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Long Lasting Effects of the Ottoman Empire on Financial
Inclusion

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Abstract

This thesis examines the long-lasting effects of the Ottoman Empire's institutions on contemporary financial inclusion of households in parts of Central Eastern and Southeastern Europe (CESEE). The primary focus is on how the legacy of Islamic laws, particularly the prohibition of interest lending, has influenced financial inclusion, even centuries after the empire's fall. Utilizing data from the OeNB Euro Survey, a geographical regression discontinuity design (RDD) is employed to exploit the within-country variation caused by the former Ottoman Empire's borders in Romania and Serbia. The findings demonstrate that individuals living in areas historically ruled by the Ottoman Empire are less likely to own giro accounts and other financial products compared to their counterparts in non-Ottoman regions. This difference persists even after controlling for various demographic and socioeconomic factors, suggesting that the historical institutional framework has a significant, enduring impact on contemporary financial behaviors. The results contribute to a broader understanding of how past institutions shape economic outcomes today, underscoring the importance of considering historical legacies in the study of financial development and inclusion.

Zusammenfassung

Diese Arbeit untersucht die langanhaltenden Auswirkungen von Institutionen des Osmanischen Reiches auf die heutige finanzielle Inklusion von Haushalten in Teilen Mittelost- und Südosteuropas. Der Schwerpunkt liegt insbesondere darauf, wie das Erbe der islamischen Gesetze, insbesondere das Zinsverbot, die finanzielle Inklusion auch Jahrhunderte nach dem Zerfall des Reiches beeinflusst hat. Die Daten kommen von der OeNB Euro Survey und anhand eines geografischen Regression- Diskontinuitätsdesigns wird die innerstaatliche Variation, die durch die ehemaligen Grenzen des Osmanischen Reiches in Rumänien und Serbien verursacht wurde, identifiziert. Die Ergebnisse zeigen, dass Individuen, die in Gebieten leben, die historisch osmanischer kontrolliert waren, mit geringerer Wahrscheinlichkeit Girokonten und andere Finanzprodukte halten als Individuen in nicht-osmanischen Regionen. Dieser Unterschied bleibt auch bestehen wenn wir für individuelle Charakteristika kontrollieren, was darauf hindeutet, dass das institutionelle Rahmenwerk einen signifikanten und dauerhaften Einfluss auf gegenwärtige Niveaus finanzieller Inklusion hat. Die Ergebnisse tragen zu einem tieferen Verständnis darüber bei, wie vergangene Institutionen heutige ökonomische Indikatoren prägen, und unterstreichen die Bedeutung der Berücksichtigung historischer Vermächtnisse auf finanzielle Entwicklung und Inklusion.

1 Introduction

Financial inclusion has become not only recently but for decades a subject of interest among researchers and policy makers. Thus, G20 leaders have ramped up their efforts and committed to meet the challenge of promoting financial inclusion around the world (GFPI, 2015). It is widely recognized that for example access to credit markets is fundamental to smooth consumption plans and individuals who do not have access face greater challenges in achieving social and economic integration. But still, there are large disparities across countries even in close proximity. It is necessary to understand the various mechanisms underlying the development of financial inclusion.

Therefore, this thesis tries to identify one mechanism, namely the influence of past institutions in the Ottoman Empire on financial inclusion today. Since the end of the 1990s, a large set of literature has emerged there emerged indicating that institutions matter for the development of economic outcomes in the long run. This thesis shows that even after the destruction of the Ottoman Empire in the 19th century, there is still a long lasting legacy in financial inclusion two centuries after the formal institutions have ceased to exist. It contributes to a large set of literature showing that history has long-lasting effects (Nunn, 2009; Becker et al., 2016; Spolaore and Wacziarg, 2013) through its impact on current formal institutions (Engerman and Sokoloff, 1995; La Porta et al., 1997; Acemoglu et al., 2001) or on financial inclusion (Grosjean, 2011).

The Ottoman Empire, also known as the Turkish Empire, was a highly centralized state ruling over most parts of South Eastern Europe from the 14th to the 20th century. In Eastern Europe, the empire started to decline during the 19th century and ultimately splitting up into several independent countries that have seen several institutional changes since then. The Islamic Law prohibited interest lending which in combination with the Islamic Inheritance Law led to a stalled and slowly developing banking sector. We argue that these laws have persisting effects on the banking

sector and especially on individuals being less likely to be financially included even two centuries after the fall of the Ottoman Empire in parts of Central Eastern and South Eastern Europe (CESEE).

We make use of the OeNB Euro Survey covering topics such as euroization, trust in institutions, monetary expectations and financial decisions. The survey provides several measures whether individuals own bank products and exact longitude and latitude data which makes it possible to assign each individual to either the Ottoman or non-Ottoman region.

It must be acknowledged, that simply comparing the levels of financial inclusion across countries with different experiences, populations and geographies particularly across a large geographical space may lead to biased results. To counter this, we set up a geographical regression discontinuity design (RDD) to exploit the within-country variation created by the Ottoman Empire in Eastern Europe. The RDD specification compares individuals left and right but close to the border within a specified bandwidth. Further, the sample is restricted to countries, where the former border of the Ottoman Empire is cutting through. In the OeNB Euro Survey data, these are Romania and Serbia. The RDD provides cleaner identification with sharp discontinuities of financial inclusion at the long gone border and hence, we can estimate the causal effect of the Ottoman Empire on financial inclusion.

We present results for both a basic measure whether individuals own a giro account and a more advanced measure whether individuals own one of three bank products. The RDD specification indicates that individuals living on the former Ottoman side are less likely to own a bank account than individuals living on the other side in non-Ottoman regions. The results are robust for both measures with varying bandwidths. Further, we conduct several robustness checks and show that the results are not driven by religious affiliation, trust or preferences. We also show that the cities close to the border in Romania and Serbia did not differ in terms of their population sizes before the Ottomans conquered CESEE and the results are not driven by countries separately.

The remainder of this thesis is organized as follows. Section 2 provides an overview of existing literature relevant for financial inclusion and the role of institutions on economic outcomes. Section 3 gives a short overview over the history of the Ottoman Empire and its institutions. Section 4 describes our data. Section 5 develops the empirical identification strategy followed by Section 6 presenting the results. Section 7 underlines the results by presenting robustness and falsification tests. Lastly, Section 8 discusses the results and Section 9 concludes.

2 Literature

There is a large list of literature addressing both the importance of history for economic development and financial inclusion.

Financial inclusion is defined as the use of formal financial services and has been put in perspective by policy makers. Several studies point out that financially excluded individuals are disproportional represented among lower-income households (Caskey, 2005), they tend to be less educated, are younger, or are a member of a minority group in the United States (Rhine and Greene, 2006). Being financially excluded can be problematic for consumers as Gross et al. (2012) point out. Paying in cash only presents personal and financial risks since there is no recourse when cash is lost or stolen. Further, under-banked individuals tend to use alternative financial service providers such as payday lenders or pawn shops who charge higher interest rates or fees than banks. Additionally, consumer protection is not given for borrowers. Having no bank account also leads to limited credit access because it is not possible to establish credit worthiness (Rhine and Greene, 2006). Further, Rhine and Toussaint-Comeau (2000) emphasise the importance of financial inclusion as it provides a financial cushion against unforeseen events and makes tools available for managing household finances.

More recent studies used randomized control trials and have shown that financial inclusion leads to increased savings among farmers in Malawi (Brune et al., 2015),

increased investments in preventative health and reduced vulnerability to health shocks in Kenya (Dupas and Robinson, 2013b). Further, there is less need for consumption reductions after economic shocks, higher subjective well-being and participants have lower short-term debts (Pomeranz and Kast, 2022). Dupas and Robinson (2013a) randomized access to bank accounts and found increase of consumption, productive investments and savings among the treated group. Thus, policy makers are encouraged to promote financial inclusion since there are manifold effects on individuals reaching from the ability to cope with shocks to both higher savings and productive investments. Allen et al. (2016) explore policies that are effective among those most likely to be excluded and find that greater financial inclusion is associated with lower account costs, greater proximity to financial intermediaries, stronger legal rights and more politically stable environments.

Since the late 1990s there is growing evidence that differences in today's economic outcomes could be explained by different institutions in the course of history. This might explain differences in financial inclusion even among regions in close proximity. There are the seminal contributions from Acemoglu et al. (2001, 2002), La Porta et al. (1997, 1998) and Engerman and Sokoloff (1995, 2002) who share the common view that colonial rule had large impacts on the domestic institutions that persisted even after independence. They all agree that institutions influence the long-term economic development and that historical events are determinants of the evolution and long-term persistence of domestic institutions. Thus, the literature has moved from whether history matters to why history matters for economic outcomes today (Nunn, 2009).

Since then, numerous studies were published using more advanced econometric models to estimate the effect of historical events on various outcomes. Dell (2010) uses a regression discontinuity design to examine the long-run impacts of the *mita*, an extensive forced mining labor system in Peru and Bolivia between 1573 and 1812. She finds that households consumption is 25 percent lower in former *mita* regions. In India, Banerjee and Iyer (2005) find persisting effects of differences in revenue

collection during colonial times on levels of health, education, and agricultural technology investments today. All these papers present evidence for path dependency shaped by differences in institutions. Although, there is large literature focusing on colonization there are also several papers focusing on historical events in Europe and on financial development.

For example, there are several studies investigating persisting differences among East- and West Germany after they reunited in 1990. Friehe and Mechtel (2014) find that conspicuous consumption is higher in the East (even 18 years after reunification) and Alesina and Fuchs-Schündeln (2007) point out that East Germans are more in favor of state intervention than West Germans after the reunification. However, they also present evidence for convergence of preferences after one to two generations. Geographically, methodologically and historically closer to this thesis is the work by Becker et al. (2016). They examine the impact of the Habsburg Empire on contemporary levels of trust and corruption. They find evidence for higher trust in public institutions and lower corruption levels in regions formerly under the rule of the Habsburg Empire. They use a geographical regression discontinuity design and compare households in close proximity to the former border and present convincing evidence for long lasting effects of former institutions. Thematically and geographically even closer, but methodologically different to this thesis is the work from Grosjean (2011). She shows that the interest-lending prohibition in the Ottoman Empire led to lower contemporaneous formal financial development measured as the share of individuals owning a bank account and lower bank penetration in former Ottoman regions. All in all, this thesis contributes to the large set of literature on both the role of history, and institutions on economic outcomes and financial development. To the best of our knowledge, this is the first work using a geographical regression discontinuity design showing long lasting effects of the Islamic Law on contemporaneous levels of financial inclusion.

