover (1995), employs the same approach when dealing with first differences; however, it relies on lagged differences for the selected set of variables when estimating the model in levels.

Gerry, Lee and Mickiewicz (2008) also discuss the application of system GMM using the example of $x_{i,t\text{-}1} - x_{i,t\text{-}2}$ exhibiting no correlation

with the previously discussed country-specific effect c_i as illustrated by equation (24):

$$E(X_{i,t\text{-}1}, c_i) = E(X_{i,t\text{-}2}, c_i) \quad (24).$$

Therefore, to obtain consistent estimates, lagged differences are used as instruments, satisfying equations (25) and (26):

$$E[(X_{i,t-1} - X_{i,t-2})(c_i + \varepsilon_{i,t})] = 0 \quad (25);$$

$$E[(X_{i,t-1} - X_{i,t-2})X_{i,t}] \neq 0 \quad (26).$$

Equations (25) and (26) thus show that the application of system GMM minimises potential bias that may arise in difference-based GMM, as the latter may rely on weakly specified instruments, thereby affecting the overall results of the model.

4. Econometric modelling

4.1 Model formulation

A total of 158 countries have been considered over the period 1970–2021. However, due to several limitations associated with the GMM framework and missing data, the final dataset is restricted to 130 countries covering the period 2000–2021. In terms of model specification, following the approach of Tsaurai (2020) and Gerry, Lee and Mickiewicz (2008), a generic fixed-effects model is first considered using a broader dataset, followed by system and difference generalised method of moments estimations. The variables used during the testing process are explained in Table 1.

Table 1. Description of the tested variables

Name	Description	Source
GINI	Income inequality level as measured by the Gini coefficient.	World Bank (2023), Statista (2023)
INFL	Inflation rate. The variable is presented as a percentage growth of consumer prices.	World Bank (2023)
UNEMP	Unemployment rate. The variable is presented as a percentage of the total labour force of a given country.	World Bank (2023)
GDP_PC	Gross domestic product per capita. The variable is presented in current US dollars.	World Bank (2023)
EDUSEC	Secondary education. The variable represents the enrolment rate as a percentage of the population of the official secondary school-age.	World Bank (2023)
EDUTER	Tertiary education. The variable represents the enrolment rate as a percentage of the population of the official tertiary school-age.	World Bank (2023)
TRADE	Trade openness. The variable is presented as the percentage of exports and imports relative to gross domestic product.	The Global Economy Database (2023)
POPGR	Population growth. The variable represents the percentage change in the population of a given country.	World Bank (2023)
GEXP	Government expenditure. The variable is shown as a percentage of government expenditure relative to gross domestic product.	International Monetary Fund (2023)
INV	Investment. The variable is presented in the form of gross capital formation in current US dollars.	World Bank (2023)
GRDEBT	Government debt growth rate. The variable is presented as a percentage.	World Bank (2023), International Monetary Fund (2023)
PRISK	Political risk. The variable is represented by the political risk index, which is computed based on 17 risk components.	World Population Review (2023)

Source: Author's own elaboration.

Accordingly, the model incorporates economic variables (inflation, unemployment, GDP per capita, trade, government expenditure, investment, and debt), together with sociopolitical and demographic variables (education, population growth, and political risk).

Even though corruption and its effects on income inequality have been mentioned and discussed in the literature review, it is difficult to measure numerically, with only the factor of 'perceived corruption' being available for testing. In order to avoid possible inconsistencies in the econometric modelling, it has been decided to eliminate this variable from the equation. The same holds true for the income tax rate, as many countries have limited transparency regarding this particular metric.

