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The Influence of Banking Crisis on Suicide Rates: A Local Projections Approach

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Master Thesis

presented as partial requirement for obtaining the Master Degree Program in Statistics and Information Management

NOVA Information Management School
Instituto Superior de Estatística e Gestão de Informação
Universidade Nova de Lisboa

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THE INFLUENCE OF BANKING CRISES ON SUICIDE RATES: A LOCAL PROJECTIONS APPROACH

By

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Master Thesis presented as partial requirement for obtaining the Master's degree in Statistics and Information Management, with a specialization in Risk Analysis and Management.

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STATEMENT OF INTEGRITY

I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism or any form of undue use of information or falsification of results along the process leading to its elaboration. I further declare that I have fully acknowledge the Rules of Conduct and Code of Honor from the NOVA Information Management School.

Iryna Nepip

Lisbon, May 29th, 2024

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ABSTRACT

Systemic banking crises have a detrimental impact on the global economy and adversely affect human well-being. This study examines the impact of systemic banking crises on suicide rates, exploring whether this effect is consistent across different income-level groups of countries and investigating gender disparities in suicide rates. The analysis covers 44 countries with high- and middle-income levels from 1980 to 2020 and a second panel of 96 countries classified with high-, middle-, and low-income levels from 1990 to 2019. We estimate impulse response functions using the Local Projections methodology to analyze this effect. Our findings indicate a positive statistically significant effect of the banking crisis shock on suicide rates only in the first panel of 44 countries, reaching the highest impact in the year following a banking crisis. We conclude that this effect is concentrated in more developed countries, affecting men more than women. The practical implications of these findings suggest that policymakers should strengthen mental health support and crisis intervention strategies, especially in developed countries, particularly for men, following banking crises, to minimize the rise in suicide rates. This work contributes to improving our understanding of the impact of systemic banking crises on suicide rates and gives insight into how that effect varies across income levels and gender differences.

KEYWORDS

Systemic banking crises; Suicide rates; Impulse Response Function; Local Projections; Unemployment

Sustainable Development Goals (SGD):



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LIST OF ABBREVIATIONS AND ACRONYMS

IRF	Impulse Response Function
LP	Linear Projection
VAR	Vector Autoregressions
WHO	World Health Organization
OECD	The Organization for Economic Cooperation and Development
GDP	Gross Domestic Product

1. INTRODUCTION

Every year, more than 700,000 people commit suicide worldwide. Suicide is a global public health issue that not only occurs in high-income countries but also affects different regions of the world; indeed, in 2019, over 77% of global suicides occurred in low- and middle-income countries (WHO, 2021). Suicidal behavior results from various causes, primarily individual mental issues, such as depression and substance use disorders. Also, a significant correlation exists between suicide and occurrences such as abuse, discrimination, violence, disaster, and conflict (WHO, 2021).

It seems plausible that, during a banking crisis, suicides may increase due to a variety of factors. These events are characterized by significant bank runs, banking system losses, and/or bank liquidations. These adverse shocks are often quite drastic on the economy and society itself, resulting in financial distress, credit crunches, a decline in economic activity, and an increase in unemployment rates (Drees & Pazarbasioglu, 1998). The loss of wealth, job insecurity, and increasing debt may cause emotions of despair and hopelessness, which raise the likelihood of suicidal thoughts.

Several studies have shown a link between suicide rates and economic downturns. The financial crisis of 2008, for example, was considered one of the most devastating globally, and analyses such as those of Demirci et al. (2020) and Reeves et al. (2012) report that this economic recession had both a short- and long-term effect on suicide rates in the United States. This situation arises from the negative impact of the crisis on the individuals' mental well-being and the decline in their prospects. It is strongly associated with the fear of unemployment and unemployment itself (Demirci et al., 2020).

This study addresses the question of how systemic banking crises affect suicide rates across different income-level groups of countries and between genders. To address this research question, we analyze two different datasets. The first panel includes 44 countries, with middle- and high-income levels, covering 1980–2020. The second dataset includes 96 countries from 1990 to 2019, including low-, middle-, and high-income countries. This analysis examines whether the effects of banking crises are more strongly evident across the diverse income range of the 96-country dataset or whether they are predominantly observed in the subset of 44 countries, most of which are high-income. Additionally, within the 44-country dataset, we investigate the gender-specific effect of banking crises on suicide rates.

To measure the impact of the banking crisis shock on suicide rates, we use the Local Projections approach. By implementing this econometric method, we can measure the short- and long-term responses of suicide rates to banking crises, providing essential insights into the depth and duration of the effect. With this research, we aim to contribute to the existing knowledge base on the impacts of financial crises on suicide rates, enabling us to identify future programs that can mitigate the impact of economic downturns on suicide.

Our empirical analysis finds that the banking crisis shock has a positive effect on suicide rates when examining the dataset of 44 countries. This suggests that the impact is more evident in high-income countries. These effects are mainly focused on men, suggesting a gender-specific impact. In contrast, the results for the group of 96 countries show a null effect from the banking crisis shock.

The remainder of the dissertation is organized as follows. Section 2 reviews the literature on suicide rates, briefly discussing the definition of banking crises and their effects on the economy and suicide

rates. Section 3 describes the Local Projections methodology and our dataset, including the control variables we use. Section 4 presents and discusses the regression estimates. Finally, Section 5 concludes with some implications and presents some ideas for future research.

2. LITERATURE REVIEW

2.1. SYSTEMIC BANKING CRISES

There are different definitions of banking crises in the literature. Reinhart & Rogoff (2009) are significant references that document financial crises across 66 countries over eight centuries, from the 13th to the early 21st centuries. Their study offers a comprehensive historical context for assessing both present and future occurrences of financial instability. They classified a total of 267 banking crises into two distinct types. Bank runs are an essential characteristic of Type I crises, which are more severe and occur when numerous depositors take their money from a bank because they are uncertain about its viability. This may result in the bank's closure or acquisition by the public sector. On the other hand, Type II banking crises take place in the absence of bank runs. They are evident by the closure, merger, takeover, or significant government assistance given to a sizable financial institution or group of institutions.

Kaminsky & Reinhart (1999) explore the relationship between banking and currency crises and present an alternative perspective on banking crises. They define a banking crisis as a situation where a large portion of banks are facing financial problems, which can be caused by several factors, such as declining asset values, unsustainable debt levels, and liquidity shortages. Similarly, Caprio & Klingebiel (1999) suggest that a banking crisis occurs when a significant number of banks face insolvency or several financial difficulties, leading to a loss of trust in the banking system and a breakdown of financial intermediation.

In our research, we adopt the widely recognized definition of systemic banking crises established by Laeven & Valencia (2020), which is considered, perhaps, the most accepted benchmark in the literature. This definition is regarded for its comprehensive framework, enabling meaningful comparisons across 165 countries from 1970 to 2017. A notable strength of their definition lies in the utilization of a broad set of quantitative criteria to delineate the conditions that correspond to the occurrence of banking crises. According to this definition, a banking crisis occurs when two specific conditions are present.

First, there must be clear indications of financial difficulties in the banking system, which may manifest themselves through remarkable events such as significant bank runs, substantial losses in the banking sector, or even bank closures. Second, a significant response must be given through banking policy interventions to address the substantial losses incurred by the banking system. The policy intervention is significant if a minimum of three of the following measures are observed: 1) *deposit freezes and/or bank holidays*; 2) *significant bank nationalizations*; 3) *bank restructuring fiscal costs (at least 3% of GDP)*; 4) *extensive liquidity support (at least 5% of deposits and liabilities to non-residents)*; 5) *significant guarantees put in place*; and 6) *significant asset purchases (at least 5% of GDP)*. However, a banking crisis may occur when there are significant losses or liquidations; in these cases, the first criterion is considered sufficient to identify a banking crisis. The losses are considered severe when: (1) *a country's banking system exhibits significant losses resulting in a share of non-performing loans above 20% of total loans or bank closures of at least 20% of banking system assets*; or (2) *fiscal restructuring costs of the banking sector are sufficiently high, exceeding 5% of GDP*.