3 Historical Background

3.1 The Ottoman Empire in South Eastern Europe

The Ottoman Empire also known as the Turkish Empire controlled much of South Eastern Europe, West Asia and North Africa from the 14th to the early 20th century. Between the early 16th and early 18th century it also controlled parts of South Eastern Europe. It was founded in 1299 by Osman I. and the empire conquered much of Anatolia and expanded into the Balkans, effectively ending the Byzantine Empire in 1453 with the conquest of Constantinople. Most of the territories in South Eastern Europe were conquered during the 14th century (Bulgaria, South Serbia and North Macedonia) and the 15th century (Albania, Bosnia and Herzegovina, Wallachia and Montenegro). The Ottoman empire reached its pinnacle of power in the 15th century, but began to experience a gradual decline by the mid-18th century. After a long time of peace the military did not stand a chance against its European rivals (Habsburg and Russian Empire) and their military force. Consequently, the Ottoman Empire suffered territorial losses during the Russo-Turkish war in 1877-1878 in northern Bulgaria, parts of Romania, Serbia, and Montenegro and ultimately fell after World War I. For further details, Table 1 shows the duration of Ottomans' reign in CESEE. Except Czechia, all countries in the later presented data were at some point in history part of the Ottoman Empire. Large parts of Poland have also never been part of the Empire. Appendix Figure A1 shows the expansion of the Ottoman Empire over time. In 1600, most of Eastern Europe was part of the Empire before it declined over time. 200 years later, the border cut through Romania and Serbia and runs between Bosnia Herzegovina and Croatia. The border in Romania mostly aligns with the Carpathians and in Serbia with the Danube being a natural border as well. This topic will be discussed later when it comes to validity of our specification.

Table 1 *Duration per region under Ottoman rule*

Country	Whole country/regions	Dates Ottoman rule	Duration Ottoman rule
Albania	Whole	1468-1912	444
Bosnia and Herzegovina	Bosnia	1463-1878	415
	Herzegovina	1482-1878	396
Bulgaria	Whole	1396-1878	483
Croatia	Dalmatia, Ragusa	1481-1699	218
Czech Republic	None	None	0
Hungary	Eastern Hungarian Kingdom	1526-1699	173
North Macedonia	Whole	1371-1913	542
Poland	None	None	0
Romania	Wallachia	1476-1829	353
	Moldavia	1504-1829	325
	Transylvania	1541-1690	149
	Bessarabia	1419-1878	459
Serbia	Vojvodina	1527-1716	189
	Other Regions	1389-1829	440

Source: Dimitrova-Grajzl (2007)

3.2 The Financial System in the Ottoman Empire

The Ottoman Empire was a highly centralized state, ruled by bureaucratic orders (Grosjean, 2011). The Sultan was the highest position in the system and the ruling law in the Ottoman empire was the sharia, also known as the sacred law of Islam, which even the Sultan had to follow.

Compared to other places in Europe, Jews were not persecuted in the Ottoman Empire by that time. On the contrary, they were encouraged and welcomed to settle in the Ottoman Empire. Thus, regarding to Sachedina (2001) the Ottoman Empire has been called an early example of pre-modern religious pluralism.

Interest lending was forbidden under Islamic Law whereas it was allowed by the Catholic Church in neighboring countries since the 15th century (Reed and Bekar, 2003). Reforms to ease the prohibition of interest lending took place much later in the Ottoman Empire, namely in the 19th century (Kuran, 2005, 2008). These late reforms are associated with the stalled development of the banking sector in the Ottoman Empire areas in the 18th and 19th century (Pamuk, 2004)

In fact, there were ways to circumvent the prohibition of interest lending. Immigrants

with various religions were welcome in the Ottoman Empire and especially Greeks, Armenians and Jews were not subject to the interest lending prohibition. Hence, Greeks and Armenians emerged as the leading money lenders and moneychangers (Pamuk, 2004) in the Ottoman Empire. Some forms of credit arrangements were allowed but what was missing was not access to credit but the development of banking institutions and financial intermediation on a large scale (Grosjean, 2011). However, there was the Islamic inheritance law which discouraged the formation of corporations leading to slow development of banking institutions. This is cited as one of the reasons why there was not a single Middle Eastern Bank in the 19th century analogous to those established in the West in the 1400s (Kuran, 2005). Indeed, the first Ottoman bank was the Banque de Constantinople which opened in Istanbul in 1847 nearly 400 years later than the first bank in Florence and by a time when most of the territories in CESEE were not part of the Ottoman Empire anymore.

4 Data

The data for this analysis comes from the OeNB Euro Survey, conducted by the Austrian National Bank since 2007. It is an annually repeated cross-sectional survey of individuals in the following ten Central, Eastern and Southeastern European countries: Bulgaria, the Czech Republic, Croatia, Hungary, Poland, Romania, Albania, Bosnia and Herzegovina, North Macedonia and Serbia. In each wave and each country, 1000 individuals are interviewed and weights are calculated for making the sample representative for the country in terms of characteristics like age, gender, religion and ethnicity.

The main purpose of the survey is to shed light on the various dimensions of euroization in CESEE. For a deeper understanding the poll also contains a rich set of questions about socioeconomic characteristics and wealth, personal beliefs, expectations and trust in institutions.

Besides the data about socioeconomic characteristics, one question is of importance

for this analysis. The participant is being asked whether he or she owns a current account (giro account), a savings deposit(e.g. savings book), a wage or debit card. The participant could answer either with 'yes', 'no', 'don't know' or refuse the answer (see Figure A2 in Appendix). This paper focuses on the most basic measure for financial inclusion, namely whether individuals own a giro account or not. Later, this paper also presents results for whether individuals own at least one of these products

If ownership of a bank account is defined as owning at least one of the products, it turns out that there is a change in the questionnaire in 2016. Until 2015, the respondents were not asked whether they own a wage card, which many Romanians do. As shown later in the estimation strategy, Romania is important for the regression-discontinuity design (RDD) and thus, this analysis uses only data from 2016 on.

The geographical RDD model requires information about the location of each household. Luckily, the dataset contains longitude and latitude coordinates for each primary sampling unit (PSU). These are not the exact coordinates of the household but the coordinates of the starting point from where the interviewer is instructed to walk a random route. Thus, the coordinates in the sample reflect a point in walking distance from the respondent's home which is precise enough for the purpose of this thesis. In Figure 1, the PSUs where interviews took place are highlighted as dots. These are equally distributed across space in each country. The red line represents the former border of the Ottoman Empire from 1815. Data for historical maps and borders is downloaded from the Free Software Foundation which provide free access to various (historical) spatial data.

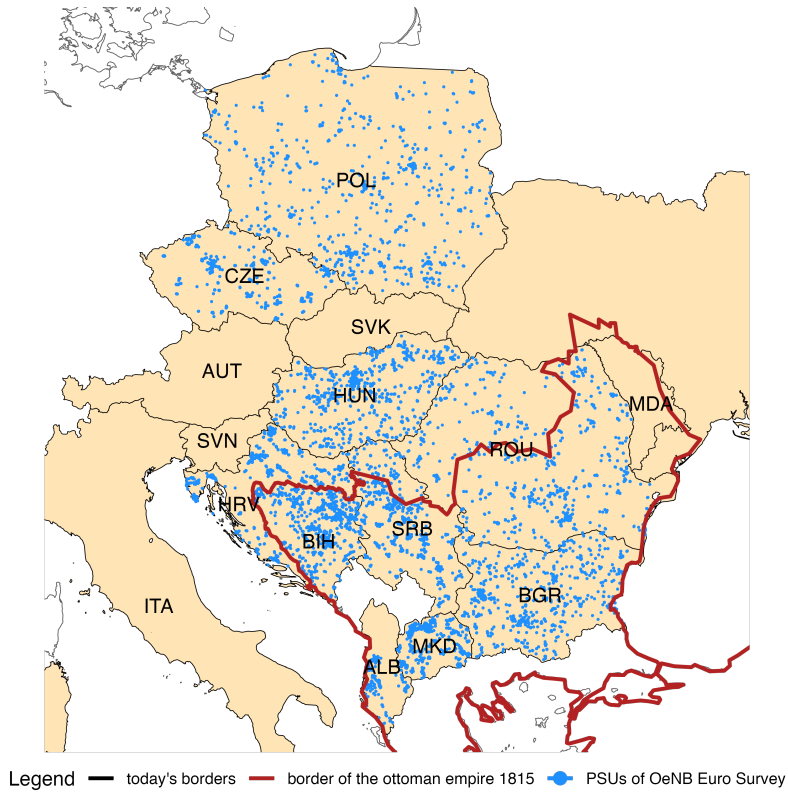


Figure 1: The Ottoman Empire 1815 in Eastern Europe and the OeNB Euro-Survey Locations

This thesis uses the former Ottoman border from 1815. This is due to various reasons. First, data availability of former historical borders is limited. Second, the border moved several times after multiple wars in the 19th century, countries declared independence and the Ottoman Empire suffered territorial losses after 1815. Third, in 1815, there were at least 100 years with no changes in the borders.

It is important to notice that this thesis does not necessarily capture the Ottoman effect on financial inclusion of exposed regions versus regions not exposed, but the effect on regions being much longer exposed to the Ottoman Empire than others. This thesis argues that the Ottoman effect on financial inclusion is stronger in regions being longer ruled by the Ottomans and the effect is less detectable today the longer countries are independent. Most countries in the sample were exposed to the Ottoman Empire at some point in history, whereas in 1815 only Albania, Bosnia

and Herzegovina, Bulgaria, North Macedonia, parts of Romania and Serbia were part of the Ottoman Empire. The border cut through Romania and Serbia (see Figure 1). However, the Czech Republic and most parts of Poland have never been part of the Ottoman Empire.

4.1 Descriptive Statistics

Table 2 shows descriptive statistics for both the individuals in regions which were part of the Ottoman Empire in 1815 and regions not being part of the Empire in 1815 within 100km from the former border. The table is separated into three parts. The upper section contains information about sociodemographic and socioeconomic characteristics of individuals. Following, there are variables on the household-level with eg. household compositions or proxies for wealth and lastly followed by a section containing macro-level variables such as city-sizes, whether there is a bank in town and night light as a proxy for economic activity in the region.