The equation for the baseline model used in this research is presented below.

$$lnGINI_{i,t} = \beta_0 + \beta_1 \ln GINI_{i,t-1} + \\ +\beta_2 ECON_{i,t} + \beta_3 SPD_{i,t} + c_i + \varepsilon_{i,t} \quad (27)$$

In equation (27), $lnGINI_{i,t}$ represents the natural logarithm of the Gini coefficient, β_0 is the intercept, $\beta_{1,2,3}$ denote the coefficients, $lnGINI_{i,t-1}$ represents the lagged Gini coefficient, $ECON_{i,t}$ denotes the represents the selected set of economic variables, $SPD_{i,t}$ is a selected set of sociopolitical and demographic variables, c_i is a country-specific effect, and $\varepsilon_{i,t}$ is the error term.

As noted above, the difference GMM approach is applied to remove country-specific effects; therefore, equation (27) can be transformed as follows:

$$G_{i,t} = \beta_1[\ln GINI_{i,t-1} - \ln GINI_{i,t-2}] + \\ +\beta_2[ECON_{i,t} - ECON_{i,t-1}] + \beta_3[SPD_{i,t} - SPD_{i,t-1}] + \\ +[\varepsilon_{i,t} - \varepsilon_{i,t-1}] \quad (28)$$

In this equation, consistent with Gerry, Lee and Mickiewicz (2008), $G_{i,t}$ represents $\ln GINI_{i,t}$ - $\ln GINI_{i,t-1}$. Equation (28) removes country-specific effects by applying first differencing. The equation also necessitates that

more than one lag be applied to the instrumental variables so that the endogeneity bias can be corrected. Equations (29) and (30) thus show the conditions that apply to this model:

$$E[ECON_{i,t\text{-}s}(\varepsilon_{i,t} - \varepsilon_{i,t\text{-}1})] = 0; \;\; s \geq 2; \;\; t \in \{3\ ,\ldots T\} \quad (29);$$

$$E[SPD_{i,t\text{-}s}(\varepsilon_{i,t} - \varepsilon_{i,t\text{-}1})] = 0, s \geq 2, t \in \{3\ ,\ldots T\} \quad (30).$$

For the system GMM specification, the following conditions apply:

$$E[(ECON_{i,t\text{-}1} - ECON_{i,t\text{-}2})(c_i + \varepsilon_{i,t})] = 0 \quad (30);$$

$$E[(ECON_{i,t\text{-}1} - ECON_{i,t\text{-}2})ECON_{i,t}] \neq 0 \quad (31);$$

$$E[(SPD_{i,t\text{-}1} - SPD_{i,t\text{-}2})(c_i + \varepsilon_{i,t})] = 0 \quad (32);$$

$$E[(SPD_{i,t\text{-}1} - SPD_{i,t\text{-}2})SPD_{i,t}] \neq 0 \quad (33).$$

4.2 Pre-estimation tests

Prior to the estimation of the model, unit root testing was undertaken in the form of the Augmented Dickey–Fuller test under the conditions of no intercept, intercept, and intercept with trend. It is worth noting that even though the GMM model necessitates a smaller T in comparison to the number of observations and unit root testing is generally applied to longer time periods, it was decided to still pursue the aforementioned stationarity test, as the baseline model includes a wider timeframe. Due to the fact that the collected data are presented in panel form, for convenience, average p-values for each tested variable are reported in the table. The null hypothesis of the ADF test, if accepted, serves as an indicator of non-stationarity. If H_0 is rejected for all variables, the dataset is stationary. The average p-values are shown in Table 2.

Table 2. The obtained P-values of the Augmented Dickey–Fuller Unit Root test

	lngini	unemp	infl	lngdppc	gexp	lninv	grdebt	edusec	eduter	popgr	prisk
No intercept	<0.0001	<0.0001	<0.0001	0.0043	<0.0001	<0.0001	0.0072	<0.0001	0.0001	<0.0001	<0.0001
Intercept	<0.0001	<0.0001	<0.0001	0.125	0.0001	0.0001	0.0985	0.0003	0.0011	0.3427	<0.0001
Intercept and trend	<0.0001	0.0011	<0.0001	0.828	0.0004	<0.0001	0.1274	0.00881	0.0038	0.5524	<0.0001

Source: Author's own calculations.