Systemic banking crises have a negative impact on the economy. Jordà et al. (2011) examined data from 14 developed countries over 140 years (1870–2008) to investigate indicators of financial distress, using four different approaches to analyze the data. These methods apply new statistical tools to analyze temporal and spatial trends in crises, identify historical episodes of global financial instability, study pre-crisis macroeconomic variables, compare them with regular economic conditions, and evaluate their forecasting capacity regarding external deficits related to financial crises. The authors show that credit growth is the most significant indicator of financial distress and observed a persistent negative impact on GDP growth.

Cerra & Saxena (2008) estimate Impulse Response Functions (IRFs) across a broad range of countries and analyze them based on income per capita levels. They found that banking crises have a negative impact on GDP, particularly in wealthier countries, where this loss is likely to persist for an extended period. Similarly, Teulings & Zubanov (2014) employ the Local Projection methodology to analyze panel data from 99 countries from 1974 to 2001. Their findings revealed that the banking crisis resulted in a significant GDP decline of nearly 10% over ten years, with little evidence of recovery. Other studies conducted by da Rocha & Solomou (2015), Romer & Romer (2017), and Uch et al. (2021) have also shown that one of the main effects of financial crises is the decline in GDP.

It is also essential to recognize the link between banking crises and unemployment. Focusing on the youth unemployment rate in 70 countries between 1980 and 2005, Choudhry (2012) reaches a significant conclusion. Banking crises have a detrimental effect on the youth unemployment rate, persisting for five years after the crisis onset. The effect is more severe in the second and third years after the start of the banking crisis. Similarly, Bernal-Verdugo (2013) conduct an analysis covering 97 countries between 1980 and 2008, which shows that, on average, banking crises have a significant adverse effect on unemployment, leading to a substantial increase in unemployment rates.

There is also a correlation between financial crises and the inflation rate. Demirguc-Kunt & Detragiache (1998), which analyze a large sample of countries from 1980–1994, highlight that banking crises arise when the overall economic conditions are fragile. Specifically, periods of low economic growth and high inflation often coincide with banking crises. Additionally, a recent study (Kaehler & Weber, 2023) investigates the impact of financial crises, particularly banking, currency, and sovereign debt crises, on inflation rates. This paper aims to fill a gap in existing research on this topic. The authors consider a large panel dataset for 1960–2019. By comparing the mean values of the inflation rate during years with and without financial crises, they conclude that banking crises tend to have a significant impact on the inflation rate, strengthening concerns that restrictive fiscal and monetary policies set in place to prevent a banking system and the economy from failing could lead to inflation rising.

2.2. THE INFLUENCE OF ECONOMIC DOWNTURNS AND BANKING CRISES ON SUICIDE RATES

Suicide is a significant cause of death globally, with over 700,000 individuals committing suicide and many attempting it. This public health problem has affected various countries over the years and is the fourth most significant cause of death in a specific group of people aged 15 to 29 (WHO, 2018). Economic factors have a significant influence (Demirci et al., 2020), and access to quality medical treatment is essential for reducing the risk of suicide (WHO, 2014).

Suicide rates differ across social groups and geographic regions. Understanding these disparities is crucial to developing effective management and prevention methods. In high-income countries, high-stress situations such as financial difficulties, divorce, and severe pain from illnesses and chronic diseases are the leading causes of suicide. However, this global affects not only high-income countries; it is a global issue that occurs in every part of the world. The WHO reported that in 2019, over 77% of global suicides occurred in low- and middle-income countries (WHO, 2021). Numerous studies have explored the correlation between suicide and poverty in low- and middle-income countries, with the majority revealing a positive association (Iemmi et al., 2016).

Suicide rates may rise, and health conditions may deteriorate in countries with fiscal austerity policies that reduce public spending on healthcare and welfare services. Arie (2013) explains how high-income countries such as Iceland and Finland did not experience increased suicide rates during the financial recession since they did not reduce their health budgets. The opposite happened with Greece and Spain, as they implemented strict fiscal austerity measures in response to economic crises, which increased suicide rates. To effectively create policies that protect individuals from the impacts of economic downturns, it is essential to identify the factors that contribute to the rise in mental health problems and susceptibility to suicide during periods of financial strain (Miret & López-García, 2016).

One consequence of economic crises is increased unemployment. Andrés & Halicioglu (2010) focus on Denmark and find that unemployment has a statistically significant positive effect on suicides. Barr et al. (2012) emphasize that unemployment accounts for 40% of the increasing suicide cases among men in England. In addition to that, observational and prospective studies also show that unemployed people are at a higher risk of suicide (Agerbo, 2005; Dooley et al., 1994).

Reeves et al. (2012) show that in the United States, the rise in unemployment during the recession is associated with a 3.8% increase in the suicide rate. In addition, significant findings by Lin & Chen (2018), which use an asymmetric generalized impulse-response method and analyze asymmetric causality, report an asymmetric relationship between unemployment and suicide rates in the U.S. from 1928–2013. They conclude that a rise in unemployment rates (economic downturn) correlates with an increase in suicide rates among an old age group (55–64 years old), whereas a decline in unemployment rates (economic growth) is associated with a decrease in suicide rates among the youngest age groups (15–24 and 25–34 years old) and middle age groups (35–44 and 45–54 years old). However, as noted by the authors, this study has certain limitations, notably the omission of various socioeconomic variables that may influence both long-term unemployment and suicide rates.

The 2008 global crisis generated significant research interest in terms of its impact on suicide rates. Chang (2013) examines the impact of the Great Recession on suicide rates across 54 countries. The study identifies the specific gender, age groups, and countries most impacted by this crisis. The findings reveal that following the 2008 economic downturn, suicide rates increased in European and American

countries, particularly among men and in economies with higher levels of unemployment. In a related study, Demirci et al. (2020) focus on investigating the effect of the 2008 economic crisis on suicides, specifically within the United States. They employ the distributed autoregressive lag method, using the number of suicide deaths as the dependent variable and considering unemployment rates and the occurrence of the 2008 crisis as independent variables. The study concludes that there are statistically significant short- and long-run impacts of the 2008 economic crisis on suicide cases in the United States.

Nordt et al. (2015) analyze a sample of 63 countries for the period 2000–2011, focusing on the 2008 economic crisis, to examine the impact of unemployment on suicide rates. Their study reveals a significant finding: the increase in suicide preceded the rise in unemployment, and the risk of suicide associated with unemployment increased by 20–30%. Only unemployment, out of the examined economic factors, consistently impacts four geographical regions.¹

According to Barr et al. (2012), the economic recession that occurred in England between 2008 and 2010 resulted in an estimated 1000 excess suicides. Similarly, Chang et al. (2013) conclude that there were nearly 5,000 excess suicides across 54 countries in 2009, based on calculations derived from the trend observed between 2000 and 2007. The 2008 global economic recession has a particularly significant impact on suicide rates in European countries, with Greece being a notable example. Kondilis et al. (2013), McDaid et al. (2013), and Kentikelenis et al. (2011) demonstrate a significant increase in suicide rates, particularly in Greece, following the global economic recession. In addition, Çiraklı & Yildirim (2019) show a positive correlation between the economic crisis of 2008 and suicide rates in Turkey.

Huikari et al. (2019) examine the impact of different financial crises on suicide rates in developed countries using negative binomial regressions. The results reveal a consistent pattern: every global crisis since 1970 has led to an increase in suicide rates, particularly in developed countries or countries with high GDP. In the 21 OECD countries considered in this study, a total of over 60,000 excess suicides can be attributed to these crises since 1970. The Asian financial crisis in 1997 had the most detrimental effect in terms of the number of excess suicides observed. When comparing the recent global financial crisis with previous economic crises, the researchers conclude that the most recent crisis was not exceptionally severe. It is unclear why these changes occurred, but global healthcare improvements during that period may have played a role (WHO, 2014). Additionally, the study reveals that different types of crises, such as banking crises, currency and inflation crises, and stock market crashes, have varying impacts on suicide rates. Banking crises and stock market crashes tend to result in more excess suicides than currency and inflation crises.