The T-test result indicates that the households do not differ in terms of gender, age and city sizes they live in. Furthermore, the religious affiliation is similar on both sides. This is important, because we argue the results are not a story of different preferences among religious affiliations but a story of different institutions. In fact, 97% of the interviewed individuals are Christian.

However, there are small differences in individual level characteristics regarding education, employment and income. It seems like individuals in Ottoman areas within 100km from the former border are slightly higher educated and have higher income. But it is also notable that the share of respondents refusing the answer regarding their income is significantly higher in Non Ottoman regions and thus, it is not clear whether there are truly differences in income.

In terms of household-level characteristics, the groups do not differ from each other. Indicators for wealth, such as ownership of a car, mobile phone, or computer do not differ statistically significant from each other. The same holds true for household

size and composition.

Table 2 Descriptive Statistics

	Ottoman		NonOttoman		Diff	P-Value
	Mean	N	Mean	N		
<i>Individual-level variables</i>						
Female	0.52	8041	0.53	2680	-0.01	0.57
Age	45.62	8041	45.66	2680	-0.04	0.92
Low Education	0.13	8041	0.10	2680	0.02	0.00
Medium Education	0.65	8041	0.70	2680	-0.04	0.00
High Education	0.22	8041	0.20	2680	0.02	0.01
Student	0.07	8041	0.06	2680	0.01	0.06
Retired	0.20	8041	0.20	2680	-0.00	0.90
Unemployed	0.15	8041	0.14	2680	0.01	0.16
Employed	0.58	8041	0.60	2680	-0.02	0.07
Income DK/NA	0.26	8041	0.37	2680	-0.11	0.00
Low Income	0.22	8041	0.21	2680	0.01	0.31
Medium Income	0.25	8041	0.22	2680	0.03	0.00
High Income	0.27	8041	0.20	2680	0.07	0.00
Married	0.62	8041	0.63	2680	-0.02	0.09
Christian	0.97	8041	0.97	2680	0.01	0.11
Muslim	0.00	8041	0.00	2680	0.00	0.04
<i>Household-level variables</i>						
Household has a car	0.64	8041	0.62	2680	0.02	0.14
Household has a second house	0.13	8041	0.10	2680	0.03	0.00
Household has access to internet	0.75	8041	0.76	2680	-0.01	0.19
Household number children under 6	0.17	8041	0.18	2680	-0.01	0.35
Household number children under 15	0.23	8041	0.24	2680	-0.01	0.41
Household size	2.98	8041	2.95	2680	0.04	0.19
Household has a mobile phone	0.92	8041	0.92	2680	0.00	0.95
Household has a computer	0.70	8041	0.67	2680	0.03	0.00
Household experienced shock in last 12 months	0.22	8041	0.22	2680	0.00	0.89
<i>Makro-level variables</i>						
City Size Today	26295.97	345	17440.30	124	8855.67	0.32
Bank in Town	0.70	8041	0.73	2680	-0.03	0.00
Night Light	1.30	8041	0.53	2680	0.77	0.00

Note: Observations within 100km from the Ottoman border

Differences in income and education could result from the fact that there is higher economic activity in Ottoman regions. Even though city sizes do not differ statistically significant from each other, it is notable that there are more than two times more cities in the Ottoman regions which have higher economic activity. Thus, the

differences in income could simply be explained by a rural-urban gap.

Further, Table A2 in the Appendix shows descriptive statistics for a bandwidth of 200km from the border, with no major changes compared to the smaller bandwidth. Table 3 shows descriptive statistics for the dependent variables. It is notable, that fewer individuals in the former Ottoman Empire own a giro account. When it comes to the constructed measure for financial inclusion whether an individual owns any bank account (giro account, savings deposit or debit card), we still see differences across the former border. There are fewer individuals with a bank account in the former Ottoman regions.

However, the differences are smaller in the sample for individuals from Romania or Serbia only. The share of individuals owning a savings deposit is higher in the former Ottoman area, which indicates that individuals might substitute the giro account or debit card with savings deposits.

Table 3 Descriptive Statistics of bank account ownership

	Ottoman Empire	Non Ottoman Empire	t-test (p.Value)
<i>All Countries</i>			
Giro Account	0.75	0.89	0.00
Savings Deposit	0.19	0.27	0.00
Debit Card	0.63	0.75	0.00
Bank Account	0.81	0.91	0.00
<i>Romania</i>			
Giro Account	0.61	0.64	0.06
Savings Deposit	0.13	0.12	0.20
Debit Card	0.56	0.59	0.08
Bank Account	0.69	0.71	0.24
<i>Serbia</i>			
Giro Account	0.85	0.91	0.00
Savings Deposit	0.13	0.08	0.00
Debit Card	0.68	0.75	0.00
Bank Account	0.86	0.92	0.00

To investigate whether the differences in account ownership of bank products could be explained by former differences in institutions, we present the empirical model in the next section.

5 Empirical Model

The basic model captures the effect on the outcome variable y the ownership of a giro account of individual i living in location l in country c as a function of an indicator O whether individual i lives in a region which has been part of the Ottoman Empire in 1815 and a set of individual-level characteristics X .

$$(1) \quad y_{ilc} = \alpha + \beta O_{ilc} + X'_{ilc} \gamma + \varepsilon_{ilc}.$$

This thesis follows mainly the strategy from Becker et al. (2016) and thus, the set of individual-level control variables contains indicators for the gender and age of the individuals. These are arguably exogenous variables to the Ottoman effect. Further, an indicator for religious affiliation is included because its effect should be separated from any possible effect of the Ottoman institutions. Later, robustness checks are conducted without religious affiliation with no major changes in the results. Other variables such as education, employment status, income level, household size, marriage status or city size are arguably endogenous to the Ottoman effect and thus not included. The second set of variables are included in a falsification test later. The standard errors are clustered on the PSU level.

In the following, there are three specifications of the above presented formula. Thereby, the distance of households to the former Ottoman border gets smaller with each specification and so does the sample size.

The first specification includes all countries in the dataset. Obviously, levels of financial inclusion across countries might differ for reasons other than exposure to

the Ottoman Empire. Different countries could have implemented different policies to promote financial inclusion or there are other not observed characteristics in countries driving the levels of financial inclusion. This would introduce omitted variable bias and thus, we include both country and time fixed effects.

The second specification restricts the sample to countries which were divided by the Ottoman border in 1815. As mentioned before, the border cuts through two countries in the sample - Romania and Serbia. By including fixed effects, the variation comes solely from within the countries. Table A1 shows that there are more observations on the Ottoman side of the border for both Romania and Serbia. We argue that this is not a problem since the number of observations is still large enough. The within-identification solves most issues of unobserved heterogeneity (Becker et al., 2016), but especially Romania is a large country and it is conceivable that individuals do differ even within a country in their observable characteristics.

This gives rise to a third specification, an approach even closer to the border with a smaller sub sample - a spatial/geographical regression discontinuity design (RDD). The sample is restricted to individuals living close to the border with varying bandwidths as a robustness check. The key identifying assumption is that individuals living close to a no longer existing border in one country do not differ in their characteristics and that the Ottoman treatment can historically be viewed as exogenous. Further, the treatment should not have any effect on any predetermined covariate. This is unlikely the case and similar to Becker et al. (2016) we actually expect that other covariates are influenced by the Ottoman treatment just like our variable of interest is influenced. Becker et al. (2016) point out the importance of exogenous treatment. Thus, in Section 7, some tests are implemented to check whether the Ottoman Empire expanded systematically or randomly.

The setting in this thesis can be viewed as a fuzzy regression discontinuity design, since compliance is imperfect. Compared to sharp RDs, the fuzzy RD exploits discontinuities in the probability or expected value of treatment conditional on a covariate, whereas in the sharp RD, treatment status is a deterministic and discontinuous

function of a covariate (Angrist and Pischke, 2009). Thus, it is difficult to identify sharp jumps in the outcome variable. However, we argue that there is a jump in the ownership of a giro account. Figure 2 presents visual proof of differences in financial inclusion at the former border. PSUs in non-Ottoman regions have higher shares of giro account ownership. On the other side of the border, the former Ottoman region, there are many PSUs with a lower share of giro account ownership.

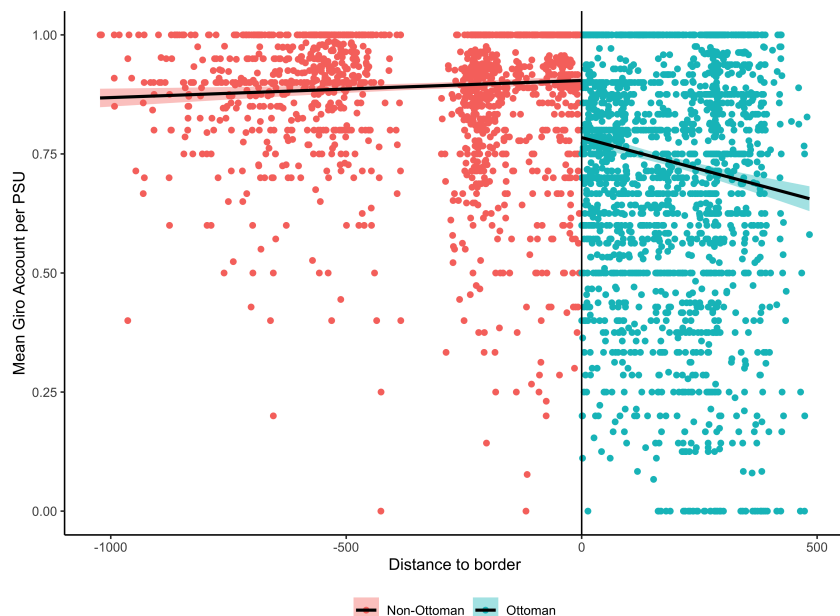


Figure 2: Giro Account ownership per PSU around the former Ottoman border

However, in this thesis points to another limitation for RDDs. The Identification is violated if people ‘sorted’ themselves to be left or right of the border (Cunningham, 2021). This sorting could possibly correlate with characteristics of individuals. For example, it is reasonable to assume, that individuals with higher education or income in 1815 were more likely to escape from the Ottoman Empire and settle on the other side of the border. We can hardly test this assumption of ‘non randomly heaping around the threshold’. However, it seems unlikely that individuals were able to sort themselves on one side of the border, since the Ottoman Empire withdrew after

several military defeats and individuals were probably not able to predict the new border when the Ottomans pulled back.