The results indicate the presence of a unit root (for the longer time-frame considered) for the variables ln_GDPPC, GRDEBT, and POPGR. Therefore, for baseline testing, the first differences of the selected variables were applied. The transformed variables were tested once again, with the obtained results shown in Table 3.

Table 3. The obtained P-values of the Augmented Dickey Fuller Unit Root test for d_ln_GDPPC, d_GRDEBT and d_POPGR

	d_ln_gdppc	d_grdebt	d_popgr
No intercept	<0.0001	<0.0001	<0.0001
Intercept	<0.0001	<0.0001	<0.0001
Intercept and trend	<0.0001	<0.0001	<0.0001

Source: Author's own calculations.

4.3 Fixed-effects estimation

The fixed-effects model was estimated using Gretl, based on the results of the Hausman test, which was employed to choose between the fixed- and random-effects specifications. The null hypothesis of the test states that the random-effects model is preferable to the fixed-effects model. The p-value of the Hausman test is approximately 0.0002, which leads to the rejection of the null hypothesis and supports the selection of the fixed-effects model.

Furthermore, it should be noted that this generic model has been estimated using an expanded dataset comprising 140 countries and covering the period 1970–2021.

Table 4. The fixed effects model

Regressor	Coefficient
lnGINI (lag)	0.6102*** (0.1240)
INFL	–0.2176*** (0.1188)
INFL^2	0.0042*** (0.0123)
UNEMP	0.3853*** (0.2075)
TRADE	0.0023** (0.0093)
dlnGDPPC	0.3093** (0.1566)
dlnGDPPC^2	–0.0323* (0.0162)
GEXP	–0.0216* (0.0448)
lnINV	0.3520 (0.2041)
dGRDEBT	0.0011 (0.0032)
EDUSEC	–0.2285*** (0.1172)
EDUTER	0.3532*** (0.1897)
dPOPGR	0.0415* (0.0173)
PRISK	0.1833** (0.0742)
Adjusted R-squared	0.7825
n	140
t	52

Source: Author's own calculations.

In this model, almost all variables are statistically significant, except for the growth rate of debt. The strongest relationship among the economic variables is exhibited by the unemployment rate, while among the sociopolitical and demographic variables it is tertiary education. The model provides support for the Kuznets curve with an inverted U-shaped relationship with GDP per capita. The model also supports the hypothesis of a U-shaped relationship between the Gini coefficient and the inflation rate. The adjusted R-squared indicates that the model explains 78.25% of the variation in the dataset.

4.4 GMM estimation

In this subsection, both difference and system GMM models are estimated. It is worth noting that the time period has been shortened in order to better fit the requirements of the model. Furthermore, additional instruments were included in the system GMM estimation, as it permits the use of lagged first differences.

Tests regarding the validity of the selected instruments were applied after the estimation. The results are included in Table 5 and described in detail in Section 5.5 for further clarity.

The estimated results are mostly statistically significant, with the exception of the growth rate of debt and population in the difference GMM model, as well as capital formation in both the difference and system GMM models. The strongest relationship is exhibited by inflation among the economic variables and by tertiary education among the sociopolitical and demographic variables. This model also supports the hypothesis of the Kuznets curve and a U-shaped relationship with inflation. It is also important to note that the table does not include time dummies, as they are irrelevant for this research.