Policies developed to mitigate the adverse effects of economic crises should cover a long-term period that will be relevant after the crisis. This is because crises have both short- and long-term effects. If it

¹ The four geographical regions are: *Americas (Argentina, Brazil, Canada, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Mexico, Nicaragua, Panama, Paraguay, Suriname, Uruguay, US)*, northern and western Europe (*Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Ireland, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Sweden, Switzerland, UK*), southern and eastern Europe (*Belarus, Bulgaria, Croatia, Czechia, Greece, Hungary, Italy, Macedonia, Moldova, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Ukraine*), as well as regions outside of the Americas, and Europe (*Australia, Egypt, Georgia, Hong Kong, Israel, Japan, Kazakhstan, Kuwait, Kyrgyzstan, Mauritius, New Zealand, Singapore, South Africa, South Korea*).

is possible to anticipate the economic crisis, implementing these programs may also significantly decrease the number of suicide occurrences (Demirci et al., 2020).

3. METHODOLOGY AND DATA

3.1. METHODOLOGY

This paper aims to study the impact of banking crises on suicide rates. In first focuses on a sample of 44 countries (high- and middle-income economies between 1980 and 2020 and a global panel that includes 96 countries (high, middle, and low-income economies) from 1990 to 2019. Additionally, we examine the impact of banking crises on suicide rates among men and women. We implement Jordà's (2005) Local Projections approach to estimate these dynamic effects, which involves estimating individual regression models specific to each forecast horizon.

The Local Projections methodology has been proven to have several advantages in different empirical settings. This method, known for its robustness to specification errors, employs simple regression approaches using standard regression packages, explicitly focusing on estimating the effects of shocks on a particular variable of interest over different horizons. It allows for model flexibility and, in addition, provides a more straightforward interpretation of the estimated coefficients.²

Indeed, the LP method, when compared to Vector Autoregressions (VAR), does not require a detailed specification of how the different variables influence each other over time to calculate impulse responses (Jordà, 2005)³. An important aspect is that VAR models require the specification of the lag structure, which establishes the number of lagged values for each variable in the model. At a general level, model identification is crucial in VAR modeling to ensure that the system of equations is well-specified and estimable.

Numerous studies use Local Projections methods to investigate the impact of different economic shocks. For instance, Furceri & Zdzienicka (2012) conducted a study using a panel of 159 countries from 1970 to 2006; their research estimates the dynamic effects of banking crises on output within a group of emerging and developing economies. They conclude that systemic banking crises result in substantial production losses, particularly in countries with a relatively higher level of economic development. Uch et al. (2021) emphasize the adverse effects of banking crises on credit dynamics in developing economies. Other studies that employ Local Projections techniques include, for example, Teulings & Zubanov (2014), da Rocha & Solomou (2015), Duval & Furceri (2018), Masten & Grdović Gnip (2019), Cette et al. (2020), and Bakas & Mendieta-Muñoz (2020).

The equation used to estimate cumulative impulse responses for panel data for country i , year t , lags s (with $s = 0,1,2$), and forecast horizon h (with $h = 1,2,3,4,5$) is as follows:

$$y_{i,t+h} - y_{i,t-1} = a_i^h + \gamma_t^h + \sum_{s=0}^2 \beta_s^h D_{i,t-s} + \sum_{s=0}^2 \delta_s^h X_{i,t-s} + \varepsilon_{i,t+h} \quad (1)$$

² For example, the Local Projections methods accommodate the implementation of non-linear effects specifications or the use of instrumental variables in a straightforward way.

³ We use the function `lp_lin_panel` from the R package "Lpirfs" (Adämmmer, 2019) to estimate impulse response functions from our panel data.

where the dependent variable, $y_{i,t+h} - y_{i,t-1}$, in our case, is the cumulative growth of the suicide rates. The dummy variable $D_{i,t-s}$, is equal to 1 if the systemic banking crisis starts in the year t in country i , and 0 otherwise. The vector $X_{i,t-s}$, contains the lagged values of the dependent and explanatory variables and control variables; based on our literature review, we include currency and sovereign crises, credit per GDP (% of GDP), unemployment (% of the total labor force), log of GDP per capita (constant 2015 US\$), and inflation rate (annual % of consumer price index), and their respective lags. We control for country- and year-fixed effects using α_i^h and γ_t^h , respectively. We follow the common practice of considering a medium-term 5-year horizon (i.e., the maximum h is equal to 5).

3.2. DATA

The data availability conditioned the selection of the analysis period, the countries, and the control variables in this study. We consider 44 countries in our primary analysis, comprising 36 OECD countries and 8 other countries included in the OECD suicide rates database (OECD Data, 2023). This study focuses mainly on high- and middle-income countries. In addition, our complementary study covers a panel of 96 countries, including low-, middle-, and high-income countries.⁴

3.2.1. Systemic Banking Crises

Consistent with earlier discussions, this paper adopts the recognized definition of banking crises established by Laeven & Valencia (2020). The authors identify 151 banking crises in 165 countries from 1970 to 2017 in their comprehensive study. In our study, we focus on examining a sample of 44 countries. We use Laeven & Valencia's (2020) comprehensive database from 1980 to 2017. Our analysis reveals 50 systemic banking crises within this period. Additionally, after an extensive review of the literature covering 2017 to 2020, we found no documented instances of additional banking crises in the countries included in our study.

Table 1 - Total Systemic Banking Crises by Year

Year	Sum of Systemic Banking Crises	Year	Sum of Systemic Banking Crises
1980	0	2001	1
1981	2	2002	0
1982	0	2003	0
1983	2	2004	0
1984	0	2005	0
1985	0	2006	0
1986	0	2007	2
1987	1	2008	17
1988	1	2009	0
1989	1	2010	0
1990	1	2011	0
1991	4	2012	0
1992	3	2013	0
1993	0	2014	0
1994	3	2015	0
1995	3	2016	0
1996	2	2017	0
1997	2	2018	0
1998	5	2019	0
1999	0	2020	0
2000	0		

Note: The sample includes a study group of 44 countries.

Table 1 illustrates the cumulative number of systemic banking crises by the years of their initiation. The most drastic year was 2008, recognized as the Global Financial Crisis, affecting 17 countries in our study; 1991 and 1998 experienced the start of 4 and 5 systemic banking crises, respectively. The

⁴ We excluded countries with a population below one million from both panels.

country-level analysis in Table 2 reveals that Argentina, the most affected country, experienced three systemic banking crises. Additionally, nine countries experienced two banking crises, while 29 countries recorded a single occurrence, and five countries did not experience any banking crises throughout the study period.

Table 2 - Total Systemic Banking Crises by Country

Country	Sum of Systemic Banking Crises	Country	Sum of Systemic Banking Crises
Argentina	3	Japan	1
Australia	0	Korea	1
Austria	1	Latvia	2
Belgium	1	Lithuania	1
Brazil	2	Mexico	2
Bulgaria	1	Netherlands	1
Canada	0	New Zealand	0
Chile	1	Norway	1
Colombia	1	Peru	1
Costa Rica	2	Poland	1
Croatia	1	Portugal	1
Czechia	1	Romania	1
Denmark	1	Russia	2
Estonia	1	Slovakia	1
Finland	1	Slovenia	2
France	1	South Africa	0
Germany	1	Spain	1
Greece	1	Sweden	2
Hungary	2	Switzerland	1
Ireland	1	Turkey	0
Israel	1	United Kingdom	1
Italy	1	United States	2

Note: The sample includes a study group of 44 countries.

3.2.2. Suicide Rates

Suicide is defined as the deliberate act of taking one's own life, which is typically the consequence of issues with mental health, personal pain, or social pressures. For our main study, we sourced the suicide rates from the OECD Data (2023). For the complementary study, we obtained the data from Our World in Data (2023), which, in turn, is sourced from the Institute for Health Metrics and Evaluation (2019). The suicide rates are measured in terms of deaths per 100,000 inhabitants and standardized by age. This approach allows us to overcome the limitations of crude rates and obtain a more precise understanding of the impact of banking crises on suicide rates.⁵

⁵ Age-standardized suicide rates offer a better measure than crude rates because the risk of suicide varies between different age groups. By standardizing these rates, we control variations in age distributions between populations, providing a clearer understanding of the actual impact of banking crises on suicide rates.

