The Impact of Legalized Abortion on Crime, Results of a Global Legal Study and a Factual Study of the UK

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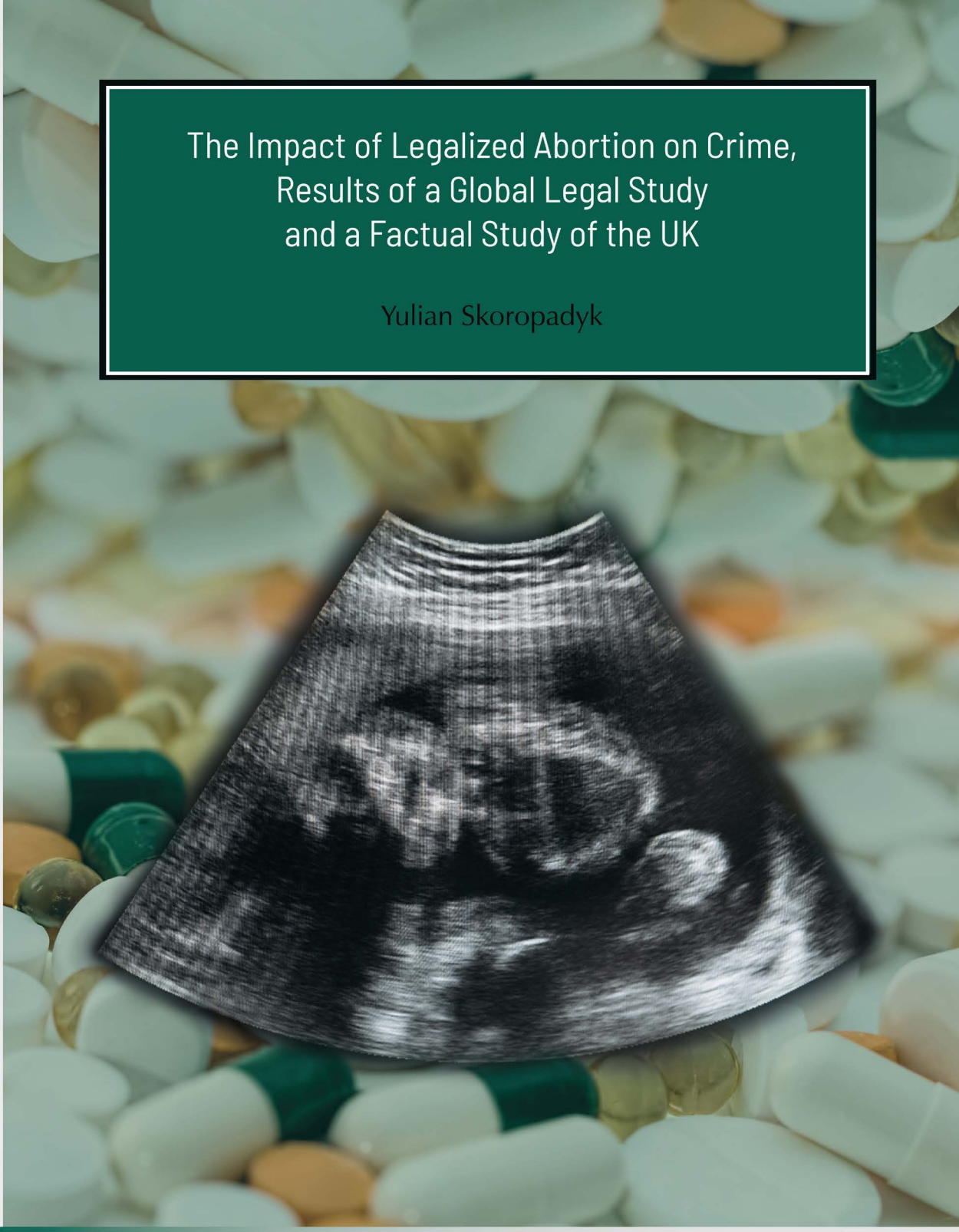

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1. Introduction

Every year, billions of crimes are committed. People are victims of murder, rape, robbery, fraud, and of various other misfortunes. The statistics around the world are very diversified; thus, some countries are positive examples of definite crime reduction trends; some, on the other hand, are the source of a constant flow of dreadful news. Therefore, a great deal of work is put into trying to understand what makes crime trends behave the way they do.

Such an interest in this topic even led to the development of a separate division of economics. More specifically, the start of this branch of behavioural economics is accredited to Gary Becker, the Nobel Prize laureate. Becker was the first to introduce a standard mathematical model of crime. His work dramatically changed the way crime is viewed by showing that it is not just explained by mental issues and social pressure, but rather by a range of definite factors that shape the deviant behaviour of a criminal. In his approach, Becker treats crime as any other result of a rational cost-benefit analysis of opportunities available for a person in the pursuit of maximum profit and benefit (Becker, 1968).

A fresh look at crime has spurred other researchers in the field of economics and other social sciences to study crime more thoroughly in order to understand what induces it and how it affects society. Consequently, a variety of studies has seen the world hypothesizing a range of ideas concerning both causes and consequences of crime and criminal behaviour.

Firstly, there is virtually no study that would suggest something other than the fact that crime harms humanity in all the possible ways, social, cultural, and, of course, economic. Every crime committed is a drawback for the human society: the social progress is slowed down; the cultural values are diminished to nothingness; the economies are inhibited. In the world of economics and finance, people view consequences of crime as more severe and premature business cycles, growth of unemployment, inflation, shortages, and economic depressions as well as, contraction of production, business activity, and development.

Consequently, the interest in the topic of crime has risen even more. Nowadays, there is a significant abundance of hypotheses; a lot of them are also of economic nature. Thus, some studies suggest that crime may be a reaction of the population to lack of proper employment; other studies claim that crime is a result of the low quality of human capital, i.e. low level of education of the population; some also state that it is the imperfection of judicial and law enforcement that mockingly encourages crime to thrive. These and other

reasons are only logical; indeed; however, they do not always explain the most peculiar decreases in crime. That has encouraged other, less straightforward explanations to emerge.

One of such peculiar explanations is commonly referred to as the legalized abortion and crime effect. Swedish researchers in the 1960s were first to suggest this idea. However, a duet of American economists, John Donohue and Steven Levitt, were the ones who popularized this idea in 2001 with the paper "The Impact of Legalized Abortion on Crime" (2001). In their article, they discuss how the landmark decision by the Supreme Court of the United States in the 1973 legal case of Roe v. Wade affected or even caused an unexpected drop in the crime rate in the USA in the 1990s. In their view, children who would have been born if not for legalized abortions had higher chances of ending up as criminals. It is believed that if a woman seriously considers abortion as an option, then a child whose birth had been doubted, i.e. an unwanted child, has higher chances to be unloved, raised in inappropriate conditions, nurtured without proper upbringing from both parents, and be subject to other horrible consequences of being unwanted. According to numerous research studies, common sense also shapes a typical criminal. Altogether, such a sequence of reasonings reviewed with the use of mathematical tools enabled Donohue and Levitt to make the famous controversial claim that legal abortions reduce crime.

Thereby, the topic of the connection between abortions and crime has been widely disputed in the research world. People have been and still are divided into two camps, supporting and undermining the hypothesis. Moreover, some of the supporters and underminers try to find evidence for or against the statement by conducting research of their own. At the same time, there are also those who criticize the present works of both supporting and undermining nature.

Indeed, Donohue and Levitt are the ones who receive the lion share of criticism and comments. A wave of negative commentaries became particularly marked in 2005 when "Freakonomics" was published with Steven Levitt as one of the authors. This book contains a chapter devoted to the article mentioned earlier and led to both the popularization of the topic and its criticism.

Nevertheless, the original authors have maintained their position throughout this time and have even answered some of the most influential opposing papers. Thus, they replied to Joyce, the principal rival of the paper, in 2004, providing further evidence to their theory, taking into account Joyce's comments (Donohue & Levitt, 2004).

Such discussions had been ongoing, but had faded over time until a new paper was published in 2019: "The Impact of Legalized Abortion on Crime over the Last Two Decades" by Donohue and Levitt. New data are reviewed

in this paper, which let them claim that "We estimate that crime fell roughly 20% between 1997 and 2014 due to legalized abortion. The cumulative impact of legalized abortion on crime is roughly 45%, accounting for a very substantial portion of the roughly 50–55% overall decline from the peak of crime in the early 1990s" (Donohue & Levitt, 2019).

Once again, the interest of researchers of various scale has been drawn to this topic. We may expect a wave of new papers reviewing the phenomenon, applying a variety of methods and data, reaching similar or different results, and supporting or undermining the initial work that brought this topic to the attention of the masses. Such popularity of the topic also lays in the controversy of the topic of abortion in the modern world. Even though it is mainly viewed as a mere social phenomenon, the subjectivity of research studies is extremely difficult to eliminate in the future. Nevertheless, the topic is of utmost importance to social sciences as the outcomes of the researchers from this area may help humanity come closer to the understanding of the mechanisms of such a social phenomenon as crime.

Thereby, this particular work falls into the category of Donohue and Levitt's followers. This paper is also intended to test the initial hypothesis – that legalisation of abortions has a negative effect on crime. This thesis paper follows some particular methodological approaches to testing the abortion-to-crime phenomenon. As in Donohue and Levitt's work, a country has been observed in order to test the initial hypothesis. While originally it was the United States of America, we use the United Kingdom as the research ground. 1967 was the year when relevant laws were reviewed and abortion was legalized under the Abortion Act of 1967. Approximately a generation later, a sudden drop in the crime rate was recorded in the UK. After the continuous growth of the crime rate that lasted roughly 40 years, the number of criminal cases unexpectedly dropped in the 1990s. A scenario so similar to the one that occurred in the USA is definitely a reasonable ground for researching the effect of abortions on crime. The data available enables us to review the claims made by the authors mentioned above, providing an additional piece of evidence in favour of supporting or undermining the hypothesis.

Furthermore, there is also an element of innovation to the range of research studies of this kind. In this work, cross section data about the legal status of abortions are also used to examine the effects of legal policies implemented in countries around the world. The particular data used in the empirical finding refer to whether abortions are legal in a country on a range of possible legal grounds, i.e. reasons that are considered legal in that country. There are nine legal grounds for abortions ranging from the most emancipated, such as

abortions at a woman's request or due to economic or social reasons, to the last resort grounds, e.g. to save a woman's life or in the case of foetal impairment. In addition to that, information about the gestational limit for every legal abortion is used. These indicators stand for the last legal moment during pregnancy when it is allowed for a woman to undergo an abortion.

Such data provide an unusual insight into the matter of abortions and crime. Thus, unlike the classical methodology, this approach does not deal with actual abortions performed and their effect on crime. Using this method, we examine the effect of the mere fact of legalization from the point of view of freedom for women to make such decisions. It is quite a new way to study this phenomenon as the majority of previous researchers were more focused on the factual abortions that were conducted. They were knowingly omitting the stage of legalization and freedom of abortions. At the same time, this work also reviews the applicability of legal policies that are implied in countries around the world.

Considering the facts mentioned before, the relevance of this work is quite significant. In addition to being a review of the sensational research conducted by Donohue and Levitt, this thesis also provides evidence for or against the legalization of abortions. It is an open issue for numerous countries around the world whether to legalize abortions or not, which policies to implement, which procedures to accept and under what conditions. Thereby, this and other studies on this topic may provide additional objective evidence that may influence the decision made by governments in many countries around the world.

Thus, for instance, Poland is going through a process of decision-making on this matter. The government is on the verge of the crucial decision, and the population is divided mostly by the moral point of view. Econometric modelling is one of the most objective approaches to choose the appropriate, socially beneficial set of options concerning abortion legalization, policies that regulate the way abortions can be performed, and restrictions that can be applied.

Accordingly, in order to serve the purpose of testing the initial hypothesis of the abortion-to-crime relationship, the thesis consists of six major chapters.

The first chapter is an introduction, the part where the general idea and relevance of the paper is described together with the origin story of the phenomenon that is being discussed in the course of the work. The second part is the analysis of the existing studies that correlate with the topic of the thesis. Thus, theoretical analysis or literature review also consists of four major parts: the theoretical background that relates to the studies on the connection between crime and economic growth; the overall review of the known causes of crime; the part focusing on the studies about abortions, crime, and their correlation; and the literature review that concludes the studies about the mechanisms of

how abortions affect the crime rate. After this, there is a chapter describing the methodology used in the thesis. As there are two major approaches to providing evidence, there are also two subchapters. The fourth, perhaps the most essential, part of the thesis includes the study's empirical findings. The first subpart describes the outcomes of the econometric model built on the global data about legal statuses of abortions and the homicide rate in various countries. Next, there is evidence based on the comparison of abortion and crime trends in the UK. The third subpart reviews the model on the UK case of abortions affecting the crime rate. Another substantial subpart of the fourth chapter is the interpretation of the results obtained. The fifth part is the conclusion; we sum up all results we have obtained in the thesis and make the final decision about the initial hypothesis, i.e. whether to accept it or not. After the concluding part comes the last section of the thesis that includes the bibliography of the information sources used during the research and the appendices to the main paper.

Thus, the purpose of this thesis is to examine the initial hypothesis for its viability.

2. Literature review

2.1 Overview of the crime-to-economy connection literature background

The society exists merely because humans are the only species able to interact with complete strangers if they are connected through one or several ideas, beliefs, or norms. People can trust a random person on the street because they know what to expect from them (Harari, 2014). These expectations are based on the belief that the person in front would follow the conventional rules and would not do us any harm. People believe that breaking some rules and committing crime is not in our nature. Moreover, everyone thinks that only by following laws and norms and doing what is right can the society thrive. Everyone understands it really, yet not everyone does it.

Thus, in EU in 2017, there were roughly 400,000 robberies, more than 5,000 intentional homicides, more than 1 million assaults, almost 700,000 car thefts, and many other crimes committed within an area of slightly more than 4,400,000 square kilometres (Eurostat, 2019). Scientists from all over the world keep themselves busy by trying to understand why it happens and what effect it has on the society.

On the one hand, it is debated that economically dissatisfied citizens blinded by successes of others believe crime to be a possible way of getting 'justice'. This way, crime is treated basically as an activity rewarded with material benefits, ergo, a job. Thereby, Rosenfeld (2009) presents and elaborates the idea that the relationship between crime and welfare may exist in this form. He suggests that unfavourable economic conditions have their impact on crime, i.e. poverty and unemployment force people to commit crime for material benefits. Crime could be still seen as a tool of equalizing people from different income categories. Cook and Zarkin support the idea by saying "The business cycle has a pervasive effect on the structure of economic opportunity and hence on behaviour" (1985). They use empirical evidence of increased crime rates during recessions as a supporting argument for the idea that business cycles have their effect on crime. They find that during recessions, the number of property-related crimes and homicides increases. It does sound logical, and there are many researchers agreeing with this point of view. Thus, Pyle and Deadman (1994) and later Hale (1998) find confirmations for the fact that consumption is negatively correlated with property-related crimes.

On the other hand, there are also studies stating the opposite (Carr-Hill & Field, 1992). For example, out of three types of common correlations (leading, simultaneous, or lagging) between the economic situation and the crime rate researched by Simon Field and Roy Carr-Hill on the example of England and Wales after the Second World War, they remain convinced that the economic situation leads to changes in the crime rate. They, however, suggest that other options cannot be entirely abandoned as they find that, in some situations, exogenous crime increase significantly slows the economy down. Some social events or phenomena could actually be examples of causes for exogenous crime increases. Field and Carr-Hill find that the two effects may work individually or simultaneously in different situations. The fact that the underperforming economy can lead to a higher crime does not necessarily mean that the circumstance cannot work the other way around.

Hence, Detotto and Otranto (2010) found evidence that increased crime decreases the economic performance of a country. Their most obvious suggestion is that "criminal activity allows the consumption of illicit goods or services which could not otherwise be consumed […] crime imposes great costs to the public and private actors, such as stolen and damaged goods, lost lives, security spending, pain and suffering" (Detotto & Otranto, 2010). They suggest that the scale of crime impact on economic growth is quite severe and has to be resolved.

Besides, research studies conducted by Czabanski (2008), Brand and Price (2000), Anderson (1999), and Detotto and Vannini (2010) were used to develop this idea to the level where they could estimate the damage to society caused by factors mentioned above. The latter research, for instance, presents the estimates of 2.6% of GDP depicting the social cost of criminal activity in Italy in 2006 (Detotto & Vannini, 2010). For a perspective reference, the Italian government spent in total 4.5% of national GDP on education in that year (World Bank, 2019). That means that crime in Italy takes up to 58% of the education budget, and there is no doubt that this money spent on education would be more beneficial for the country's welfare and human capital quality.

Czabanski's book on the estimation of the cost of crime is based on calculating the social costs in accordance with the author's belief that all resources held up by crime constitute a significant reason for why national economies are not able to develop in the way they should. He treats crime estimates as "an important tool for controlling institutions acting on behalf of society", suggesting in the meantime that social welfare could be reached principally through economic development, which is not quite possible at its fullest when crime is thriving (Czabanski, 2008).

"Criminal activity acts as a tax on the entire economy: it discourages domestic and foreign direct investments, it reduces firms' competitiveness, and reallocates resources creating uncertainty and inefficiency" (Detotto & Otranto, 2010). Thus, according to Detotto and Otranto, crime is rather a burden for the economy. Unlike a tax mentioned by them, crime does not and simply cannot result in benefits for the society.

There is no doubt that crime and economic development are connected; it is also indisputable that crime has a negative effect on both the social and economic life of societies. Thereby, the connection has to be studied further so that the reasons for crime in general can be found.

"It is no crime to be ignorant of economics, which is, after all, a specialized discipline and one that most people consider to be a 'dismal science'. However, it is totally irresponsible to have a loud and vociferous opinion on economic subjects while remaining in this state of ignorance", says Murray Rothbard (1995).

It is no coincidence that the words 'crime' and 'economics' are used in one sentence. As it has been suggested before, crime is widely treated as an impediment to economic development. Even if we adopt the approach of viewing criminals as mere economic agents who have simply chosen the type of economic activity that ensures them the highest profitability and utility, which happens to be illegal, we see crime as an undesired phenomenon (Becker, 1968). When committing a crime, a person or a group of people perform, in accordance with Webster's new world law dictionary, "a violation of a law in which there is an injury to the public or a member of the public", albeit providing services or selling goods, in some cases, which are never a part of GDP (Wallace & Wild, 2010). Therefore, resources allocated to crime not only do not add value to society's welfare but also decrease this welfare.

All in all, it is widely agreed that crime has no positive, but only adverse effects on economic development; however, the question of the origins of crime is open as there are numerous theories on the matter at hand.

2.2 Analysis of the variety of crime causes researched in the past

The opinions on what can affect the crime rate in any given country or the world in general range from quite predictive and unambiguous theories to some that are somewhat difficult to believe in. Various hypotheses are studied, tested, and accepted based on historical examples of crime fluctuations. The most attractive source of empirical data is the USA, apparently, due to the high level of data availability.

Thus, according to the US Bureau of Justice Statistics, the murder rate was in decline in the 1950s and 1960s. It started snowballing in or soon after 1964 (US Bureau of Justice Statistics, 2006). "The flood of violence from the 1960s through the 1980s reshaped American culture, the political scene, and everyday life" (Pinker, 2012). The most astonishing thing is that the preceding decade could be actually called one of the most prosperous and stable periods in the twentieth century or perhaps in the whole history of the USA. After the Second World War, American industry thrived in development, demography boomed, and pop-culture expanded (Duna, 2006). As mentioned before, after the prosperous post-war times ended, the era of danger and anxiety began. The crime rate started growing at an extreme pace and peaked in the 1980s. The homicide rate increased from less than four homicides per 100,000 people per year in 1950–1960 to more than 10 in the 1980s (US Bureau of Justice Statistics, 2006).

The phenomenon is discussed from various points of view and using different approaches to explain the reasons for such a massive leap in crime. The most common of them is a sociological one. It is believed that post-war Baby Boom resulted in significant population growth and the late 1960s were the time when children born after the war were old enough to join criminal cohorts (Courtwright, 2009). However, this is merely a prerequisite, a background for the atrocious situation to come. It is commonly presumed that the reasons are changes in cultural layers, now there were more young passionate 'daredevils' who could not be appropriately reasoned with by the minority of the mature generation of the population. The youth were getting wild until the end of the century when the crime rate started fluctuating and dropped in the late 1990s under the influence of various political, social, and cultural processes taking place at that time (Pinker, 2012).

Nevertheless, there is an example that is much more prevalent among researchers – of an unanticipated change of crime rate pattern. It was an abrupt decrease in the USA in the 1990s – the times everyone predicted the USA to 'bathe in blood' – when suddenly everything changed (Levitt & Dubner, 2005; Mauborgne & Chan, 2005). There are many sources, from individuals' recollections to news reports, suggesting that the crime situation in the late 1980s in the USA was terrifying, especially in New York City. The situation was so bizarre that Ronald Reagan, the US President in that period, said: "The victims of crime have been transformed into a group oppressively burdened by a system designed to protect them". He suggested that the problem was so widespread that the whole system was a threat to society. "The criminal element now calculates that crime really does pay". That could really show people who are not familiar with the reality of those times how common crime at that time was.

However, as mentioned before, at the beginning of the 1990s, a sudden drop in crime was observed and this happened at the time when the USA was considered to be doomed, and a threat was not external (the USSR, commonly believed to be the most substantial threat to the USA), but internal. Addressing the data collected by the US Bureau of Justice Statistics once again, we observe a continuous drop in the homicide rate in the USA in the period between 1990 and 2000 (US Bureau of Justice Statistics, 2006).

A significant number of various theories that were trying to explain the unexpected phenomenon emerged as a logical consequence of the public's astonishment. A group of scientists worked through most of the leading theories in 2014. In particular, they collected and analysed 17 theories explaining the issue in question (Farell et al., 2014). They also note that many more theories exist; however, they do not seem logical or possible enough. As a consequence, they have all been rejected. With 17 theories at hand, the authors have run tests in order to find out which theory works best for them. We could divide the theories into three categories: judicial, economic, and social.

The judicial category includes theories concerning the improvement in the operation of law enforcement institutions. For instance, it is suggested that the increased levels of imprisonment led to a drop in crime rates in the USA in the given period (Spelman, 2000). It is claimed that the prison population rose due to more efficient work of all those who put criminals in prisons; however, it could be criticized on the grounds of logical assumptions that a higher imprisonment rate is more a consequence of a high crime rate rather than the reason for its shrinkage. Nonetheless, the most popular theory suggests that it were the police system improvements, new police strategies, and more police officers in the field that constituted the reason for a slump in the crime rate. Kelling and Sousa (2001) discuss a question of the degree of influence that the police had, suggesting that they were really significant as a crime reducing element in New York. Zimring (2001) agrees with that to some extent, implying that New York was subject to a significant decline in crime due to police efforts. New York actually seems to be quite a popular example on which the theory is built, perhaps, because the drop there was the most impressive.

NYC together with NYPD are even claimed to have been a blue ocean, a marketing strategy that entails an utterly new service or product that has not been offered before, according to Chan and Mauborgne (2005). They represent the New York Police Department as a business entity that was run under management with a fresh look at the matters providing 'services' like never before.

It is agreed that the 'management' of police and the 'services' provided by them really changed in this period and undoubtedly that had its impact on the

decline of the crime rate. However, theories of this kind were also widely criticized. First of all, the fact that the famous overhaul of the police service in New York had a socially benefiting effect on crime does not necessarily mean that the same improvements were implemented elsewhere in the US. However, there is evidence that the crime rate decrease occurred there too. Apart from this, it is argued that the changes mentioned before existed when the decriminalization process had already started (Ouiment, 2002). These and other opinions leave the judicial type of theories in a state of plausibility, but they do not seem to provide the full answer.

As economics-related theories were partly discussed before, there is no point in reviewing them once again. It is just worth mentioning that overall crime and economic performance are found to be very much interrelated, having a substantial impact both ways. The mechanisms of these theories are as follows: when recessions are ongoing, the unemployment and inflation rates grow, lowering the welfare level and causing poverty. An unsatisfying financial situation pushes some people to commit crimes in order to regain resources, which they lack, but, in their opinion, deserve.

Then, we have the social type theories left to fill up the picture of the diminished crime rate. The most popular ones are demographical changes mentioned when the crime crisis of the late 1960s was discussed; immigration, and legalization of abortions. Since the decades of the 1950s–1960s mentioned above, the population growth in the USA, for instance, has decreased, sometimes it was even lower than 1% (World Bank, 2019). The reasons for this will be elaborated later on. Still, we can make an obvious conclusion from statistics that the population was not growing and that the nation was actually ageing. As a matter of fact, it is even believed that it is the demographic changes in the country that account for the 10–15% drop in crime (Fox, 2000). On the other hand, various authors considered immigration – an inflow of people to a country – a factor accounting for the crime drop. The idea of the research studies is based on a comparison of immigration rates and crime rates in the USA. It was observed that when immigration grew, the crime decreased. That led Sampson (2006; 2008) as well as Stowell et al. (2009) to study the question and conclude that immigration caused the crime rate to go down. However, as it defied the logic mentioned above and elaborated below, it was also later refuted with claims that immigration was a factor that moved along with crime or even lagged behind it, i.e. the effect was simultaneous (Ramiro & Mehlman-Orozco, 2013). All in all, these theories are proven to have an effect on the drop in crime, at least a slight one, but they do not answer all the questions.

2.3 Review of the abortion-to-crime connection literature

Nevertheless, there is a theory that uses an extraordinary way of explaining the crime drop in the USA. The idea follows the demographical nature of crime drop elaborated above and is very close in its framework to the one of the crime surges in the 1960s.

The theory presented by Donohue and Levitt (2001) and later popularized by Levitt and Dubner (2005) claims that abortion legalized in the USA in 1973 was actually the legitimate reason for the famous crime rate drop in the 1990s. Both the article and the book state approximately the same; however, the article is a little bit more comprehensive in explaining why and how abortion legalization in 1973 could have an impact on crime in the 1990s. The core idea presented in the original work suggests that after the Supreme Court's decision on abortion legalization in the USA in 1973 in the case of Roe v. Wade, the numbers of undesired, unwanted, and unloved children went down (Donohue & Levitt, 2001). Donohue and Levitt also noticed that, a few years after the legalization, the number of officially reported abortions rose incredibly.