Further, most of the observed socioeconomic and sociodemographic characteristics do not differ statistically significant from each other across the border. Thus, we argue that the differences in the shares of bank account ownership are unlikely to be explained by differences in characteristics of individuals.

Lastly, the estimated model for the RDD specification is the same as in equation (1). The only difference is that the sample is restricted to households within a pre-specified bandwidth around the border in Serbia or Romania. The RDD model can be described as follows:

$$(2) \quad y_{ilc} = \alpha + \beta O_{ilc} + X'_{ilc} \gamma + \varepsilon_{ilc} \quad \text{if } i \in \text{border region},$$

Alpha contains a set of country fixed effects and border region is a small bandwidth around the border. In RDDs, there is always a trade-off between statistical power and both precision and similarities in characteristics. The larger the bandwidth around a cutoff (in this case border) the larger is statistical power. However individuals might differ in observable characteristics with increasing distance from each other and vice versa. Thus, we present results in the next section for different bandwidths, which should be robust to small changes in distances. We present results for 25km, 50km, 100km, 150km and 200km.

6 Results

This section provides the main results for the effect of former Ottoman Islamic Law on financial inclusion today. In a first step, we present results of all three described specifications for the main variable of interest - namely whether people own a giro account. This is the most basic measure for financial inclusion. In a second step,

we define financial inclusion in a broader sense as whether individuals own at least one of the following products: giro account, savings deposit, wage card or debit card. Table 4 presents the results for both the full country sample and the second specification including only Romania and Serbia. All models in the following account for the age of individuals, their gender and their religious affiliation (Muslim, Christian or Other). The result in column 1 indicates that there is a negative effect of living in regions belonging to the Ottoman Empire in 1815. On average, individuals are 3.8 percentage points (4.6%) less likely to have a giro account than individuals in non Ottoman regions. The effect is statistically significant at the 1% level.

Table 4 Giro account ownership: All Countries and Romania/Serbia

	<i>Dependent variable:</i>	
	Giro Account	
	All Countries	RO/RS
	(1)	(2)
Ottoman	−0.038*** (0.007)	−0.042*** (0.008)
log(Age)	3.960*** (0.063)	4.793*** (0.159)
log(Age)2	−0.540*** (0.009)	−0.650*** (0.022)
Female	−0.028*** (0.003)	−0.021*** (0.006)
Constant	−6.530*** (0.116)	−8.145*** (0.290)
Mean Control Group	0.89	0.73
Country Fixed Effects	Yes	Yes
Wave Fixed Effects	Yes	Yes
Controls for religious affiliation	Yes	Yes
No. of PSUs	4516	1468
Observations	73,129	16,073
Adjusted R ²	0.151	0.159

Note: Standard errors (clustered at the level of PSUs) in parentheses: *significance at 10, **5, ***1%. *Source:* OeNB Euro Survey

Column 2 in Table 4 presents the result for the second specification with a restricted sample for observations from Romania and Serbia only. As described before, this specification tries to shut off the possibility that differences in financial inclusion in the first full sample are driven by cross-country differences. Today's Romania and Serbia would have been divided in two parts by the Ottoman border from 1815. Compared to column 1 of Table 4, the effect of living in former Ottoman regions on financial inclusion is similar to the first specification. Romanians and Serbians in

Ottoman regions are 4.2 percentage points less likely to hold a giro account, which is a difference of 5.8%. The sample still contains 18,000 observations and more than 1500 PSUs. Furthermore, 16% of the variation in ownership of a giro account could be explained by the model.

Lastly, the results from the regression discontinuity design are presented in Table 5 for varying bandwidths. The results are stable with an increasing bandwidth around the border. However, for 25km around the border there is no effect of living in Ottoman regions from 1815 on financial inclusion. But for increasing distances, the effect becomes statistically significant. We refer here mostly to column 3, 100km within the border. Individuals living today in former Ottoman regions are 4 percentage points (5.1%) less likely to have a giro account, which is again similar in magnitudes with presented results from the first two specifications.

Table 5 Geographical Regression Discontinuity Design - Giro Account

	<i>Dependent variable:</i>				
	Giro Account				
	25km (1)	50km (2)	100km (3)	150km (4)	200km (5)
Ottoman	−0.003 (0.016)	−0.029*** (0.011)	−0.040*** (0.009)	−0.035*** (0.008)	−0.030*** (0.008)
log(Age)	5.805*** (0.268)	5.482*** (0.226)	5.020*** (0.193)	4.905*** (0.175)	4.797*** (0.163)
log(Age)2	−0.772*** (0.037)	−0.731*** (0.031)	−0.674*** (0.026)	−0.661*** (0.024)	−0.648*** (0.022)
Female	−0.015 (0.011)	−0.008 (0.009)	−0.012 (0.008)	−0.015** (0.007)	−0.016** (0.007)
Constant	−10.232*** (0.486)	−9.579*** (0.410)	−8.645*** (0.352)	−8.416*** (0.319)	−8.199*** (0.298)
Mean Control Group	0.76	0.82	0.78	0.76	0.74
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Wave Fixed Effects	Yes	Yes	Yes	Yes	Yes
Controls for religious affiliation	Yes	Yes	Yes	Yes	Yes
No. of PSUs	438	622	946	1174	1397
Observations	4,166	6,016	9,325	11,994	14,760
Adjusted R ²	0.223	0.203	0.171	0.164	0.160

Note: Standard errors (clustered at the level of PSUs) in parentheses: *significance at 10, **5, ***1%. *Source:* OeNB Euro Survey

We present results for the ownership of a giro account. Owning a giro account is the most basic measure for financial inclusion and thus, we present results for the ownership of any bank product. In this section, financial inclusion is defined as owning either a giro account, a savings deposit, a wage or debit card. Table 6 presents the result for both the whole sample specification and the divided countries specification.

Table 6 Bank account ownership: All Countries and Romania/Serbia

	<i>Dependent variable:</i>	
	Bank Account	
	All Countries	RO/RS
	(1)	(2)
Ottoman	−0.024*** (0.006)	−0.027*** (0.007)
log(Age)	3.735*** (0.058)	4.893*** (0.150)
log(Age)2	−0.508*** (0.008)	−0.664*** (0.020)
Female	−0.028*** (0.002)	−0.026*** (0.006)
Constant	−6.043*** (0.107)	−8.215*** (0.274)
Mean Control Group	0.91	0.79
Country Fixed Effects	Yes	Yes
Wave Fixed Effects	Yes	Yes
Controls for religious affiliation	Yes	Yes
No. of PSUs	4516	1468
Observations	73,062	16,066
Adjusted R ²	0.116	0.115

*Note: Standard errors (clustered at the level of PSUs) in parentheses: *significance at 10, **5, ***1%. Source: OeNB Euro Survey*

There is still an Ottoman Empire effect on financial inclusion. However, the effect size is smaller compared to the previous results for sole ownership of a giro account. This is not surprising, since the descriptive results show smaller differences for ownership of any bank account in comparison to ownership of giro accounts (see Table 3). Nevertheless, the results are statistically significant and individuals living in Ottoman regions are on average 2.4 (all countries), respectively 2.7 (Romania and Serbia) percentage points less likely to have any bank account. In relative terms,

the Ottoman group is 2.6% less likely to have any bank product in the whole sample and 3.4% in Romania and Serbia.

The results are robust in the RDD strategy. Individuals living in a range of 100km of the former border are on average 3.9 percentage points less likely to have any bank account when they live in the Ottoman region (Table 7). Further, the results are robust with higher bandwidths but not for a bandwidth of 25km.

Table 7 Geographical Regression Discontinuity Design - Bank Account

	<i>Dependent variable:</i>				
	Bank Account				
	25km	50km	100km	150km	200km
	(1)	(2)	(3)	(4)	(5)
Ottoman	0.015 (0.015)	-0.019* (0.011)	-0.039*** (0.009)	-0.033*** (0.008)	-0.015** (0.008)
log(Age)	5.675*** (0.257)	5.338*** (0.219)	4.956*** (0.186)	4.871*** (0.167)	4.926*** (0.155)
log(Age)2	-0.756*** (0.035)	-0.713*** (0.030)	-0.665*** (0.025)	-0.656*** (0.023)	-0.666*** (0.021)
Female	0.0002 (0.011)	0.0003 (0.009)	-0.013* (0.008)	-0.017** (0.007)	-0.021*** (0.006)
Constant	-9.901*** (0.467)	-9.233*** (0.397)	-8.451*** (0.338)	-8.258*** (0.305)	-8.320*** (0.282)
Mean Control Group	0.78	0.84	0.82	0.81	0.79
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Wave Fixed Effects	Yes	Yes	Yes	Yes	Yes
Controls for religious affiliation	Yes	Yes	Yes	Yes	Yes
No. of PSUs	438	622	946	1174	1397
Observations	4,165	6,014	9,320	11,990	14,753
Adjusted R ²	0.191	0.173	0.139	0.129	0.119

*Note: Standard errors (clustered at the level of PSUs) in parentheses: *significance at 10, **5, ***1%. Source: OeNB Euro Survey*

In this section we have shown that there is a persisting Ottoman effect on financial inclusion today. In the next section, we will conduct some further robustness and falsification tests to substantiate the presented results.

7 Falsification and Robustness

In a first step, we present results for varying bandwidths around the border, which is standard in the literature for regression discontinuity designs. As mentioned, the results are robust for bandwidths of 50, 100, 150 and 200km, which is reassuring that we truly estimate a causal Ottoman effect on financial inclusion. However, we find no effect for individuals living within 25km of the former border. This is possibly due to internal migration or cross-border movement. Further, the RDD may be more prone to attenuation from diffusion and local spillovers (Becker et al., 2016). Individuals could simply own bank products because of marriage between neighbouring towns or spill-overs, such as individuals in Ottoman regions observe positive consequences of being financially included. Hence, they are more likely to imitate their behavior and own a bank product.

However, we check the critical distance in which the results become significant (Table A3). 35 kilometers away from the border we do not find any effect of the former Ottoman Empire on financial inclusion. From 40km onwards, the results are statistically significant and stable over the varying bandwidths. Thus, we take a closer look at the map and find both Belgrade and Novi Sad are located close to the former border on the Ottoman side. These are the two largest cities in Serbia, with Belgrade having more than a million inhabitants and Novi Sad around 200,000. Individuals living in large cities are probably more likely to have a bank account compared to individuals in more rural areas.