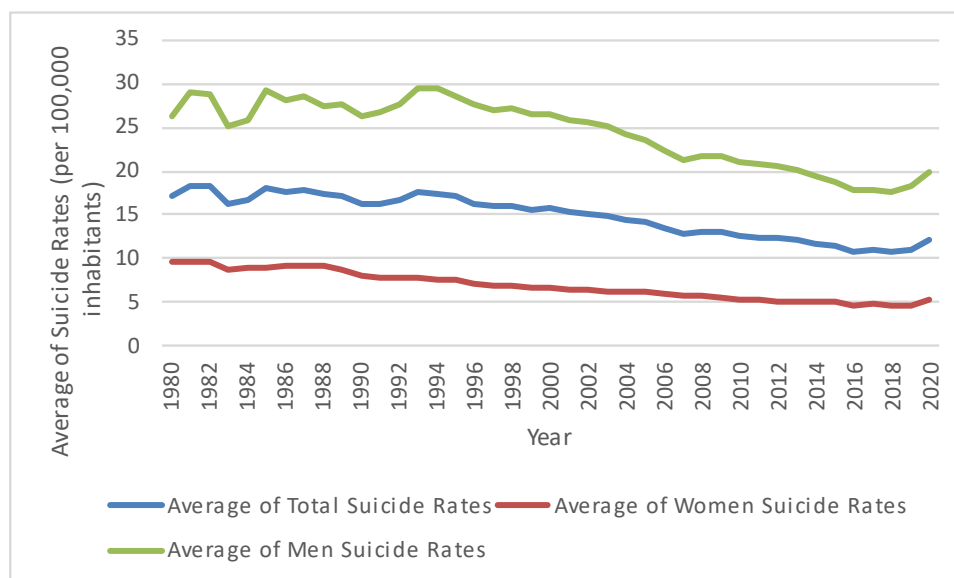


Figure 1 - Average Suicide Rate (per 100,000 inhabitants) by Year

Note: The author's calculation employed a simple average based on data from the OECD (2023). The sample includes a study group of 44 countries.

Figure 1 illustrates an overall decreasing trend throughout the observed time range. However, within this general trend, there are noticeable fluctuations (increases) in suicide rates. Table A.1 in the Appendix presents an analysis of suicide rates over the years. For instance, in 1993, suicide rates increased from 16.34 (in 1991) to 17.66. This coincided with the onset of banking crises in four countries in 1991 and three in 1992, primarily mostly from countries in post-communist transition. The collapse of the planned economy in these regions was particularly severe, contributing to the rise in both suicide rates and banking crises. Notably, in 2008, there was a noticeable disruption in the decline in suicide rates that had been evident in previous years. Suicide rates registered a slight increase from 12.80 to 13.03, coinciding with the onset of banking crises in 17 countries during the same year.⁶

Lithuania had the highest average suicide rate in our dataset, reaching 36.58 per 100,000 inhabitants, as observed in Table A.3 of the Appendix, while South Africa had the lowest average rate, recorded at 0.89 per 100,000 inhabitants.⁷

In addition, when analyzing the gender-specific suicide rates represented in Figure 1, a notable discrepancy between male and female suicides becomes evident. The data consistently reveals that, on average, the suicide rates among men are considerably higher than those among women across all the years examined in the study. Additionally, the trends highlighted above in the general suicide rates primarily reflect those observed in the male rates.

⁶ Table A.2 in the Appendix presents the average suicide rates by year for the 96-country study.

⁷ Table A.4 and Table A.5 in the Appendix present the average suicide rates by country for the 96-country study.

3.2.3. Control Variables

Our study incorporates several macroeconomic variables as control variables, sourced from the World Bank (2023). More specifically, we include the unemployment rate (% of the total labor force), log of GDP per capita (constant 2015 US\$), inflation rate (annual % of consumer price index), and credit per GDP (%GDP). Including these macroeconomic variables allows us to account for the potential influence of economic conditions and labor market dynamics on suicide rates.

In addition, we consider currency and sovereign debt crises as control variables in our study. There is a strong correlation between the banking crises and those mentioned above. Since banking crises restrict financial stability and currency crises affect the value of the national currency, causing economic instability, the two crises frequently occur simultaneously. The occurrence of sovereign and banking crises may also coincide. Banking crises can affect the banking industry through failure or debt restructuring, while sovereign crises can strain government budgets. This economic instability caused by currency and sovereign debt crises often leads to reduced fiscal austerity measures and volatile financial markets, which contribute to rising unemployment. This uncertainty surrounding job security affects the risk of mental health disorders, including depression and suicide.

We use the Laeven & Valencia (2020) database to identify 33 currency crises and 10 sovereign debt crises covering the years 1980 to 2017 across the 44 countries of our main study. To extend our analysis to the years 2018–2020, we consulted a recent study by Nguyen et al. (2022), which offers an updated database covering 206 countries. This study identifies 414 currency crises from 1950 to 2019 and 200 sovereign debt crises from 1960 to 2019. Despite the expanded coverage, our panel data analysis for 44 countries revealed only one additional currency crisis for Argentina in 2018 in this database. Notably, there is no evidence of any type of financial crisis in 2019 and 2020.

Table 3 - Summary Statistics of the Dependent, Explanatory, and Control Variables

Variables	Nº Observations	Average	Min	Max	Std. Deviation	Median
Suicide rates (per 100,000 inhabitants)	1609	14.83	0.40	52	9.53	12.60
Male Suicide rates (per 100,000 male inhabitants)	1609	24.43	0.60	95.20	16.50	20.50
Female Suicide rates (per 100,000 female inhabitants)	1609	6.80	0.20	31	4.70	5.70
Systemic Banking crises (1 if the crisis occurs, 0 otherwise)	1804	0.03	0	1	0.17	0
Currency crises (1 if the crisis occurs, 0 otherwise)	1804	0.02	0	1	0.14	0
Sovereign Debt crises (1 if the crisis occurs, 0 otherwise)	1804	0.01	0	1	0.09	0
Unemployment rates (% of the total labor force)	1320	8.45	1.10	27.47	4.52	7.50
GDP per capita (constant 2015 US\$)	1635	24247.81	2628.79	87123.66	17997.34	1911.61
Inflation rates ⁸ (annual % of consumer price index)	1664	11.02	-4.48	100	21.77	3.34
Credit per GDP (%GDP)	1156	79.30	6.98	217.76	47.76	67.23

Note: The sample consists of a study group of 44 countries, covering the period from 1980 to 2020. We obtained suicide rates from OECD Data (2023), while data on systemic banking, currency, and sovereign debt crises were extracted from the Laeven & Valencia (2020) database. Additionally, we sourced data on GDP per capita, credit per GDP, and unemployment and inflation rates from the World Bank (2023).

⁸ We implement a capping method to address the outliers in the inflation rates. Specifically, the inflation rates above 100% were capped at 100%. This adjustment affects 62 observations. Notable examples without this adjustment include the two highest values of inflation rates, 7781.66% and 3398.68%.

4. RESULTS AND DISCUSSION

4.1. BANKING CRISES AND SUICIDE IN OECD DATABASE COUNTRIES

In this section, we present the results of our main analysis, estimating impulse response functions (IRFs) based on equation (1) and analyzing the variation in the suicide rate over a five-year horizon as the dependent variable. We divide our analysis into two parts. Firstly, we examine the Local Projections results based on estimating impulse response functions without control variables to retain as many observations as possible. Secondly, we incorporate control variables in our study, both with and without applying two lags, including the dependent variable and the banking crisis dummy. We also provide corresponding figures to improve the interpretability of the results. As noted before, these findings are based on a panel of 44 countries from the OECD database (high- and middle-income countries).

Figure 2 and Table 4 present the results corresponding to the estimation of IRFs without control variables. Upon analyzing the results without lags and with lags ≤ 2 , we observe a statistically significant positive effect at the 1% level in period $h=1$ (the year of the banking crisis occurrence), indicating an immediate impact on the suicide rate, and at the 5% level in period $h=2$ (the year following the crisis). This analysis suggests a positive and more precise effect in the year following a banking crisis, reaching its maximum and resulting in a statistically null effect in the following periods.