Such a controversial topic led to discussions and criticism of this theory. Joyce (2011), for instance, attempts to assess not only the original work about crime and abortion correlation and its authors, but other researchers of the topic as well, and is generally believed to be one of the biggest disputers of the topic. He and some other researchers find Donohue and Levitt's methodology to be somewhat misguided (Foote & Goetz, 2008). Joyce even offers some alterations of his own. Nevertheless, Joyce admits vigour and professionalism displayed by Donohue and Levitt, acknowledging that they have responded to every comment to their work with updates and improvements of their methodology and data, for instance, in 2004, they presented a paper answering Joyce himself, providing answers and proving points to the questions and criticisms posted by him previously (Donohue & Levitt, 2004). Joyce also recognizes their academic skill and the beneficial effect on other academics and graduates, who "will continue to explore the association between abortion and crime and its many offshoots for years to come" (Joyce, 2011).

Extraordinarily for such a provocative theory, the idea itself is rarely criticized or doubted; it is methodology, data, or approach that are reviewed and undermined by other researchers. Thus, the idea of a typical cohort age undertaken in the original work is denounced by Cook and Laub. They find pieces of evidence that the typical age for crime involved cohorts during the discussed period changed due to exogenous reasons (Cook & Laub, 2002). Thus, they reject the abortion legalization as the significant reason for a decrease in crime rate in the

observed period, at least in the existing explanations. Kahane, Paton, and Simmons also found no significant relationship between abortions and the crime rate in the country as their research did not show significant results. They report that by conducting similar research in the UK, they have gained traces of a negative correlation between abortions and crime; however, the regression does not hold in tests, leaving the results to be insignificant (Kahane et al., 2008). They also find that statistics in the UK go sideways comparing to the US ones as the crime had started going down a few years prior to abortions being legalized; furthermore, they have found a minor difference in the crime rate between the regions of the country where abortions were legalized and the one where they were not (Kahane et al., 2008).

On the other hand, some research studies suggest that the theory works. Hence, Dills et al. (2008) study various forms of crime-affecting phenomena. When it comes to the legalization of abortions, they superficially examined data from 20 countries, searching for an effect of legalization on the crime rate. Frankly, not all of the countries show evidence for the idea, most of them are inconsistent in the lag proposed by Donohue and Levitt. However, it is possible that with a more thorough scrutiny of these countries and with cultural differences in the crime world of different countries taken into account, the theory would be supported on more substantial grounds as it would be fair to say that their research lacked some thoroughness and attention to details. Canada, together with France, Italy and others, provide evidence of a negative correlation between abortion legalizations and the crime rate. Canada was also a subject for a study by another paper. In his work, Sen investigates the abortions-to-crime link; however, with some alterations, he suggests fertility is to be taken into account as well. In his view, Canada and the USA are similar in various cultural aspects and, therefore, both countries are subject to similar effects, and the effect of abortions should not be considerably different. However, as mentioned, he also considers fertility in this 'equation' as "this is important as a decline in crime due to smaller cohort size might compromise the efficacy of other policies aimed at enhancing fertility" (Sen, 2007). In his analysis, Sen does find clear pieces of evidence of the connection between abortions and crime adjusted by fertility changes. He primarily highlights the impact of teenage abortions. According to him, even though the proportion of teenage abortions is relatively lower than the one for adults, it accounts for about one-fourth of the effect in the 1990s. Of course, there is also strong evidence of an abrupt decline in teenage fertility, which affected crime rate noticeably as well. It is interesting, notwithstanding, that Sen, seeing how similar his results are to the one of Donohue and Levitt's, is not yet persuaded that it can be 'the only'

factor responsible for the massive drop in crime in the 1990s both in the USA and in Canada (Sen, 2007).

The most recent study published by Donohue and Levitt in 2019 is a review of the 2001 paper with further evidence in favour of the original work. In the 2019 paper, Donohue and Levitt expand the period of observation by almost 20 years, receiving significant confirmation of their hypothesis viability (Donohue & Levitt, 2019).

2.4 Discussions of mechanisms of abortion effect on crime in existing studies

Summing up, the demographic and social effects of legalization of abortions implies interest among researchers. It is widely discussed whether existing methodologies, explaining the crime rate drop induced by the application or existence of the abortions as an option in general, are correct and reliable. Various ideas and perceptions are suggested, tested, criticized, updated, tested again, and so on and on in circles. However, another question could also be raised: what is the logic behind the theory in detail, and how is it supported, what are the mechanics of the abortions-to-crime phenomenon?

As it is suggested before, the primary effect of abortions on crime is, as Levine, Staiger, Kane, and Zimmerman (1999) define it, the lower fertility rate in the region. Donohue and Levitt (2001) call it a "smaller cohort size". Levine et al. (1999) estimate the case of Roe v Wade, the one which legalized abortions in the USA, to lead to a situation where fertility rate in states with abortions was lower by approximately 4% compared to the ones in which abortions were illegal until the end of the twentieth century. Simple logic suggests that some percentage of random unborn children could have potentially committed a crime in the future. However, it may be abandoned as it could appear that the number of crimes would go down in the same proportion as the population growth does if we assume that abortions are evenly spread among social groups.

However, the idea simply needs a more profound and distinctive approach to it. Of course, the belief that abortions are a prerogative of all people similarly is short-sighted and even foolish. It is believed that different cohorts or social groups have very different destinies aligned for them and are subject to different positive or negative social phenomena (Tracy et al., 2013). Using the example of cohorts born right after the Second World War and in the Baby Boom period, Tracy et al. (2013) suggest that there is a disparity between them. We can define two significant groups of reasoning; the first one is the conditions standing for

the world around, its norms, realities, ideas, and influence on the cohorts; the second is upbringing from their parents, which is defined by the desire and ability of parents to perform their duties in front of their children. That is, of course, applicable to any period; at any time, there are ones who are luckier to be taken care of and those who are not so lucky.

Apart from this, there is evidence that unwanted pregnancies and children occur much more frequently in case of families or single parents with a lower social status. Donohue and Levitt (2001) find evidence for this and also refer to the Commission on Population Growth and the American Future to support their opinion on this (1972). Levine et al. (1999) provide evidence that African-American women under 19 years of age were considerably more exposed to abortion legalization after the Roe v Wade case in 1973. In the last decade, about 30% of teenage pregnancies in the USA ended in abortions; however, it is rather compelling that in the 1990s the number would go to 40% and higher (Guttmacher Institute, 2019). Teenagers are widely treated as, in general, not capable of being competent parents due to their young age and lack of life experience and skills. 'Non-white' women have a higher statistical predisposition to abortions than white women (Sklar & Berkov, 1974). Although this phenomenon is relatively regional, it explains how some less socially adjusted strata of society, that are more inclined to engage in crime, are also more inclined to have abortions.

It is observed by various researchers that children born after abortion legalization were statistically better off than the ones prior to the legalization. "Subsequent cohorts were less likely to be in single-parent households, and as a result less likely to live in poverty, and less likely to receive welfare. Besides, these cohorts experienced lower infant mortality. In particular, we find that for the marginal child not born due to increased abortion access, the odds of living in a single-parent family would have been roughly 60 per cent higher, the odds of living in poverty nearly 50 per cent higher, the odds of welfare receipt 45 per cent higher, and the odds of dying as an infant 40 per cent higher" (Gruber et al., 1999).

Sampson and Laub (1993) have also studied what leads a person to a life of crime. They present a very distinctive graph suggesting how various factors contribute first to delinquency and then to crime (Appendix A). It has a very intuitive way of pointing out different elements influencing the 'life-path' for any given person. According to it, in the age of adolescence, delinquency may develop due to the following factors:

- a lack of supervision
- threatening, erratic, harsh discipline
- parental rejection from the family side.

They, in their turn, could develop from such factors:
- low family socioeconomic status (SES)
- family size
- family disruption
- other elements.

Ergo, taking into account the ideas mentioned above, that families with a low socioeconomic status are, as a matter of fact, able to undergo an abortion, if this is a viable option, it confirms that abortions have a legal effect on the crime rate.

Donohue and Levitt (2001) mention the study by Rasanen et al. (1999), in which various maternal factors were studied as to assess their effect on criminal inclinations of the members of the research group of a male birth cohort from Northern Finland born in 1966. Surprisingly, despite the title of the article, mother smoking during pregnancy had a lower, however perceptible, effect than a mother not wishing to be pregnant at the moment, single-mother family, teenage mother, and low level of education of mother, which, peculiarly, had the biggest effect, out of the listed factors, on delinquency and crime committed by children. It is exemplified that in Finland the majority of crime is also accompanied by antisocial behaviour such as smoking, abuse of alcohol, and drug taking, together with other signs of the "antisocial personality disorder", which in turn is believed to be 'inherited' to some extent from parents, or in the case of this study, mother. Maternal smoking during pregnancy is a sign of such a disorder. This study is also supported by the notion that being rejected or unloved by their mother nudges males, in these studies, to step on the path of crime (Raine et al., 1994; 1996).

Research conducted among the prison population in 1991 shows that the prison population raised without parents is almost five times higher than for the general population, and slightly less than twice as high for those raised by a single parent (Beck et al., 1993). Also, more than one-third of them report that they were raised by people with alcohol and/or drugs issues.

Referring to previous suggestions, unwanted children or children brought up in inappropriate conditions and/or by parents of low social responsibility, are in the delinquency and crime group risk. All those irresponsible, unfit, unprepared parents would use abortion, and they do whenever they have the opportunity, according to statistics we observe. Abortions could provide teenagers with a chance of revoking their reckless actions and give them more time to prepare to be decent parents for their future children. People with financial or social issues could also win time to solve them thanks to abortions so that they are able to bring up children in more appropriate conditions. Potential parents who do

not want a child could undergo an abortion and later either re-evaluate their life values and decide to have a baby or keep on with the life they have had. In that case, a considerably lower number of people would have a statistically determined predisposition to crime.

All in all, the existing literature provides reasons to believe that unwanted children, those raised in unsuitable conditions and/or by inadequate parents can indeed end up as criminals. It also seems to be a fact that abortions are capable of preventing, at least partly, this phenomenon, were they allowed. In addition, a negative link between crime and economic growth is simply undeniable even though the disputes about the order of effect are intact. Summarizing, we can suggest that, based on the remaining findings, the connections between abortions and crime and, as a result, economic development is possible.

3. Methodology

3.1 The approach to the global study of the abortion legalization effect on the homicide rate and data overview

In order to define the purpose of this work, it should be pointed out that its initial hypothesis confirms the existence of a correlation between legal abortions and crime, and that it is negative, i.e. a large number of legal abortions causes a reduction in the crime rate.

Evidently, the next step after building the theoretical foundation of the core idea of this work is supporting it sufficiently with our empirical findings. Looking back at the referenced authors, it is clear that the most prevalent approach to the matter of the effect of legal abortions on the crime rate in any given country is a particular country's abortion and crime data analysis of any kind.

The inspiration for this work, "The impact of legalized abortions on crime" written by John J. Donohue and Steven D. Levitt, uses this particular approach to analyse the time series data of various nature, presenting it as empirical support for the hypothesis that legal abortions bring down the level of crime on the example of the USA.

Having in mind the above-mentioned experience and other previous research studies of the effect of the legal abortion on crime in addition to innovations of this paper, the empirical findings of this work are being built upon two approaches, not including explicit plain crime trend overview before and after the legalisation of abortions could have impacted it.

The approaches differ in the kind of data analysed, methods, models, and other nuances even though serving the same goal of testing the initial hypothesis.

The first approach is based on dealing with broad global data concerning the legal statuses of abortions in various countries all around the world and the intentional homicides that have happened in these countries during the period between 1998 and 2017, i.e. 20 years. Together with other variables, the abortions and homicide variables make up a panel dataset.

Even though the homicide variable used in the model is a dependent variable, in this case it is a relatively simple set of data of intentional homicides per 100,000 people in a country during a given year that has been provided by the World Bank (2020). It has been chosen as a representation of the crime rate just like it has been used in the majority of other studies in this field. Murder or

homicide is also considered to be the most violent crime, i.e. it accurately represents the level of criminal inclinations in a country. The data includes figures for the number of deaths caused by intentional usage of any kind of weapon per 100,000 for 44 countries for 20 years each. A simple data analysis shows that the most crime-ridden state of the 44 ones listed is Venezuela, with an average of about 42.5 intentional homicides per 100,000 population from 1998 to 2017 with the highest of 61.9 murders per 100,000 in 2014. The safest country, on the other hand, is Singapore, on average only 0.57 people out of 100,000 were killed there during the observable time frame. Speaking about it, abortions in Venezuela are virtually forbidden; women have only one legal ground to get an abortion there: saving their life. Apart from this, we can see that on average, about 5.3 people die a violent death per 100,000 people in all the countries included. Nevertheless, the tendencies and dynamics inside countries may be more significant for the research conducted due to the nature of the data present and the model used.

The next important group of variables consists of two abortion-related variables. They are the author's calculations based on the data provided by the World Health Organization in the form of the Global Abortion Policies Database (2020). The Database provides data on the legal state of abortions in numerous countries and territories around the world. The data range from statuses concerning grounds for abortion in these countries and the legal gestational limit for them, to additional requirements, to abortion procedures together with other supplementary policies concerning it. The author's real interest actually falls into the first part; the thesis includes data based on the information stating under which conditions abortions are allowed (grounds) and how far into the pregnancy the abortion is permitted (gestational limit) in any country given.

The span of legal grounds for abortions used in the Database includes the following aspects:

- at the woman's request
- to save a woman's life
- to preserve a woman's health
- to preserve a woman's physical health
- to preserve a woman's mental health
- in cases of intellectual or cognitive disability of the woman
- in case of incest
- in case of rape
- in case of foetal impairment
- for economic or social reasons.

At the same time, the gestational limit for each ground is simply presented in weeks. Altogether, based on this information, two variables were determined, the so-called SUM and INDEX.

The first one is a mere SUM of all legal grounds implemented in any given country. Needless to say, the variable is a number ranging from to 0 to 9, i.e. the maximum number of legal grounds available. Even though there are technically ten legal grounds for an abortion to be carried out, the SUM variable is limited to 9 in order to avoid a bias regarding abortion at the woman's request. Essentially, abortions carried out on this legal ground mean that no reasoning is needed from the woman, which automatically makes this legal ground a consolidation for all of the other ones. Therefore, the SUM variable disregards 'at the woman's request' legal ground.

The SUM variable is a little rough and inexact due to the vagueness of its nature, uncertainty of the legal system, and imperfect information in some countries and territories. Even without further analysis, this variable does not strike as a reliable factor for adequate research; however, defining a general situation with regard to legal ground for abortions has implication for policies around the world.

Due to the imperfection of SUM, a more superior additional variable, INDEX, has been adopted, determined as a sum of products of grounds allowed in any country and a ratio of the gestational limit for this ground in any country to the maximum value among all the countries available in the Database. The following equation can represent the mathematical form of the variable estimation

$$\sum_{i=1}^{9} lg_n \times \left(\frac{gl_n}{\max(gl)} \right) \qquad \text{(form. 3.1)}$$

where:

- lg stands for a legal ground (one out of nine) and can take values 1 for allowed legal ground and 0 for not allowed legal ground
- gl is for gestational limit, presented in a number of weeks approved as a gestational limit in a country; n stands for an index of a nation
- gl for every n-th country and i-th legal ground is compared to the appropriate cross-sectional sample maximum.

The outcome, INDEX, represents the freedom of women to have an abortion much better than the above-mentioned SUM of grounds allowed. The index variable takes into account the limitations present in any given country as to when the decision of abortion can be made.

If we imagine a theoretical country A where technically 6 out of 9 legal grounds for abortions are allowed, we will estimate the sum variable for it as 6,

which is a relatively high level. However, if we take into account that all six grounds for abortions are only legal for the first eight weeks, which is a few days shy from 2 months, a period when some women do not even notice their pregnancy, then the country's abortion policy should not be viewed as very free and democratic.

The approach and formula concerning the abortion-related variables have the purpose of revealing the fact that the more democratic the country's abortion policy is, the more of them are available for the population, whereas it is hypothesized that the abundance of legal abortions leads to a decrease in the crime rate.

Looking at the countries available in the Database, we can see that, on average, there are 4.7 abortion grounds legalized in the world out of 9 possible, which means a half threshold being passed. It may seem like a positive sign, assuming that more freedom is beneficial; however, due to the reasons elucidated above, SUM may be slightly biased and may fail to present the real situation. The mean value for INDEX, yet, is only 3.2, which suggests that abortion policies in the countries might be not so flexible as it seemed from the previous statement. The extremes of the data also show that the countries that fall into the category of free, democratic, and progressive by common belief, such as Denmark (INDEX equalling 8.3) are estimated at the top of the list, while more conservative and strict countries like Azerbaijan (INDEX equalling 0.3) are at the bottom of this rating. An engaging fact that may serve as evidence in favour of INDEX, and against SUM, is that some countries' governments, such as some of post-Soviet states, de jure allow for a lot of legal grounds for abortions, but in fact, the time limit is rather short. Ukraine may serve as an example here: there are six legal grounds for abortions in Ukraine, while three others are not banned, on request abortions are allowed, and the INDEX value is only 3.13. Of course, it is not a very low indicator, but it is considerably lower than something we get from the SUM.

Now, if we come back to homicide data and the record setters, with a bare look, we could see that countries with more freedom put into abortion legalization policies may show a relatively lower level of crime. In contrast, it is very rarely a case that a country with close to no legal ways to have an abortion would have low a crime rate. It may seem unnecessary to draw any intermediate conclusions before running econometric models; however, the observations remain a solid fact in favour of the initial hypothesis.

The panel data set also includes several controlled variables of macroeconomic nature to complete the model. The additional variables are chosen since they are so popular among researchers that they have become a common-sense knowledge. Such researchers as Gillani, Rehman, and Gill highlight unemployment, poverty, and inflation as important macroeconomic reasons for crime

to grow using the example of Pakistan (Gillani et al., 2009). Other researchers also state that inflation and unemployment have a strong effect on crime, with examples in other countries (Torruam & Abur, 2014; Tang, 2009). The variables included in this particular work are inflation and unemployment as indicators of economic downturns that force people to engage in crime; the share of education in the government's spending, representing the government's attempt to turn population towards productive economic activity rather than violent crime.

The inflation data used in the model are taken from the IMF World Economic Outlook (April 2020; 2020). The Outlook provides inflation rates from over 200 countries and regions for a period from 1980 to 2019, with a five-year forecast as well. However, due to the low quality of data for the early years and countries with underdeveloped statistical institutions, and due to the homicide and abortion-related data availability being a priority, only part of the Outlook provided figures are used, i.e. 44 countries for 20 years. The inflation rate is presented as the annual percentage change in average consumer prices. As it has already been mentioned, inflation, especially an excessive one, shows business cycle fluctuations, it may be a representation of the economy's occasional downturns. The inflation variable and its correlation to homicide are expected to show how recessions and financial difficulties outlined by significant inflation increases may be fertile soil for crime to thrive and the number of homicides to increase as it is generally believed that inflation as a representation of business cycle fluctuations and crime are correlated. The inflation fluctuations are more apparent in countries separately indicating expansions and recessions throughout the observable period. It is even possible to observe some particular crises simultaneously. Judging on the data available, the verge of millennia, the year 1999 was the least stable for the 44 countries present in the data chosen. The annual percentage change in average consumer prices was roughly several decimal points shy of 14 per cent. This figure is so high due to some countries being in a situation of deep monetary instability, e.g. the inflation rate in Belarus in 1999 was 293.7 per cent. Surprisingly, the almost threefold depreciation of the Belarusian currency is not a record in this data set; inflation of 438.1 per cent occurred in Venezuela in 2017, which also fits in with the leap in the number of homicides in this country, suggesting that inflation may indeed partially explain crime rate fluctuations.

Another variable used as a controlled one in the model is unemployment. It is sourced from the IMF World Economic Outlook (April 2020) as well (2020). All the dimensions of data on unemployment are virtually the same as the ones of inflation, i.e. the number of countries and the period are the same. The unemployment indicator in this dataset is the estimation of the number of unemployed people as the percentage of the total labour force in any country or region from

over 200 of them available in the Outlook. Both theoretical and empirical approaches to explaining the relationship between unemployment and crime have been discussed quite widely: it is argued that the absence of jobs or other legal sources of income often pushes people to break the law and commit a crime, and sometimes engage in homicide for various reasons. It is also sometimes a case that a high unemployment level is a sign of unstable economic, social, or political situation, which in turn may be a reason for crime level growth. That makes unemployment a great controlling factor to use in a model concerning crime. Surprisingly, unemployment and inflation are not so greatly correlated, at least at the first look at the data. Thus, the inflation variable proves to be more volatile, while the unemployment variable does not change so abruptly. It may suggest higher longevity and persistence of unemployment and its effects on other factors, such as the crime rate. During the observed period, the unemployment situation in North Macedonia proves to be the worst, indicating 31.6% of the labour force being unemployed on average. However, the 'all-time' record among 44 countries present belongs to Armenia in 2001, when the unemployment rate was 38.4%. Just like in the case of the inflation variable, it is expected that the unemployment fluctuation will prove to be impactful on the crime rate within countries as they have their different reference points, levels of unemployment that the population got used to over their history.

The last variable used in this model is the so-called education. As its name is not self-explanatory, it should be clarified that this piece of data consists of statistics on the government expenditure on education represented as the percentage of total government spending. The data is collected by UNESCO and provided by the World Bank in their DataBank database (2020). It also covers 44 countries and a time range of 20 years, but this data proves to be more scarce than the others and thus counts 628 observations. It could be that this data is more difficult to be tracked for particular countries or, which is more plausible, it is not a priority for some states and their statistical institutions to collect data of such nature. The education variable is chosen due to considerable evidence from other researchers, such as Lochner and Moretti for instance, suggesting that the level of education and intelligence in a country has a strong link to its crime rate (2004). It is argued that proper education may provide a person with more opportunities in life and hold them back from engaging in criminal activity (Lochner, 2020). We may expect highly educated people to use their knowledge and experience to make their living rather than engage in robberies or gunfights. High-quality human capital, i.e. educated skilled people, is believed to be a key factor for economic growth in countries of all levels of development. Within the range of available countries, governments have been devoting about 13.4% of

their total expenditure to education of any kind. Interestingly, Singapore, which was already mentioned as the safest country, also spends most on education, slightly more than 24%. That may be a piece of definite evidence in favour of education spending being correlated to the crime rate, and it may also be a mere coincidence.

All the coincidences and connections between the data observed with a naked eye may both turn out to be proven or rejected. Hence, the clarity will be introduced with the econometric approach that is to be described.

With the above-described dataset consisting of 6 variables, a model is built to test the initial hypothesis of this thesis.

The main approach to the model used in this thesis is chosen due to the nature of the data at hand and due to the researchers' experience in the past. However, it should be preceded by a simple model that can show the viability of the data under such conditions and requirements. The model chosen for this purpose is the Pooled Ordinary Least Square model. POLS is a linear least squares model that minimizes the sum of squares of the difference between the variables, specifically between the dependent one and independent ones, specialized in working with pooled and panel datasets (Gujarati & Porter, 2009). It should be noted regularly; in this case, Panel OLS is not a viable option as it generally neglects the nature of the data. The regular OLS model is commonly used to check variables for any correlation at all, while the pooled variation of it is also perfect for the data at hand. Thus, applying the Pooled OLS model to the panel data available, we can see the vague, general tendencies in relationships between the variables represented by the POLS equation. Judging from the econometric research outcomes, preliminary conclusions may be drawn. Even though the results of the POLS model are only a general overview of the hypothesized correlation between abortions and crime, they may be used to test the initial hypothesis. Customarily, no matter what the results are, various tests are to be run to make sure that the model is statistically significant and can be trusted at all. The vagueness of the model is rather a downside to it, no matter what results are received; it usually is not enough to prove a point and accept the hypothesis. The Pooled OLS model is rarely treated as a reliable final mathematical model providing viable outcomes; however, it may be different if some econometric techniques applied to the data show us that the POLS is a perfect fit for the data, i.e. Wald's test used to choose between POLS and Fixed Effects Model.

That is why, in addition to the Pooled OLS model, the panel data at hand is also to be analysed in a fixed or random effects model to show the full potential of the input materials. Either one of them works well with the panel data, assuming that the data is appropriate and the initial hypothesis is possible to be accepted

at all. Fixed and Random Effects models work under two different major assumptions about the independent variable. The fixed effects model can be used in a situation when the variable is fixed, i.e. it is measured without errors and values are the same for various studies; at the same time, the random effects model is dedicated to the random variable commonly treated as a random chunk of one bigger population (Gujarati & Porter, 2009). It should also be noted that fixed and random effects in panel data may be present in the form of cross-section and/or period. Judging on the Redundant Fixed Effects – Likelihood Ratio Test and Correlated Random Effects – Hausman Test, the appropriate model is to be chosen. These tests are aimed at checking the type of the independent variable and defining a suitable model for the given data. The chosen model is the one to show the actual connection between legal policies concerning abortions and the number of intentional homicides per 100,000 population. In the case of data being adequately prepared and model accurately built, supported by tests and check-ups, the outcomes can be treated as evidence for the acceptance or rejection of the initial hypothesis.

When the results of the research are reviewed, and the first conclusions are drawn about the effect of the legal status of abortion on crime, the research can be continued. Having done that, we may proceed to the analysis of the second part of the empirical findings of the thesis.