Table 5. Difference and system GMM estimation

Variable name	Difference GMM	System GMM
lnGINI (lag)	0.5225*** (0.2351)	0.4214*** (0.1824)
INFL	–0.3123*** (0.1778)	–0.3461*** (0.0921)
INFL^2	0.0052*** (0.0102)	0.0056*** (0.0122)
UNEMP	0.2712** (0.091)	0.2884** (0.0743)
TRADE	0.0033* (0.0015)	0.0033* (0.0030)
lnGDPPC	0.2193** (0.1225)	0.2432** (0.1284)
lnGDPPC^2	–0.0288** (0.0138)	–0.0197** (0.0072)
GEXP	–0.0216* (0.0448)	–0.0216* (0.0448)
lnINV	0.3002 (0.1924)	0.3185 (0.2242)
GRDEBT	0.0015 (0.0032)	0.0012* (0.0026)
EDUSEC	–0.2794*** (0.1873)	–0.2629*** (0.1639)
EDUTER	0.3819** (0.1526)	0.4013** (0.1555)
POPGR	0.0081 (0.0097)	0.0118* (0.0081)
PRISK	0.2060** (0.0832)	0.2226** (0.0856)
Sargan test	0.3284	-
Hansen test	0.2625	0.1853
AR (1) p-value	0.057	0.043
AR (2) p-value	0.152	0.218
Number of instruments	33	45

Source: Author's own calculations.

4.5 Post-estimation tests

To begin with, testing pertaining to the baseline model has been performed. The first test applied is a collinearity test using the assessment of the variance inflation factors of the model. All coefficients presented in the table below indicate no collinearity in the dataset. The test necessitates that all assigned coefficients do not exceed the value of 10 in order to rule out potential collinearity, with the minimum possible value being one. According to the results in Table 6, all obtained coefficients satisfy this condition.

Table 6. Variance inflation factors

Regressor	Coefficient
UNEMP	1.321
lnGDPPC	2.424
GEXP	1.553
INV	1.991
GRDEBT	1.772
EDUSEC	2.001
EDUTER	2.113
POPGR	1.036
PRISK	1.002

Source: Author's own calculations.

White's test has also been applied to the panel data in order to rule out possible heteroscedasticity in the dataset. All p-values are higher than 0.01 for individual variables in the dataset, with the overall p-value equal to approximately 0.73, which leads to the acceptance of the null hypothesis of a homoscedastic dataset with equal variance distribution. Additionally, non-percentage variables have all been transformed into

their natural logarithmic form, which is known to be one of the methods for avoiding or correcting potential heteroscedasticity.

The Breusch–Godfrey first-order autocorrelation test has been applied to the baseline model. In this test, the null hypothesis indicates the absence of autocorrelation if accepted. The results show that the p-values of all variables involved, including that of the Lagrange Multiplier F-statistic (LMF), are greater than 0.05, with the LMF statistic's p-value equal to 0.11247. The obtained results confirm the absence of autocorrelation, which has also been verified at the time of baseline model estimation by considering the Durbin–Watson coefficient of approximately 1.8.

The following tests have been applied to the GMM model. It is worth noting that while the overall model has been estimated in Gretl, for the purposes of testing it has also been examined using Stata, and all the tests below have been performed there as well.

The Sargan test for over-identified restrictions has been applied first. The null hypothesis of this test is that all restrictions are valid, indicating that the model is specified appropriately and that the instruments are not correlated with the model's error terms. Using *xtabond2*, the Hansen test has also been applied. The null hypothesis of this test is essentially the same as in the case of the Sargan test. At the same time, the Sargan test cannot be applied when estimating the system GMM, as it may yield invalid results; therefore, Hansen's J-statistic testing should be consulted exclusively in that case.

For difference GMM, the p-value of the Sargan test is 0.3284 and the p-value of Hansen's J-statistic is 0.2625. These results indicate the validity of the restrictions, correct model specification, and the absence of correlation between the instruments and the error terms. For system GMM, the Hansen test's p-value is equal to 0.1853, which also justifies the aforementioned conclusions pertaining to the model.