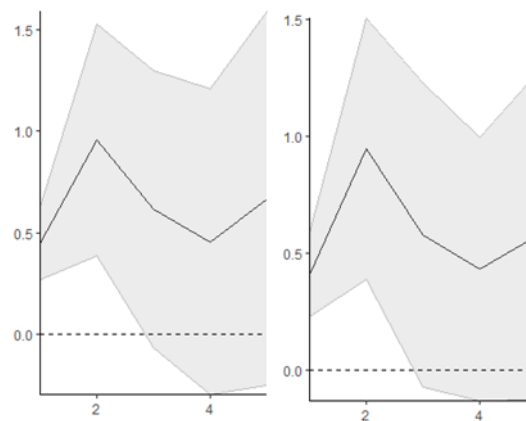


Figure 2 - IRF of Suicide Rates without Control Variables (OECD)

Note: Control variables are excluded. $h=1$ is the year of the banking crisis shock. Confidence bands of 90%. The first figure does not include lags, and the second includes lags ≤ 2 of the explanatory and dependent variables.

To maintain a high number of observations, we include control variables such as currency and sovereign crises, the log of GDP per capita, and unemployment and inflation rates in our regressions. We excluded credit per GDP due to the low number of observations. These results, shown in Figure 3 and Table 5, align with the previous findings. When considering the analysis with a lag of 2, only the third regression is not statistically significant. Additionally, we observe an immediate impact on suicide rates, with a 5% significant level in the year of the banking crisis followed by an increase of 0.9618 per 100,000 inhabitants in suicide rates with a 10% significant level in the subsequent year ($h=2$).

Table 4 - IRF of Suicide Rates with no Control Variables (OECD)

Shock	h=1	h=2	h=3	h=4	h=5
1. No lags	0.4495*** (0.1092)	0.9594*** (0.3454)	0.6167 (0.4121)	0.4560 (0.4552)	0.6695 (0.5558)
Number of Events	48	48	47	48	48
Observations	1544	1493	1451	1414	1374
2. Lags<=2	0.4097*** (0.1079)	0.9464*** (0.3372)	0.5801 (0.3938)	0.4334 (0.3417)	0.5728 (0.4217)
Number of Events	45	45	45	45	45
Observations	1484	1435	1397	1358	1316

Note: The estimations are based on equation (1). Control variables are excluded. $h=1$ is the year of the banking crisis shock. Robust-clustered standard errors are in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

When we include all control variables, we observe a significant decrease of 706 observations compared to regressions without control variables. This substantial decrease in observations is primarily due to the inclusion of credit per GDP in our analysis. Consequently, the results should be interpreted with caution, as the reduced sample can affect their reliability. Figure 4 and Table A.6 in the Appendix show that regressions without lags produce similar results to the previous analyses: the banking crisis shock affects suicide rates in the first two periods (the year of the crisis and the following year), but this effect becomes indistinguishable from zero in subsequent years. In contrast, the analysis with a lag of two shows no significant impact of the banking crisis shock on suicide rates, resulting in a zero effect.

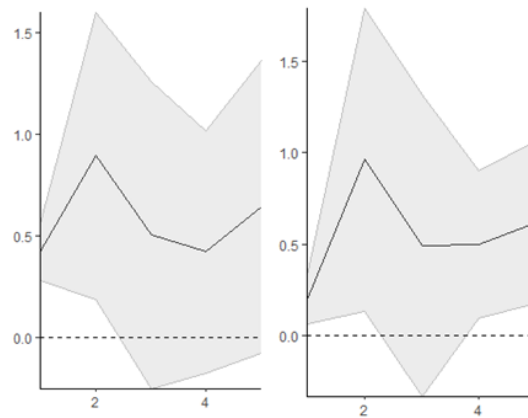


Figure 3 - IRF of Suicide Rates with the First Set of Control Variables (OECD)

Note: The control variables implemented are the log of GDP, unemployment and inflation rate, and currency and sovereign debt crises. $h=1$ is the year of the banking crisis shock. Confidence bands of 90%. The first figure does not include lags; the second includes lags ≤ 2 of the explanatory, dependent, and control variables.

This analysis shows that there is a statistically significant positive effect of banking crisis shock on suicide rates in the year of the crisis and the following year. This impact is most noticeable in the year after the banking crisis, reaching its maximum in this period. However, in subsequent years ($h=3,4,5$), this effect becomes statistically indistinguishable from zero.

Table 5 - IRF of Suicide Rates with the First Set of Control Variables (OECD)

Shock	h=1	h=2	h=3	h=4	h=5
1. No lags	0.4191*** (0.0847)	0.8928** (0.4277)	0.5034 (0.4577)	0.4209 (0.3612)	0.6413 (0.4369)
Number of Events	38	38	38	38	38
Observations	1151	1106	1064	1025	983
2. Lags<=2	0.1926** (0.0806)	0.9618* (0.5022)	0.4927 (0.5002)	0.4966** (0.2454)	0.6179** (0.2696)
Number of Events	30	30	30	30	30
Observations	1059	1015	975	935	893

Note: The estimations are based on equation (1). The control variables implemented are the log of GDP, unemployment and inflation rate, and currency and sovereign debt crises. $h=1$ is the year of the banking crisis shock. Robust-clustered standard errors are in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

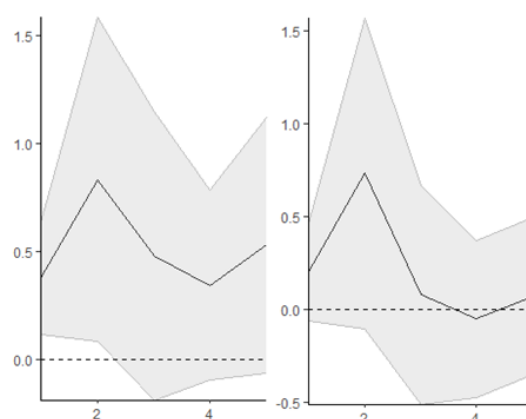


Figure 4 - IRF of Suicide Rates with All Control Variables (OECD)

Note: The control variables implemented are the log of GDP, unemployment and inflation rate, credit per GDP, and currency and sovereign debt crises. $h=1$ is the year of the banking crisis shock. Confidence bands of 90%. The first figure does not include lags; the second includes lags ≤ 2 of the explanatory, dependent, and control variables.

It is important to note that our study primarily concentrates on high- and middle-income countries.⁹ Specifically, our analysis includes 34 high-income and 10 middle-income countries. In the subsequent section, we will present a more general analysis to extend our study and provide a comprehensive analysis across a group of countries with high-, middle-, and low-income levels.

⁹ The categorization of countries according to income level is based on the World Bank income classification (2022).

4.2. BANKING CRISES AND SUICIDE: A GLOBAL PERSPECTIVE

In this subsection, we analyze a panel of 96 countries from 1990 to 2019, sourced from Our World in Data (2023), which in turn sources data from the Institute for Health Metrics and Evaluation (2019). According to the World Bank's income classification criteria (2022), 31 countries are classified as high-income, 47 as middle-income, and 18 as low-income. In this extension, we investigate if banking crises have similar impacts on a larger group of countries, covering a wider range of income levels, compared to the previous study. The analysis adopts the same methodology as in the previous subsection.

Figure 5 and Table A.7 in the Appendix display the results of the initial analyses, which do not incorporate control variables. Both sets of regressions, including those with and without lags of explanatory and dependent variables, show similar outputs but no statistically significant results. While most point estimates are positive, negative figures are also observed in the year of the banking crisis; overall, the confidence bands show that these effects are statistically indistinguishable from zero.