Therefore, we focus on descriptive statistics and how the share of individuals owning a giro account changes with increasing distance. Table A5 shows the shares and within 35km there are almost no differences in the ownership of giro accounts. Excluding

major cities leads to 5 percentage points lower shares in the account ownership. Therefore, we exclude Novi Sad and Belgrade and run a separate regression for 25km without these large cities. However, Table A4 shows that excluding larger cities does not lead to a change in the regression results. The next robustness check includes all control variables and we see that city size has on average no effect on financial inclusion. We can therefore conclude, that this is not driven by city sizes within 25km from the border.

Table A5 also shows that the share of giro account ownership diverges between 35 and 40km from the border. Whereas the share within 35km was almost similar, suddenly the gap opens up between 35 and 40km from the former Ottoman border. Figure A3 visually shows the means per distance. It is visible that in general the account ownership for each 5km is volatile (possibly due to low number of observations) for both the Ottoman and non-Ottoman side. Between 35 and 40km, the share of individuals owning a giro account in Ottoman regions declines sharply. Possible explanations could be differences in socioeconomics of individuals living in exact this distance from the border. Geographical issues might also explain the sharp drop. We do not expect that our results are hampered by the fact that we do not find statistically significant results for the 25km specification, as we do present stable results for the remaining specifications. However, the driver of this phenomenon should be investigated in further research.

Following Becker et al. (2016), we add more control variables into the regressions. By now, the controls were arguably exogenous to the Ottoman treatment. Exposure to the Ottoman Empire could have affected much more than the levels of financial inclusion. It is conceivable that individual characteristic levels of income or education are affected by longer Ottoman exposure, but also city sizes or economic activity of cities or trust in banks. Thus, we conduct a robustness check for the RDD specification within a range of 100km of the border, including additional control variables assumed to be endogenous. As table 8 shows, the treatment variable is hardly affected by the additional controls. The effect sizes are even higher than

in the setting with exogenous control variables. Thus, education, household size, employment, income or urbanisation and economic activity of cities are unlikely the channels through which exposure to the Ottoman Empire affects financial inclusion today. In the remainder of this thesis, we refer to the specification with the whole set of control variables.

Table 8 Additional Control Variables

	<i>Dependent variable:</i>	
	Giro Account	Any Bank Account
	(1)	(2)
Ottoman	−0.053*** (0.009)	−0.055*** (0.009)
log(Age)	2.855*** (0.277)	2.864*** (0.264)
log(Age)2	−0.374*** (0.038)	−0.374*** (0.036)
Female	0.011 (0.008)	0.011 (0.007)
Married	0.021** (0.010)	0.013 (0.009)
Household Size	−0.020*** (0.004)	−0.015*** (0.004)
Children under 6	0.023*** (0.009)	0.024*** (0.008)
Children 7-14	0.002 (0.008)	0.001 (0.007)
Education	0.044*** (0.007)	0.048*** (0.007)
Unemployed	−0.186*** (0.015)	−0.201*** (0.014)
Employed	0.077*** (0.013)	0.077*** (0.013)
Low Income	−0.002 (0.012)	0.001 (0.011)
Medium Income	0.036*** (0.011)	0.037*** (0.010)
High Income	0.058*** (0.011)	0.054*** (0.010)
Second House	0.022* (0.012)	0.025** (0.011)
Internet Access	0.103*** (0.011)	0.099*** (0.011)
Size of Town	−0.00000*** (0.000)	−0.00000*** (0.000)
Constant	−4.965*** (0.490)	−4.927*** (0.467)
Mean Control Group	0.73	0.82
Country Fixed Effects	Yes	Yes
Wave Fixed Effects	Yes	Yes
Controls for religious affiliation	Yes	Yes
Controls for economic activity	Yes	Yes
No. of PSUs	946	946
Observations	9,258	9,254
Adjusted R ²	0.255	0.241

Note: Standard errors (clustered at the level of PSUs) in parentheses: *significance at 10, **5, ***1%. *Source:* OeNB Euro Survey

We also check whether the results are driven by one country only. Therefore, we run two regressions with one dropped country each. Table A6 and Table A7 verify that there are, if any, small differences between Romania and Serbia. Individuals in Serbia living in former Ottoman areas are 5.9 percentage points less likely to have a giro account whereas individuals in Romania are 4.1 percentage points less likely to have a giro account when living in the Ottoman area.

As a falsification test we conduct an analysis whether the Ottoman Empire expanded selectively. Since we claim a causal persisting effect of the Ottoman treatment on financial inclusion, it is important to check whether the border is ‘randomly assigned’. If not, the results may simply reflect pre-existing differences (Becker et al., 2016).

Therefore, we test whether the Ottoman Empire expanded in areas associated with higher economic activity. We follow the argumentation of Becker et al. (2016) and argue that the presented results only show pre-existing differences if the Ottoman Empire would have stopped their pulling back behind cities less developed. Less developed cities would have been harder to develop and integrate into the economic Ottoman Empire. We use data from Bairoch et al. (1988) who collected information on urban population. In the literature, urban population is often used as a measure for pre-industrial economic prosperity because cities are associated with high agricultural productivity in the surrounding area, advanced economic specialization and developed transport systems (Bairoch et al. (1988); Acemoglu et al. (2002)). Although data availability is limited for population sizes, by the time of Ottoman conquest, we find no differences in population sizes in 1300 and 1500 inside and outside the Ottoman borders. As Table 1 shows, most of the countries in the sample were conquered after 1400, but unfortunately there is no population data from 1400. However, data from 1300 and 1500 indicate no differences, and it is unlikely that there have been large disparities in the century between.

Further, one possible explanation for differences in financial development could be religion. The estimated effect could have more to do with contemporaneous religious

beliefs than with the Ottoman effect. If this is the case, we would expect differences in the Ottoman indicator when regressing on financial inclusion for each religion separately. Therefore, we split the sample into three subsamples: Muslim, Christian, and Other. Table A9 indicates that this is unlikely the case in Romania and Serbia. There is only a small number of individuals living in proximity to the border not affiliated to be Christian. Thus, the result is not a story of differences of religious beliefs, since the large majority of the sample is Christian.

We also re-estimate the RDD specifications for the giro account and ownership of any account without controlling for religion, and find only small changes in the estimator for the Ottoman effect on financial inclusion (see Table A13 and Table A14).

It is also possible that the Ottoman Empire shaped trust and preferences of individuals and they are thus less likely to own bank products. Becker et al. (2016) show persisting effects of trust for individuals living in the Habsburg Empire, which neighboured the Ottoman Empire. Table A10 shows an effect of the Ottoman Empire on trust in government, domestic banks and the preference to save in cash. Interestingly, individuals in the former Ottoman Empire area have higher trust in domestic banks and prefer less to save in cash than individuals not living in the Ottoman area. Including variables on trust and preferences in the regression for the RDD specification within 100km of the former border, we see no major changes for the variable of interest. Thus, the results are also not driven by trust in governments or banks and preferences to save in cash.

In sum, the robustness and falsification tests indicate that individuals own in average less bank products because of the former interest lending prohibition and not because of different religious beliefs. We also investigate whether the results are mediated by factors such as trust or preferences in government or financial institutions. Further, the results are not driven by one country only and the border seems to be randomly assigned.

8 Discussion

The above presented results are in line with what Grosjean (2011) finds. She shows that former Islamic rule in the Ottoman empire is associated with a decrease in bank penetration by 10% across countries and 4% within countries. By comparing these results to our RDD specification, we see that the magnitudes are similar. Our estimation reveals that individuals in the Ottoman Empire are 5% less likely to own a bank account compared to individuals in non-Ottoman regions. Whereas Grosjean (2011) uses the bank penetration index on a PSU level, we use ownership of bank accounts as dependent variable, a variable capturing both supply and demand side and not only the supply side of financial services. In comparison to Grosjean, we find significant results for Serbia, which are even larger compared to those from Romania. She argues that Serbia is one of the first countries which gained independence from the Ottoman Empire and thus the effects are smaller and statistically not significant. However, we cannot confirm her result, as we find an effect of the Ottoman institutions on financial inclusion. Thus, the earlier independence does not seem to play a role here. On the other hand, supporting the similarity of results to Grosjean, we also find only small effects of the Ottoman Empire on trust in banks of individuals. The results in Grosjean's paper are not statistically significant, we find significant results on a 10% level of small magnitudes. This could simply be explained by the fact that she uses six countries for the within country analysis whereas we only have two, and the remaining four countries drive the results towards zero.

Our analysis also aligns with findings from other studies regarding the impact of sociodemographics on account ownership. Several studies reveal that the employment status, income, education, gender and age determine ownership of bank accounts. Beckmann (2019) and Corrado and Corrado (2015) show that better educated and older individuals are more likely to be financially included, as well as individuals with higher income. Further, Corrado and Corrado (2015) also find a positive relationship between bank account ownership and internet access. Allen et al. (2016) show that

poor, female, young and employed individuals are less likely to own a bank account. After adding the whole set of controls in the RDD specification, we also see that individuals who are married, better educated, employed, have higher income or internet access are more likely to have a bank account. Most studies point out that female individuals are less likely to have a bank account. However, we do not find evidence for a gender gap. According to the World Bank and its Global Findex Database, this could simply be because the gender gap of financial inclusion narrowed over the last years. Since we use more recent data, it is possible that the gap in Romania and Serbia is closed.

However, there are also some limitations in our approach. In an optimal setting, the spatial RDD requires that the border does not coincide with other borders such as state borders but also natural borders. The border from 1815 is used due to the fact that the border was stable for a long period in time. Regions which are considered to be Ottoman in 1815 were under Ottoman rule for at least 300 years, whereas the non-Ottoman regions were freed by 1815 for at least 100 years and have been part of the Ottoman Empire for a maximum of 189 years. Thus, our analysis does not compare untreated regions with treated regions, but rather regions treated for a longer period with regions treated a shorter period. Thus, our estimated effect could be larger if we would compare treated versus never treated regions. Unfortunately, due to border movements, this is not possible.