In addition, the Arellano–Bond test for autocorrelation has been applied, herein referred to as AR(1) and AR(2). The null hypothesis indicates the absence of first-order serial correlation in terms of first differences for AR(1) and the absence of second-order correlation for AR(2). The obtained p-values are partially consistent with Arellano and

Bond (1991), who note the potential rejection of the null hypothesis for first-order correlation and its acceptance for second-order correlation. The p-values for AR(1) and AR(2) are 0.057 and 0.152, respectively, for difference GMM, as well as 0.043 and 0.218 for system GMM. The results indicate a small degree of potential first-order serial correlation in the model, which does not invalidate its robustness, as a limited degree of first-order correlation is expected due to first differencing. There is no evidence of second-order correlation in the dataset, indicating that the results can be considered valid and representative.

5. Results

Both models show a strong relationship (statistically significant at the one percent threshold) between the Gini coefficient and the inflationary level. At the same time, it is evident that at lower levels of inflation, the relationship is adverse—that is, increasing inflation decreases inequality; on the other hand, when inflationary levels exceed a certain point, the relationship becomes positive, meaning that an increase in inflation widens the income gap. For example, the system GMM estimation suggests that at lower inflationary levels, a one percentage point increase in the inflation rate contributes to a 34.61% decrease in the Gini coefficient; at higher levels of inflation, it results in a 0.56% increase in income inequality.

The findings are consistent with Monnin (2014), who also discovers a strong inverse relationship between the rate of inflation and income inequality, characterised by a U-shaped association. The results also partially correspond to those obtained by Glawe and Wagner (2024), who find that when inflation exceeds 5.87%, there is a positive correlation between inflation and the overall Gini coefficient. The coefficient of the CPI exhibits a negative sign below the identified threshold; however, the findings are not statistically significant. Therefore, it is reasonable to assume that the results are viable. The rise in inflation thus has the potential to alter the income structure by exerting a differentiated impact

across households. As Wimer *et al.* (2019) note, because inflation fluctuates at different points along the income distribution, multiple perspectives on the financial situation of individuals earning modest incomes may be drawn. The research suggests that inflation beyond a certain level is likely to disproportionately and negatively affect lower-income individuals and households. This tendency, therefore, is likely to lead to rising income inequality in a given country.

The effect of unemployment on income inequality has also been statistically significant at the one percent threshold, with a strong positive correlation. That is, referring once again to the system GMM results, a one percentage point increase in the unemployment rate leads to a 28% increase in the Gini coefficient at the five percent significance level. Comprehensive evidence suggests that unemployment raises the likelihood of poverty and thereby further fuels inequality. Additionally, it has a number of detrimental social repercussions for unemployed individuals, their immediate relatives, and the neighbourhoods in which they reside. The negative effects of unemployment on income inequality are particularly pronounced due to the possibility of unemployed individuals falling into long-term unemployment, which further depletes their financial resources. As Dahliah and Nur (2021) claim, when a person is jobless, the probability of experiencing long-term unemployment increases. The results are consistent with those reported by Cysne (2009), who provides evidence that structural unemployment has a positive relationship with inequality. The findings are also supported by González and Menendez (2000), who argue that rising unemployment rates are among the most notable contributors to widening income gaps worldwide.

When it comes to trade openness, all estimations indicate a positive relationship. Referring again to the system GMM results, a one percentage point increase in the trade openness metric leads to a 0.33% increase in inequality at the 10% significance level. These findings are consistent with those of Cuaresma and Roser (2016), who examine trade and inequality using data from 32 industrialised nations between 1963 and 2002. The authors demonstrate that openness to trade and income inequality are positively related, in accordance with the Stolper–Samuelson principle.

Their results imply a favourable correlation between income inequality in advanced economies and imports from emerging economies. At the same time, it remains difficult to pinpoint the exact and uninterrupted effect of trade volume and openness on the income gap, as it may be influenced by various outliers and vary in magnitude across countries.

GDP per capita has an inverted U-shaped relationship with income inequality. That is, at lower levels, growth in this metric exacerbates income inequality, whereas at higher levels, income inequality decreases. System GMM results show that a one percent increase in GDP per capita during the initial stage of development increases the Gini coefficient by 0.2432% at the five percent significance level. However, during subsequent periods, a one percent increase in GDP per capita is likely to reduce income inequality, reflected by a 0.0197% decrease in the Gini coefficient.