3.2 Technique of the UK study of the effect of legal abortions on the crime rate analysis and data overview

In addition to the first approach described previously, another one is presented in this thesis. The approach method chosen in the second part of the empirical research is one that has been used by a lot of other researchers who studied the abortion-to-crime correlation. This method consists in studying the effect of abortion on crime in a particular country or state. Such an approach can be useful to highlight the specifics of the process and correlation. Under these conditions, a more thorough connection between abortions carried out and crime committed can be outlined, and more detailed results can be obtained. However, there are some additional specifics within a smaller scope of research such as this. For example, Donohue and Levitt (2001) suggest an idea that the effect of abortions on crime is delayed by the number of years that would have passed since the birth of the 'unwanted' children to the moment when they would engage in intense criminal activity. In their research, the legal case of Roe v Wade that took place in 1973 affected the crime rate in the USA and New York City

in particular in the 1990s. In our case, the researched country is the United Kingdom, where abortions are regulated under the Abortion Act of 1967, which first and foremost legalized abortions. Just like in the case of the US described by Donohue and Levitt, after some time had passed the previously growing crime rate suddenly dropped in the 1990s. The only differences are that in the UK the drop happened in two phases and the period between these two events was longer, suggesting that the British engage in criminal activity when they are older, while American criminals begin their 'careers' earlier.

Even though in part two the approach, type of data, and scope differ from part one, the same kind of variables are used to run the econometric model: crime rate, abortion rate, education, inflation, and unemployment.

In this model, the crime rate, the dependent variable, is represented by a figure for the number of total crimes recorded in England and Wales in the period from 1898 to 2015 per 100,000 population. The data is collected by the UK Home Office, a governmental institution responsible for dealing with migration control, safety, and order (2016). The abundance of the data provided by the Home Office allows the use of not just homicide indicators as was the case previously, but also other crimes, such as violence towards other people, sexual crime, property-related crime, fraud and forgery, and others. With such data, a more thorough and less biased analysis is possible and available. In spite of the more complex nature of this data than the data used in part one, it represents the crime rate in virtually the same way as previously. Looking at the data, we can observe their constant growth between 1960 and 1993 when it suddenly plummeted for the first time, a situation quite similar to the one observed by Donohue and Levitt in the USA. Taking into account the fact that abortions in the UK were legalized 26 years before this drop, we may suggest that it can be connected, i.e. the potential criminals had not been born and thus were not able to commit a crime when they would have become of the appropriate age to start committing it. There was one more crime growth spurt during the beginning of the new millennium, and the zenith of crime rate took place in 2004 when 9741.21 crimes were committed per 100,000 population. On average, however, the crime rate stood at about 5900 crime cases per 100,000 population. All in all, this time series proves to be an appropriate fit in the model, showing the crime rate factor needed to accept or reject the initial hypothesis that legal abortions have a significant negative impact on the crime rate.

Another set of data crucial for the thesis is the abortion rate in the United Kingdom compiled by Robert Johnston for the Abortion Worldwide Report for the years from 1930 to 2018 (2020). The abortion rate indicator stands for the figure stating how many abortions have been performed per 1,000 live births; it

is also important to note that only live births count, i.e. births when a child is born alive. This should have made a great difference at the beginning of the observable period due to the infamous death rate among newborn children during this period. The dataset includes figures for both illegal abortions performed before they were legalized and legal cases that became possible right after the Abortion Act of 1967. The criminal cases are customary estimates derived from police and hospital reports. Under the superficial analysis of the data, one may observe an obvious tendency in the abortion rate. Immediately, in the year following the legalisation of abortion, the abortion rate leapt up and continued to grow until 1974, after which the growth slowed down. As it has already been mentioned in part, the beginning of the abortion rate growth matches the first drop in the crime rate; furthermore, the first peak of abortions also vaguely matches the second drop in the crime rate. Indeed, all this is true under the assumption that the effect of abortions is delayed by the number of years needed for a potential criminal to grow up and start on a criminal path. After the growth of abortions in the UK slowed down in 1974, there were 269.4 abortions per 1,000 live births, whilst the largest number of abortions were conducted in 2001, around 313 abortions per 1,000 live births. In light of the above and the facts provided about the abortion variable in part one, which may as well apply to this variable in terms of the nature of its effect on crime, the abortion rate data is chosen to be a representation of the variable used in the model.

The inflation rate data used in this part of the research originates in the same IMF World Economic Outlook (April 2020) as the inflation variable used in the first approach to the empirical research of this work (2020). However, this time it is a time series for the UK only. It generally serves the same role in this model as in the previous one and has the same mechanism of the effect on the crime rate. It represents additional economic factors to influence the crime rate, i.e. the inflation rate worsens financial stability, standards of living, and the life quality of people, which virtually pushes them towards the criminal path in their life. Once again, the Outlook provides inflation data in the period starting from 1980. Since then, the inflation rate has been decreasing, rapidly at first and gradually later on, with the exception of the 1990s when it peaked at 7.5%. Overall, during all of the period observed, the inflation rate in the UK stood at about 3.6% on average.

Even though unemployment serves the same function in part two model as it does in part one, it has an additional source, too. Earlier entries to this data are built on the basis of the dataset by Denman and McDonald, "Unemployment statistics from 1881 to the present day" (1996). Otherwise, the variable is similar to the one from part one in a lot of dimensions. Thus, this data helps additionally

explain the reasons for the crime rate to fluctuate in the way of unemployment being the reason for people not having income sources which they would like to have and could fill in with the criminal activity. The unemployment trends are not so obvious as there was a growing period until the 1980s, with a peak in 1982 when the unemployment rate was at 13%, and then two smaller peaks later on. In the period from 1980 until the present day, around 7.5% of the labour force in the UK was unemployed on average (International Monetary Fund, 2020).

Education, in this model, is a time series for government expenditure on education represented by the percentage of total government spending too for the period from 1980 to 2019, sourced, however, from the House of Commons (Bolton, 2019). Once again, it is used to show that education may be influential in the life decision-making process. This variable is used to explain the degree of the country's orientation on building up proper human capital rather than to leave the population and let them resolve their issues in more primitive ways. As well as abortion, the effect of education on crime is expected to be delayed on the scale of a country as it is assumed that proper education affects the future of students rather than their present. Such a delay should be investigated and applied later on in the empirical findings of the thesis. The fluctuation of the education variable is relatively inelastic; it ranges between 3.85% and 5.52%, a range of only 1.67%. However, under a closer look, a trend of growth can be observed until the year 2011, followed by a slight drop. Public expenditure on education in £bn price chart for 2017–2018 presented by the House of Commons elaborates the idea of growth trend until 2011 and a drop afterwards even more illustratively.

The time series data described above is used to build an econometric model the purpose of which is to check the initial hypothesis of the work whether legal abortions affect the crime rate.

The first step for the model to work is to decide upon the delays used in the model. The delays should be chosen based on empirical and experimental grounds and be supported by the theoretical background. The empirical evidence for the delays selected may be a comparison of trends of the chosen variables, which was already partially described above. The received vague outcomes should be tested by experiments with the model that would show the most appropriate set of delays. If the resulting delays lie in the ranges supported by theoretical background, then we can proceed to the model estimation step.

The first stage in model processing is traditionally the Ordinary Least Squares model, which shows the overall results and can be used for the experiments for delays. As was already mentioned, the OLS model is often used as an initial step to see the overall picture of the hypothesis. Of course, only the final version of

experimental settings of the delays should be considered to proceed with the analysis.

Assuming that the OLS experiments are fruitful, the model received after regressing the crime rate on abortion rate, education, inflation, and unemployment level can be reviewed. The model can be tested for significance before interpreting, but it is better to run a robust model under the condition the HAC (Newey-West) covariance method is applied. The Newey-West estimator is especially useful to mitigate the autocorrelation issues, which can occur quite often in the case of time-series data (Gujarati & Porter, 2009). Thus, we do not have to worry about the quality of the estimation and the trustworthiness of the results.

The results obtained may already serve as evidence supporting or undermining the initial hypothesis.

However, for more confidence in confirming or rejecting the existence of any long-run relation between our dependent variable and the independent ones, it would be beneficial also to check the cointegration of the variables. We may proceed in two ways here. The first one is running the Johansen Cointegration Test. This test shows us whether the indicators at hand are related in the long run (Gujarati & Porter, 2009). Another way to do it is to run a Cointegration model under the condition that the variables are stationary and do not have a unit root, which needs to be checked with a Standard Unit Root Test. The variables ought to be manipulated to be put into the model by differencing them. Only when the stationarity of variables is ensured, can the cointegration model be applied. The outcomes of the cointegration model show us even more vividly how 'cointegrated' the variables are and how they are related in the long run. That is the reason why the cointegration model shows more reliable results. Additionally, the Engel-Granger test applied to the model may be of use for us as it generally serves the same role as the Johansen cointegration test, but is considerably more meticulous. Thus, when the model is run, tests are applied to show that the model is significant and provides reliable results. The coefficients obtained represent the strength and the vector of relationships between the dependent and independent variables.

Thus, the mentioned earlier methods of analysis of the time series data about the UK abortion and crime correlation should be used to make a firm decision whether to support or not the idea that the two indicators are correlated.

All in all, the methodology described in this chapter is purposed to view the effect of abortions on crime from two dimensions, the effect of emancipated abortion policy on crime and the effect of actual abortions conducted on crime. Hereby, the two approaches are aimed to check the initial hypothesis from two slightly different points of view on the same issue.

4. Empirical results

4.1 The global study of the effect of legalisation of abortions on the homicide rate analysis

The purpose of this thesis is the confirmation or rejection of the initial hypothesis stating that legal abortions have a strong significant effect on the crime rate. The general path of work is described in the previous chapter; thus, in this chapter, the actions described are going to be applied to serve this purpose.

The first logical step is chosen in line with the concept of the 'general to specific' empirical process. As it was formerly described, at first, a global scope model is to be run and analysed. As discussed, 44 countries are present in this empirical work, for a 20 year period each. This is supposed to be a globally scoped research on how the legal status of abortions affects the crime rate.

At first, we want to see the estimation of the factors in the Pooled Ordinary Least Squares model, remembering that a regular OLS is not a valid option for panel data as it neglects the panel character of the dataset.

Thus, a model representing the following equation is built:

$$\begin{aligned} \text{HOMICIDE}_{it} = {} & \beta_0 + \beta_1 \times \text{INDEX}_{it} + \beta_2 \times \text{SUM}_{it} + \\ & + \beta_3 \times \text{EDUCATION}_{it} + \beta_4 \times \text{INFLATION}_{it} + \\ & + \beta_5 \times \text{UNEMPLOYMENT}_{it} + \varepsilon_{it} \end{aligned} \qquad \text{(eq. 4.1)}$$

The model received seems to be well built, such as Fisher's F-statistic suggests. The probability is considerably lower than 0.05, allowing us to reject the null hypothesis of the group means being equal. Unfortunately, this model's dependent variables explain a rather limited fraction of variance for a dependent variable. According to R^2 statistic, the chosen variables explain only 32% of homicides that happened in the 44 countries present in the dataset.

Table 4.1. The outcomes of the Pooled Ordinary Least Squares model

Dependent Variable: HOMICIDE
Method: Pooled Least Squares

Sample: 1998 2017
Included observations: 598
Cross-sections included: 6
Total pool (balanced) observations: 3588

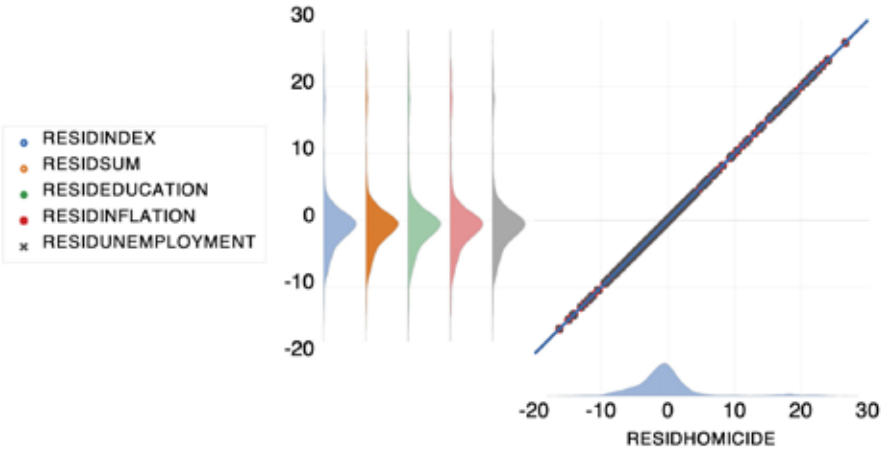
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-10.59954	0.512026	-20.70117	0.0000
INDEX	-0.447679	0.101101	-4.428025	0.0000
SUM	0.339454	0.086380	3.929780	0.0001
EDUCATION	0.540457	0.028055	19.26394	0.0000
INFLATION	0.396493	0.019015	20.85179	0.0000
UNEMPLOYMENT	0.634845	0.018904	33.58316	0.0000

Root MSE	6.299699	R-squared	0.317762
Mean dependent var	4.452174	Adjusted R-squared	0.316809
S.D. dependent var	7.628028	S.E. of regression	6.304973
Akaike info criterion	6.522225	Sum squared resid	142394.1
Schwarz criterion	6.532569	Log likelihood	-11694.87
Hannan-Quinn criter.	6.525912	F-statistic	333.6728
Durbin-Watson stat	0.140005	Prob(F-statistic)	0.000000

Source: author's EViews estimations based on Appendix B data.

On the other hand, all the variables present in the model are statistically significant at the 1% significance level. In addition, such a situation can also be viewed graphically. Thus, a scatter plot with a regression fit line and Kernel densities illustrates two major statements. The first one concerns Kernel densities of the residuals; an obvious tail is visible towards the positive figure, which is a definite sign of Kurtosis. It means that the distribution of the residuals is unlikely to be normal. Perhaps, the abnormality of the distribution is the result of the presence of extremely crime-ridden states such as Venezuela mentioned in the previous chapter. However, the abnormality is symmetrical and is present for the residuals of all the variables quite similarly. Secondly, the scatter plot represents a very thick distribution of residuals. This may be a sign of a perfect correlation as well as a sign of a biased model, which is to be checked.

Figure 4.1. The POLS model residuals graph



Source: author's EViews estimations based on Appendix B data.

The model results may be presented in the form of the following equation:

$$\begin{aligned} HOMICIDE_{it} = &-10.5995414223 - 0.447679179115 \times \\ &\times INDEX_{it} + 0.339453883958 \times SUM_{it} + 0.540457315502 \times \\ &\times EDUCATION_{it} + 0.396493364775 \times INFLATION_{it} + \\ &+ 0.634844658076 \times UNEMPLOYMENT_{it} + \varepsilon_{it} \end{aligned} \quad \text{(eq. 4.2)}$$

Such a model provides plausible preliminary results. Thus, we can assume that inflation and unemployment have a positive impact on homicide. It is evident from the coefficients that a 1 percentage point change of inflation and unemployment causes a corresponding change in the number of homicides per 100 thousand people, by 0.4 and 0.6, respectively. INDEX, on the other hand, implies the expected effect on homicide; thus, 1 point change in INDEX inversely changes homicide by roughly 0.45.

Nevertheless, Pooled Ordinary Least Squares is not the model of the last resort in this part of empirical findings. OLS models have a tendency to skip specifics of data; thus, Fixed and Random Effects can be used as one of the best fits to the panel type of data.

Even though the Pooled Least Squares model is not a good fit for our data, it can serve as a base ground for choosing between the cross-section effect, the period effect, or their combination. The heteroskedasticity test run on this model can show under which effect assumption should the Fixed and Random

Effects model be run. The theoretical background suggests that a good model has its error term similar along with all the values of the dependent variable. Such a property is called homoskedasticity. The likelihood ratio heteroskedasticity test is run for both cross-section and period. According to the p-values of the tests run, the model's residuals are homoskedastic under the period assumption (likelihood ratio p-value is 0.9991) and heteroskedastic under cross-section (p-value – 0.0000). Therefore, we may accept the homoskedastic assumption of the effect, namely the period one.

Table 4.2. Cross-section and period effects heteroskedasticity test outcomes

Panel Cross-section Heteroskedasticity LR Test
Equation: UNTITLED
Specification: HOMICIDE INDEX SUM EDUCATION INFLATION UNEMPLOYMENT C
Null hypothesis: Residuals are homoskedastic

	Value	df	Probability
Likelihood ratio	2295.156	43	0.0000

LR test summary:

	Value	df
Restricted LogL	-1949.145	592
Unrestricted LogL	-801.5674	592

Panel Period Heteroskedasticity LR Test
Equation: UNTITLED
Specification: HOMICIDE INDEX SUM EDUCATION INFLATION UNEMPLOYMENT C
Null hypothesis: Residuals are homoskedastic

	Value	df	Probability
Likelihood ratio	19.67218	43	0.9991

LR test summary:

	Value	df
Restricted LogL	-1949.145	592
Unrestricted LogL	-1939.309	592

Source: author's EViews estimations based on Appendix B data.

In view of the foregoing, the Fixed Period Effects and Random Period Effects models have to be built and compared for their quality and appropriateness. The comparison criteria are Redundant Fixed Effects – Likelihood Ratio Test and Correlated Random Effects – Hausman Test. They are applied to the Fixed and Random Effects models, respectively. The Redundant Fixed Effects Test's null hypothesis is that the Fixed Effects model is inappropriate. Based on the test's probability of both F and Chi-square statistic, we cannot reject the null hypothesis at all levels of significance. At the same time, the Hausman Test has its null hypothesis stating that the Random Effects model is preferred under the given conditions and circumstances. Based on the Chi-square statistic and p-value, it is clear that the null hypothesis cannot be rejected.

Thus, both tests result in null hypotheses not being rejected, i.e. the Random Period Effects model (Panel EGLS) is the most appropriate for the given data.

Table 4.3. Redundant Fixed Effects – Likelihood Ratio Test and Correlated Random Effects – Hausman Test outcomes

Redundant Fixed Effects Tests
Equation: FIXED
Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	0.228377	(19,573)	0.9998
Period Chi-square	4.511414	19	0.9997

Correlated Random Effects - Hausman Test
Equation: RANDOM
Test period random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	1.416568	5	0.9225

Source: author's EViews estimations based on Appendix B data.

Having decided that the Random Effects is more appropriate, the Pooled OLS model can be declined as a model of lower appropriateness even without Wald's test. It is known that the Random Effects model approved by the Hausman test revokes the possibility of Pooled OLS being the preferred one (Gujarati & Porter, 2009). Thus, ending up with Period Random Effects is to be used to support or undermine the initial hypothesis of the thesis. The Period Random Effects model takes the form of the following equation:

$$\begin{aligned} \text{HOMICIDE}_{it} = \beta_0 + \beta_1 \times \text{INDEX}_{it} + \beta_2 \times \text{SUM}_{it} + \\ + \beta_3 \times \text{EDUCATION}_{it} + \beta_4 \times \text{INFLATION}_{it} + \\ + \beta_5 \times \text{UNEMPLOYMENT}_{it} + \varepsilon_{it} + [\text{PER} = \text{R}] \end{aligned} \quad \text{(eq. 4.3)}$$

First of all, the model itself must be a significant and reliable one. Thus, a relatively high Fisher's F-statistic and its low probability value indicate that explanatory variables are significant when explaining the resulting variable, which is a very general indicator of a qualitative model. Independent variables, on the other hand, explain only 32% of the variation of the dependent homicide variable according to the R^2 statistic. Another issue of the model that strikes the eye is Durbin-Watson's first-order serial correlation test. According to its value, the model at hand

suffers from autocorrelation. It is not absolutely unexpected as some of the data used in the model have definite time-related tendencies, which may be the reason for the serial autocorrelation of the model.

Table 4.4. Panel EGLS, Period Random Effect model outcome

Dependent Variable: HOMICIDE
Method: Panel EGLS (Period random effects)

Sample: 1998 2017
Periods included: 20
Cross-sections included: 43
Total panel (unbalanced) observations: 598
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INDEX	-0.447679	0.251828	-1.777717	0.0760
SUM	0.339454	0.215159	1.577687	0.1152
EDUCATION	0.540457	0.069882	7.733886	0.0000
INFLATION	0.396493	0.047363	8.371361	0.0000
UNEMPLOYMENT	0.634845	0.047086	13.48262	0.0000
C	-10.59954	1.275380	-8.310890	0.0000

Effects Specification	S.D.	Rho
Period random	0.000000	0.0000
Idiosyncratic random	6.411430	1.0000

Weighted Statistics

Root MSE	6.299699	R-squared	0.317762
Mean dependent var	4.452174	Adjusted R-squared	0.311999
S.D. dependent var	7.633350	S.E. of regression	6.331543
Sum squared resid	23732.35	F-statistic	55.14637
Durbin-Watson stat	0.106123	Prob(F-statistic)	0.000000

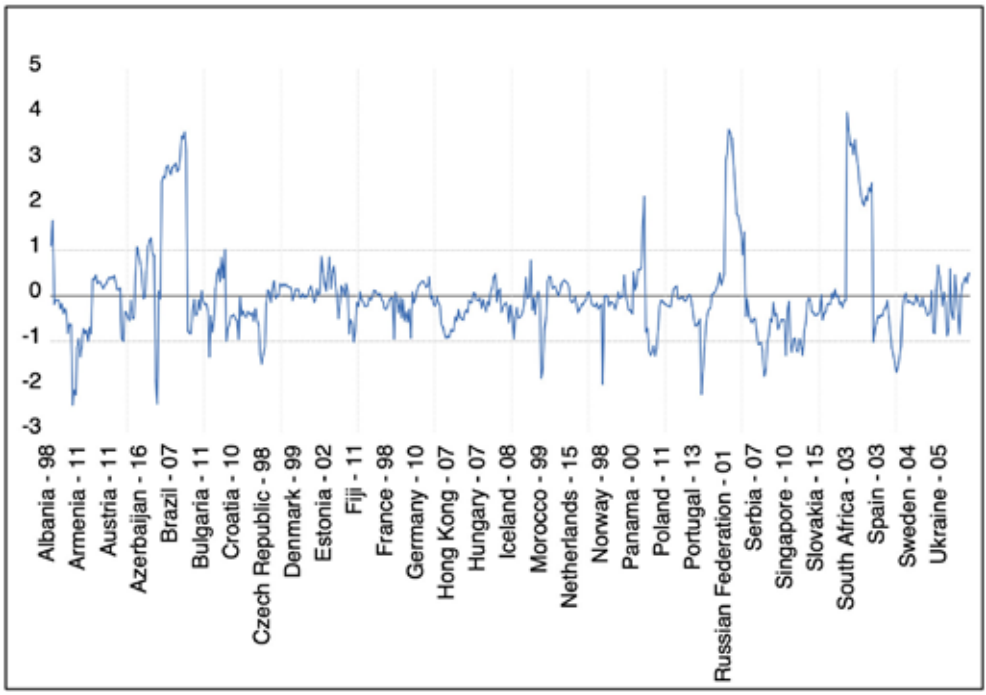
Unweighted Statistics

R-squared	0.317762	Mean dependent var	4.452174
Sum squared resid	23732.35	Durbin-Watson stat	0.106123

Source: author's EViews estimations based on Appendix B data.

On the bright side, the residuals of the model graphically represented stick to the regression line with a few exceptions. The biggest deviation can be seen in countries such as Brazil, Russia, and South Africa. The effect of chosen independent variables upon the dependent ones may be the least predictable, judging from the high standardized residual values. Apart from that, this residual graph is an indicator of a model with consistent and coherent results sufficient to support the hypothesis.

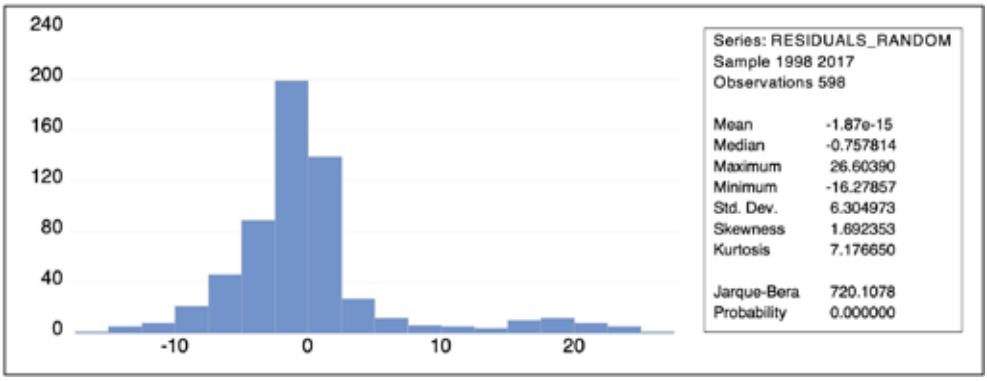
Figure 4.2. Standardized residual graph



Source: author's EViews estimations based on Appendix B data.

The model's residuals are also checked for normality and, as it can be seen from the graph, the residuals are not normally distributed. Besides, a huge Jarque-Bera indicator unambiguously suggests a need to reject the null hypothesis of the normal distribution of residuals. The reasons for the abnormality of the residuals are the same as the reasoning presented for Kernel densities for the Pooled OLS model, countries with severe levels of crime rate cause a tail to the right of the distribution graph. High 7.2 kurtosis only supports the idea and does not allow residuals to draw the expected bell shape of normal distribution.

Figure 4.3. Residuals normality graph



Source: author's EViews estimations based on Appendix B data.

All in all, the model at hand can be considered an imperfect representation of data used to check the initial hypothesis. However, its quality and significance are altogether sufficient to draw conclusions about the correlation between homicides in individual countries and such factors as legal policies on abortion, education share in government expenditure, inflation, and unemployment. The outcomes of the model are adequate enough to use them as evidence for or against the thesis statement: that free and democratic policy on abortion decreases the level of crime.