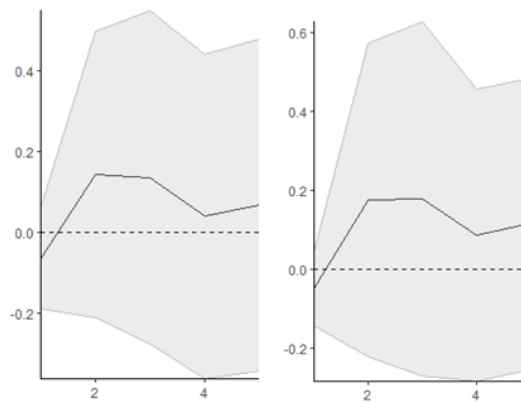


Figure 5 - IRF of Suicide Rates without Control Variables (Our World in Data)

Note: Control variables are excluded. $h = 1$ is the year of the banking crisis shock. Confidence bands of 90%. The first figure does not include lags; the second includes lags ≤ 2 of the explanatory and dependent variables.

In line with the previous subsection, we analyze regressions that include currency and sovereign crises, the log of GDP per capita, and unemployment and inflation rates as control variables, excluding credit per GDP, to maximize the number of observations. Figure 6 and Table A.8 in the Appendix show similar results to those without control variables. The results are not statistically significant, indicating a null effect of the banking crisis shock on suicide rates.

When including all control variables in our analysis, we observe a reduction of 503 observations, primarily due to the low number of credit per GDP observations. In Figure 7 and Table A.9 in the Appendix, the results without lags specification display the same conclusion as previously mentioned, where the confidence bands show a large uncertainty in the effect of a banking crisis shock on suicide rates, indicating no statistically significant effect. However, we observe some evidence when analyzing the study with a lag of two years. The point estimates are positive, but only the third regression (two years after the banking crisis occurrence) is statistically significant at the 10% level, indicating a small positive effect in that year.

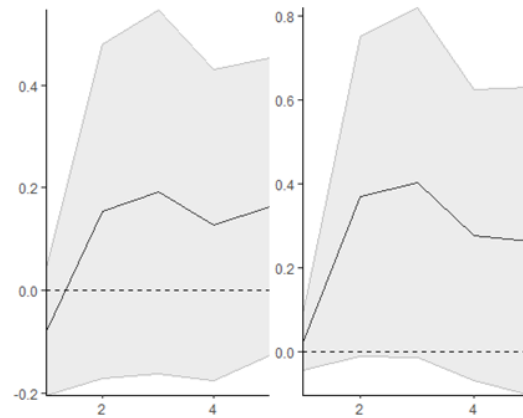


Figure 6 - IRF of Suicide Rates with the First Set of Control Variables (Our World in Data)

Note: The control variables implemented are the log of GDP, unemployment and inflation rate, credit per GDP, and currency and sovereign debt crises. $h=1$ is the year of the banking crisis shock. Confidence bands of 90%. The first figure does not include lags; the second includes lags ≤ 2 of the explanatory, dependent, and control variables.

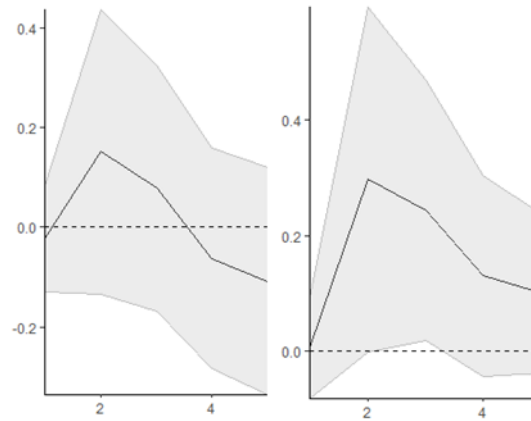


Figure 7 - IRF of Suicide Rates with All Control Variables (Our World in Data)

Note: The control variables implemented are the log of GDP, unemployment and inflation rate, credit per GDP, and currency and sovereign debt crises. $h=1$ is the year of the banking crisis shock. Confidence bands of 90%. The first figure does not include lags; the second includes lags ≤ 2 of the explanatory, dependent and control variables.

In general, analyzing a larger group of countries, including those with low-income levels, we find a statistically significant positive effect only in the analysis that includes all control variables with a two-year lag, specifically two years after the banking crisis occurrence. However, we should be cautious with this result since the sample size is reduced. The overall point estimates in this analysis are smaller than those from the 44-country study. Comparing these findings with those from the previous section, we conclude that the impact of the banking crisis shock is more concentrated in the 44-country study, specifically in more developed countries.

Similarly to our findings, Laeven & Valencia (2020) demonstrate that systemic banking crises have a greater impact on high-income countries than low-income countries, resulting in higher output losses. In addition, Tola & Waelti (2018) identify that the impact of financial crises on output varies between different income levels, and in high-income countries, these impacts are more significant.

4.3. THE DIFFERENT EFFECTS OF BANKING CRISES ON MALE AND FEMALE SUICIDE RATES

We extend our analysis by estimating IRFs for men and women across the 44 countries from Section 4.1, using data from the OECD (2023) and implementing, again, the methodology described in previous subsections.

The differences in impulse response functions between genders are notable. Figure 8 illustrates that when a banking crisis shock is applied to male suicide rates, there is a statistically significant positive effect. This effect is observed for the first two periods in the analysis without lags and the first three periods with lags ≤ 2 . Specifically, in the analysis without lags, male suicide rates increase by 1.55 per 100,000 inhabitants at a 5% significance level in the year following the banking crisis. Similarly, in the analysis with a two-period lag, the point estimate for the same horizon is 1.54, also at a 5% significance level.

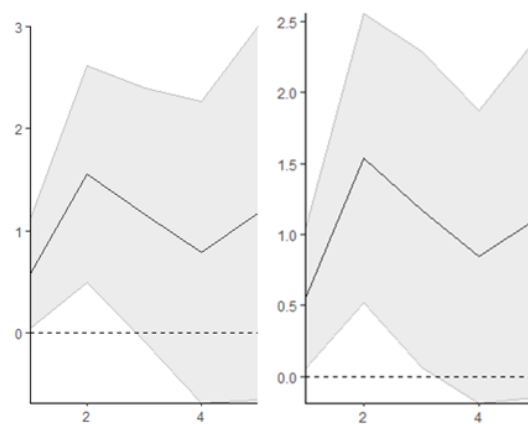


Figure 8 - IRF of Male Suicide Rates without Control Variables (OECD)

Note: Control variables are excluded. $h=1$ is the year of the banking crisis shock. Confidence bands of 90%. The first figure does not include lags; the second includes lags ≤ 2 of the explanatory and dependent variables.

Figure 9 demonstrates a statistically significant positive effect of the banking crisis shock on female suicide rates at a 1% significance level in the year of the crisis. This immediate effect is evident in regressions both with and without lags. Compared to the previous results for males, these point estimates are significantly smaller, and no effect is observed in the subsequent periods, as indicated by the uncertainty of confidence bands. This suggests that banking crises have a greater impact on male suicide rates.

In order to ensure the robustness of our analysis, we include control variables, excluding credit per GDP, to maintain a relatively large number of observations. This approach integrates the log of GDP, unemployment rate, inflation rate, currency crises, and sovereign debt crises. Focusing on the impact of banking crises on male suicide rates, Figure 10 illustrates statistically significant positive effects at $h=1$ and 2 in the analysis without lags, and at $h=1,2,4$ and 5 in analysis with a two-period lag. These findings indicate consistency over these periods. Notably, including lagged variables reduces the level of uncertainty compared to the analysis without lags, revealing an increase of 1.75 per 100,000 inhabitants at a 5% significance level in the following year after crisis. In addition, it is interesting to note that this effect persists even four years after the start of the crisis.

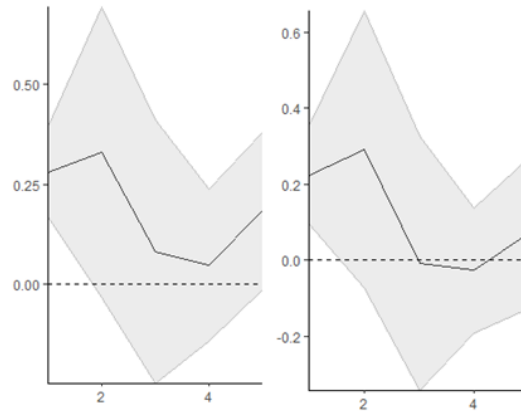


Figure 9 - IRF of Female Suicide Rates without Control Variables (OECD)

Note: Control variables are excluded. $h=1$ is the year of the banking crisis shock. Confidence bands of 90%. The first figure does not include lags; the second includes lags ≤ 2 of the explanatory and dependent variables.