As has been mentioned before, modern studies present widely varying viewpoints regarding this specific relationship, with some supporting Kuznets' approach and finding an inverted U-shaped curve, and others either completely opposing the mentioned theory or finding a normal U-shaped relationship. Therefore, it is likely that the actual effect of GDP per capita on income inequality is difficult to pin down, since the relationship between the economic growth rate and disparity varies across nations, and current multinational data panels with initial self-consistent historical series for several countries cannot always support the existence of a Kuznets curve. The theory is also not supported by the fact that some nations experience a spike in income disparity in conjunction with their economic growth stage after a predicted income threshold, whereas other nations experience an adverse correlation between disparities and the economic growth stage prior to it. In the end, in spite of the presented findings, it is reasonable to assume that the magnitude and direction of the relationship are likely to vary depending on the economic stage countries are entering, as suggested by Monnin (2014), or the level of their economic development, as supported by Causa, de Serres and Ruiz (2014).

Government expenditure has an adverse relationship with the Gini coefficient. As illustrated by system GMM estimation, a one percentage

point increase in this variable leads to a 2.16% decrease in the Gini coefficient at the 10% significance threshold. Even though most research on this topic seems to be inconclusive when it comes to the exact magnitude of the effect of government expenditures on income disparity, the results still support those presented by Rhee *et al.* (2014). The authors have discovered that spending by government institutions on social assistance typically decreases the income gap, although the magnitude of this impact varies depending on the extent to which these payments are targeted at lower-income groups.

Another study by Anderson *et al.* (2017) also supports the mentioned findings. The authors indicate a weak adverse correlation between governmental expenditure and income disparity, with the largest correlation observed for welfare programmes and other social expenditures. Nonetheless, it is crucial to understand that a variety of other parameters influence both the projected connection's magnitude and direction. Because of these factors, it is challenging to determine whether there is, on average, a substantial correlation for every specific category of governmental expenditure and financial disparity. Anderson *et al.* (2017) also imply that the influence of government expenditures on redistribution cannot be experienced across the board, but is instead concentrated in the top half of the wealth distribution, flowing toward middle-class households. This means that even though the obtained results support most of the published studies, the full effect of government expenditures on inequality is better captured through more detailed approaches (e.g. disaggregating government expenditures, quantile testing).

The growth rate of debt has also been included as a control variable and appears to exhibit a weak positive relationship with the Gini coefficient at the 10% statistical significance level in the system GMM estimation. In all other models, the relationship between income disparity and the growth rate of public debt is not statistically significant. The results indicate that a one percentage point increase in this variable is associated with a 0.12% increase in the Gini coefficient. There are contrasting views on this issue: while some researchers argue that public

debt accumulation may help reduce inequality in a given nation, others suggest that the relationship is non-linear and becomes detrimental once a certain threshold is exceeded.

The latter is expressed by Atta–Mensah and Ibrahim (2024). The authors argue that when nations surpass the cutoff point of 38.11%, public debt has a statistically significant effect on widening income disparity. However, the accumulation of public or external debt has an adverse impact on income inequality only in nations that fall below the projected threshold. In this case, increases in debt may be advantageous for wealth redistribution. Nevertheless, once debt benchmarks are exceeded, further debt accumulation increases income disparity rather than reducing it. This occurs when a country's resources are diverted from financing essential investments and economic development toward servicing debt. Consequently, debt accumulation and servicing generate a crowding-out effect that significantly affects income disparity.