Therefore, the variables can now be reviewed. After running the model, its equation with the β parameters is formulated in the following way:

$$\begin{aligned} HOMICIDE_{it} = &-10.5995414223 - 0.447679179115 \times \\ &\times INDEX_{it} + 0.339453883958 \times SUM_{it} + 0.540457315502 \times \\ &\times EDUCATIONit + 0.396493364775 \times INFLATIONit + \\ &+ 0.634844658076 \times UNEMPLOYMENT_{it} + \varepsilon_{it} + [PER = R] \end{aligned} \quad \text{(eq. 4.4)}$$

First of all, the coefficients of the variables are completely the same as they were for the Pooled OLS model; the only differences are t-statistic and probabilities. Thus, it should be noted that all of the variables except SUM (p-value is 0.1192) are statistically significant. Education, inflation, and unemployment are significant at all significance levels (prob. = 0.0000) and INDEX only at the 10% level (prob. = 0.0760). This means that, according to the Random Effects model, similarly as in Pooled OLS, in the case of a change, inflation and unemployment may cause a corresponding change of 0.4 and 0.6 homicides per

100,000 population. The education variable coefficient indicates quite a controversial point; according to it, a 1 per cent change of the education share in government expenditure results in the conforming 0.5 change of the homicide indicator. This is rather unusual as it is commonly believed that education should bring crime down. A particularly plausible explanation might be that education spending comes into effect after students in whose education the government invested have grown up and made their life decision after some years have passed. Such a concept is reviewed and elaborated in the further part of the empirical findings of the thesis.

Having left behind the additional factors affecting the dependent variable, the variables which are essential to this abortion-related research are examined. Thus, for the reasons of imperfection elucidated above, SUM ended up insignificant. Its effect on homicide is rather unreliable as it is hardly a realistic indicator of abortion policies in individual countries. INDEX, on the other hand, is considered significant both theoretically and empirically. A convincing inverse relationship between INDEX and homicide is established. According to the model at hand, a 1 unit change in the INDEX implies an opposite homicide adjustment by almost 0.5 people killed per 100,000 population in a country.

Therefore, this implies that, in addition to the macroeconomic stability being a beneficial asset in crime-fighting process, a diverse elaborated emancipated abortion policy has a relatively strong effect on homicide being a representation of crime. It should also be noted that the effect depicted in this model has its effect based on the mere existence of aforementioned policies permitting abortion, i.e. the effect of any kind of additional policies or procedures simplifying and mainstreaming abortions can have an even greater impact. This particular model also emphasizes the superior importance of actual policies over the policies that only pretend to be so. Such a significant difference between the SUM and INDEX representations of the policies implemented serves as a great example of authentic efficiency of any policy, process, procedure, and other social phenomena. Furthermore, it should be noted that unlike the next part of the research, this model does not account for the actual abortions carried out; it merely discusses an opportunity for women living in the countries observed to make such a decision. The opportunity to act and actual action are very different dimensions, especially in the case of such a controversial matter as abortion, due to cultural and social pressure on a woman's decision. Thus, it is expected that the number of abortions performed might be an additional driving force bringing the crime rate down. The following part of the research intends to study this question.

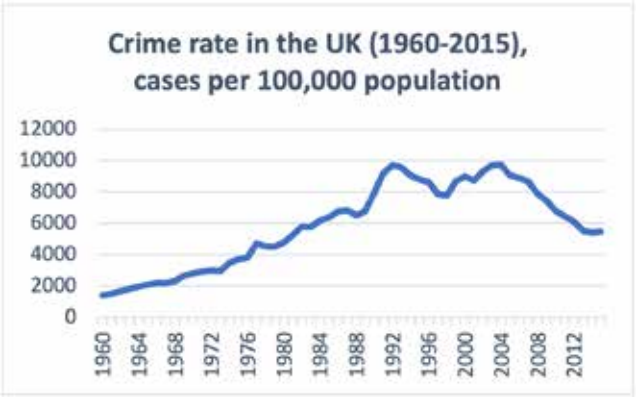
4.2 Legal abortions and crime rate trends comparison in the UK

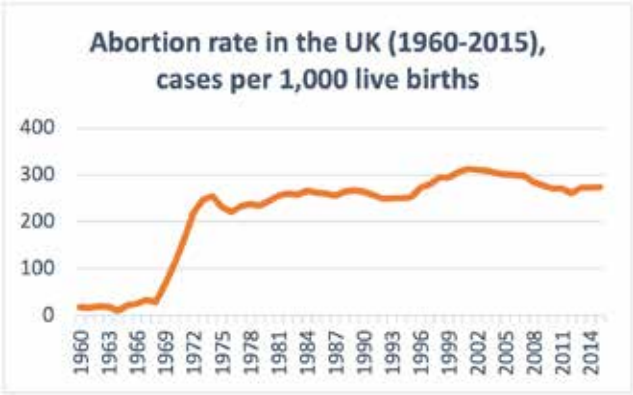
At first, it should be noted that a comparison of historical dynamics and tendencies of the variables of interest, abortions and crime, can show the connection of the variables that can be interpreted in favour or against the initial hypothesis.

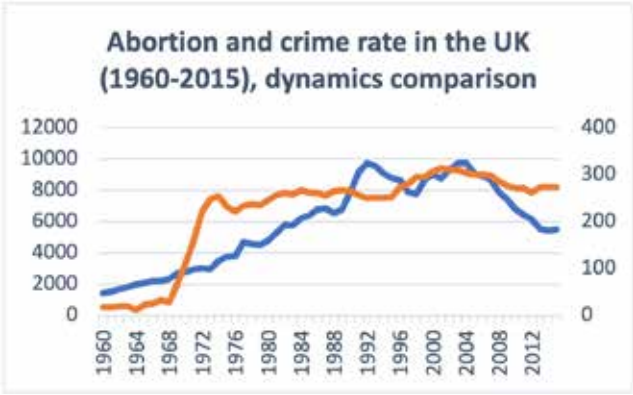
In our case, we can analyse the dynamics of abortion rate and crime rate in the United Kingdom in the period between 1960 and 2015. There are two pieces of data; thus, two charts show the dynamics of changes in the two variables. As it was already mentioned, crime had been continuously growing until the late 1980s, when it suddenly leapt up, peaked, and plummeted. After this, there was one slower increase in the crime rate and a steady decline until the present. The area of interest is the two drops in crime that happened in the UK at the beginning of the 1990s and 2000s. On the other hand, we have abortions which were on a very low level, illegal abortions only, until 1967. This is the year when abortions were legalized in the UK. Starting in 1968, a rapid growth of abortions took place ending six years later, in 1974. This was a period of the enormous growth of abortions performed per 1,000 live births. We can call this period the 'Abortion Boom', in an analogy with 'Baby Boom' in the USA after the Second World War. Even though abortions peaked in 1974, it should not be considered the end of the 'Abortion Boom'. It is only logical to put an end to it in the year fluctuations stop, which is circa 1977. After this moment, the abortion rate dynamics became more stable until the end of the 1990s when it grew a little bit more once again and then trailed off.

Now, when we combine the charts, any kind of connection is very difficult to trace if it is there at all. The charts seem to intersect occasionally, but it is definitely not enough to draw any conclusions.

Figure 4.4. Abortion and crime rate dynamics graphs







Source: author's EViews estimations based on Appendix C data.

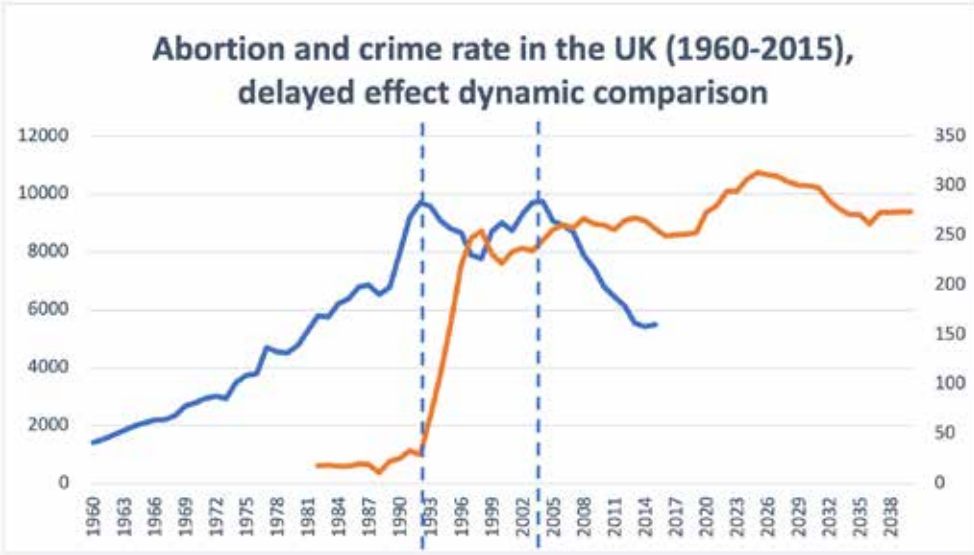
However, it should not be forgotten that the effect of abortions on crime is delayed. Various researchers have put their effort into studying the question of the age of the most active cohorts of criminals. Thus, the authors of one of the fundamental works in this field, Glaser and Rice, argue that various age groups have various probability or expectancy to commit a crime and end up in jail as their research was based prison data in various parts of the USA. Based on the police and prison reports from 1935 to 1956, the most 'active' age group was the '25 through 34' (Glaser & Rice, 1959). '21 through 24' was right behind the leaders. From this, we may conclude that 25–27 is the average age of the most active crime cohorts. Obviously, although the researched time frame is outdated, it is clear that the cultural and social angles of life have changed. Therefore, we can use another work to narrow the age range down. Farrington analysed data from both the USA and UK, comparing three moments in the 20th century:

1938, 1961, and 1983. His result only supports the idea that tendencies in crime change as sharply as any other social economic phenomena. That is why 1983 should be viewed due to its proximity to the period being researched in this thesis. According to Farrington, on average, the most arrested age group in the USA in 1983 was 28.4-year-old people, while in the UK, this group was 24.9-year-old ones (1986). He also discussed the peak of arrests for both countries: they were 18 years old age of arrested for Americans and 15 – for British. It can be concluded that the British used to begin and thrive in their criminal career a few years earlier than their American peers. At last, it seems wise to refer to more modern research focused mainly on Britain, the field of interest of this thesis. In her work, Hansen has studied the age profiles for various types of crime among young people of two groups, with a higher and lower level of education. Even though she claims that the more educated have a higher probability of stepping away from crime by the age of 25, while the less educated do not show this kind of tendency, she states that the age around 25 is a threshold for crime (Hansen, 2003). This is the age of transition from low- or non-violent crime to socially abusive violent crime.

Based on the research papers by Glaser & Rice and Farrington as well as Hansen, we may approximately assume that the delay between an abortion and its effect is 25 years for theoretical purposes. Under this assumption, some modifications should be applied to the chart of the abortion and crime rate in the UK dynamics. As the effect is delayed by 25 years, then its graphical representation should be a chart shifted by the same number of years. As it can be interpreted that the abortions done in 1969 will affect the crime rate only in 25 years, in 1994, thus the 1969 abortion value corresponds to the 1994 crime value graphically. The perpendicular dotted lines represent the peaks mentioned and explained above; these peaks are followed by downslides of crime. These particular points are the reference points of interest for the work done in this thesis as they represent the most illustrative examples of a possible correlation between abortion and crime.

The graph below shows that the beginning of the 'Abortion Boom' perfectly fits the moment when the crime plummeted in 1992 under the assumption of 25 year abortion delay being effective. The year when abortions were legalized, 1967, is clearly in line with the crime drop, which happened 25 years later. The end of 'Abortion Boom' in 1977 described above, however, did not correspond to the second drop in crime in 2004 so perfectly, its effects preceded the drop by two years. Nevertheless, the comparison of the dynamics suggests the existence of a very vague, not yet elaborated connection between the variables of interest over time in the long run.

Figure 4.5. Abortion and crime rate dynamics graph, delayed



Source: author's EViews estimations based on Appendix C data.

All in all, the comparison of the trends is a great illustration of a possible correlation between the abortion rate and crime rate in the UK. It quite vividly shows how the two significant periods for indicators fit each other, suggesting the existence of a connection. Nevertheless, it may not be enough to provide evidence in favour or against the initial hypothesis. Thus, more sophisticated approaches should be applied to the data at hand.

4.3 The UK study of the legal abortions effect on crime rate analysis

The second major approach to empirical research of the initial hypothesis is mainly concerned with the country-level scale and more specific data dimensions. In this part, the case of the UK is reviewed in the period between 1960 and 2015. This model is used to study the effect of actual abortions performed on the crime rate as an extension of the previous part.

Thus, as the research's outline is set and analysed in the preceding chapter, the model has to have a few distinct features. The major feature of the model is the delayed effect of some variables taken into account. Thus, it is believed that both the abortion rate and the government expenditure on

education variables are expected to carry out their effect upon the crime rate of the UK. The deferred effect of abortions is already a determined matter as, according to the studies reviewed above, the age of the highest activeness of crime elements is 25 years in the UK. From this, we may draw a conclusion that the effect of abortion, i.e. the absence of birth of a potential criminal is deferred for around 25 years. However, the matters with education delay are yet unclear.

Both abortions and education deferred period are to be defined with experiments with the data. The essence of the experiments lies in trying out variously delayed abortion and education variables combined with other variables present in the model in order to find out the combination that falls into the logically determined range and is statistically significant. The experiments are to be run on the basis of a simple Ordinary Least Squares model as it proves to be enough to trace some correlations between variables. The assumptions are applied when experimenting indicates that the delay for abortions' effect lies around the period of 25 years, while the delay for education should correspond to the following logical assumption:

$$D_{ed} = D_{ab} - A_{sc} \qquad \text{(form. 4.1)}$$

This logical assumption means that the education effect delay equals the difference between abortion effect delay, which also stands for the age of the highest criminal activity, minus the age of an average British school student when deliberate significant education begins. In the UK, Asc, the age of beginning more serious study, corresponds with the Key Stage 3 (secondary school) of 'National Curriculum for England', a school system implemented by the government by the Education Reform Act of 1988 (GOV.UK 2020). According to it, this age is approximately 12–14 years. It is also the age that is called transitional or litigious age, one of the most important periods in any person's life due to the great physical and mental changes of a person which are extremely important for future determination and destiny definition.

Thus, a set of experimental models produces an outcome of 24-year abortion effect delay and 11-year educational delay. This means that an abortion carried out affects the level of crime after 24 years from the moment when it was performed, as the abortion results in an unwanted child potentially not committing a crime at the age most appropriate for that crime. The results also illustrate that the quality of education received during teenage years, the age of around 13 years, makes a great deal of life decision impact for a person, potentially changing the life path of a person in education. Such results fall into

the theoretical and logical ranges, meaning that they can and should be used in the research.

Now, with the delays used in the theoretically and experimentally agreed model, the models estimating the variables and their effect on the dependent variable should be built and reviewed. The first step in the process of checking the initial hypothesis that abortions negatively affect crime is Newey-West Ordinary Least Squares. This variation of the OLS model provides more robust results than the regular variation of the OLS model. However, as previously, such a model is run mainly to see the vague results of the regression with the variables at hand. Thus, the model equation has the following form:

$$\begin{aligned} CRIME\_RATE_t = \beta_0 + \beta_1 \times ABORTION_{t\text{-}25} + \\ + \beta_2 \times EDUCATION_{t\text{-}13} + \beta_3 \times INFLATION_t + \\ + \beta_4 \times UNEMPLOYMENTt + \varepsilon_t \end{aligned} \quad \text{(eq. 4.5)}$$

The model built is of a significant nature, which is known due to low F-statistic probabilities, both Fisher and Wald, a high R^2 value; also, Akaike info, Schwarz, and Hannan-Quinn criteria are high. On the other hand, the Durbin-Watson statistic indicator suggests the first order serial correlation present in the model, which will be dealt with later on.

Table 4.5. The outcomes of the Newey-West Ordinary Least Squares model

Dependent Variable: CRIME_RATE
Method: Least Squares

Sample (adjusted): 1992 2015
Included observations: 22 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)

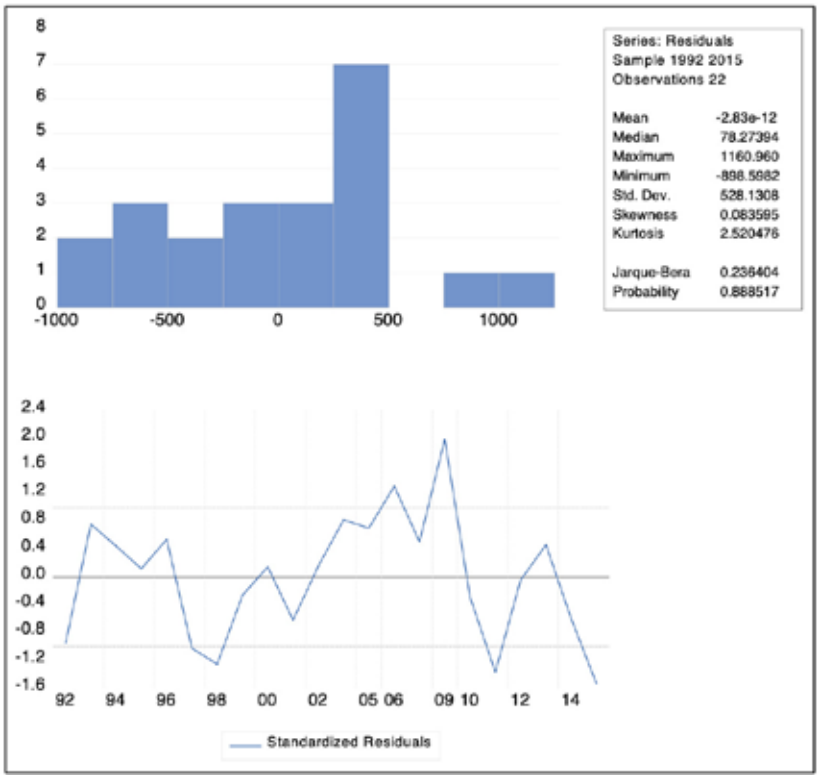
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ABORTION	-21.60916	2.511086	-8.605503	0.0000
EDUCATION	-820.4701	165.4492	-4.959045	0.0001
INFLATION	452.7578	264.5528	1.711408	0.1052
UNEMPLOYMENT	-725.7704	163.0390	-4.451515	0.0004
C	26477.58	1932.507	13.70116	0.0000

R-squared	0.865043	Mean dependent var	8039.709
Adjusted R-squared	0.833288	S.D. dependent var	1437.618
S.E. of regression	586.9845	Akaike info criterion	15.78459
Sum squared resid	5857364.	Schwarz criterion	16.03255
Log likelihood	-168.6305	Hannan-Quinn criter.	15.84300
F-statistic	27.24147	Durbin-Watson stat	1.286741
Prob(F-statistic)	0.000000	Wald F-statistic	44.93128
Prob(Wald F-statistic)	0.000000		

Source: author's EViews estimations based on Appendix C data.

The robust nature of the model means that the residuals are normally distributed, and the model is homoskedastic; the model is also stable in accordance with the Ramsey RESET Test. The standardized residual graphical representation also suggests the robustness of the model.

Figure 4.6. The Newey-West Ordinary Least Squares model residuals graph and residuals distribution normality



Source: author's EViews estimations based on Appendix C data.

The variables themselves are significant as well, all of them but one are significant at 1% significance, and inflation is only marginally significant at the 10% level. The abortion, education, and inflation variables show a logically acceptable result in the form of the coefficients. Thus, inflation is positively correlated with the crime rate with the β parameter of 452.8, while education and abortions negatively correlate with the crime rate: 1 unit change in either of them leads to an inverse change of 820.5 and 21.6 units in the crime rate, respectively. All in all, the substituted coefficients of the model look as follows:

$$\begin{aligned} CRIME\_RATE_t = {} & 26477.5779364 - 21.6091569257 \times \\ & \times ABORTION_t - 820.470050312 \times EDUCATION_t + \\ & + 452.757808873 \times INFLATION_t - 725.770410334 \times \\ & \times UNEMPLOYMENT_t + \varepsilon_t \end{aligned} \quad \text{(eq. 4.6)}$$

However, there are better uses of the data provided. The previously described cointegration phenomenon is a great approach to be applied to the data to see if the dependent and independent variables have any long-term relationships.

First, the Johansen Cointegration Test is applied to the data we have under 1 to 1 lag interval condition to check the long-term presence correlation between the variables. The test uses two methods, Trace and Maximum Eigenvalue, to check if cointegrating equations are present. The results received are similar for both methods, so they can be treated equally.

Table 4.6. The Johansen Cointegration Test outcome

Trend assumption: Linear deterministic trend
Series: CRIME_RATE ABORTION EDUCATION INFLATION UNEMPLOYMENT
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.991584	169.9986	69.81889	0.0000
At most 1 *	0.954952	93.55676	47.85613	0.0000
At most 2 *	0.738296	43.95631	29.79707	0.0006
At most 3 *	0.688558	22.50764	15.49471	0.0037
At most 4 *	0.213518	3.842971	3.841465	0.0499

Trace test indicates 5 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.991584	76.44182	33.87687	0.0000
At most 1 *	0.954952	49.60045	27.58434	0.0000
At most 2 *	0.738296	21.44867	21.13162	0.0451
At most 3 *	0.688558	18.66467	14.26460	0.0094
At most 4 *	0.213518	3.842971	3.841465	0.0499

Max-eigenvalue test indicates 5 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: author's EViews estimations based on Appendix C data.

Thus, based on the results of both methods, none and at most 1 through 4 equation options can be rejected at the 5% significance level, i.e. both tests indicate five cointegrating equations at 5% significance level. This is a strong suggestion that a long term relationship exists between the variables.

It is also possible to examine the equation under the Johansen Cointegration Test assumption, i.e. the normalized cointegrating equation. First of all, a high t-statistic for all of the variables allows us to reject the null hypothesis of no cointegration. Before the coefficients are reviewed, it should be noted that in the case of long-term relationships in the Johansen Cointegration Test, the coefficients are reversed. Thus, we can see that unemployment, surprisingly, is still negative as in the Newey-West OLS, suggesting that changes in unemployment result in an inverse change in the crime rate in the UK. The variable of interest, abortion has a coefficient of 26, i.e. every unit change of abortions per 1,000 live births results in an inverse reaction of the crime rate by 26 units.

Table 4.7. The Johansen Cointegration Test coefficient

Normalized cointegrating coefficients (standard error in parentheses)

CRIME_RATE	ABORTION	EDUCATION	INFLATION	UNEMPLOYMENT
1.000000	26.18198	794.9645	-1757.012	1403.977
	(0.91148)	(27.5343)	(74.2488)	(49.5185)

Source: author's EViews estimations based on Appendix C data.

The next step of the estimation of given data is the Cointegration model with the Fully-Modified OLS method applied. However, in order to do it, the stationarity of the variables needs to be examined. Thus, every variable needs to be checked for a unit root test, including only intercept testing and with the automated lag selection according to the Akaike Info Criterion. Based on this, the following results were drawn. Inflation is the only stationary variable at level; all others are stationary at first difference but one. There is an issue with the education variable; it is not stationary at any level because of a rather small number of observations; however, it was decided to keep it for the sake of the model's integrity and to treat it as stationary at level as the Augmented Dickey-Fuller test statistic is the closest to the threshold allowing the rejection of the null hypothesis of a unit root. This variable, however, should be treated more cautiously in the model. All in all, the Cointegration model is to be built with education and inflation at level and the crime rate, abortion, and unemployment at first difference modification.

Table 4.8. Unit root tests outcome

ADF Prob. / Variable	At level	1st difference	2nd difference	Stationary at
CRIME_RATE	0.4158	0.0011	0.0007	1st difference
ABORTION	0.4522	0.1030	0.0000	1st difference
EDUCATION	0.1954	0.9089	–	level*
INFLATION	0.0057	0.0009	0.0029	level
UNEMPLOYMENT	0.3000	0.0041	0.002	1st difference

Source: author's EViews estimations based on Appendix C data.

The Fully modified OLS Cointegration model with stationary variables built with the Barlett Kernel option and the Newey-West bandwidth method results in the model formed using the following equation:

$$\begin{aligned} D(CRIME\_RATE)_t = \beta_0 + \beta_1 \times D(ABORTION)_t + \\ + \beta_2 \times EDUCATION_t + \beta_3 \times INFLATION_t + \\ + \beta_4 \times D(UNEMPLOYMENT)_t + \varepsilon_t \end{aligned} \quad \text{(eq. 4.7)}$$

The model should satisfy the requirement put before it. It explains almost 50% of the crime rate variance, according to R^2, meaning that there are other factors not included that also have their effect upon the crime rate. Unlike previous methods applied to the data, FMOLS results suggest that unemployment is insignificant as its t-statistic is 0.99, too low for a significant variable.

Table 4.9. The FMOLS Cointegration model outcome

Dependent Variable: D(CRIME_RATE)
Method: Fully Modified Least Squares (FMOLS)

Sample (adjusted): 1993 2015
Included observations: 19 after adjustments
Cointegrating equation deterministics: C
Long-run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ABORTION)	-8.455510	2.850475	-2.966352	0.0102
EDUCATION	-184.2404	61.85282	-2.978690	0.0100
INFLATION	-145.4473	67.00303	-2.170757	0.0476
D(UNEMPLOYMENT)	119.2415	119.3018	0.999495	0.3345
C	2446.813	699.9658	3.495618	0.0036

R-squared	0.492687	Mean dependent var	-122.4968
Adjusted R-squared	0.347740	S.D. dependent var	426.0924
S.E. of regression	344.1233	Sum squared resid	1657892.
Long-run variance	51193.20		

Source: author's EViews estimations based on Appendix C data.

The quality of the model check with the Engle-Granger Cointegration test may also be applied. The results received clearly suggest that there is no cointegration between variables; thus, no long-term relations are noted. However, it is commonly known that the Engle-Granger test is not reliable when working with multiple variables, unlike the Johansen Cointegration Test. Thus, its results are not to be trusted.

On the other hand, the Engle-Granger works perfectly well with only two variables, in this case, the crime rate and abortions. The Engle-Granger applied to only those variables suggests results in the Engle-Granger z-statistic value of –14.67677 and probability of 0.1002, which is marginally significant at the 10% significance level. In addition, the differenced residual value in the Engle-Granger Test is significant as well, now at the 1% significance level. From this, the conclusions may be drawn that in accordance with the Engle-Granger Cointegration Test, the abortion and crime rate variables are significantly cointegrated, i.e. related in a long run. Thus, the result of FMOLS Cointegration model may be trusted at least concerning the abortion and crime rate relation checked by the test.