Figure 11, which includes the control variables mentioned above, shows that the regressions for the women's group without lags have a statistically significant positive effect at $h=1$. However, this effect gradually diminishes, approaching zero in statistical terms in the years following the banking crisis. In addition, the results with lags of two indicate a null effect, as none of the regressions demonstrate statistical significance.

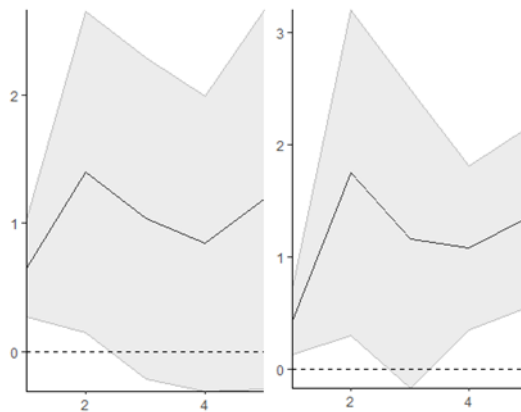


Figure 10 - IRF of Male Suicide Rates with the First Set of Control Variables (OECD)

Note: The control variables implemented are the log of GDP, unemployment and inflation rate, and currency and sovereign debt crises. $h=1$ is the year of the banking crisis shock. Confidence bands of 90%. The first figure does not include lags; the second includes lags ≤ 2 of the explanatory, dependent, and control variables.

To determine the robustness of male suicide rates when credit per GDP is also included as a control variable, we estimate Impulse Response Functions (IRFs) incorporating all control variables. Figure 12 illustrates that the positive effect persists across all horizons in the analysis without lags, showing statistical significance at the 10% level two years after the beginning of the banking crisis and at the level of 5% in the other years. The impact reaches its highest value in the year following the crisis, with an increase of 1.57 in the male suicide rate per 100,000 inhabitants. In the analysis with a lag of two years, the effect is only observed in the subsequent year of the crisis.

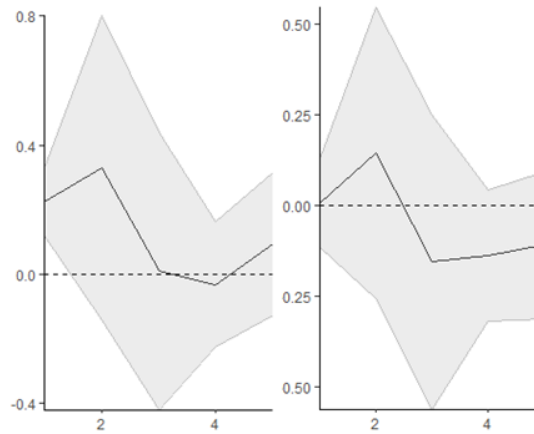


Figure 11 - IRF of Female Suicide Rates with the First Set of Control Variables (OECD)

Note: The control variables implemented are the log of GDP, unemployment and inflation rate, and currency and sovereign debt crises. $h=1$ is the year of the banking crisis shock. Confidence bands of 90%. The first figure does not include lags; the second includes lags ≤ 2 of the explanatory, dependent, and control variables.

Our findings reveal a significant gender disparity in the impact of banking crises on suicide rates across 44 countries. The male group experiences a more pronounced and long-term increase in suicide rates post-crisis. In contrast, the female group registers an immediate, but comparatively smaller increase in suicide rates in the year of the crisis, with no significant effects observed in subsequent years.

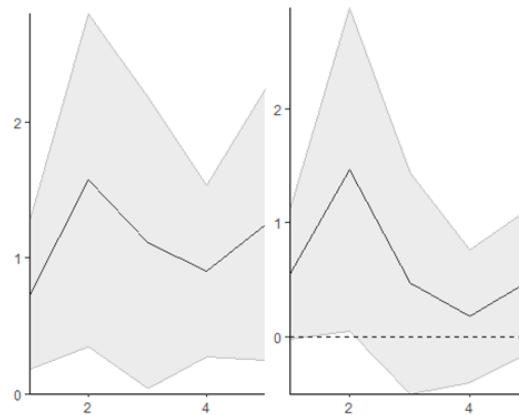


Figure 12 - IRF of Male Suicide Rates with All Control Variables (OECD)

Note: The control variables implemented are the log of GDP, credit per GDP, unemployment and inflation rate, and currency and sovereign debt crises. $h=1$ is the year of the banking crisis shock. Confidence bands of 90%. The first figure does not include lags; the second includes lags ≤ 2 of the explanatory, dependent, and control variables.

5. CONCLUSIONS AND FUTURE WORKS

This study concludes that, on average, systemic banking crises affect suicide rates, particularly in high-income countries and among males. These crises have a higher impact in the following year the banking crisis. We divide our analysis into three parts: the first examines panel data from 44 countries from 1980 to 2020, focusing on middle- and high-income countries, and the second part incorporates panel data from 96 countries from 1990 to 2019, which includes a larger number of low- and middle-income countries. Additionally, the third analysis uses panel data for the initial 44 countries to determine whether the banking crisis affects both genders equally or significantly impacts one of them.

The first analysis demonstrates a robust and statistically significant positive effect of the banking crisis shock in both the year of the crisis and the subsequent year. This effect is most evident in the year following the banking crisis, reaching its maximum during this period. While suicide rates tend to increase in the first year after the banking crisis, no effect is observed in the subsequent years. In contrast, the second analysis indicates that regressions including all control variables with a lag of two suggest a positive effect of the banking crisis in the second year after its start. However, general results indicate that the banking crisis shock has a null effect on suicide rates in a group of 96 countries.

Consequently, we highlight the differences in the impact of banking crises across two distinct groups of countries. The first analysis, which primarily focuses on high-income countries, shows a higher impact on suicide rates compared to our second analysis, which includes a higher number of low- and middle-income countries. In this way, as the shock of banking crises more significantly impacts high-income countries, policy interventions should be adapted to address the specific vulnerabilities during economic downturns.

The third analysis shows a significant difference in the impact of banking crises on suicide rates between genders. In the female group, the effect is observed only in the year of the crisis and is significantly lower compared to the variations in male suicide rates. The male group is more affected, with the impact mainly observed in the year of the crisis and the following year. However, the analysis that includes all control variables without lags provides evidence that the effect persists in all years following the crisis, as well as during the crisis year itself. These findings highlight the necessity for gender-specific interventions to mitigate the mental health consequences of economic downturns.

In conclusion, there are different ways of understanding suicide rates that are certainly interesting for future research. For example, considering the effect of social indicators on suicide rates would help to improve future research. There is also considerable scope for investigating causal effects, such as how banking crises in certain countries can influence others and generate plausibly exogenous shocks.

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APPENDIX

Table A.1 - Average of Total Suicide Rates by Year (OECD)

Year	Average of Total Suicide Rates	Year	Average of Total Suicide Rates
1980	17.15	2001	15.23
1981	18.25	2002	15.11
1982	18.21	2003	14.87
1983	16.30	2004	14.49
1984	16.63	2005	14.19
1985	18.12	2006	13.41
1986	17.65	2007	12.80
1987	17.94	2008	13.03
1988	17.36	2009	13.01
1989	17.20	2010	12.55
1990	16.22	2011	12.46
1991	16.34	2012	12.33
1992	16.81	2013	12.12
1993	17.66	2014	11.72
1994	17.43	2015	11.43
1995	17.04	2016	10.79
1996	16.34	2017	10.92
1997	15.99	2018	10.71
1998	16.06	2019	10.96
1999	15.61	2020	12.06
2000	15.69		

Note: Average suicide rates per 100,000 inhabitants. The analysis includes 44 countries from the study in Section 4.1.