The border from 1815 seems to be the best specification regarding the exposure time to the Ottoman Empire, but not to the coincidence of borders. The 1815 border runs mainly along the Carpathians in Romania and the Danube in Serbia. Both present a natural border. This would violate the assumption of a random border and it is assumable that individuals differ in their levels of bank account ownership because of these natural borders. But this is unlikely the case since these barriers do not seem to be unmanageable to pass. The Ottomans crossed these barriers a long time ago when they expanded their empire to the south of Poland. After some military defeats, they pulled back to the Danube and Carpathians. Thus, we argue

that there were at least no pre-existing differences in confounding factors among individuals from both sides of the river. When the Ottoman Empire extended to the south of Poland, individuals were free to migrate over the Danube. Furthermore, we do not expect that individuals anticipated where the new border would be after military defeats, and thus it is unlikely that they sorted themselves on one side of the river. However, for further research some pseudo tests should be conducted. For example, it is possible to check whether the levels of bank account ownership have discrete jumps at the Danube further up or down the river, where it does not coincide with the former Ottoman border.

Another caveat is data precision. Whereas the data from the Euro Survey and their geographical information is very precise, the border data from open source web pages seem to be a bit imprecise. The border seems to run through the Carpathians and along the Danube though not precisely. We assume that the border ran along the Danube river and not a few kilometers north of it, since this is easier to defend in case of a war. Thus, we believe that the border data is not perfect, most likely underestimate the results if some households are considered to be Ottoman although they have not been under Ottoman rule in 1815. The fact that the border data is not perfect could also explain the statistically insignificant results for households living within 25km of the border. Thus, for further research more precise spatial data is mandatory.

9 Conclusion

Both financial inclusion and the impact of institutions on economic outcomes are pressing questions. Thus, this thesis tries to combine these two topics and investigates the effect of past institutions on financial inclusion on a household level. As several studies show, financial inclusion is fundamental to smooth consumption plans and achieve economic integration and has therefore become subject of interest among researchers.

The previous sections have shown that even after a century of the fall of the Ottoman Empire, the effect of past interest lending prohibition and Islamic Inheritance Law on today's levels of bank account ownership still persists. Due to the stalled banking sector and its persistence over time, individuals are nearly 150 years after the fall of the Ottoman Empire in Eastern Europe less likely to own a bank account.

The results are based on a spatial regression discontinuity design, which makes use of the fact that the border cut through Romania and Serbia in 1815. Thus, we are able to exploit the within country variation and compare individuals living in close geographical proximity to each other. Using a spatial RDD approach has the advantage that individuals on both sides of the border shared a common set of institutions for a long time, since they live in the same country. We also show that the results are not driven by religious affiliations, education, income or wealth. Further, the results are not driven by one country only or by trust in institutions. The results are robust for both different bandwidths around the border and two different measures for financial inclusion.

Our findings are in line with (Grosjean, 2011) who shows that (1) in former Ottoman regions, the contemporaneous bank branch penetration is lower even today and (2) there is no evidence for lower financial inclusion because of Islamic religion in itself but rather with former formal Islamic institutions.

Although, there are convincing findings, there are still some caveats which should be tackled in future research. First, the border moved several times and thus, individuals here assigned to the non-Ottoman side of the border lived in fact in a region that was at least at some point in time part of the Ottoman Empire. However, the regions were much shorter exposed to the Ottoman Empire than the regions here assigned to the Ottoman Empire. It must be mentioned that it is not a story of Ottoman Empire versus non Ottoman Empire but a story of length of exposure to the Empire. Second, after gathering more precise spatial data a placebo test should be conducted where the border is spuriously moved in each direction. If our results are robust, we would not find any significant results after moving the border.

Nevertheless, the results show that institutions can leave a legacy through a stalled banking sector decades later. For the understanding of the functioning of financial institutions in general, this implies that historical institutional legacies can significantly influence contemporary economic behaviors and financial inclusion long into the future.

References

- Acemoglu, D., S. Johnson, and J. A. Robinson (2001). The colonial origins of comparative development: An empirical investigation. *American Economic Review* 91(5), 1369–1401.
- Acemoglu, D., S. Johnson, and J. A. Robinson (2002). Reversal of fortune: Geography and institutions in the making of the modern world income distribution. *The Quarterly Journal of Economics* 117(4), 1231–1294.
- Alesina, A. and N. Fuchs-Schündeln (2007). Good-bye lenin (or not?): The effect of communism on people’s preferences. *American Economic Review* 97(4), 1507–1528.
- Allen, F., A. Demircuc-Kunt, L. Klapper, and M. S. Martinez Peria (2016). The foundations of financial inclusion: Understanding ownership and use of formal accounts. *Journal of Financial Intermediation* 27, 1–30.
- Angrist, J. D. and J.-S. Pischke (2009). *Mostly Harmless Econometrics: An Empiricist’s Companion*. Princeton University Press.
- Bairoch, P., J. Batou, and P. Chèvre (1988). La population des villes européennes : banque de données et analyse sommaire des résultats = the population of european cities : data bank and short summary of results : 800-1850.
- Banerjee, A. and L. Iyer (2005). History, institutions, and economic performance: The legacy of colonial land tenure systems in india. *American Economic Review* 95(4), 1190–1213.
- Becker, S. O., K. Boeckh, C. Hainz, and L. Woessmann (2016). The empire is dead, long live the empire! long-run persistence of trust and corruption in the bureaucracy. *The Economic Journal* 126(590), 40–74.

- Beckmann, E. (2019). Household savings in central eastern and southeastern europe: How do poorer households save? *World Bank Policy Research Working Paper Series*.
- Brune, L., X. Giné, J. Goldberg, and D. Yang (2015). Facilitating savings for agriculture: Field experimental evidence from malawi. *Economic Development and Cultural Change* 64, 187 – 220.
- Caskey, J. P. (2005, 07). Reaching Out to the Unbanked. In *Inclusion in the American Dream*. Oxford University Press.
- Corrado, G. and L. Corrado (2015). The geography of financial inclusion across europe during the global crisis. *Journal of Economic Geography* 15.
- Cunningham, S. (2021). *Causal Inference: The Mixtape*. Yale University Press.
- Dell, M. (2010). The persistent effect of peru’s mining mita. *Econometrica* 78, 1863 – 1903.
- Dimitrova-Grajzl, V. (2007). The great divide revisited: Ottoman and habsburg legacies on transition. *Kyklos* 60(4), 539–558.
- Dupas, P. and J. Robinson (2013a). Savings constraints and microenterprise development: Evidence from a field experiment in kenya. *American Economic Journal: Applied Economics* 5(1), 163–92.
- Dupas, P. and J. Robinson (2013b). Why don’t the poor save more? evidence from health savings experiments. *American Economic Review* 103(4), 1138–71.
- Engerman, S. and K. Sokoloff (1995). Factor endowments, institutions, and differential paths of growth among new world economies: A view from economic historians of the united states. *Stephen Haber (ed.), How Latin America Fell Behind: Essays on the Economic Histories of Brazil and Mexico*.

- Engerman, S. L. and K. L. Sokoloff (2002). Factor endowments, inequality, and paths of development among new world economics. Working Paper 9259, National Bureau of Economic Research.
- Friehe, T. and M. Mechtel (2014). Conspicuous consumption and political regimes: Evidence from east and west germany. *European Economic Review* 67, 62–81.
- GFPI (2015). G20 Action Plan on SME Financing: Joint Action Plan of G20 GPFI SME Finance Sub-Group and IIWG.
- Grosjean, P. (2011). The institutional legacy of the ottoman empire: Islamic rule and financial development in south eastern europe. *Journal of Comparative Economics* 39, 1–16.
- Gross, M., J. Hogarth, and M. Schmeiser (2012). Use of financial services by the unbanked and underbanked and the potential for mobile financial services adoption. *Federal Reserve Bulletin* 98.
- Kuran, T. (2005). The logic of financial westernization in the middle east. *Journal of Economic Behavior Organization* 56(4), 593–615. Festschrift in honor of Richard H. Day.
- Kuran, T. (2008). *Institutional Causes of Economic Underdevelopment in the Middle East: a Historical Perspective*, pp. 64–76. London: Palgrave Macmillan UK.
- La Porta, R., F. Lopez-de Silanes, A. Shleifer, and R. W. Vishny (1997). Legal determinants of external finance. *The Journal of Finance* 52(3), 1131–1150.
- La Porta, R., F. Lopez-de Silanes, A. Shleifer, and R. W. Vishny (1998). Law and finance. *Journal of Political Economy* 106(6), 1113–1155.
- Nunn, N. (2009). The importance of history for economic development. *Annual Review of Economics* 1 (Volume 1, 2009), 65–92.

- Pamuk, (2004). The evolution of financial institutions in the ottoman empire, 1600–1914. *Financial History Review* 11(1), 7–32.
- Pomeranz, D. and F. Kast (2022). Savings accounts to borrow less. *Journal of Human Resources*.
- Reed, C. G. and C. T. Bekar (2003). Religious prohibitions against usury. *Explorations in Economic History* 40(4), 347–368.
- Rhine, S. L. W. and W. H. Greene (2006). The determinants of being unbanked for u.s. immigrants. *The Journal of Consumer Affairs* 40(1), 21–40.
- Rhine, S. L. W. and M. Toussaint-Comeau (2000). Increasing participation in mainstream financial markets by black households. Consumer and Community Affairs Policy Studies 2000-4, Federal Reserve Bank of Chicago.
- Sachedina, A. (2001, 01). *The Islamic Roots of Democratic Pluralism*. Oxford University Press.
- Spolaore, E. and R. Wacziarg (2013). How deep are the roots of economic development? *Journal of Economic Literature* 51(2), 325–69.