Table 4.10. The Engle-Granger outcome for the abortion and crime variables

Cointegration Test - Engle-Granger

Equation: UNTITLED
Specification: D(CRIME_RATE) D(ABORTION) C
Cointegrating equation deterministics: C
Null hypothesis: Series are not cointegrated
Automatic lag specification (lag=0 based on Schwarz Info Criterion, maxlag=7)

	Value	Prob.*
Engle-Granger tau-statistic	-3.038149	0.1292
Engle-Granger z-statistic	-14.67677	0.1002

*MacKinnon (1996) p-values.

Intermediate Results:

Rho - 1	-0.458649
Rho S.E.	0.150963
Residual variance	176073.1
Long-run residual variance	176073.1
Number of lags	0
Number of observations	32
Number of stochastic trends**	2

**Number of stochastic trends in asymptotic distribution.

Engle-Granger Test Equation:
Dependent Variable: D(RESID)
Method: Least Squares

Sample (adjusted): 1984 2015
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.458649	0.150963	-3.038149	0.0048

R-squared	0.229435	Mean dependent var	0.765608
Adjusted R-squared	0.229435	S.D. dependent var	478.0155
S.E. of regression	419.6107	Akaike info criterion	14.94728
Sum squared resid	5458266.	Schwarz criterion	14.99309
Log likelihood	-238.1565	Hannan-Quinn criter.	14.96247
Durbin-Watson stat	1.798785		

Source: author's EViews estimations based on Appendix C data.

Thus, reviewing the coefficients resulting from the FMOLS, we may observe leaving unemployment behind due to its insignificance, that the inflation variable presents an issue similar to the one which happened to unemployment during the Johansen Cointegration Test and Newey-West OLS, the coefficient defies common sense. The relation between inflation and crime is negative, meaning that changes in inflation lead to inverse changes in the crime rate. Particularly, an increase in inflation by 1% would mean a decrease in the crime rate by 145 crime cases per 100,000 population. Such an unusual situation may only be explained by the long-term nature of the coefficient. Thus, it is obvious that in a short run, inflation reduces the purchasing power of consumers, leaving the demands and

wishes on the same level easily fulfilled by cheap stolen products provided by the crime world, which only encourages the latter to act (Rosenfeld, 2014). However, in the long run, such a relation may be mitigated and even reversed. Government spending on education has an inverse long-term relation to the crime rate, too. According to FMOLS, a 1% change results in 184-unit inverse change in the crime rate. Such results fall into any kind of a common-sense or theoretical explanation possible. Nevertheless, the variable of interest is abortion, and its coefficient is –8.5, which clearly suggests a negative relationship in the long run between this variable and the dependent variable. It is expected that with every abortion carried out per 1,000 live births, the crime rate decreases by 8.5 cases per 100,000 population.

Table 4.11. The FMOLS Cointegration model coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ABORTION)	-8.455510	2.850475	-2.966352	0.0102
EDUCATION	-184.2404	61.85282	-2.978690	0.0100
INFLATION	-145.4473	67.00303	-2.170757	0.0476
D(UNEMPLOYMENT)	119.2415	119.3018	0.999495	0.3345
C	2446.813	699.9658	3.495618	0.0036

Source: author's EViews estimations based on Appendix C data.

Such results may also be presented in the following form of substituted coefficients:

$$\begin{aligned} D(CRIME\_RATE)_t = {} & 2446.81348292 - \\ & - 8.45551042959 \times D(ABORTION)_t - 184.240405884 \times \\ & \times EDUCATION_t - 145.447311792 \times INFLATION_t + \\ & + 119.241497526 \times D(UNEMPLOYMENT)_t + \varepsilon_t \end{aligned} \quad \text{(eq. 4.8)}$$

Compared to that of education, the abortion coefficient may seem not large and serious enough to be considered. However, this is an illusion of scale and depth. Thus, in a recent illustrative year, 2015, only 273.7 abortions took place for every 1,000 live births, of which there were 731,217. From this, we may estimate that abortions performed during 2015 will reduce the crime level of the year 2039 , 24 years from 2015, by roughly 1.7 million cases of crime activities reported. For reference, in 2015, there were about 3.5 million crime cases in total in the UK.

The preceding findings suggest the number of legal abortions that can affect the crime rate. Besides, when coefficients retrieved from the Johansen

Cointegration Test are applied to similar estimations, the decrease in crime cases by 1.7 million in 2039 due to abortions carried out in 2015 changes to an incredible 5.2 million.

Therefore, from this model, we have received results stating that the long-term correlation between legal abortion and the crime rate actually exists. During the course of action, various methods were applied to reach such a conclusion; however, the Johansen Cointegration Test and the Fully Modified Ordinary Least Squares model are most compelling. Thereby, according to the first one, the change in the number of abortions per 1,000 live births by one unit corresponds to about 26-unit reverse change in the crime rate (cases of all crime activity per 100,000 population), while the second one suggests that the coefficient of the correlation is only 8.5. Hence, as FMOLS is considered more trustworthy out of the two, the final coefficient is decided upon as a weighted average, when the weights are given due to the author's own estimation (Gujarati & Porter, 2009). Thus, an assumption of FMOLS weighing 65% of the final abortion-to-crime correlation coefficient, and Johansen Cointegration Test weighing 35% seems to be justified by common experience of the combined usage of the aforementioned econometric methods. From this, we can easily assume that the effect of the abortion coefficient on the crime rate is roughly 15.

Such findings correspond to and complement the findings from part one of the research. It is clear from the econometric discoveries that actual abortions influence the crime rate as does the legal background that lies behind abortion policies and procedures. Altogether, we can draw a conclusion that the initial hypothesis of the thesis cannot be rejected in two dimensions, legal, concerning legal abortion-related policies, and actual, concerning the actual abortions that women undergo. It is also important to understand that abortion policies, as well as abortions performed, are expected to come into effect and influence the crime rate after the passage of time required by potential demoralised children to become criminals.

4.4 Discussion of the received results

To conclude, there are three approaches used in the empirical part of the research to support or undermine the null hypothesis that legal abortion has a strong significant negative effect on the crime rate. The three approaches are the Period Random Effects model built on the basis of panel data of countries with data on the legal status and policies concerning abortions and homicide in 44 countries over a period of 20 years, a general comparison of dynamics of

crime rate, i.e. total crime number per 100,000 from 1960 to 2015 and delayed dynamics of abortions carried out in the UK during the same period, and the Fully Modified OLS model with the previously mentioned data on the number of abortions and the crime rate in the UK. Even though the final purpose of the methods is the same, not only the methods but also dimensions of research applied are different.

Thus, the Period Random Effects model applied to panel data studies the effect of the legal grounds for abortion in countries of the world. In particular, there are nine legal grounds accepted worldwide, allowing a woman to undergo an abortion; there is also a measure of the latest term of gestation until which the abortion is legal. An estimator based on the two factors mentioned is the representation of the level of freedom of the abortion policy in any given country. Hence, with the econometric methods applied, it is concluded that the legal background allowing for abortions may have a potent effect on crime. Thus, if a country is fully legalizing one of nine legal grounds for abortions with a maximum gestational limit or two legal grounds with half a maximum gestational limits, three grounds with one-third of maximum gestational limit each, or finally any other combination of the number of legalized abortion grounds and gestational limit producing 1 according to the aforementioned INDEX formula, the country may expect a homicide drop by somewhere around 0.5 homicides per 100,000 population. For reference, the average homicide level for the world is only 5.3 and this is mainly due to some states having monstrous levels of crime; other countries, such as Poland in 2017, recorded only 0.8 homicides per 100,000 population. For such states, the implementation of such policies would mean a world of difference. There is no doubt in saying that a –0.5 change in the homicide rate due to a one unit change of the INDEX is merely an approximation of the averaged global effect represented by 44 countries. Thus, countries with an already low homicide rate or very strong cultural or social pressure on abortion-related decisions would not be expected to benefit so strongly from changes in legal abortion statuses. However, legal grounds and the gestational limit are only the tips of policies influencing the real availability of abortions in individual countries, especially for the latter types of countries. Hereby, in countries with strong cultural and social animadversion, the gestational limit regulations are not the major reason for abortions not being a matter of free choice. Apart from social judgement and disapproval, other ways to restrain women's freedom to have abortions exist, some of them even enshrined in law. For instance, there are countries where a woman who has undergone an abortion is supervised by police or other law enforcement institutions like a common criminal, in other countries, abortions are impossible without spousal consent;

there are even places on the Earth where sex restrictions are applied to abortions meaning that abortions can only be carried out if the foetus is confirmed to be of a particular sex, usually female foetuses are allowed to be aborted while male ones are not. These and other factors of withholding women's right to undergo abortions if they wish to do so, together with the absence of legal grounds for abortions and low gestational limits may be, and most likely are, the reasons for children with a higher risk of committing a crime being born. It should be reminded that unwanted children or pregnancies that can potentially result in abortion, if it is allowed, have a much higher chance to deviate and choose the path of crime due to reasons such as being traumatized by not receiving enough parenting love, lack of discipline, low standards of living, negative influence of the surroundings, and other. Thus, from the theoretical reasoning and empirical evidence, we may draw a conclusion that high freedom in the legal status of abortion promoted by appropriate policies and social changes towards freedom of choice may be of much use to decrease crime.

On the other hand, we have some evidence in favour of the initial hypothesis presented with the help of the time series from the UK. This data provides another point of view, different from the previous one as it does not look at the legal ability to undergo abortions, but reviews actual abortions carried out in the UK in the period from 1960 to 2015 and their effect on the crime rate some years after they were performed. The first piece of evidence available with this data is a mere comparison of the dynamics of the variables of interest, abortion and crime rate. As there are two peaks followed by downslides in the crime rate, there is also a period we call the 'Abortion Boom' in the UK between 1968 and 1977, which fits almost perfectly into the graphic representation of crime. We observe the first drop of the crime rate 25 years after the beginning of the 'Abortion Boom' and another one about 27 years after its end. It is a piece of rather simple but imposing evidence in favour of abortion being negatively correlated to crime. Nevertheless, the Fully Modified OLS Cointegration model has also been applied to the data at hand, together with the Johansen and Engle-Granger Cointegration Tests. All of them strongly suggest that there is a long-term relationship between the abortion and the crime variable. The model and tests also result in an estimated coefficient stating that every abortion conducted per 1,000 live births in the UK, on average, results in around 15 crime cases fewer per 100,000 population after 24 years. It has been elaborated before that even such a small coefficient with modern levels of the abortion rate in the UK has a great impact on lowering the crime rate in the long run. Yet, it is should be obvious that such results may not necessarily be similar in other countries or regions due to the difference of exogenous factors present. Nevertheless, it is

clear that not only the legal status of abortions matters but also their actual number. The number may in fact be a representation of the legal policies being implemented in real life. The United Kingdom may actually be considered a country with an average, considerable level of freedom as regards the abortion policies. The cultural and social attitude towards abortions is quite positive too. Together, this leads to considerable abortion rates. Thus, the factual abortion rate variable represents the effect of social and cultural burden not present in the legal grounds-related part of the research filling the gaps in the explanation of the crime rate variance. This gives us grounds to confirm the statement that the legalization of abortion may result in a considerable crime rate reduction and provide additional evidence in favour of the statement that processes of judicial, social, and cultural nature have great importance, too. Therefore, these findings are yet another piece of evidence in favour of the hypothesis that legal abortions are a significant tool in fighting crime in the way of reducing the number of unwanted, unloved children, or children born and raised in inappropriate conditions, who have high chances of becoming criminals.

To conclude, the methodology used in this work proves to be useful in supporting the statement that legal abortions have a strong effect on the crime rate. The matter is reviewed from two points of view: legal policies concerning abortion implemented in individual countries and actual abortions performed as a result of the aforementioned policies. The results of both approaches may be briefly summarised in an interpretation stating that the legalization of abortions can be quite beneficial for a country in terms of fighting crime by allowing people freedom to decide not to have unwanted children who could potentially have higher chances of becoming criminals.

5. Conclusion

Abortions have always been a controversial issue in society. There are two major groups in the world, voting for and against abortions. The author of this work does not take any sides in this debate while reviewing the ongoing dispute about legalized abortions and crime raised by Donohue and Levitt (2001). In their view, the legalization of abortions in the USA in 1973 with the legal case of Roe v Wade was the major reason for a tremendous drop in the crime rate in the USA, and NYC in particular, in the early 1990s. They argued that pregnancies unwanted due to a great range of reasons result in births of children that are unloved, raised in inappropriate conditions and surroundings, etc. Such children also prove to be a group at risk of committing crime in the future. Thus, a legal opportunity to stop such pregnancies, in view of Donohue and Levitt, would prevent the potential crime from happening. Both the statement and the research have been criticized by some researchers as well as supported by others. The disputes between economists and sociologists studying this issue are additionally spiced up with the question of morality. Thus, the purpose of this thesis has been also to review the original statement.

Thereby, econometric methods of analysis are applied to particular data with the purpose of confirming or rejecting of the results obtained by Donohue and Levitt. This work targets major dimensions of legal abortions. The first one is the legality of abortion itself. Data on 44 countries during the period of 1998 to 2017 are used in this part of the research. The data take into account the degree of freedom of abortion policies in terms of legal reasons to permit abortions and additional time limitations applied to those legal grounds, the so-called gestational limits. The abortion data are used together with the homicide data, which account for the number of intentionally killed people per 100,000 population. The results clearly indicate that the countries with higher freedom of abortion-related policies, i.e. with more legal grounds implied and higher gestational limits also have a lower level of the homicide rate. The methods applied enable us to claim that the introduction of abortion policies which would account for an increase of the INDEX estimator by 1 would lower the homicide rate by approximately 0.5 homicides per 100,000 population. The effect of policies implied may vary from country to country due to the difference in cultures and social norms. Nevertheless, it clearly is a piece of evidence in favour of the hypothesis popularized by Donohue and Levitt.

The second dimension of the research is concerned with the actual figures of abortions conducted. This part of the analysis follows the pattern outline by

Donohue and Levitt to some extent. Just like they observed the United States of America and the impact of the abortions on a crime rate there; this particular thesis focuses on the United Kingdom. Indeed, a similar phenomenon can be observed in both countries, i.e. we may observe a long-lasting trend of crime growth until suddenly it drops in both countries in the 1990s. Another peculiar thing observed in both cases is that abortion is legalised exactly a generation before the decrease. More particularly, in the British case, two drops can be observed, which both fit into the beginning and the end of sudden abortion rate growth period, the so-called the 'Abortion Boom'. Such trend coincidences are very unlikely to have happened randomly both in the USA and in the UK. The mathematical models applied to the data also illustrate a negative correlation between abortion and crime. Hereby, in the UK, every abortion per 1,000 live births results in 15 cases of any kind of crime fewer per 100,000 population in the long run. Thus, the relatively moderate crime level in the UK now may be believed to be partly the result of all the abortions conducted back in the middle of the 1990s.

Such an experience can be projected on a range of countries burdened by their too strict abortion policies with a high crime rate. There is various evidence claiming that abortion freedom is a progressive approach towards higher population safety and, subsequently, economic stability. Thus, looking through the data, some clear tendencies can be observed: commonly assumed prosperous and safe countries such as Canada, Denmark, Japan, Norway, Singapore, Sweden, the UK, and the USA and others have relatively low crime levels as well as a high level of abortions awareness. In most of these countries, abortions are not only allowed and legally supported by the governments but also socially accepted and not judged. Countries such as the Scandinavian ones have worked hard on building societies that do not limit people's freedom to make their own decisions, which has enabled them to be so highly ranked in all kinds of social and economic ratings, including the safety and confidence in future ratings. On the other hand, there are other countries, mostly burdened with social issues and outdated cultural backgrounds such as some Latin American, Middle Eastern, African countries, and even some in Europe. Not only are abortions prohibited by law in any form there, but they are also condemned by the society. People in these countries cannot get an abortion if they cannot afford to raise a child at the moment, if they are not ready for it, or if they simply do not want children. As a matter of fact, abortions are even legally or factually prohibited in some countries in cases of rape and incest, or even in cases of woman's life or health being in severe danger, e.g. a rape victim legally has no other option but to give birth to a child that might be hated later on due to the traumatic conception experience. Thus, a vicious circle of violence breeding more violence may continue.

Thus, judging from the results retrieved from this research, these countries and people cannot expect their crime situation to stabilize and the living standard to improve. The abortion and crime trend correlations from the USA and the UK might serve as illustrative examples of legal abortions being a reason for crime levels to decrease for countries that suffer more from crime.

However, it is not only crime that should be of concern. From the experience of other economists and using mere common sense, we may conclude that crime is very closely bound to economic performance or, as some researchers tend to call it, business cycles fluctuations. It is widely known that crime leads to economic and financial issues. As a matter of fact, it is claimed that crime and business cycles actually affect each other. Nevertheless, it should be noted that when talking about growing crime, we may as well predict the economy to suffer from this. History teaches us that the most crime-ridden times are also the times of great economic downturns, for instance, thriving criminal activity of the mafia in the 1920s–1930s and the Great Depression partially resulted from it. Crises like this result in the instability of the financial system, balance of payments deficit, enormous unemployment and inflation levels, product deficit, poverty and other displays of economic and financial misfortunes. Therefore, we may conclude that abortion also has an impact on economic growth via crime. This makes legalization of abortions even more useful for society in general.

The relevance of the topic to the realities of the modern world lays in the need of the mentioned modern world to move on towards freedom, understanding, respect, appreciation, and emancipation. People need to break out of their dark cages and perceive the world as it is. Pragmatical evidence such as the research conducted is of much use for people to understand how seemingly unrelated to standard macroeconomic indicators phenomena and processes influence the life of the whole society. It is clear that neither Donohue and Levitt's work nor this one, in particular, have an intention to advocate ideas of abortions. The major point that needs to be understood is that the world is much more complicated, and we need to view things in a much broader manner to finally understand the way the world works.

Indeed, the empirical evidence provided in the thesis still might be improved. First of all, more complete data about the legal status of abortions, not only legal grounds and gestational limits but also other indicators, could be beneficial to track down the strength of abortion legalization on crime. Besides, country-specific research studies carried out with other countries would widen the range of example and strengthen the evidence base. Any data improvements can be beneficial, as can be the usage of more sophisticated mathematical tools and methods.

Nevertheless, the methods applied to the research enables us to draw final conclusions stating that legal abortion actually does have a significant negative impact on the crime rate. As this work was initially aimed at reviewing Donohue and Levitt's sensational work, it ended up providing further evidence with the resources available.

Bibliography

1. Anderson, D.A., 1999. The aggregate burden of crime. *The Journal of Law and Economics,* 42(2), pp. 611–642.
2. Beck, A.J., Gilliard, D., Greenfield, L., Harlow, C., Hester, T., Jankowski, L., Snell, T., Stephan, J., Morton, D., 1993. Survey of state prison inmates, 1991. *National Contest Journal*, 136949.
3. Becker, G.S., 1968. Crime and punishment: An economic approach. In: N.G. Fielding, A. Clarke, R. Witt (eds.), *The economic dimensions of crime,* Hampshire, London, New York: Macmillan Press Ltd., pp. 13–68.
4. Bolton, P., 2019. Education spending in the UK, *House of Commons Library Briefing Paper*, 1078.
5. Brand, S., Price, R., 2000. The economic and social costs of crime. Munich Personal RePEc Archive, https://mpra.ub.uni-muenchen.de/74968/ (accessed 19.12.2019).
6. Carr-Hill, R.A., Field, S., 1992. Trends In Crime and Their Interpretation: A Study of Recorded Crime in Post-War England and Wales. Home Office Research. *The British Journal of Criminology,* 32(2), pp. 222–225.
7. Commission on Population Growth and the American Future, 1972. *Population and the American Future,* Washington, DC: U.S. Government Printing Office.
8. Cook, P.J., Laub, J.H., 2002. After the epidemic: Recent trends in youth violence in the United States. *Crime and Justice,* 29, pp. 1–37.
9. Cook, P.J., Zarkin, G.A., 1985. Crime and the business cycle. *The Journal of Legal Studies,* 14(1), pp. 115–128.
10. Courtwright, D.T., 2009. Violent land: Single men and social disorder from the frontier to the inner city. Reprint ed. Cambridge: Harvard University Press.
11. Czabanski, J., 2008. Estimates of cost of crime: history, methodologies, and implications. Berlin: Springer Science & Business Media.
12. Deadman, D., Pyle, D., 1994. Crime and business cycle in post-war Britain. *The British Journal of Criminology,* 34(3), pp. 339–357.
13. Denman, J., McDonald, P., 1996. Unemployment statistics from 1881 to the present day. *Labour Market Trends,* 104(1), pp. 5–18.
14. Detotto, C., Otranto, E., 2010. Does crime affect economic growth? *Kyklos,* 63(3), pp. 330–345.
15. Detotto, C., Vannini, M., 2010. Counting the cost of crime in Italy. *Global Crime,* 11(4), pp. 421–435.

16. Dills, A.K., Miron J.A., Summers, G., 2008. What do economists know about crime? https://www.degruyter.com/document/doi/10.7208/9780226153766-010/html (accessed 26.04.2020).
17. Donohue, J.J., Levitt, S.D., 2001. The impact of legalized abortion on crime. *The Quarterly Journal of Economics,* 116(2), pp. 379–420.
18. Donohue, J.J., Levitt, S.D., 2004. Further evidence that legalized abortion lowered crime a reply to Joyce. *Journal of Human Resources,* 39(1), pp. 29–49.
19. Donohue, J.J., Levitt, S.D., 2019. The Impact of Legalized Abortion on Crime over the Last Two Decades, https://bfi.uchicago.edu/wp-content/uploads/BFI_WP_201975.pdf (accessed 26.04.2020).
20. Duna, A.J., 2006. America in the fifties. Syracuse: Syracuse University Press.
21. Eurostat, 2019. Crime statistics, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Crime_statistics (accessed 9.12.2019).
22. Farell, G., Tilley, N., Tseloni, A., 2014. Why the Crime Drop? *Crime and Justice,* 43(1), pp. 421–490.
23. Farrington, D.P., 1986. Age and crime. *Crime and justice,* 7, pp. 189–250.
24. Foote, C., Goetz, C., 2008. The Impact of Legalized Abortion on Crime: Comment. *Quarterly Journal of Economics,* 123(1), pp. 407–423.
25. Fox, J.A., 2000. Demographics and U.S. Homicide. In: A. Blumstein, J. Wallman (eds.), The Crime Drop in America. New York: Cambridge University Press, pp. 288–317.
26. Gillani, S.Y.M., Rehman, H.U., Gill, A.R., 2009. Unemployment, poverty, inflation and crime nexus: Cointegration and causality analysis of Pakistan. *Pakistan Economic and Social Review,* pp. 79–98.
27. Glaser, D., Rice, K., 1959. Crime, Age, and Employment. *American Sociological Review*, 24, pp. 679–686.
28. GOV.UK, 2020. The national curriculum, https://gov.uk/national-curriculum (accessed 26.04.2020).
29. Gruber, J., Levine, P., Staiger, D., 1999. Abortion Legalization and Child Living Circumstances: Who Is the 'Marginal Child?' *Quarterly Journal of Economics,* 114, pp. 263–291.
30. Gujarati, D.N., Porter, D.C., 2009. Basic econometrics. 5 ed. New York: McGraw-Hill.
31. Guttmacher Institute, 2019. *Data Center,* https://data.guttmacher.org/states?state=US&topics=90+88 (accessed 19.12.2019).
32. Hale, C., 1998. Crime and the business cycle in post-war Britain revisited. *The British Journal of Criminology,* 38(4), pp. 681–698.
33. Hansen, K., 2003. Education and the crime-age profile. *British Journal of Criminology,* 43(1), pp. 141–168.
34. Harari, Y.N., 2014. Sapiens: A brief history of humankind. New York: Random House.