Table A.2 - Average of Total Suicide Rates by Year (Our World in Data)

Year	Average of Total Suicide Rates	Year	Average of Total Suicide Rates
1990	12.97	2005	11.74
1991	12.91	2006	11.51
1992	12.97	2007	11.37
1993	13.04	2008	11.29
1994	13.13	2009	11.12
1995	13.15	2010	10.92
1996	13.02	2011	10.75
1997	12.97	2012	10.57
1998	12.82	2013	10.41
1999	12.72	2014	10.29
2000	12.60	2015	10.25
2001	12.35	2016	10.11
2002	12.18	2017	9.98
2003	12.05	2018	9.92
2004	11.88	2019	9.81

Note: Average suicide rates per 100,000 inhabitants. The analysis includes 96 countries from the study in Section 4.2.

Table A.3 - Average of Total Suicide Rates by Country (OECD)

Country	Average of Total Suicide Rates	Country	Average of Total Suicide Rates
Argentina	8.86	Japan	20.51
Australia	12.60	Korea	21.42
Austria	19.99	Latvia	28.03
Belgium	19.98	Lithuania	36.58
Brazil	5.45	Mexico	4.27
Bulgaria	15.05	Netherlands	10.53
Canada	12.56	New Zealand	13.19
Chile	9.44	Norway	13.12
Colombia	5.27	Peru	1.22
Costa Rica	7.14	Poland	14.79
Croatia	20.78	Portugal	9.18
Czech Republic	16.28	Romania	12.18
Denmark	18.27	Russia	31.48
Estonia	26.33	Slovak Republic	12.24
Finland	22.46	Slovenia	26.38
France	19.14	South Africa	0.89
Germany	12.67	Spain	7.59
Greece	3.83	Sweden	14.94
Hungary	33.30	Switzerland	18.78
Ireland	10.72	Turkey	2.52
Israel	7.55	United Kingdom	7.82
Italy	7.24	United States	12.86

Note: Average suicide rates per 100,000 inhabitants. The analysis includes 44 countries from the study in Section 4.1.

Table A.4 - Average of Total Suicide Rates by Country – Part I (Our World in Data)

Country	Average of Total Suicide Rates	Country	Average of Total Suicide Rates
Albania	4.89	Korea	19.93
Algeria	4.79	Kuwait	2.99
Australia	11.61	Lesotho	35.71
Austria	14.56	Liberia	9.90
Bangladesh	7.43	Libya	4.60
Belgium	17.33	Madagascar	11.24
Benin	11.76	Malawi	13.87
Bolivia	7.66	Malaysia	6.16
Brazil	6.34	Mali	8.46
Bulgaria	15.17	Mauritania	7.61
Burkina Faso	13.15	Mexico	5.07
Burundi	16.39	Mongolia	20.33
Cambodia	6.32	Mozambique	14.36
Cameroon	14.33	Myanmar	5.65
Canada	12.21	Nepal	14.00
Central African Rep.	21.97	Netherlands	9.56
Chad	13.54	Nicaragua	6.82
Chile	12.90	Niger	9.23
China, P.R.	13.05	Nigeria	8.27
Colombia	5.80	Norway	11.28
Congo, Dem. Rep. of	13.04	Pakistan	9.38
Congo, Rep. of	16.03	Paraguay	5.13
Côte d'Ivoire	15.83	Peru	3.45
Croatia	15.80	Philippines	4.44
Czech Republic	14.08	Poland	16.54
Denmark	13.18	Portugal	10.28
Egypt	3.67	Romania	10.25
El Salvador	9.45	Russia	34.70
Ethiopia	15.42	Rwanda	14.07
Finland	19.00	Senegal	12.87
France	16.79	Serbia, Republic of	17.91
Germany	11.36	Singapore	10.15
Ghana	9.96	South Africa	18.74
Greece	3.29	Spain	6.54
Guatemala	8.61	Sri Lanka	30.27
Guinea	10.70	Sudan	6.89
Haiti	10.46	Sweden	13.34
Honduras	3.93	Switzerland	14.96
Hungary	21.94	Tanzania	11.14
India	17.79	Togo	12.42
Iran, I.R. of	6.23	Trinidad and Tobago	12.42

Note: Average suicide rates per 100,000 inhabitants. The analysis includes 96 countries from the study in Section 4.2.

Table A.5 - Average of Total Suicide Rates by Country – Part II (Our World in Data)

Country	Average of Total Suicide Rates	Country	Average of Total Suicide Rates
Ireland	10.90	Tunisia	3.74
Israel	7.51	Turkey	3.98
Italy	5.93	Ukraine	25.51
Jamaica	2.43	United Kingdom	8.12
Japan	16.89	United States	11.65
Jordan	3.49	Uruguay	15.63
Kenya	11.84	Yemen	6.30

Note: Average suicide rates per 100,000 inhabitants. The analysis includes 96 countries from the study in Section 4.2.

Table A.6 - IRF of Suicide Rates with All Control Variables (OECD)

Shock	h=1	h=2	h=3	h=4	h=5
1. No lags	0.3750** (0.1593)	0.8332* (0.4561)	0.4789 (0.4052)	0.3429 (0.2673)	0.5288 (0.3592)
Number of Events	25	25	25	25	25
Observations	869	836	805	774	743
2. Lags<=2	0.2030 (0.1594)	0.7341 (0.5065)	0.0791 (0.3564)	-0.0052 (0.2564)	0.0705 (0.2557)
Number of Events	21	21	21	21	21
Observations	801	770	739	708	677

Note: The estimations are based on equation (1). The control variables implemented are the log of GDP, unemployment and inflation rate, and currency and sovereign debt crises. $h=1$ is the year of the banking crisis shock. Robust-clustered standard errors are in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Table A.7 - IRF of Suicide Rates without Control Variables (Our World in Data)

Shock	h=1	h=2	h=3	h=4	h=5
1. No lags	-0.0641 (0.0762)	0.1438 (0.2151)	0.1363 (0.2501)	0.0393 (0.2443)	0.0669 (0.2495)
Number of Events	63	63	63	63	63
Observations	2784	2688	2592	2496	2400
2. Lags<=2	-0.0472 (0.0573)	0.1768 (0.2401)	0.1788 (0.2715)	0.0874 (0.2247)	0.1160 (0.2231)
Number of Events	55	55	55	55	55
Observations	2688	2592	2496	2400	2304

Note: The estimations are based on equation (1). The control variables are excluded. $h=1$ is the year of the banking crisis shock. Robust-clustered standard errors are in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Table A.8 - IRF of Suicide Rates with the First Set of Control Variables (Our World in Data)

Shock	h=1	h=2	h=3	h=4	h=5
1. No lags	-0.0800 (0.0748)	0.1539 (0.1970)	0.1925 (0.2144)	0.1280 (0.1837)	0.1630 (0.1754)
Number of Events	61	61	61	61	61
Observations	2673	2581	2488	2395	2301
2. Lags<=2	0.0230 (0.0402)	0.3690 (0.2309)	0.4030 (0.2522)	0.2772 (0.2097)	0.2633 (0.2218)
Number of Events	49	49	49	49	49
Observations	2475	2383	2990	2197	2103

Note: The estimations are based on equation (1). The control variables implemented are the log of GDP, credit per GDP, unemployment and inflation rate, and currency and sovereign debt crises. $h=1$ is the year of the banking crisis shock. Robust-clustered standard errors are in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Table A.9 - IRF of Suicide Rates with All Control Variables (Our World in Data)

Shock	h=1	h=2	h=3	h=4	h=5
1. No lags	-0.0231 (0.0651)	0.1511 (0.1730)	0.0781 (0.1491)	-0.0625 (0.1340)	-0.1080 (0.1375)
Number of Events	51	51	51	51	51
Observations	2376	2290	2202	2113	2021
2. Lags<=2	0.0056 (0.0527)	0.2970 (0.1810)	0.2434* (0.1369)	0.1302 (0.1051)	0.0998 (0.0836)
Number of Events	42	42	42	42	42
Observations	2175	2089	2001	1912	1820

Note: The estimations are based on equation (1). The control variables implemented are the log of GDP, credit per GDP, unemployment and inflation rate, and currency and sovereign debt crises. $h=1$ is the year of the banking crisis shock. Robust-clustered standard errors are in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.



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