Appendix



Figure A1: The Ottoman Empire 1600 and 1815 in Eastern Europe

12) Do you have any of the following bank products or assets? Please refer only to those bank products or assets you hold personally or together with your partner .				
[FOR INTERVIEWER: - A teenager should only report whether he/she personally has any of the following bank products or assets, not whether parents or siblings have any of the following bank products or assets. - For partners/spouses it may not be possible to identify individual bank products or assets. In this case, the respondent should report all bank products or assets held jointly with a partner. However, any bank products or assets of children or other household members should be excluded.				
a) A current account (giro account)	yes 1	no 2	Don't know 88888	No answer 99999
b) Savings deposits (e.g. savings book, bank deposit, term deposit, postal bank deposit, etc.)	yes 1	no 2	Don't know 88888	No answer 99999
c) A wage card/debit card	yes 1	no 2	Don't know 88888	No answer 99999

Figure A2: Question 12 about ownership of bank products from the OeNB Euro Survey

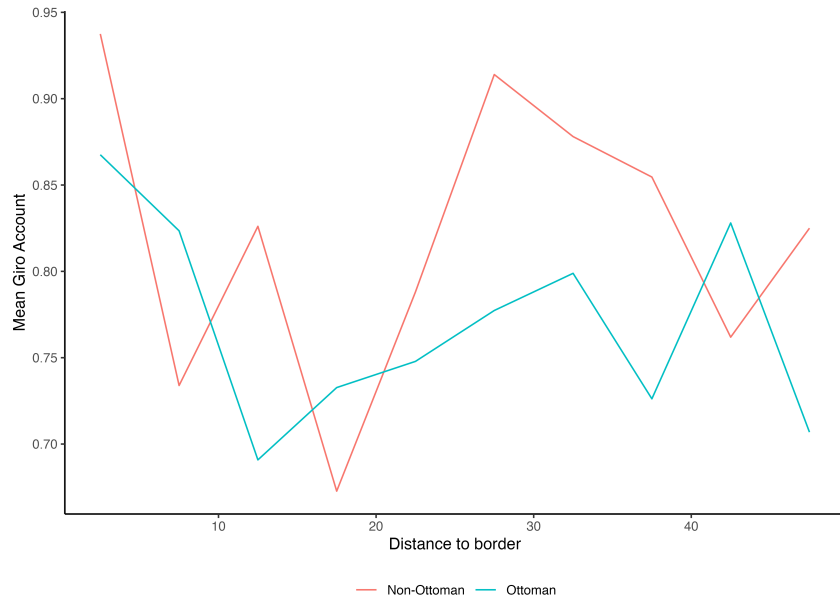


Figure A3: Account Ownership by distance

Table A1 Number of Observations per side of border

Country	Ottoman		NonOttoman	
	N	Share	N	Share
Romania	6686	0.72	2562	0.28
Serbia	7732	0.84	1427	0.16
Total	14418	0.78	3989	0.22

Table A2 Descriptive Statistics for observations within 200km

	Ottoman		NonOttoman		Diff	P-Value
	Mean	N	Mean	N		
<i>Individual-level variables</i>						
Female	0.52	13217	0.53	3656	-0.01	0.17
Age	46.21	13217	46.33	3656	-0.12	0.70
Low Education	0.11	13217	0.09	3656	0.02	0.00
Medium Education	0.67	13217	0.71	3656	-0.04	0.00
High Education	0.22	13217	0.20	3656	0.02	0.00
Student	0.06	13217	0.05	3656	0.01	0.06
Retired	0.22	13217	0.24	3656	-0.01	0.17
Unemployed	0.13	13217	0.13	3656	0.00	0.47
Employed	0.58	13217	0.58	3656	-0.00	0.85
Income DK/NA	0.23	13217	0.34	3656	-0.11	0.00
Low Income	0.23	13217	0.23	3656	0.00	0.70
Medium Income	0.27	13217	0.22	3656	0.04	0.00
High Income	0.27	13217	0.21	3656	0.06	0.00
Married	0.64	13217	0.62	3656	0.02	0.03
Christian	0.97	13217	0.97	3656	0.00	0.28
Muslim	0.01	13217	0.00	3656	0.01	0.00
<i>Household-level variables</i>						
Household has a car	0.63	13217	0.59	3656	0.04	0.00
Household has a second house	0.12	13217	0.09	3656	0.03	0.00
Household has access to internet	0.73	13217	0.74	3656	-0.01	0.29
Household number children under 6	0.16	13217	0.17	3656	-0.02	0.07
Household number children under 15	0.22	13217	0.23	3656	-0.01	0.17
Household size	2.94	13217	2.84	3656	0.09	0.00
Household has a mobile phone	0.91	13217	0.90	3656	0.01	0.02
Household has a computer	0.67	13217	0.64	3656	0.03	0.00
Household experienced shock in last 12 months	0.23	13217	0.20	3656	0.03	0.00
<i>Makro-level variables</i>						
City Size Today	24660.30	551	19856.59	164	4803.71	0.48
Bank in Town	0.69	13217	0.73	3656	-0.04	0.00
Night Light	1.25	13217	0.54	3656	0.71	0.00

Note: Observations within 200km from the Ottoman border in Romania and Serbia

Table A3 Geographic Regression Discontinuity Design - 35 and 40km

	<i>Dependent variable:</i>	
	Giro Account	
	35km	40km
	(1)	(2)
Ottoman	−0.015 (0.013)	−0.029** (0.012)
log(Age)	5.685*** (0.243)	5.584*** (0.234)
log(Age)2	−0.756*** (0.033)	−0.743*** (0.032)
Female	−0.011 (0.010)	−0.010 (0.009)
Constant	−9.986*** (0.441)	−9.784*** (0.424)
Country Fixed Effects	Yes	Yes
Wave Fixed Effects	Yes	Yes
Controls for religious affiliation	Yes	Yes
Observations	5,131	5,525
Adjusted R ²	0.213	0.212

*Note: Note: Standard errors (clustered at the level of PSUs) in parentheses: *significance at 10, **5, ***1%. Source: OeNB Euro Survey*

Table A4 RDD at 25km without Belgrade and Novi Sad

	<i>Dependent variable:</i>
	Giro Account 25km
Ottoman	−0.008 (0.018)
log(Age)	5.234*** (0.371)
log(Age)2	−0.705*** (0.050)
Female	−0.018 (0.015)
Constant	−9.002*** (0.677)
Country Fixed Effects	Yes
Wave Fixed Effects	Yes
Controls for religious affiliation	Yes
Observations	2,656
Adjusted R ²	0.178

Note: Standard errors (clustered at the level of PSUs) in parentheses: *significance at 10, **, ***1%. *Source:* OeNB Euro Survey

Table A5 Ownership of Giro Account within 40km

Ottoman	Mean under 35km	Mean under 35km without major cities	Mean 35 - 40km
No	0.81	0.81	0.85
Yes	0.80	0.76	0.73

Table A6 RDD for Romania only within 100km from the border

	<i>Dependent variable:</i>	
	Giro Account	Any Bank Account
	(1)	(2)
Ottoman	−0.041** (0.017)	−0.031* (0.016)
log(Age)	1.586*** (0.524)	1.712*** (0.494)
log(Age)2	−0.226*** (0.072)	−0.236*** (0.068)
Female	0.029* (0.015)	0.036** (0.015)
Married	0.044** (0.019)	0.028 (0.018)
Household Size	0.008 (0.009)	0.015* (0.008)
Children under 6	0.003 (0.019)	0.013 (0.018)
Children 7-14	−0.004 (0.017)	−0.008 (0.016)
Education	0.128*** (0.019)	0.125*** (0.018)
Unemployed	−0.208*** (0.032)	−0.237*** (0.030)
Employed	0.045* (0.026)	0.059** (0.025)
Low Income	−0.024 (0.023)	−0.012 (0.021)
Medium Income	0.030 (0.023)	0.041* (0.021)
High Income	0.077*** (0.024)	0.095*** (0.023)
Second House	0.083*** (0.031)	0.092*** (0.029)
Internet Access	0.163*** (0.021)	0.155*** (0.020)
Size of Town	0.00000 (0.00000)	0.00000 (0.00000)
Constant	−2.562*** (0.927)	−2.820*** (0.875)
Mean Control Group	0.73	0.82
Country Fixed Effects	Yes	Yes
Wave Fixed Effects	Yes	Yes
Controls for religious affiliation	Yes	Yes
Controls for economic activity	Yes	Yes
No. of PSUs	340	340
Observations	3,340	3,342
Adjusted R ²	0.194	0.203

*Note: Standard errors (clustered at the level of PSUs) in parentheses: *significance at 10, **5, ***1%. Source: OeNB Euro Survey*

Table A7 RDD for Serbia only within 100km from the border

	<i>Dependent variable:</i>	
	Giro Account	Any Bank Account
	(1)	(2)
Ottoman	−0.059*** (0.010)	−0.072*** (0.010)
log(Age)	4.545*** (0.291)	4.419*** (0.281)
log(Age)2	−0.588*** (0.040)	−0.572*** (0.039)
Female	−0.009 (0.008)	−0.011 (0.007)
Married	−0.011 (0.010)	−0.014 (0.010)
Household Size	−0.018*** (0.004)	−0.017*** (0.004)
Children under 6	0.028*** (0.009)	0.027*** (0.009)
Children 7-14	−0.002 (0.007)	0.001 (0.007)
Education	0.033*** (0.007)	0.034*** (0.007)
Unemployed	−0.243*** (0.015)	−0.244*** (0.015)
Employed	0.019 (0.014)	0.018 (0.014)
Low Income	−0.007 (0.012)	−0.004 (0.012)
Medium Income	0.026** (0.010)	0.023** (0.010)
High Income	0.034*** (0.010)	0.024** (0.010)
Second House	0.008 (0.011)	0.011 (0.010)
Internet Access	0.047*** (0.012)	0.051*** (0.012)
Size of Town	−0.00000*** (0.000)	−0.00000*** (0.000)
Constant	−7.917*** (0.517)	−7.656*** (0.499)
Mean Control Group	0.73	0.82
Country Fixed Effects	Yes	Yes
Wave Fixed Effects	Yes	Yes
Controls for religious affiliation	Yes	Yes
Controls for economic activity	Yes	Yes
No. of PSUs	606	606
Observations	5,918	5,912
Adjusted R ²	0.299	0.303

*Note: Standard errors (clustered at the level of PSUs) in parentheses: *significance at 10, **5, ***1%. Source: OeNB Euro Survey*

Table A8 City Size in 1300 and 1500

	Ottoman City Size	Non Ottoman City Size	t-test
Year 1300	8.67	2.50	0.08
Year 1500	14.29	4.67	0.19