Secondary education has an adverse relationship with the Gini coefficient, meaning that a one percentage point increase in this variable leads to a 26.29% decrease in inequality, according to the system GMM estimation results. Shahabadi, Nemati and Hosseinidoust (2018) report similar findings, underscoring that secondary educational attainment is likely to significantly reduce income inequality. The authors argue that general schooling improves an individual's position in the labour market, thereby increasing the earning capacity of low-income individuals. As a result, education may narrow welfare and income gaps, and both primary and secondary schooling can positively affect a nation's development trajectory while reducing inequality. In most countries, secondary education is fully financed by the state, which promotes educational equality and fair access to basic education and is therefore likely to contribute to a more equal income distribution.

The tertiary education attainment variable, on the other hand, has exhibited a moderately significant yet adverse relationship with the income inequality coefficient. Referring to the system GMM results, a one percentage point increase in tertiary education attainment increases the Gini coefficient, thereby widening the income gap by 40.13% at the one

percent significance level. Although unusual, these results are supported by Shahabadi, Nemati and Hosseinidoust (2018).

In the end, there is still a viable explanation pertaining to why only tertiary education spending or attainment might worsen income disparity. One possible reason for this tendency is that universities and colleges provide their graduates with specific sets of skills, which increase the probability of obtaining a higher-paying job compared to those who obtained only secondary education, thus widening the gap between them. Furthermore, most countries do not fully cover tertiary education in financial terms. Based on the findings of Shahabadi, Nemati and Hosseinidoust (2018), it seems clear that because of their improved skills and associated higher remuneration, those with university-level education are likely to be more affluent than those without it. Naturally, various educational opportunities and training at college and graduate stages will result in increased knowledge and earnings for those who benefit from them whenever higher education is structured in a way that primarily benefits wealthy individuals. Since higher education is only partially funded by the government, wealthy individuals are more able to afford it, which might lead to a rise in income disparity in a given nation. On the other hand, if governments in the majority of nations paid for colleges and universities, this could be a way to reduce poverty and economic disparity.

With an acceleration of population growth by one percentage point, the Gini coefficient is likely to increase by 1.18%. This variable has been added as a control in order to account for demographic forces behind income inequality. Even though several articles and publications state that population growth is likely to decrease income inequality, the results presented by Odusola *et al.* (2017) indicate that population growth and inequality are positively correlated. The authors note, however, that this outcome may be driven by several outliers or estimation nuances. In general, reduced public savings linked to lower public spending on education and healthcare per capita, resulting from rapid population growth, have an immediate impact on measures of income disparity such as the Gini coefficient. A country gains relative weight when its population rises

more quickly compared to that of other nations. Assuming that GDP per capita remains unchanged in other countries, inequality will increase in those experiencing rapid population growth.

When the political risk coefficient increases by one unit, the Gini coefficient rises by 22.26%. Not many studies have established a conclusive relationship between these variables. At the same time, the findings partly confirm the results obtained by Wu *et al.* (2022). Based on a sample of 19 economies, the authors find that political risk, perceived as a component of country risk, has a positive and significant relationship with income inequality in emerging economies. A larger sample is analysed by Lee and Lee (2018); using data from 110 countries, the authors conclude that an increase in the political risk index is likely to exacerbate income inequality, with a non-linear relationship also observed. There is still insufficient concrete evidence regarding the precise effect of political risk on income inequality. Nevertheless, according to the aforementioned studies, it is reasonable to expect such a relationship, although political risk appears to affect the Gini index through a variety of indirect channels rather than solely through a direct effect.

6. Conclusion

6.1 Discussion

The main goal of the research has been to comprehend the dynamics and forces of income inequality, with the aim of establishing connections between various economic, sociopolitical, and demographic variables and income disparity, focusing on both theoretical underpinnings and econometric modelling.

The research has addressed the definition of income disparity along with its historical evolution, the associated effects and trends, discussed the socioeconomic consequences of income inequality, and presented several methods of measuring this variable based on academic literature. After examining various determinants of income disparity, the thesis

has focused on model specification, in which the generalised method of moments (GMM) has been selected and derived. Both baseline (fixed--effects) and GMM modelling approaches (difference and system), along with pre- and post-estimation tests, have been described in order to ensure the robustness of the results.