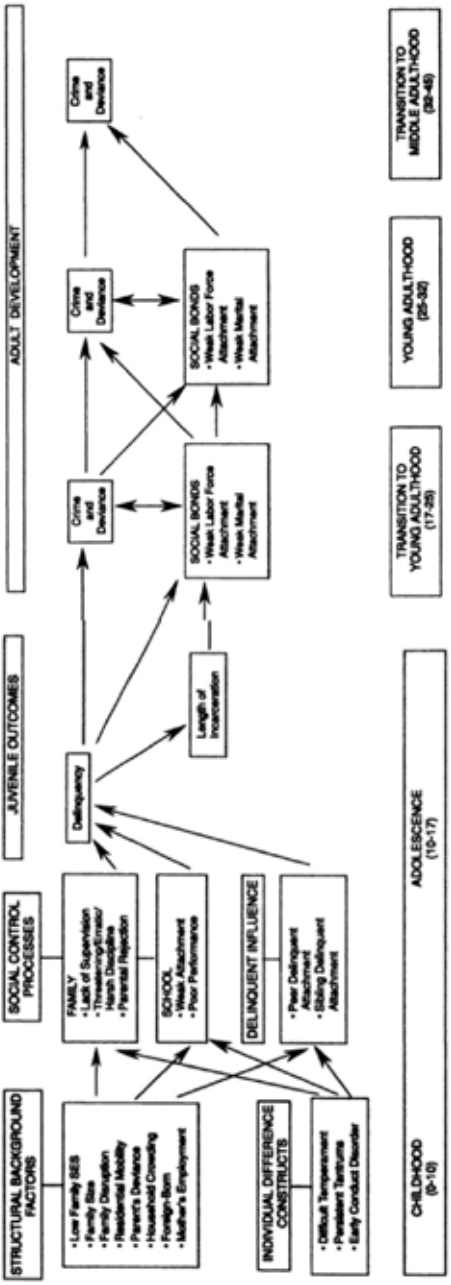
35. Home Office, 2016. Historical crime data, https://gov.uk/government/statistics/historical-crime-data (accessed 1.05.2020).
36. International Monetary Fund, 2020. Inflation rate, average consumer prices, https://imf.org/external/datamapper/PCPIPCH@WEO/OEMDC/ADVEC/WEOWORLD (accessed 1.05.2020).
37. International Monetary Fund, 2020. Unemplyment rate, https://imf.org/external/datamapper/LUR@WEO/OEMDC/ADVEC/WEOWORLD (accessed 1.05.2020).
38. Johnston, W.R., 2020. Historical abortion statistics, United Kingdom, http://johnstonsarchive.net/policy/abortion/ab-unitedkingdom.html (accessed 1.05.2020).
39. Joyce, T.J., 2011. Abortion and Crime: A Review. In: B. Benson, P.R. Zimmerman (eds.), *Handbook on the Economics of Crime*. Cheltenham: Elgar.
40. Kahane, L.H., Paton, D., Rob, S., 2008. The abortion-crime link: Evidence from England and Wales. *Economica,* 75(297), pp. 1–21.
41. Kelling, G.L., Sousa, W.H., 2001. Do Police Matter? An Analysis of the Impact of New York City's Police Reforms. New York: Manhattan Institute.
42. Levine, P.B., Staiger, D., Kane, T.J., Zimerman, D.J., 1999. Roe v Wade and American Fertility. *American Journal of Public Health,* 89(2), pp. 199–203.
43. Levitt, S.D., Dubner, S.J., 2005. Freakonomics. New York: William Morrow.
44. Lochner, L., 2020. Education and crime. In: S. Bradley, C. Green (eds.) The Economics of Education, 2nd ed. London: Academic Press, pp. 109–117.
45. Lochner, L., Moretti, E., 2004. The Effect of Education on Crime: Evidence From Prison Inmates, Arrests, and Self-Reports. *American Economic Review,* 94(1), pp. 155–189.
46. Mauborgne, R., Chan, W.K., 2005. Blue Ocean Strategy. Boston: Harvard Business School Publishing Corporation.
47. Ouiment, M., 2002. Explaining the American and Canadian Crime 'Drop' in the 1990s. *Canadian Journal of Criminology and Criminal Justice,* 44(1), pp. 33–50.
48. Pinker, S., 2012. The better angels of our nature: Why violence has declined. New York: Penguin Group USA.
49. Räsänen, P., Hakko, H., Isohanni, M., Hodgins, S., Järvelin, M.R., Tiihonen, J., 1999. Maternal smoking during pregnancy and risk of criminal behavior among adult male offspring in the Northern Finland 1966 Birth Cohort. *American Journal of Psychiatry,* 156(6), pp. 857–862.
50. Raine, A., Brennan, P., Mednick, B., Mednick, S., 1996. High Rates of Violence, Crime, Academic Problems, and Behavioral Problems in Males with Both Early Neuromotor Deficits and Unstable Family Environment. *Archives of General Psychiatry,* 103, pp. 544–549.
51. Raine, A., Brennan, P., Mednick, S., 1994. Birth Complications Combined with Early Maternal Rejection at Age 1 Year Predispose to Violent Crime at Age 18 Years. *Archives of General Psychiatry,* 101, pp. 984–988.

52. Ramiro, M., Mehlman-Orozco, K.B., 2013. Hispanic Immigration and Crime. In: M. Tonry, S. Bucerius (eds.), *Oxford Handbook of Ethnicity, Crime, and Immigration*. Oxford: Oxford University Press.
53. Rosenfeld, R., 2009. Crime is the problem: Homicide, acquisitive crime, and economic conditions. *Journal of Quantitative Criminology,* 25(3), pp. 287–306.
54. Rosenfeld, R., 2014. Crime and inflation in cross-national perspective. *Crime and Justice,* 43(1), pp. 341–366.
55. Rothbard, M.N., 1995. Making Economic Sense. Auburn: Ludwig von Mises Institute.
56. Sampson, R.J., 2006. Open Doors Don't Invite Criminals. *New York Times*, 11 March.
57. Sampson, R.J., 2008. Rethinking Crime and Immigration. *Contexts,* 7(1), pp. 28–33.
58. Sampson, R., Laub, J., 1993. Crime in the Making: Pathways and Turning Points through Life. Cambridge: Harvard University Press.
59. Sen, A., 2007. Does increased abortion lead to lower crime? Evaluating the relationship between crime, abortion, and fertility. *The BE Journal of Economic Analysis & Policy,* 7(1).
60. Sklar, J., Berkov, B., 1974. Abortion, illegitimacy, and the American birth rate. *Science,* 185(4155), pp. 909–915.
61. Spelman, W., 2000. The Limited Importance of Prison Expansion. In: A. Blumstein, J. Wallman (eds.), *The crime drop in America*. New York: Cambridge University Press, pp. 123–125.
62. Stowell, J.I., Messner, S.F., McGeever, K.F., Raffalovich, L.E., 2009. Immigration and the Recent Violent Crime Drop in the United States: A Pooled, Cross-Sectional Time-Series Analysis of Metropolitan Areas. *Criminology,* 47(3), pp. 889–929.
63. Tang, C.F., 2009. The linkages among inflation, unemployment and crime rates in Malaysia. *International Journal of Economics and Management,* 3(1), pp. 50–61.
64. The World Bank, 2020. Government expenditure on education, total (% of government expenditure), https://data.worldbank.org/indicator/SE.XPD.TOTL.GB.ZS (accessed 1.05.2020).
65. The World Bank, 2020. Intentional homicides (per 100,000 people), https://data.worldbank.org/indicator/VC.IHR.PSRC.P5 (accessed 1.05.2020).
66. Torruam, J.T., Abur, C., 2014. The relationship between unemployment, inflation and crime: An application of cointegration and causality analysis in Nigeria. *Journal of Economics and Sustainable Development,* 5(4), pp. 131–137.
67. Tracy, P.E., Wolfgang, M.E., Figlio, R.M., 2013. Delinquency careers in two birth cohorts. Berlin: Springer Science & Business Media.
68. US Bureau of Justice, 2006. Crime in the US, 1960–2004, https://web.archive.org/web/20110720192206/http://bjsdata.ojp.usdoj.gov/dataonline/Search/Crime/State/StateCrime.cfm (accessed 10.12.2019).

69. Wallace, J., Wild, S.E., 2010. Webster's new world law dictionary. Boston: Houghton Mifflin Harcourt.
70. World Bank, 2019. Government expenditure on education, total (% of GDP) – Italy, https://data.worldbank.org/indicator/SE.XPD.TOTL.GD.ZS?locations=IT (accessed 22.12.2019).
71. World Bank, 2019. Population growth (annual %) – United States, https://data.worldbank.org/indicator/SP.POP.GROW?locations=US (accessed 14.12.2019).
72. World Health Organization, 2020. Global Abortion Policies Database, https://abortion-policies.srhr.org/ (accessed 1.05.2020).
73. Zimring, F.E., 2001. The city that became safe: New York's lessons for urban crime and its control. Oxford: Oxford University Press.

Appendices

Appendix A. Factors leading to delinquency compiled by Laub and Sampson



Appendix B. Data used for the global scoped empirical findings about the legal status of abortions and homicide rate

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Albania	1998	4.12820513	6	21.3	17.7	20.6	9.62407
Albania	1999	4.12820513	6	17.1	18.4	0.4	9.68246
Albania	2000	4.12820513	6	4.2	16.8	0	10.13703
Albania	2001	4.12820513	6	7	16.4	3.1	10.58193
Albania	2002	4.12820513	6	6.9	15.8	5.2	9.88692
Albania	2003	4.12820513	6	5.3	15	2.4	10.5736
Albania	2004	4.12820513	6	4.2	14.4	2.9	10.70316
Albania	2005	4.12820513	6	5	14.1	2.4	11.35797
Albania	2006	4.12820513	6	3.1	13.8	2.4	10.93295
Albania	2007	4.12820513	6	3.5	13.4	3	11.17719
Albania	2008	4.12820513	6	3.1	13.1	3.3	
Albania	2009	4.12820513	6	2.9	13.8	2.2	
Albania	2010	4.12820513	6	4.3	14	3.6	
Albania	2011	4.12820513	6	4.9	14	3.4	
Albania	2012	4.12820513	6	5.4	13.4	2	
Albania	2013	4.12820513	6	4.2	16	1.9	12.12391
Albania	2014	4.12820513	6	4	17.5	1.6	
Albania	2015	4.12820513	6	2.8	17.1	1.9	11.3177
Albania	2016	4.12820513	6	3.4	15.2	1.3	13.59696
Albania	2017	4.12820513	6	2.3	13.8	2	12.3908
Armenia	1998	0.87179487	1	3	no data	8.7	
Armenia	1999	0.87179487	1	2.9	no data	0.6	

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Armenia	2000	0.87179487	1	3	no data	–0.8	
Armenia	2001	0.87179487	1	2.9	38.4	3.1	
Armenia	2002	0.87179487	1	2.3	35.3	1.8	
Armenia	2003	0.87179487	1	2.5	31.2	4.5	
Armenia	2004	0.87179487	1	2.8	31.6	5.9	
Armenia	2005	0.87179487	1	1.9	31.2	0.7	13.64809
Armenia	2006	0.87179487	1	2.7	27.8	3.4	13.57852
Armenia	2007	0.87179487	1	2.6	28.7	4.6	13.46559
Armenia	2008	0.87179487	1	3.3	16.4	9	14.26845
Armenia	2009	0.87179487	1	3.4	18.7	3.5	13.45122
Armenia	2010	0.87179487	1	1.9	19	7.3	12.40051
Armenia	2011	0.87179487	1	2.5	18.4	7.7	12.59334
Armenia	2012	0.87179487	1	2.3	17.3	2.5	12.36897
Armenia	2013	0.87179487	1	2.2	16.2	5.8	11.13676
Armenia	2014	0.87179487	1	2.5	17.6	3	9.36712
Armenia	2015	0.87179487	1	2.6	18.5	3.7	10.65636
Armenia	2016	0.87179487	1	3	20.3	–1.4	10.1972
Armenia	2017	0.87179487	1	2.4	18.7	1	10.40313
Austria	1998	4.33333333	5	1	4.7	0.8	11.29195
Austria	1999	4.33333333	5	0.7	4.1	0.5	12.15057
Austria	2000	4.33333333	5	1	3.9	2	11.03322
Austria	2001	4.33333333	5	0.9	4	2.3	10.85632
Austria	2002	4.33333333	5	0.8	4.4	1.7	10.53233
Austria	2003	4.33333333	5	0.6	4.8	1.3	10.73962
Austria	2004	4.33333333	5	0.7	5.5	2	9.87333

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Austria	2005	4.33333333	5	0.7	5.7	2.1	10.26185
Austria	2006	4.33333333	5	0.7	5.2	1.7	10.37458
Austria	2007	4.33333333	5	0.5	4.9	2.2	10.45229
Austria	2008	4.33333333	5	0.7	4.1	3.2	10.55515
Austria	2009	4.33333333	5	0.6	5.3	0.4	10.58393
Austria	2010	4.33333333	5	0.7	4.8	1.7	10.78913
Austria	2011	4.33333333	5	0.9	4.6	3.5	10.98849
Austria	2012	4.33333333	5	0.9	4.9	2.6	10.70118
Austria	2013	4.33333333	5	0.7	5.3	2.1	10.74029
Austria	2014	4.33333333	5	0.5	5.6	1.5	10.41116
Austria	2015	4.33333333	5	0.5	5.7	0.8	10.69348
Austria	2016	4.33333333	5	0.7	6	1	10.95385
Austria	2017	4.33333333	5		5.5	2.2	
Azerbaijan	1998	0.30769231	1	3.5	no data	–0.8	18.75694
Azerbaijan	1999	0.30769231	1	3	no data	–8.5	21.60498
Azerbaijan	2000	0.30769231	1	2.8	11.8	1.8	21.11908
Azerbaijan	2001	0.30769231	1	2.7	10.9	1.8	20.87755
Azerbaijan	2002	0.30769231	1	2.6	10	2.8	13.63072
Azerbaijan	2003	0.30769231	1	2.2	9.2	2.1	15.17084
Azerbaijan	2004	0.30769231	1	2.4	8	6.7	14.23504
Azerbaijan	2005	0.30769231	1	2.2	7.3	9.6	13.22315
Azerbaijan	2006	0.30769231	1	2.2	6.6	8.2	10.10042
Azerbaijan	2007	0.30769231	1	2.2	6.3	16.6	9.77937
Azerbaijan	2008	0.30769231	1	2.2	5.9	20.8	7.76384
Azerbaijan	2009	0.30769231	1		5.7	1.3	9.34393

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Azerbaijan	2010	0.30769231	1	2.3	5.6	5.7	8.70084
Azerbaijan	2011	0.30769231	1		5.4	7.8	7.21986
Azerbaijan	2012	0.30769231	1	2.2	5.2	1	5.64367
Azerbaijan	2013	0.30769231	1	2.4	5	2.4	6.46413
Azerbaijan	2014	0.30769231	1	2.5	4.9	1.4	7.23873
Azerbaijan	2015	0.30769231	1	2.3	5	4	7.6311
Azerbaijan	2016	0.30769231	1	2.1	5	12.4	8.2069
Azerbaijan	2017	0.30769231	1	2	5	12.8	6.9504
Belarus	1998	2.87179487	3	10.3	2.3	73	
Belarus	1999	2.87179487	3	9.8	2.1	293.7	
Belarus	2000	2.87179487	3	10.2	2.1	168.6	
Belarus	2001	2.87179487	3	9.8	2.3	61.1	
Belarus	2002	2.87179487	3	10.1	2.7	42.6	
Belarus	2003	2.87179487	3	9	3.1	28.4	
Belarus	2004	2.87179487	3	8.4	2.5	18.1	12.55235
Belarus	2005	2.87179487	3	8.6	1.7	10.3	12.62011
Belarus	2006	2.87179487	3	7.7	1.4	7	12.45032
Belarus	2007	2.87179487	3	6.8	1.1	8.4	10.13372
Belarus	2008	2.87179487	3	5.7	0.9	14.8	
Belarus	2009	2.87179487	3	5.1	0.9	13	8.44955
Belarus	2010	2.87179487	3	4.2	0.8	7.7	11.77813
Belarus	2011	2.87179487	3	3.9	0.7	53.2	11.62665
Belarus	2012	2.87179487	3	3.6	0.6	59.2	12.7523
Belarus	2013	2.87179487	3	3.5	0.5	18.3	12.27399
Belarus	2014	2.87179487	3	3.6	0.5	18.1	12.40672

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Belarus	2015	2.87179487	3		0.9	13.5	11.46173
Belarus	2016	2.87179487	3		1	11.8	12.15878
Belarus	2017	2.87179487	3		0.8	6	12.28169
Brazil	1998	1.12820513	2	22.6	14.7	3.2	11.62986
Brazil	1999	1.12820513	2	22.8	14.7	4.9	9.60027
Brazil	2000	1.12820513	2	23.7	13.9	7	11.45216
Brazil	2001	1.12820513	2	24.7	12.5	6.8	10.61096
Brazil	2002	1.12820513	2	25.3	13	8.4	9.6373
Brazil	2003	1.12820513	2	25.7	13.7	14.7	
Brazil	2004	1.12820513	2	24	12.9	6.6	10.41292
Brazil	2005	1.12820513	2	23.3	11.4	6.9	11.26515
Brazil	2006	1.12820513	2	23.9	11.5	4.2	12.4269
Brazil	2007	1.12820513	2	23.4	10.9	3.6	13.22306
Brazil	2008	1.12820513	2	23.8	9.4	5.7	14.08374
Brazil	2009	1.12820513	2	22.8	9.7	4.9	14.72693
Brazil	2010	1.12820513	2	22	8.5	5	14.16016
Brazil	2011	1.12820513	2	24.2	7.8	6.6	15.26901
Brazil	2012	1.12820513	2	26.5	7.4	5.4	15.72767
Brazil	2013	1.12820513	2	26.8	7.2	6.2	15.59278
Brazil	2014	1.12820513	2	28.6	6.8	6.3	15.44382
Brazil	2015	1.12820513	2	28.4	8.3	9	16.21822
Brazil	2016	1.12820513	2	29.7	11.3	8.7	
Brazil	2017	1.12820513	2	30.5	12.8	3.4	
Bulgaria	1998	2.82051282	4	4.7	12.4	18.7	8.95102
Bulgaria	1999	2.82051282	4	4.1	13.8	2.6	

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Bulgaria	2000	2.82051282	4	4.2	18.1	10.3	
Bulgaria	2001	2.82051282	4	3.9	17.5	7.4	9.27774
Bulgaria	2002	2.82051282	4	3.2	17.4	5.8	9.65432
Bulgaria	2003	2.82051282	4	3.2	13.9	2.3	11.18025
Bulgaria	2004	2.82051282	4	3.2	12.2	6.1	6.703
Bulgaria	2005	2.82051282	4	2.6	10.2	6	12.07252
Bulgaria	2006	2.82051282	4	2.4	9	7.4	12.01048
Bulgaria	2007	2.82051282	4	2.3	6.9	7.6	11.11392
Bulgaria	2008	2.82051282	4	2.3	5.7	12	12.61226
Bulgaria	2009	2.82051282	4	2	6.9	2.5	12.65675
Bulgaria	2010	2.82051282	4	2	10.3	3	11.16342
Bulgaria	2011	2.82051282	4	1.7	11.3	3.4	11.10005
Bulgaria	2012	2.82051282	4	1.9	12.4	2.4	10.69092
Bulgaria	2013	2.82051282	4	1.5	13	0.4	11.4398
Bulgaria	2014	2.82051282	4	1.6	11.5	–1.6	
Bulgaria	2015	2.82051282	4	1.8	9.2	–1.1	
Bulgaria	2016	2.82051282	4	1.1	7.7	–1.3	
Bulgaria	2017	2.82051282	4	1.5	6.2	1.2	
Cabo Verde	1998	4.30769231	7		24	4.4	17.25592
Cabo Verde	1999	4.30769231	7		22	4.3	16.76194
Cabo Verde	2000	4.30769231	7		20	–2.4	
Cabo Verde	2001	4.30769231	7		21	3.7	
Cabo Verde	2002	4.30769231	7		20.5	1.9	19.76623
Cabo Verde	2003	4.30769231	7	3.3	20	1.2	
Cabo Verde	2004	4.30769231	7	4.5	19.5	–1.9	20.84048

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Cabo Verde	2005	4.30769231	7	9.3	21.4	0.4	
Cabo Verde	2006	4.30769231	7	7.3	13.4	4.8	17.54058
Cabo Verde	2007	4.30769231	7	6	15.2	4.4	18.32875
Cabo Verde	2008	4.30769231	7	6.9	13	6.8	18.24099
Cabo Verde	2009	4.30769231	7	7.6	13	1	15.88655
Cabo Verde	2010	4.30769231	7	7.8	10.7	2.1	14.2169
Cabo Verde	2011	4.30769231	7	10.4	12.2	4.5	15.15328
Cabo Verde	2012	4.30769231	7	10.9	16.8	2.5	
Cabo Verde	2013	4.30769231	7	10.4	16.4	1.5	14.77823
Cabo Verde	2014	4.30769231	7	12.3	12	–0.2	16.28219
Cabo Verde	2015	4.30769231	7	8.6	10	0.1	16.74823
Cabo Verde	2016	4.30769231	7	11.5	9	–1.4	17.84301
Cabo Verde	2017	4.30769231	7		9	0.8	16.41258
Croatia	1998	5.25641026	6	2.3	11.6	6.7	
Croatia	1999	5.25641026	6	2.5	18.6	4	
Croatia	2000	5.25641026	6	2.3	20.6	4.6	
Croatia	2001	5.25641026	6	1.8	21.5	3.8	
Croatia	2002	5.25641026	6	1.7	21.8	1.7	7.55612
Croatia	2003	5.25641026	6	1.6	19.1	1.8	7.75087
Croatia	2004	5.25641026	6	1.9	17.8	2.1	7.83662
Croatia	2005	5.25641026	6	1.6	17.6	3.3	
Croatia	2006	5.25641026	6	1.7	16.5	3.2	
Croatia	2007	5.25641026	6	1.4	14.7	2.9	8.73112
Croatia	2008	5.25641026	6	1.6	13	6.1	9.4254
Croatia	2009	5.25641026	6	1.1	14.5	2.4	9.07877

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Croatia	2010	5.25641026	6	1.4	17.2	1	8.83678
Croatia	2011	5.25641026	6	1.1	17.4	2.3	8.55059
Croatia	2012	5.25641026	6	1.2	18.6	3.4	
Croatia	2013	5.25641026	6	1.1	19.8	2.2	9.56341
Croatia	2014	5.25641026	6	0.8	19.3	–0.2	
Croatia	2015	5.25641026	6	0.9	17.1	–0.5	
Croatia	2016	5.25641026	6	1	15	–1.1	
Croatia	2017	5.25641026	6	1.1	12.4	1.1	
Cyprus	1998	1.28205128	7	0.8	3.4	2.3	
Cyprus	1999	1.28205128	7	1.1	3.6	1.1	13.90412
Cyprus	2000	1.28205128	7	0.8	4.8	4.9	14.26831
Cyprus	2001	1.28205128	7	0.7	3.9	2	14.32157
Cyprus	2002	1.28205128	7	0.2	3.5	2.8	14.91421
Cyprus	2003	1.28205128	7	1.4	4.1	4	16.51523
Cyprus	2004	1.28205128	7	1.6	4.6	1.9	15.83298
Cyprus	2005	1.28205128	7	1.9	5.3	2	15.83936
Cyprus	2006	1.28205128	7	1.4	4.6	2.3	16.17962
Cyprus	2007	1.28205128	7	1.2	3.9	2.2	16.72048
Cyprus	2008	1.28205128	7	0.8	3.7	4.4	17.59075
Cyprus	2009	1.28205128	7	1.7	5.3	0.2	17.20125
Cyprus	2010	1.28205128	7	0.7	6.3	2.6	15.64949
Cyprus	2011	1.28205128	7	0.8	7.9	3.5	15.49765
Cyprus	2012	1.28205128	7	1.9	11.8	3.1	
Cyprus	2013	1.28205128	7	1	15.9	0.4	15.36213
Cyprus	2014	1.28205128	7	1	16.1	–0.3	15.92778

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Cyprus	2015	1.28205128	7	1.3	14.9	–1.5	16.21095
Cyprus	2016	1.28205128	7	1.1	13	–1.2	16.69229
Cyprus	2017	1.28205128	7	0.6	11.1	0.7	
Czech Republic	1998	2.76923077	5	1.7	6.5	10.7	8.54842
Czech Republic	1999	2.76923077	5	1.7	8.7	2.2	8.90853
Czech Republic	2000	2.76923077	5	1.9	8.8	3.8	8.91229
Czech Republic	2001	2.76923077	5	1.3	8.1	4.7	8.67646
Czech Republic	2002	2.76923077	5	1.4	7.3	1.9	8.8648
Czech Republic	2003	2.76923077	5	1.6	7.8	0.1	8.38266
Czech Republic	2004	2.76923077	5	1.3	8.3	2.7	9.43307
Czech Republic	2005	2.76923077	5	1.1	7.9	1.9	9.20297
Czech Republic	2006	2.76923077	5	1.3	7.1	2.5	10.19694
Czech Republic	2007	2.76923077	5	1.2	5.3	2.9	9.57695
Czech Republic	2008	2.76923077	5	1.1	4.4	6.3	9.21464
Czech Republic	2009	2.76923077	5	0.9	6.7	1	9.43733
Czech Republic	2010	2.76923077	5	1	7.3	1.5	9.34049
Czech Republic	2011	2.76923077	5	0.8	6.7	1.9	9.92718
Czech Republic	2012	2.76923077	5	1	7	3.3	9.55685
Czech Republic	2013	2.76923077	5	0.8	6.9	1.4	9.60244
Czech Republic	2014	2.76923077	5	0.8	6.1	0.4	9.41373
Czech Republic	2015	2.76923077	5	0.8	5	0.3	13.88252
Czech Republic	2016	2.76923077	5	0.6	3.9	0.7	14.1515
Czech Republic	2017	2.76923077	5	0.6	2.9	2.5	
Denmark	1998	8.30769231	8	0.9	4.9	1.3	14.63437
Denmark	1999	8.30769231	8	1	5.1	2	14.54371

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Denmark	2000	8.30769231	8	1.1	4.3	2.8	15.34415
Denmark	2001	8.30769231	8	1	4.5	2.3	15.54854
Denmark	2002	8.30769231	8	0.9	4.6	2.4	15.43388
Denmark	2003	8.30769231	8	1.2	5.4	2	15.14175
Denmark	2004	8.30769231	8	0.8	5.5	0.9	15.48686
Denmark	2005	8.30769231	8	1	4.8	1.7	15.77934
Denmark	2006	8.30769231	8	0.5	3.9	1.8	15.51264
Denmark	2007	8.30769231	8	0.7	3.8	1.7	15.3567
Denmark	2008	8.30769231	8	1	3.5	3.6	14.83026
Denmark	2009	8.30769231	8	0.9	6	1	14.94417
Denmark	2010	8.30769231	8	0.8	7.5	2.2	15.10334
Denmark	2011	8.30769231	8	0.8	7.6	2.7	15.03626
Denmark	2012	8.30769231	8	0.8	7.5	2.4	12.48871
Denmark	2013	8.30769231	8	0.9	7	0.5	15.21744
Denmark	2014	8.30769231	8	1.3	6.5	0.4	13.82682
Denmark	2015	8.30769231	8	1.1	6.2	0.2	
Denmark	2016	8.30769231	8	1	6.2	0	
Denmark	2017	8.30769231	8	1.2	5.7	1.1	
Estonia	1998	2.56410256	5	13.9	9.8	8.8	16.02168
Estonia	1999	2.56410256	5	11.2	12.3	3.1	16.35712
Estonia	2000	2.56410256	5	10.2	14.6	3.9	14.6785
Estonia	2001	2.56410256	5	9.8	13	5.6	14.94748
Estonia	2002	2.56410256	5	10.3	11.2	3.6	15.14523
Estonia	2003	2.56410256	5	10.7	10.3	1.4	15.04903
Estonia	2004	2.56410256	5	6.7	10.1	3	14.30608