The results show a strong relationship between the Gini coefficient and the inflationary level. For lower levels of inflation, the relationship is adverse—that is, increasing inflation decreases inequality; at the same time, when inflationary levels exceed a certain point, the relationship becomes positive, meaning that an increase in the inflation rate widens the income gap. For example, system GMM estimation suggests that at lower inflationary levels, a one percentage point increase in the inflation rate contributes to a 34.61% decrease in the Gini coefficient; at higher levels of inflation, it results in a 0.56% increase in income inequality.

The effect of unemployment on income disparity has also been statistically significant at the one percent threshold, with a strong positive correlation. That is, once again referring to the system GMM results, a one percentage point increase in the unemployment rate leads to a 28% increase in the Gini coefficient at the five percent significance level.

When it comes to trade openness, all estimations indicate a positive relationship. According to the system GMM results, a one percentage point increase in the trade openness metric leads to a 0.33% increase in inequality at the 10% significance level.

GDP per capita has an inverted U-shaped relationship with income inequality. That is, at lower levels, growth in this metric exacerbates income inequality, whereas at higher levels, income inequality decreases. System GMM results show that a one percent increase in GDP per capita during the initial stage of development increases the Gini coefficient by 0.2432% at the five percent significance level. However, during subsequent periods, a one percent increase in GDP per capita is likely to reduce income disparity, reflected by a 0.0197% decrease in the Gini coefficient.

Government expenditure has an adverse relationship with the Gini coefficient. As illustrated by the system GMM estimation, a one

percentage point increase in this variable leads to a 2.16 percent decrease in the Gini coefficient at the 10% significance threshold.

The growth rate of debt has also been included as a control variable and exhibits a weak positive relationship with the Gini coefficient at the 10% statistical significance level in the system GMM estimation. In all other models, the relationship between income disparity and the growth rate of public debt has not been statistically significant. The results show that a one percentage point increase in the latter variable leads to a 0.12% increase in the Gini coefficient.

Secondary education has an adverse relationship with the Gini coefficient, meaning that a one percentage point increase in the aforementioned variable leads to a 26.29% decrease in inequality, according to the system GMM estimation results.

Tertiary education exhibits a moderately positive association with the Gini coefficient. A one percentage point increase in tertiary education attainment leads to a 40.13% increase in the Gini coefficient, thereby widening the income gap at the one percent significance level.

With an acceleration of population growth by one percentage point, the Gini coefficient is likely to increase by 1.18%. When the political risk coefficient increases by one unit, the Gini coefficient rises by 22.26%.

In sum, income inequality is a central challenge that is simultaneously affected by a multitude of factors: changes in economic, sociopolitical, and demographic variables may widen or lessen the income gap in unpredictable ways. Although it is possible to estimate and identify the individual effects of these variables on income inequality, it is very difficult to derive an appropriate policy response, as it is virtually impossible to address all contributing factors simultaneously.

6.2 Limitations and suggestions

The research is limited by insufficient data pertaining to transitional and developing economies, particularly with respect to the Political Risk Index, external and internal debt levels, and educational attainment. Some countries do not have publicly available economic data, while

others do not have the Gini coefficient calculated. As a result, it has been necessary to correct for missing values and adjust the dataset for the purposes of this analysis.

For future research, it may be insightful to compare developed and developing countries or to examine how the aforementioned determinants affect income inequality across different income groups within the population.

ABSTRACT

Income inequality is one of the most prevalent socioeconomic issues in the modern world, with a variety of detrimental effects ranging from hindered economic growth and productivity to a lower quality of life in general. Therefore, in order to mitigate the emergence of excessive income gaps and formulate an adequate policy response, it is necessary to understand the forces behind the aforementioned phenomenon, which is the primary objective of this dissertation. Using baseline (fixed-effects) and GMM modelling, this research establishes relationships between various economic, sociopolitical, and demographic variables and income inequality.

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