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Estonia	2005	2.56410256	5	8.3	8	4.1	14.2577
Estonia	2006	2.56410256	5	6.7	5.9	4.4	
Estonia	2007	2.56410256	5	7.1	4.6	6.7	13.68231
Estonia	2008	2.56410256	5	6.4	5.5	10.6	13.87971
Estonia	2009	2.56410256	5	5.2	13.5	0.2	12.93009
Estonia	2010	2.56410256	5	5.3	16.7	2.7	13.64279
Estonia	2011	2.56410256	5	4.9	12.3	5.1	13.4062
Estonia	2012	2.56410256	5	4.8	10	4.2	11.9912
Estonia	2013	2.56410256	5	3.9	8.6	3.2	12.58262
Estonia	2014	2.56410256	5	3.1	7.4	0.5	14.26602
Estonia	2015	2.56410256	5	3.4	6.2	0.1	12.9666
Estonia	2016	2.56410256	5	2.5	6.8	0.8	13.10831
Estonia	2017	2.56410256	5	2.2	5.8	3.7	
Fiji	1998	5.02564103	6		4.6	5.7	19.00093
Fiji	1999	5.02564103	6		5.1	2	20.53511
Fiji	2000	5.02564103	6		5.5	1.1	21.75859
Fiji	2001	5.02564103	6		6	4.3	19.63864
Fiji	2002	5.02564103	6		6.4	0.7	21.03781
Fiji	2003	5.02564103	6	3.1	6.8	4.2	
Fiji	2004	5.02564103	6	2.8	7.3	2.8	23.74915
Fiji	2005	5.02564103	6	2.8	7.3	2.3	20.26613
Fiji	2006	5.02564103	6	2.7	7.7	2.5	20.84329
Fiji	2007	5.02564103	6	2.5	8.6	4.8	23.1704
Fiji	2008	5.02564103	6	2	8.8	7.7	17.36972
Fiji	2009	5.02564103	6	3.4	8.7	3.7	15.85362

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Fiji	2010	5.02564103	6	2.3	7.1	3.7	
Fiji	2011	5.02564103	6	2.3	7.1	7.3	15.23479
Fiji	2012	5.02564103	6	2.3	6.8	3.4	
Fiji	2013	5.02564103	6	2.2	6.4	2.9	14.30039
Fiji	2014	5.02564103	6	2.3	6.2	0.5	
Fiji	2015	5.02564103	6		5.5	1.4	
Fiji	2016	5.02564103	6		5.5	3.9	
Fiji	2017	5.02564103	6		4.5	3.4	
Finland	1998	3.07692308	6	2.2	11.5	1.3	
Finland	1999	3.07692308	6	2.8	10.3	1.3	11.76006
Finland	2000	3.07692308	6	2.9	9.9	3	12.17092
Finland	2001	3.07692308	6	3	9.2	2.7	12.63445
Finland	2002	3.07692308	6	2.5	9.2	2	12.68253
Finland	2003	3.07692308	6	2	9.1	1.3	12.77597
Finland	2004	3.07692308	6	2.8	8.9	0.1	12.77896
Finland	2005	3.07692308	6	2.3	8.5	0.8	12.2497
Finland	2006	3.07692308	6	2.3	7.8	1.3	12.28382
Finland	2007	3.07692308	6	2.4	7	1.6	12.14995
Finland	2008	3.07692308	6	2.5	6.4	3.9	12.1154
Finland	2009	3.07692308	6	2.2	8.3	1.6	11.84332
Finland	2010	3.07692308	6	2.2	8.5	1.7	11.94549
Finland	2011	3.07692308	6	2	7.8	3.3	11.91888
Finland	2012	3.07692308	6	1.6	7.7	3.2	12.79729
Finland	2013	3.07692308	6	1.6	8.2	2.2	12.44551
Finland	2014	3.07692308	6	1.6	8.7	1.2	12.30714

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Finland	2015	3.07692308	6	1.5	9.4	–0.2	12.41213
Finland	2016	3.07692308	6	1.3	8.8	0.4	12.33513
Finland	2017	3.07692308	6	1.2	8.6	0.8	
France	1998	2.30769231	3	1.6	10.7	0.7	10.74723
France	1999	2.30769231	3	1.6	10.4	0.6	10.78116
France	2000	2.30769231	3	1.8	9.2	1.8	
France	2001	2.30769231	3	1.7	8.5	1.8	
France	2002	2.30769231	3	1.9	8.3	1.9	
France	2003	2.30769231	3	1.6	8.5	2.2	
France	2004	2.30769231	3	1.6	8.8	2.3	
France	2005	2.30769231	3	1.6	8.9	1.9	
France	2006	2.30769231	3	1.4	8.8	1.9	
France	2007	2.30769231	3	1.6	8	1.6	
France	2008	2.30769231	3	1.6	7.5	3.2	
France	2009	2.30769231	3	1.3	9.1	0.1	
France	2010	2.30769231	3	1.3	9.3	1.7	
France	2011	2.30769231	3	1.4	9.2	2.3	
France	2012	2.30769231	3	1.2	9.8	2.2	
France	2013	2.30769231	3	1.2	10.3	1	
France	2014	2.30769231	3	1.2	10.3	0.6	
France	2015	2.30769231	3	1.6	10.4	0.1	
France	2016	2.30769231	3	1.4	10.1	0.3	
France	2017	2.30769231	3	1.3	9.4	1.2	
Georgia	1998	2.30769231	5	5	12.4	3.6	10.85143
Georgia	1999	2.30769231	5	5.1	12.6	19.1	10.60486

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Georgia	2000	2.30769231	5	5.1	10.3	4	12.54072
Georgia	2001	2.30769231	5	5.6	11.1	4.7	12.36196
Georgia	2002	2.30769231	5	6.3	13.5	5.6	13.60351
Georgia	2003	2.30769231	5	6.6	12.7	4.8	12.49294
Georgia	2004	2.30769231	5	6.6	13.9	5.7	15.03676
Georgia	2005	2.30769231	5	9	15.1	8.2	11.18125
Georgia	2006	2.30769231	5	7.3	15.4	9.2	12.89539
Georgia	2007	2.30769231	5	7.5	17.4	9.2	9.48665
Georgia	2008	2.30769231	5	6.1	17.9	10	8.9376
Georgia	2009	2.30769231	5	4.9	18.3	1.7	8.99825
Georgia	2010	2.30769231	5	4.4	17.4	7.1	
Georgia	2011	2.30769231	5		17.3	8.5	9.26943
Georgia	2012	2.30769231	5		17.2	–0.9	6.70776
Georgia	2013	2.30769231	5		16.9	–0.5	
Georgia	2014	2.30769231	5	2.7	14.6	3.1	
Georgia	2015	2.30769231	5		14.1	4	
Georgia	2016	2.30769231	5	1	14	2.1	12.6662
Georgia	2017	2.30769231	5		13.9	6	12.95336
Germany	1998	3.61538462	5	1.2	9.4	0.6	9.26752
Germany	1999	3.61538462	5	1.2	8.6	0.7	
Germany	2000	3.61538462	5	1.2	8	1.4	
Germany	2001	3.61538462	5	1.1	7.8	1.9	
Germany	2002	3.61538462	5	1.2	8.6	1.3	
Germany	2003	3.61538462	5	1.1	9.7	1.1	
Germany	2004	3.61538462	5	1.1	10.3	1.7	

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Germany	2005	3.61538462	5	1.1	11	1.9	
Germany	2006	3.61538462	5	1	10	1.8	9.49249
Germany	2007	3.61538462	5	0.9	8.6	2.3	10.06227
Germany	2008	3.61538462	5	0.9	7.4	2.7	10.0362
Germany	2009	3.61538462	5	1	7.7	0.2	10.18564
Germany	2010	3.61538462	5	1	6.9	1.1	10.26904
Germany	2011	3.61538462	5	0.9	5.9	2.5	10.66542
Germany	2012	3.61538462	5	0.8	5.4	2.2	11.03474
Germany	2013	3.61538462	5	0.8	5.2	1.6	11.03833
Germany	2014	3.61538462	5	0.9	5	0.8	11.14962
Germany	2015	3.61538462	5	0.8	4.6	0.7	10.97799
Germany	2016	3.61538462	5	1.2	4.2	0.4	10.92541
Germany	2017	3.61538462	5	1	3.8	1.7	
Greece	1998	4.8974359	7	1.6	11.2	4.5	6.40668
Greece	1999	4.8974359	7	1.4	12.1	2.1	6.56005
Greece	2000	4.8974359	7		11.4	2.9	6.95777
Greece	2001	4.8974359	7	1.2	10.8	3.6	7.31652
Greece	2002	4.8974359	7	0.8	10.4	3.9	7.47716
Greece	2003	4.8974359	7	1.1	9.8	3.4	7.3604
Greece	2004	4.8974359	7	1	10.6	3	7.70183
Greece	2005	4.8974359	7	1.2	10	3.5	8.70021
Greece	2006	4.8974359	7	1	9	3.3	
Greece	2007	4.8974359	7	1.1	8.4	3	
Greece	2008	4.8974359	7	1.3	7.8	4.2	
Greece	2009	4.8974359	7	1.3	9.6	1.3	

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Greece	2010	4.8974359	7	1.5	12.7	4.7	
Greece	2011	4.8974359	7	1.6	17.9	3.1	
Greece	2012	4.8974359	7	1.5	24.4	1	
Greece	2013	4.8974359	7	1.4	27.5	–0.9	
Greece	2014	4.8974359	7	0.9	26.5	–1.4	
Greece	2015	4.8974359	7	0.8	24.9	–1.1	
Greece	2016	4.8974359	7	0.8	23.6	0	
Greece	2017	4.8974359	7	0.7	21.5	1.1	
Hong Kong	1998	4.07692308	6	1	4.7	2.8	
Hong Kong	1999	4.07692308	6	1	6.2	–4	
Hong Kong	2000	4.07692308	6	0.6	4.9	–3.7	
Hong Kong	2001	4.07692308	6	1	5.1	–1.6	22.41878
Hong Kong	2002	4.07692308	6	1	7.3	–3	22.20729
Hong Kong	2003	4.07692308	6	0.8	7.9	–2.6	23.24429
Hong Kong	2004	4.07692308	6	0.7	6.8	–0.4	23.15106
Hong Kong	2005	4.07692308	6	0.5	5.6	0.9	22.47858
Hong Kong	2006	4.07692308	6	0.5	4.8	2	23.2826
Hong Kong	2007	4.07692308	6	0.3	4	2	22.63778
Hong Kong	2008	4.07692308	6	0.5	3.5	4.3	22.9224
Hong Kong	2009	4.07692308	6	0.7	5.2	0.6	23.79947
Hong Kong	2010	4.07692308	6	0.5	4.3	2.3	19.90941
Hong Kong	2011	4.07692308	6	0.2	3.4	5.3	20.14833
Hong Kong	2012	4.07692308	6	0.4	3.3	4.1	18.64948
Hong Kong	2013	4.07692308	6	0.9	3.4	4.3	20.3008
Hong Kong	2014	4.07692308	6	0.4	3.3	4.4	17.6204

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Hong Kong	2015	4.07692308	6	0.3	3.3	3	18.60857
Hong Kong	2016	4.07692308	6	0.4	3.4	2.4	18.12696
Hong Kong	2017	4.07692308	6	0.3	3.1	1.5	17.84128
Hungary	1998	3.61538462	6	2.8	7.8	14.2	8.6998
Hungary	1999	3.61538462	6	2.5	7	10	9.38613
Hungary	2000	3.61538462	6	2	6.4	9.8	10.32361
Hungary	2001	3.61538462	6	2.5	5.7	9.2	10.45507
Hungary	2002	3.61538462	6	2	5.8	5.3	10.17915
Hungary	2003	3.61538462	6	2.2	5.9	4.7	11.82977
Hungary	2004	3.61538462	6	2.1	6.1	6.8	11.0059
Hungary	2005	3.61538462	6	1.6	7.2	3.6	10.80057
Hungary	2006	3.61538462	6	1.7	7.5	3.9	10.32771
Hungary	2007	3.61538462	6	1.5	7.4	8	10.33817
Hungary	2008	3.61538462	6	1.8	7.8	6.1	10.27056
Hungary	2009	3.61538462	6	1.4	10	4.2	9.86438
Hungary	2010	3.61538462	6	1.4	11.2	4.9	9.67102
Hungary	2011	3.61538462	6	1.5	11	3.9	9.29022
Hungary	2012	3.61538462	6	1.3	11	5.7	8.59944
Hungary	2013	3.61538462	6	1.6	10.2	1.7	8.51606
Hungary	2014	3.61538462	6	1.5	7.7	–0.2	9.3679
Hungary	2015	3.61538462	6	2.3	6.8	–0.1	9.12867
Hungary	2016	3.61538462	6	2.1	5.1	0.4	10.06791
Hungary	2017	3.61538462	6	2.5	4.2	2.4	
Iceland	1998	2.56410256	3	0	2.9	1.7	16.70634
Iceland	1999	2.56410256	3	0.7	2	3.2	15.5717

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Iceland	2000	2.56410256	3	1.8	2.2	5.1	15.73919
Iceland	2001	2.56410256	3	0.4	2.3	6.4	16.20941
Iceland	2002	2.56410256	3	1.4	3.1	5.2	17.08739
Iceland	2003	2.56410256	3	0	3.4	2.1	16.3759
Iceland	2004	2.56410256	3	1	3.1	3.2	16.80609
Iceland	2005	2.56410256	3	1	2.6	4	17.81014
Iceland	2006	2.56410256	3	0	2.9	6.7	17.92558
Iceland	2007	2.56410256	3	0.7	2.3	5.1	17.21786
Iceland	2008	2.56410256	3	0	3	12.7	13.03326
Iceland	2009	2.56410256	3	0.3	7.2	12	15.16024
Iceland	2010	2.56410256	3	0.6	7.6	5.4	14.60397
Iceland	2011	2.56410256	3	0.9	7.1	4	15.41712
Iceland	2012	2.56410256	3	0.3	6	5.2	17.33145
Iceland	2013	2.56410256	3	0.3	5.4	3.9	17.66942
Iceland	2014	2.56410256	3	0.6	5	2	17.54882
Iceland	2015	2.56410256	3	0.9	4	1.6	18.15799
Iceland	2016	2.56410256	3	0.3	3	1.7	16.83943
Iceland	2017	2.56410256	3	0.9	2.8	1.8	
Mongolia	1998	2.12820513	8			9.5	15.17901
Mongolia	1999	2.12820513	8			7.4	15.49801
Mongolia	2000	2.12820513	8			11.4	16.07477
Mongolia	2001	2.12820513	8			6.4	
Mongolia	2002	2.12820513	8			1	20.31151
Mongolia	2003	2.12820513	8	13.9		5	
Mongolia	2004	2.12820513	8	13.3		8.2	13.59445

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Mongolia	2005	2.12820513	8	15.8		12.7	
Mongolia	2006	2.12820513	8	13.1		4.4	
Mongolia	2007	2.12820513	8	11.3	11.3	8.2	13.28645
Mongolia	2008	2.12820513	8	8.1	9.2	26.7	
Mongolia	2009	2.12820513	8	8.2	11.6	6.4	14.51142
Mongolia	2010	2.12820513	8	8.8	9.9	10.3	14.71114
Mongolia	2011	2.12820513	8	9.6	7.7	7.7	12.15085
Mongolia	2012	2.12820513	8	7.1	8.2	15	14.40723
Mongolia	2013	2.12820513	8	7.1	7.9	8.6	15.36745
Mongolia	2014	2.12820513	8	7.3	7.9	12.9	14.6681
Mongolia	2015	2.12820513	8	6.2	7.5	5.9	13.54711
Mongolia	2016	2.12820513	8	5.7	10	0.5	13.06311
Mongolia	2017	2.12820513	8	6.2	10	4.6	12.64562
Morocco	1998	1.66666667	2	2	15.2	2.7	25.21153
Morocco	1999	1.66666667	2	1.9	13.9	0.7	25.76847
Morocco	2000	1.66666667	2	1.6	13.4	1.9	
Morocco	2001	1.66666667	2	1.9	12.3	0.6	
Morocco	2002	1.66666667	2	1.6	11.3	2.8	
Morocco	2003	1.66666667	2	1.7	11.4	1.2	
Morocco	2004	1.66666667	2	1.6	10.8	1.5	
Morocco	2005	1.66666667	2	1.5	11.1	1	
Morocco	2006	1.66666667	2	1.6	9.7	3.3	
Morocco	2007	1.66666667	2	1.7	9.8	2	
Morocco	2008	1.66666667	2	1.3	9.6	3.9	17.47064
Morocco	2009	1.66666667	2	1.4	9.1	1	17.29529

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Morocco	2010	1.66666667	2	1.4	9.1	1	
Morocco	2011	1.66666667	2	1.3	8.9	0.9	
Morocco	2012	1.66666667	2	1.1	9	1.3	
Morocco	2013	1.66666667	2	1.3	9.2	1.9	
Morocco	2014	1.66666667	2	1	9.9	0.4	
Morocco	2015	1.66666667	2	1.2	9.7	1.5	
Morocco	2016	1.66666667	2	1.7	9.9	1.6	
Morocco	2017	1.66666667	2	2.1	10.2	0.8	
Netherlands	1998	1.84615385	3	1.1	4.9	1.8	10.42019
Netherlands	1999	1.84615385	3	1.3	4.1	2	10.56879
Netherlands	2000	1.84615385	3	1.1	3.7	2.3	11.08149
Netherlands	2001	1.84615385	3	1.3	3.1	5.1	11.15739
Netherlands	2002	1.84615385	3	1.2	3.7	3.9	11.2315
Netherlands	2003	1.84615385	3	1.2	4.8	2.2	11.53141
Netherlands	2004	1.84615385	3	1.2	5.7	1.4	11.87694
Netherlands	2005	1.84615385	3	1.1	5.9	1.5	12.33591
Netherlands	2006	1.84615385	3	0.8	5	1.7	11.97108
Netherlands	2007	1.84615385	3	0.9	4.2	1.6	11.76275
Netherlands	2008	1.84615385	3	0.9	3.7	2.2	11.87849
Netherlands	2009	1.84615385	3	0.9	4.4	1	11.61846
Netherlands	2010	1.84615385	3	0.9	5	0.9	11.66905
Netherlands	2011	1.84615385	3	0.9	5	2.5	11.88771
Netherlands	2012	1.84615385	3	0.9	5.8	2.8	11.77607
Netherlands	2013	1.84615385	3	0.7	7.3	2.6	12.09424
Netherlands	2014	1.84615385	3	0.7	7.4	0.3	12.1508

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Netherlands	2015	1.84615385	3	0.6	6.9	0.2	12.20965
Netherlands	2016	1.84615385	3	0.6	6	0.1	12.80686
Netherlands	2017	1.84615385	3	0.8	4.9	1.3	
New Zealand	1998	4.53846154	6	1.3	7.7	1.3	
New Zealand	1999	4.53846154	6	1.2	7.1	–0.1	16.22986
New Zealand	2000	4.53846154	6	1.3	6.2	2.6	
New Zealand	2001	4.53846154	6	1.3	5.5	2.7	16.7103
New Zealand	2002	4.53846154	6	1.5	5.3	2.7	16.77153
New Zealand	2003	4.53846154	6	1.1	4.8	1.7	16.75843
New Zealand	2004	4.53846154	6	1.1	4	2.3	17.00461
New Zealand	2005	4.53846154	6	1.5	3.8	3	16.25796
New Zealand	2006	4.53846154	6	1.2	3.9	3.4	15.16337
New Zealand	2007	4.53846154	6	1.1	3.6	2.4	14.98482
New Zealand	2008	4.53846154	6	1.2	4	3.9	14.07769
New Zealand	2009	4.53846154	6	1.5	5.8	2.2	15.3436
New Zealand	2010	4.53846154	6	1	6.2	2.3	15.68851
New Zealand	2011	4.53846154	6	0.9	6	4.1	15.77792
New Zealand	2012	4.53846154	6	0.9	6.4	1	17.76722
New Zealand	2013	4.53846154	6	1	5.8	1.1	16.55307
New Zealand	2014	4.53846154	6	0.9	5.4	1.2	16.27686
New Zealand	2015	4.53846154	6	1	5.4	0.3	16.37508
New Zealand	2016	4.53846154	6	1.1	5.1	0.6	16.82011
New Zealand	2017	4.53846154	6	0.7	4.7	1.9	
North Macedonia	1998	5.25641026	6	2.4	34.5	0.5	
North Macedonia	1999	5.25641026	6	1.9	32.4	–1.3	

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
North Macedonia	2000	5.25641026	6	2.3	31.7	6.6	
North Macedonia	2001	5.25641026	6	2.7	30.5	5.2	
North Macedonia	2002	5.25641026	6	2.9	31.9	2.3	8.64088
North Macedonia	2003	5.25641026	6	3.4	36.7	1.1	
North Macedonia	2004	5.25641026	6	2.4	37.2	–0.7	
North Macedonia	2005	5.25641026	6	2.1	37.3	–0.6	
North Macedonia	2006	5.25641026	6	2.2	36	3.3	
North Macedonia	2007	5.25641026	6	2	34.9	2.8	
North Macedonia	2008	5.25641026	6	1.7	33.8	7.5	
North Macedonia	2009	5.25641026	6	1.7	32.2	–0.7	
North Macedonia	2010	5.25641026	6	2.1	32.1	1.5	
North Macedonia	2011	5.25641026	6	1.4	31.4	3.9	
North Macedonia	2012	5.25641026	6	1.4	31	3.3	
North Macedonia	2013	5.25641026	6	1.1	29	2.8	
North Macedonia	2014	5.25641026	6	1.7	28	–0.3	
North Macedonia	2015	5.25641026	6	1.2	26.1	–0.3	
North Macedonia	2016	5.25641026	6	0.9	23.8	–0.2	
North Macedonia	2017	5.25641026	6	1.5	22.4	1.4	
Norway	1998	5.51282051	8	0.9	3.2	2.3	15.53134
Norway	1999	5.51282051	8	0.7	3.2	2.4	15.12919
Norway	2000	5.51282051	8	1.1	3.4	3.1	15.77262
Norway	2001	5.51282051	8	0.8	3.5	3	15.92199
Norway	2002	5.51282051	8	1	3.9	1.3	16.25833
Norway	2003	5.51282051	8	1.1	4.5	2.5	15.68493
Norway	2004	5.51282051	8	0.8	4.5	0.5	16.4396

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Norway	2005	5.51282051	8	0.7	4.6	1.5	16.54838
Norway	2006	5.51282051	8	0.7	3.4	2.3	15.86487
Norway	2007	5.51282051	8	0.6	2.5	0.7	15.99489
Norway	2008	5.51282051	8	0.7	2.7	3.8	15.85855
Norway	2009	5.51282051	8	0.6	3.3	2.2	15.64057
Norway	2010	5.51282051	8	0.6	3.8	2.4	15.22733
Norway	2011	5.51282051	8	2.2	3.4	1.3	14.95735
Norway	2012	5.51282051	8	0.5	3.3	0.7	17.42965
Norway	2013	5.51282051	8	0.9	3.8	2.1	17.26891
Norway	2014	5.51282051	8	0.6	3.6	2	17.04335
Norway	2015	5.51282051	8	0.5	4.5	2.2	15.72807
Norway	2016	5.51282051	8	0.5	4.7	3.6	15.97161
Norway	2017	5.51282051	8	0.5	4.2	1.9	
Panama	1998	1.84615385	3	9.6	11.6	0.6	
Panama	1999	1.84615385	3	9.6	9.5	1.3	18.97315
Panama	2000	1.84615385	3	9.9	13.5	1.4	19.83194
Panama	2001	1.84615385	3	9.9	14	0.3	16.63913
Panama	2002	1.84615385	3	11.9	13.5	1	16.9575
Panama	2003	1.84615385	3	10.5	13	0.1	16.34301
Panama	2004	1.84615385	3	9.4	11.7	0.5	14.56827
Panama	2005	1.84615385	3	10.9	9.8	2.9	
Panama	2006	1.84615385	3	6.5	8.7	2.5	
Panama	2007	1.84615385	3	8.1	6.4	4.2	
Panama	2008	1.84615385	3	14	5.6	8.8	14.88983
Panama	2009	1.84615385	3	15.7	6.6	2.4	

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Panama	2010	1.84615385	3	12.6	6.5	3.5	
Panama	2011	1.84615385	3	14.8	4.5	5.9	13.01972
Panama	2012	1.84615385	3	16.9	4.1	5.7	
Panama	2013	1.84615385	3	17.3	4.1	4	
Panama	2014	1.84615385	3	15.5	4.8	2.6	
Panama	2015	1.84615385	3	11.9	5.1	0.1	
Panama	2016	1.84615385	3	10	5.5	0.7	
Panama	2017	1.84615385	3	9.7	6.1	0.9	
Poland	1998	3.33333333	5	2	10.6	11.8	11.27881
Poland	1999	3.33333333	5	1.9	13.1	7.3	10.8919
Poland	2000	3.33333333	5	2.2	16.1	10.1	11.8693
Poland	2001	3.33333333	5	2	18.2	5.5	11.83149
Poland	2002	3.33333333	5	1.9	19.9	1.9	11.88938
Poland	2003	3.33333333	5	1.7	19.6	0.8	11.64438
Poland	2004	3.33333333	5	1.6	19	3.5	12.28659
Poland	2005	3.33333333	5	1.4	17.7	2.1	12.22228
Poland	2006	3.33333333	5	1.3	13.8	1	12.66541
Poland	2007	3.33333333	5	1.4	9.6	2.5	11.26715
Poland	2008	3.33333333	5	0.9	7.1	4.2	11.37921
Poland	2009	3.33333333	5	1	8.2	3.4	11.07648
Poland	2010	3.33333333	5	1	9.6	2.6	11.06464
Poland	2011	3.33333333	5	1.1	9.6	4.3	10.98486
Poland	2012	3.33333333	5	1.1	10.1	3.7	11.22697
Poland	2013	3.33333333	5	0.8	10.3	0.9	11.59794
Poland	2014	3.33333333	5	0.7	9	0	11.57975

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Poland	2015	3.33333333	5	0.8	7.5	–0.9	11.54798
Poland	2016	3.33333333	5	0.7	6.2	–0.6	11.28603
Poland	2017	3.33333333	5	0.8	4.9	2	
Portugal	1998	2.48717949	5	1.2	4.9	2.2	
Portugal	1999	2.48717949	5	1.1	4.4	2.2	11.86899
Portugal	2000	2.48717949	5	1.1	3.9	2.8	12.05288
Portugal	2001	2.48717949	5	1	4	4.4	12.09582
Portugal	2002	2.48717949	5	1.1	5	3.7	11.9002
Portugal	2003	2.48717949	5	1.4	6.3	3.2	11.65633
Portugal	2004	2.48717949	5	1.4	6.6	2.5	10.96746
Portugal	2005	2.48717949	5	1.3	7.6	2.1	10.85812
Portugal	2006	2.48717949	5	1.5	7.6	3	10.87095
Portugal	2007	2.48717949	5	1.7	8	2.4	11.0547
Portugal	2008	2.48717949	5	1.2	7.6	2.7	10.37183
Portugal	2009	2.48717949	5	1.2	9.4	–0.9	11.07481
Portugal	2010	2.48717949	5	1.2	10.8	1.4	10.42656
Portugal	2011	2.48717949	5	1.1	12.7	3.6	10.23923
Portugal	2012	2.48717949	5	1.2	15.5	2.8	10.19303
Portugal	2013	2.48717949	5	1.4	16.2	0.4	10.56848
Portugal	2014	2.48717949	5	0.9	13.9	–0.2	9.90569
Portugal	2015	2.48717949	5	1	12.4	0.5	10.152
Portugal	2016	2.48717949	5	0.6	11.1	0.6	
Portugal	2017	2.48717949	5	0.7	8.9	1.6	
Romania	1998	1.97435897	3	2.5	9.6	59.1	
Romania	1999	1.97435897	3	2.5	7.2	45.8	

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Romania	2000	1.97435897	3	2.6	7.6	45.7	8.18758
Romania	2001	1.97435897	3	2.7	7.3	34.5	9.84882
Romania	2002	1.97435897	3	2.6	8.3	22.5	10.92235
Romania	2003	1.97435897	3	2.5	7.8	15.4	11.13906
Romania	2004	1.97435897	3	2.4	8	11.9	9.84331
Romania	2005	1.97435897	3	2.1	7.1	9	10.83668
Romania	2006	1.97435897	3	2.1	7.2	6.6	12.71962
Romania	2007	1.97435897	3	2	6.3	4.8	12.00496
Romania	2008	1.97435897	3	2.3	5.5	7.8	11.61622
Romania	2009	1.97435897	3	1.9	6.3	5.6	11.02129
Romania	2010	1.97435897	3	2	7	6.1	9.12913
Romania	2011	1.97435897	3	1.7	7.2	5.8	8.32978
Romania	2012	1.97435897	3	1.9	6.8	3.3	8.43579
Romania	2013	1.97435897	3	1.7	7.1	4	
Romania	2014	1.97435897	3	1.5	6.8	1.1	9.25695
Romania	2015	1.97435897	3	1.5	6.8	–0.6	9.09451
Romania	2016	1.97435897	3	1.2	5.9	–1.6	9.51059
Romania	2017	1.97435897	3	1.5	4.9	1.3	
Russian Federation	1998	2.17948718	3	22.8	11.9	27.7	
Russian Federation	1999	2.17948718	3	26	13	85.7	
Russian Federation	2000	2.17948718	3	28.1	10.6	20.8	8.95185
Russian Federation	2001	2.17948718	3	29.4	8.9	21.5	9.21336
Russian Federation	2002	2.17948718	3	30.5	8	15.8	10.58384
Russian Federation	2003	2.17948718	3	28.9	8.2	13.7	10.53169
Russian Federation	2004	2.17948718	3	27.3	7.7	10.9	11.17591

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Russian Federation	2005	2.17948718	3	24.8	7.2	12.7	11.95057
Russian Federation	2006	2.17948718	3	20.1	7.1	9.7	12.4258
Russian Federation	2007	2.17948718	3	17.7	6	9	
Russian Federation	2008	2.17948718	3	16.6	6.2	14.1	11.95923
Russian Federation	2009	2.17948718	3	14.9	8.2	11.6	
Russian Federation	2010	2.17948718	3		7.4	6.8	
Russian Federation	2011	2.17948718	3		6.5	8.4	
Russian Federation	2012	2.17948718	3	11.3	5.5	5.1	11.14676
Russian Federation	2013	2.17948718	3	11.2	5.5	6.8	10.86184
Russian Federation	2014	2.17948718	3	11.5	5.2	7.8	11.48852
Russian Federation	2015	2.17948718	3	11.6	5.6	15.5	10.86947
Russian Federation	2016	2.17948718	3	11	5.5	7	10.98528
Russian Federation	2017	2.17948718	3	9.2	5.2	3.7	
Saudi Arabia	1998	1.43589744	2		no data	–0.4	23.98243
Saudi Arabia	1999	1.43589744	2	0.9	4.3	–2.1	23.3294
Saudi Arabia	2000	1.43589744	2	0.8	4.6	–1.1	17.83659
Saudi Arabia	2001	1.43589744	2	1.1	4.6	–1.2	20.89614
Saudi Arabia	2002	1.43589744	2	1.3	5.3	0.1	21.29412
Saudi Arabia	2003	1.43589744	2	1.1	5.6	0.6	21.45522
Saudi Arabia	2004	1.43589744	2	1.3	5.8	0.3	20.18866
Saudi Arabia	2005	1.43589744	2	1.2	6.1	0.5	19.29229
Saudi Arabia	2006	1.43589744	2	1	6.3	1.9	21.60387
Saudi Arabia	2007	1.43589744	2	1	5.6	5.1	
Saudi Arabia	2008	1.43589744	2		5.2	6.1	19.25742
Saudi Arabia	2009	1.43589744	2		5.4	4.2	

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Saudi Arabia	2010	1.43589744	2		5.5	3.8	
Saudi Arabia	2011	1.43589744	2		5.8	3.8	
Saudi Arabia	2012	1.43589744	2		5.5	2.9	
Saudi Arabia	2013	1.43589744	2		5.6	3.5	
Saudi Arabia	2014	1.43589744	2		5.7	2.2	
Saudi Arabia	2015	1.43589744	2	1.5	5.6	1.3	
Saudi Arabia	2016	1.43589744	2		5.6	2	
Saudi Arabia	2017	1.43589744	2	1.3	6	–0.9	
Serbia	1998	5.25641026	6		12.8	30	
Serbia	1999	5.25641026	6		13.3	41.1	
Serbia	2000	5.25641026	6	2.4	12.1	70	
Serbia	2001	5.25641026	6	2.6	12.2	80.7	
Serbia	2002	5.25641026	6	2.1	14.5	8.9	
Serbia	2003	5.25641026	6	1.9	16	2.9	
Serbia	2004	5.25641026	6	1.8	19.5	10.6	
Serbia	2005	5.25641026	6	1.6	21.8	16.3	
Serbia	2006	5.25641026	6	1.7	21.6	10.7	
Serbia	2007	5.25641026	6	1.9	18.8	6	9.97664
Serbia	2008	5.25641026	6	1.5	14.4	12.4	10.39082
Serbia	2009	5.25641026	6	1.7	16.9	8.1	10.48218
Serbia	2010	5.25641026	6	1.4	20	6.1	10.09823
Serbia	2011	5.25641026	6	1.5	23.6	11.1	10.17957
Serbia	2012	5.25641026	6	1.2	24.6	7.3	9.22701
Serbia	2013	5.25641026	6	1.6	23	7.7	
Serbia	2014	5.25641026	6	1.4	19.9	2.1	8.764

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Serbia	2015	5.25641026	6	1.2	18.2	1.4	8.87636
Serbia	2016	5.25641026	6	1.4	15.9	1.1	8.69299
Serbia	2017	5.25641026	6	1.1	14.1	3.1	9.25646
Singapore	1998	3.61538462	4	1.1	2.5	–0.3	
Singapore	1999	3.61538462	4	1	2.8	0	
Singapore	2000	3.61538462	4	1	2.7	1.3	20.30553
Singapore	2001	3.61538462	4	0.8	2.7	1	21.55666
Singapore	2002	3.61538462	4	0.8	3.6	–0.4	21.41607
Singapore	2003	3.61538462	4	0.6	4	0.5	24.75983
Singapore	2004	3.61538462	4	0.5	3.4	1.7	22.74441
Singapore	2005	3.61538462	4	0.5	3.1	0.5	22.27879
Singapore	2006	3.61538462	4	0.4	2.7	1	22.53678
Singapore	2007	3.61538462	4	0.4	2.1	2.1	23.23229
Singapore	2008	3.61538462	4	0.6	2.2	6.6	30.09941
Singapore	2009	3.61538462	4	0.4	3	0.6	21.85297
Singapore	2010	3.61538462	4	0.4	2.2	2.8	18.57173
Singapore	2011	3.61538462	4	0.3	2	5.2	28.86184
Singapore	2012	3.61538462	4	0.2	2	4.6	31.37175
Singapore	2013	3.61538462	4	0.3	1.9	2.4	28.83915
Singapore	2014	3.61538462	4	0.3	2	1	
Singapore	2015	3.61538462	4	0.3	1.9	–0.5	
Singapore	2016	3.61538462	4	0.3	2.1	–0.5	
Singapore	2017	3.61538462	4	0.2	2.2	0.6	
Slovakia	1998	3.64102564	5	2.4	12.7	6.7	
Slovakia	1999	3.64102564	5	2.6	16.5	10.5	8.59327

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Slovakia	2000	3.64102564	5	2.4	18.9	12.2	7.44282
Slovakia	2001	3.64102564	5	2.2	19.5	7.1	8.87773
Slovakia	2002	3.64102564	5	2.2	18.8	3.5	9.41757
Slovakia	2003	3.64102564	5	2.5	17.7	8.4	10.56774
Slovakia	2004	3.64102564	5	2	18.4	7.5	10.86331
Slovakia	2005	3.64102564	5	1.7	16.4	2.8	9.46612
Slovakia	2006	3.64102564	5	1.5	13.4	4.3	9.58011
Slovakia	2007	3.64102564	5	1.5	11.2	1.9	9.71228
Slovakia	2008	3.64102564	5	1.6	9.6	4	9.54827
Slovakia	2009	3.64102564	5	1.4	12.1	0.9	9.09838
Slovakia	2010	3.64102564	5	1.5	14.5	0.7	9.76616
Slovakia	2011	3.64102564	5	1.6	13.7	4.1	9.70747
Slovakia	2012	3.64102564	5	1.2	14	3.7	9.62131
Slovakia	2013	3.64102564	5	1.3	14.2	1.5	9.86131
Slovakia	2014	3.64102564	5	1.3	13.2	–0.1	10.06451
Slovakia	2015	3.64102564	5	0.8	11.5	–0.3	10.28055
Slovakia	2016	3.64102564	5	1	9.7	–0.5	9.41514
Slovakia	2017	3.64102564	5	1.5	8.1	1.4	
Slovenia	1998	2.25641026	3	0.7	7.4	7.9	
Slovenia	1999	2.25641026	3	1.3	7.4	6.1	
Slovenia	2000	2.25641026	3	1.8	6.7	8.9	
Slovenia	2001	2.25641026	3	1.4	6.2	8.4	13.81725
Slovenia	2002	2.25641026	3	1.8	6.3	7.5	13.72527
Slovenia	2003	2.25641026	3	1.1	6.7	5.5	13.69596
Slovenia	2004	2.25641026	3	1.4	6.3	3.6	13.49902

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Slovenia	2005	2.25641026	3	1	6.5	2.5	13.29055
Slovenia	2006	2.25641026	3	0.6	6	2.5	13.3197
Slovenia	2007	2.25641026	3	1.2	4.9	3.7	12.89666
Slovenia	2008	2.25641026	3	0.5	4.4	5.7	12.54904
Slovenia	2009	2.25641026	3	0.6	5.9	0.8	12.30418
Slovenia	2010	2.25641026	3	0.7	7.3	1.8	12.08019
Slovenia	2011	2.25641026	3	0.8	8.2	1.8	12.07168
Slovenia	2012	2.25641026	3	0.7	8.9	2.6	12.63184
Slovenia	2013	2.25641026	3	0.6	10.1	1.8	9.99504
Slovenia	2014	2.25641026	3	0.8	9.7	0.2	11.27432
Slovenia	2015	2.25641026	3	1	9	–0.5	11.21851
Slovenia	2016	2.25641026	3	0.5	8	–0.1	11.74521
Slovenia	2017	2.25641026	3	0.9	6.6	1.4	
South Africa	1998	5.38461538	8	56.6	26.1	7	
South Africa	1999	5.38461538	8	50.2	23.3	5.1	
South Africa	2000	5.38461538	8	47.6	23	5.4	
South Africa	2001	5.38461538	8	46.1	26	5.6	20.47205
South Africa	2002	5.38461538	8	45.8	27.8	9.1	20.0957
South Africa	2003	5.38461538	8	41.6	27.7	5.9	19.5923
South Africa	2004	5.38461538	8	39	25.2	1.4	19.93463
South Africa	2005	5.38461538	8	38	24.7	3.4	19.92499
South Africa	2006	5.38461538	8	38.7	23.6	4.6	18.00499
South Africa	2007	5.38461538	8	36.9	23	7.2	18.02707
South Africa	2008	5.38461538	8	35.9	22.5	11	17.90631
South Africa	2009	5.38461538	8	32.9	23.7	7.1	18.30626

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
South Africa	2010	5.38461538	8	30.8	24.9	4.3	18.04437
South Africa	2011	5.38461538	8	29.8	24.8	5	18.96147
South Africa	2012	5.38461538	8	30.6	24.9	5.6	20.63561
South Africa	2013	5.38461538	8	31.7	24.7	5.8	19.17124
South Africa	2014	5.38461538	8	32.6	25.1	6.1	19.13845
South Africa	2015	5.38461538	8	33.8	25.4	4.6	18.69935
South Africa	2016	5.38461538	8	34	26.7	6.3	18.04874
South Africa	2017	5.38461538	8	35.9	27.5	5.3	18.7153
Spain	1998	2.48717949	4	1.3	18.6	1.8	10.48723
Spain	1999	2.48717949	4	1.2	15.6	2.2	10.69392
Spain	2000	2.48717949	4	1.4	13.9	3.5	10.66263
Spain	2001	2.48717949	4	1.4	10.5	3.6	10.71261
Spain	2002	2.48717949	4	1.3	11.5	3.1	10.709
Spain	2003	2.48717949	4	1.4	11.5	3	10.88755
Spain	2004	2.48717949	4	1.2	11	3	10.72426
Spain	2005	2.48717949	4	1.2	9.2	3.4	10.77912
Spain	2006	2.48717949	4	1.1	8.5	3.5	10.88591
Spain	2007	2.48717949	4	1.1	8.2	2.8	10.84699
Spain	2008	2.48717949	4	0.9	11.2	4.1	10.9364
Spain	2009	2.48717949	4	0.9	17.9	–0.3	10.63257
Spain	2010	2.48717949	4	0.9	19.9	1.8	10.56192
Spain	2011	2.48717949	4	0.8	21.4	3.2	10.61811
Spain	2012	2.48717949	4	0.8	24.8	2.4	9.21341
Spain	2013	2.48717949	4	0.6	26.1	1.4	9.49991
Spain	2014	2.48717949	4	0.7	24.4	–0.2	9.54349

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Spain	2015	2.48717949	4	0.7	22.1	–0.5	9.77104
Spain	2016	2.48717949	4	0.6	19.6	–0.2	9.97324
Spain	2017	2.48717949	4	0.7	17.2	2	
Sweden	1998	1.79487179	3	1	8.8	1	12.758
Sweden	1999	1.79487179	3	1.1	7.6	0.6	12.49202
Sweden	2000	1.79487179	3	1.1	6.3	1.3	12.98767
Sweden	2001	1.79487179	3	1	5.8	2.7	12.87803
Sweden	2002	1.79487179	3	1.1	6	1.9	13.21271
Sweden	2003	1.79487179	3	0.9	6.6	2.3	12.92092
Sweden	2004	1.79487179	3	1.2	7.4	1	13.06133
Sweden	2005	1.79487179	3	0.9	7.6	0.8	12.76274
Sweden	2006	1.79487179	3	1	7	1.5	12.80668
Sweden	2007	1.79487179	3	1.2	6.1	1.7	12.84501
Sweden	2008	1.79487179	3	0.9	6.2	3.3	13.02608
Sweden	2009	1.79487179	3	1	8.3	1.9	13.26278
Sweden	2010	1.79487179	3	1	8.6	1.9	13.30598
Sweden	2011	1.79487179	3	0.9	7.8	1.4	13.17739
Sweden	2012	1.79487179	3	0.7	8	0.9	15.22918
Sweden	2013	1.79487179	3	0.9	8	0.4	15.14365
Sweden	2014	1.79487179	3	0.9	7.9	0.2	15.32902
Sweden	2015	1.79487179	3	1.1	7.4	0.7	15.50146
Sweden	2016	1.79487179	3	1.1	7	1.1	15.73223
Sweden	2017	1.79487179	3	1.1	6.7	1.9	
Ukraine	1998	3.12820513	6	8.4	11.3	10.6	11.59928
Ukraine	1999	3.12820513	6	8.6	11.9	22.7	13.53417

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Ukraine	2000	3.12820513	6	9	11.5	28.2	11.35897
Ukraine	2001	3.12820513	6	10	10.8	12	12.81095
Ukraine	2002	3.12820513	6	9	9.6	0.8	14.36096
Ukraine	2003	3.12820513	6	8.5	9.1	5.2	14.41952
Ukraine	2004	3.12820513	6	7.4	8.6	9	12.78175
Ukraine	2005	3.12820513	6	6.5	7.2	13.5	13.73865
Ukraine	2006	3.12820513	6	6.3	6.8	9.1	13.92323
Ukraine	2007	3.12820513	6	5.7	6.4	12.8	14.03619
Ukraine	2008	3.12820513	6	5.3	6.4	25.2	13.55783
Ukraine	2009	3.12820513	6	4.9	8.8	15.9	15.05482
Ukraine	2010	3.12820513	6	4.3	8.1	9.4	
Ukraine	2011	3.12820513	6		7.9	8	13.48432
Ukraine	2012	3.12820513	6	5.2	7.5	0.6	13.66552
Ukraine	2013	3.12820513	6		7.2	–0.3	13.86764
Ukraine	2014	3.12820513	6	6.3	9.3	12.1	13.12135
Ukraine	2015	3.12820513	6		9.1	48.7	
Ukraine	2016	3.12820513	6		9.5	13.9	12.35312
Ukraine	2017	3.12820513	6	6.2	9.7	14.4	13.05142
Uruguay	1998	5.66666667	6	7.4	10.1	10.8	
Uruguay	1999	5.66666667	6	6.5	11.2	5.7	
Uruguay	2000	5.66666667	6	6.4	13.4	4.8	8.35896
Uruguay	2001	5.66666667	6	6.6	15.2	4.4	9.2292
Uruguay	2002	5.66666667	6	6.9	16.8	14	7.71222
Uruguay	2003	5.66666667	6	5.9	17.2	19.4	6.83601
Uruguay	2004	5.66666667	6	6	13.3	9.2	8.60901

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Uruguay	2005	5.66666667	6	5.7	12.1	4.7	9.4712
Uruguay	2006	5.66666667	6	6.1	10.8	6.4	9.84128
Uruguay	2007	5.66666667	6	5.8	9.4	8.1	
Uruguay	2008	5.66666667	6	6.6	7.9	7.9	
Uruguay	2009	5.66666667	6	6.7	7.8	7.1	
Uruguay	2010	5.66666667	6	6.1	7	6.7	
Uruguay	2011	5.66666667	6	5.9	6.3	8.1	15.16272
Uruguay	2012	5.66666667	6	7.9	6.3	8.1	
Uruguay	2013	5.66666667	6	7.6	6.5	8.6	
Uruguay	2014	5.66666667	6	7.8	6.6	8.9	
Uruguay	2015	5.66666667	6	8.5	7.5	8.7	
Uruguay	2016	5.66666667	6	7.8	7.9	9.6	14.64528
Uruguay	2017	5.66666667	6	8.2	7.9	6.2	14.93611
Venezuela	1998	0.56410256	1	19.3	no data	35.8	
Venezuela	1999	0.56410256	1	24.9	14.5	23.6	
Venezuela	2000	0.56410256	1	32.8	14	16.2	
Venezuela	2001	0.56410256	1	31.9	13.4	12.5	
Venezuela	2002	0.56410256	1	37.8	16	22.4	
Venezuela	2003	0.56410256	1	43.8	18.2	31.1	
Venezuela	2004	0.56410256	1	36.9	15.1	21.7	
Venezuela	2005	0.56410256	1	37.2	12.2	16	
Venezuela	2006	0.56410256	1	45	10	13.7	
Venezuela	2007	0.56410256	1	47.5	8.5	18.7	
Venezuela	2008	0.56410256	1	51.8	7.4	31.4	
Venezuela	2009	0.56410256	1	48.9	7.9	26	

Country	Year	Index	Sum	Homicide	Unemployment	Inflation	Education
Venezuela	2010	0.56410256	1	45.1	8.5	28.2	
Venezuela	2011	0.56410256	1	47.8	8.2	26.1	
Venezuela	2012	0.56410256	1	53.8	7.8	21.1	
Venezuela	2013	0.56410256	1		7.5	40.6	
Venezuela	2014	0.56410256	1	61.9	6.7	62.2	
Venezuela	2015	0.56410256	1		7.4	121.7	
Venezuela	2016	0.56410256	1	56.3	20.9	254.9	
Venezuela	2017	0.56410256	1		27.9	438.1	

Appendix C. Data used for the UK scoped empirical findings about the actual abortions performed and crime rate

Year	Crime rate	Abortion rate	Inflation	Unemployment	Education
1958		18.3		2.2	
1959		18.6		2.3	
1960	1419.3	17.8		1.7	
1961	1528.22	17.6		1.6	
1962	1683.43	20		2.1	
1963	1823.07	19.4		2.6	
1964	1977.71	10.9		1.7	
1965	2086.33	22.6		1.5	
1966	2195.59	25.2		1.6	
1967	2197.44	32.7		2.5	
1968	2334.81	28.9		2.5	
1969	2685.05	68.7		2.5	
1970	2795.37	110.3		2.7	
1971	2944.89	161.9		3.5	
1972	3013.62	220.4		3.8	
1973	2949.88	247.3		2.7	
1974	3491.66	254.6		2.6	
1975	3744.96	231.5		4.2	
1976	3799.39	221.9		5.7	
1977	4691.85	233.6		6.2	
1978	4558.11	237.3		6.1	
1979	4510	234.7		5.7	
1980	4773.63	245.2	16.8	7.4	
1981	5261.07	256.1	12.2	11.4	12.64421
1982	5793.31	260.5	8.5	13	11.60222
1983	5764.01	257.8	5.2	12.2	11.40756

Year	Crime rate	Abortion rate	Inflation	Unemployment	Education
1984	6201.66	266.9	4.4	11.5	11.20601
1985	6387.03	261.8	5.2	11.7	10.45942
1986	6787.78	260.6	3.6	11.8	10.21579
1987	6852.22	255.7	4.1	10.5	10.50665
1988	6527.1	265	4.6	8.3	10.78651
1989	6781.66	267.5	5.2	6.3	11.13732
1990	7936.77	264.7	7	5.8	11.1656
1991	9187.95	256.7	7.5	8	10.91144
1992	9711.15	249.5	4.2	9.8	11.19357
1993	9574.48	250.5	2.5	10.3	
1994	9077.88	251	2	9.4	11.88866
1995	8790.63	252.5	2.6	8.6	11.96908
1996	8658.79	273.3	2.4	8.1	11.75599
1997	7885.06	279.5	1.8	7	
1998	7771.52	294.7	1.6	6.3	12.22012
1999	8706.33	294.7	1.3	6	11.7498
2000	9001.46	306.7	0.8	5.5	12.02011
2001	8746.4	313.3	1.2	5.1	12.25854
2002	9306.01	311	1.3	5.2	13.51474
2003	9709.16	309.6	1.4	5	13.60071
2004	9741.21	304	1.3	4.8	12.93768
2005	9067.32	300.9	2.1	4.8	13.17415
2006	8916.97	300.4	2.3	5.4	13.13644
2007	8679.33	298	2.3	5.4	13.03284
2008	7897.39	285.2	3.6	5.7	12.95477
2009	7435.23	277.2	2.2	7.6	12.61481
2010	6795.1	271.2	3.3	7.9	13.02604
2011	6447.27	270.9	4.5	8.1	12.6972
2012	6128.04	261.7	2.8	8	

Year	Crime rate	Abortion rate	Inflation	Unemployment	Education
2013	5540.72	273.2	2.6	7.6	12.91605
2014	5426.97	273.4	1.5	6.2	13.66837
2015	5497.77	273.7	0	5.4	13.83661
2016		273.5	0.7	4.9	13.8311
2017			2.7	4.4	
2018			2.5	4.1	

There are numerous reasons to highly value this monograph. Firstly, because of its comprehensive coverage, both theoretical and empirical, of multi-layered and complex issues related to abortion and crime. Secondly, because of an ingenious and novel attempt to construct new measures of institutionalized, judicial framework concerning abortion, a clear advantage of which is the opportunity to expand empirical analyses upon a vast range of countries. Thirdly, it's about the author's ability and ingenuity to convincingly present his own viewpoints and – even if sometimes disputable – to bravely (with a help of econometric tools) stick to them. And last but not least, it's about the whole message of this monograph, being highly instructive and illuminating: after having read it a careful reader familiar with the topic finds a lot of possible ways this work can be continued and deepened.

Dr hab. Waldemar Florczak, prof. UJ

The subject of the monograph is original, extremely rare in the literature, especially in our country. This is determined by its political and social sensitivity. As a result, there is a lack of serious scientific studies about the subject. Even more valuable are reflections resulting from the research conducted in other European countries and also their dissemination.

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