Table A9 Regressions with religious affiliations seperately

	Dependent variable:				
	Giro Account		Any Bank Account		
	(1)	(2)	(3)	(4)	(5)
Ottoman	0.293 (0.337)	-0.051*** (0.009)	-0.078 (0.065)	0.293 (0.337)	-0.053*** (0.009)
log(Age)2	-2.053 (6.812)	2.918*** (0.281)	-0.299 (1.908)	-2.053 (6.812)	2.861*** (0.268)
Female	0.226 (0.991)	-0.382*** (0.039)	0.049 (0.261)	0.226 (0.991)	-0.373*** (0.037)
Married	0.058 (0.320)	0.012 (0.008)	-0.068 (0.051)	0.058 (0.320)	0.013* (0.007)
Household Size	0.206 (0.601)	0.019* (0.010)	0.039 (0.065)	0.206 (0.601)	0.011 (0.009)
Children under 6	-0.017 (0.280)	-0.019*** (0.004)	-0.029 (0.030)	-0.017 (0.280)	-0.015*** (0.004)
Children 7-14	-0.023 (0.410)	0.024*** (0.009)	0.060 (0.059)	-0.023 (0.410)	0.026*** (0.009)
Education	-0.130 (0.212)	-0.0005 (0.008)	0.092** (0.044)	-0.130 (0.212)	-0.001 (0.007)
Unemployed	0.138 (0.287)	0.043*** (0.008)	0.027 (0.049)	0.138 (0.287)	0.048*** (0.007)
Employed	-0.538 (0.873)	-0.182*** (0.015)	-0.246** (0.101)	-0.538 (0.873)	-0.197*** (0.015)
Low Income	0.476 (0.754)	0.078*** (0.014)	-0.014 (0.095)	0.476 (0.754)	0.080*** (0.013)
Medium Income	-0.276 (0.542)	-0.007 (0.012)	0.130 (0.079)	-0.276 (0.542)	-0.004 (0.011)
High Income	-0.038 (0.355)	0.033*** (0.011)	0.155* (0.082)	-0.038 (0.355)	0.033*** (0.010)
Second House	0.087 (0.326)	0.056*** (0.011)	0.120* (0.071)	0.087 (0.326)	0.051*** (0.010)
Internet Access	-0.321 (0.511)	0.023* (0.012)	0.027 (0.066)	-0.321 (0.511)	0.025** (0.011)
Size of Town	-0.250 (0.472)	0.099*** (0.011)	0.236*** (0.085)	-0.250 (0.472)	0.097*** (0.011)
Constant	0.00000 (0.00000)	-0.00000*** (0.000)	-0.00000 (0.00000)	0.00000 (0.00000)	-0.00000*** (0.000)
Mean Control Group	4.672 (11.701)	-5.104*** (0.497)	0.632 (3.415)	4.672 (11.701)	-4.945*** (0.473)
Country Fixed Effects	0.6	0.78	0.8	0.6	0.82
Wave Fixed Effects	Yes	Yes	Yes	Yes	Yes
Controls for economic activity	Yes	Yes	Yes	Yes	Yes
Religion	Muslim	Christian	Other	Muslim	Christian
Observations	29	9,021	208	29	9,017
Adjusted R ²	0.371	0.253	0.381	0.371	0.239
					0.307

Note: Standard errors (clustered at the level of PSUs) in parentheses: *significance at 10, **, ***1%. Source: OeNB Euro Survey

Table A10 Individual trust in government, bank, police and preference to save in cash

	<i>Dependent variable:</i>				
	Trust in Government (1)	Trust in Domestic Bank (2)	Trust in Foreign Bank (3)	Trust in Police (4)	Preference to save in cash (5)
Ottoman	0.079*** (0.011)	0.024* (0.012)	0.012 (0.012)	0.046*** (0.012)	-0.059*** (0.013)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Wave Fixed Effects	Yes	Yes	Yes	Yes	Yes
Full Set of Control Variables	Yes	Yes	Yes	Yes	Yes
No. of PSUs	606	606	606	606	606
Observations	9,166	9,096	8,951	8,851	8,803
Adjusted R ²	0.081	0.036	0.038	0.042	0.027

*Note: Standard errors (clustered at the level of PSUs) in parentheses: *significance at 10, **5, ***1%. Source: OeNB Euro Survey*

Table A11 All Controls and Trust Variables

	<i>Dependent variable:</i>	
	Giro Account	Any Bank Account
	(1)	(2)
Ottoman	−0.048*** (0.009)	−0.050*** (0.009)
log(Age)	2.649*** (0.288)	2.698*** (0.273)
log(Age)2	−0.348*** (0.040)	−0.352*** (0.038)
Female	0.010 (0.008)	0.011 (0.007)
Married	0.023** (0.010)	0.012 (0.009)
Household Size	−0.017*** (0.004)	−0.014*** (0.004)
Children under 6	0.022** (0.009)	0.026*** (0.009)
Children 7-14	0.001 (0.008)	−0.0002 (0.007)
Education	0.038*** (0.008)	0.040*** (0.007)
Unemployed	−0.182*** (0.016)	−0.194*** (0.015)
Employed	0.071*** (0.014)	0.074*** (0.013)
Low Income	−0.0004 (0.012)	0.003 (0.011)
Medium Income	0.027** (0.011)	0.028*** (0.010)
High Income	0.043*** (0.011)	0.039*** (0.010)
Second House	0.021* (0.012)	0.028** (0.011)
Internet Access	0.115*** (0.012)	0.109*** (0.011)
Size of Town	−0.00000*** (0.000)	−0.00000*** (0.000)
Trust in Government	0.005 (0.010)	−0.005 (0.009)
Trust in Domestic Banks	0.056*** (0.010)	0.062*** (0.010)
Trust in Foreign Banks	−0.003 (0.010)	0.004 (0.010)
Preference to save in cash	−0.021*** (0.008)	−0.017** (0.007)
Constant	−4.556*** (0.511)	−4.603*** (0.483)
Mean Control Group	0.78	0.82
Country Fixed Effects	Yes	Yes
Wave Fixed Effects	Yes	Yes
Controls for religious affiliation	Yes	Yes
Controls for economic activity	Yes	Yes
No. of PSUs	946	946
Observations	8,382	8,380
Adjusted R ²	0.256	0.243

Note: Standard errors (clustered at the level of PSUs) in parentheses: *significance at 10, **5, ***1%. *Source:* OeNB Euro Survey

Table A12 Effect Of Ottoman Empire on Education and Income

	<i>Dependent variable:</i>	
	Education	Income
	(1)	(2)
Ottoman	−0.014 (0.013)	0.238*** (0.027)
Country Fixed Effects	Yes	Yes
Wave Fixed Effects	Yes	Yes
Full Set of Control Variables	Yes	Yes
No. of PSUs	606	606
Observations	9,280	9,280
Adjusted R ²	0.199	0.109

Note: Standard errors (clustered at the level of PSUs) in parentheses: *significance at 10, **5, ***1%. Source: OeNB Euro Survey

Table A13 RDD without Religion - Giro Account

	<i>Dependent variable:</i>				
	Giro Account				
	25km (1)	50km (2)	100km (3)	150km (4)	200km (5)
Ottoman	−0.004 (0.016)	−0.029*** (0.011)	−0.038*** (0.009)	−0.033*** (0.008)	−0.028*** (0.008)
log(Age)	5.744*** (0.266)	5.444*** (0.225)	5.012*** (0.193)	4.908*** (0.174)	4.792*** (0.162)
log(Age)2	−0.764*** (0.036)	−0.726*** (0.031)	−0.673*** (0.026)	−0.662*** (0.024)	−0.647*** (0.022)
Female	−0.013 (0.011)	−0.006 (0.009)	−0.011 (0.008)	−0.014** (0.007)	−0.016** (0.007)
Constant	−10.133*** (0.482)	−9.537*** (0.408)	−8.654*** (0.350)	−8.430*** (0.317)	−8.197*** (0.296)
Mean Control Group	0.76	0.82	0.78	0.76	0.74
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Wave Fixed Effects	Yes	Yes	Yes	Yes	Yes
Controls for religious affiliation	No	No	No	No	No
No. of PSUs	438	622	946	1174	1397
Observations	4,234	6,091	9,425	12,108	14,907
Adjusted R ²	0.220	0.202	0.171	0.165	0.160

Note: Standard errors (clustered at the level of PSUs) in parentheses: *significance at 10, **5, ***1%. *Source:* OeNB Euro Survey

Table A14 RDD without Religion - Bank Account

	<i>Dependent variable:</i>				
	Any Bank Account				
	25km (1)	50km (2)	100km (3)	150km (4)	200km (5)
Ottoman	0.014 (0.015)	−0.018* (0.011)	−0.037*** (0.009)	−0.032*** (0.008)	−0.012 (0.008)
log(Age)	5.618*** (0.256)	5.304*** (0.218)	4.949*** (0.185)	4.874*** (0.167)	4.919*** (0.154)
log(Age)2	−0.748*** (0.035)	−0.708*** (0.030)	−0.664*** (0.025)	−0.657*** (0.023)	−0.666*** (0.021)
Female	0.002 (0.010)	0.002 (0.009)	−0.012 (0.008)	−0.016** (0.007)	−0.020*** (0.006)
Constant	−9.814*** (0.464)	−9.199*** (0.395)	−8.454*** (0.336)	−8.273*** (0.304)	−8.309*** (0.281)
Mean Control Group	0.78	0.84	0.82	0.81	0.79
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Wave Fixed Effects	Yes	Yes	Yes	Yes	Yes
Controls for religious affiliation	No	No	No	No	No
No. of PSUs	438	622	946	1174	1397
Observations	4,234	6,090	9,420	12,105	14,902
Adjusted R ²	0.189	0.171	0.139	0.130	0.119

Note: Standard errors (clustered at the level of PSUs) in parentheses: *significance at 10, **5, ***1%. *Source:* OeNB Euro Survey

Table A15 Geographic Regression Discontinuity Design - Savings Deposit

	<i>Dependent variable:</i>				
	Savings Deposit				
	25km (1)	50km (2)	100km (3)	150km (4)	200km (5)
Ottoman	0.057*** (0.016)	0.049*** (0.011)	0.039*** (0.008)	0.033*** (0.007)	0.031*** (0.007)
log(Age)	2.048*** (0.271)	1.624*** (0.212)	1.230*** (0.168)	1.256*** (0.148)	1.142*** (0.133)
log(Age)2	−0.275*** (0.037)	−0.220*** (0.029)	−0.164*** (0.023)	−0.168*** (0.020)	−0.152*** (0.018)
Female	−0.033*** (0.011)	−0.020** (0.009)	−0.019*** (0.007)	−0.018*** (0.006)	−0.016*** (0.005)
Constant	−3.712*** (0.492)	−2.906*** (0.386)	−2.224*** (0.305)	−2.270*** (0.269)	−2.062*** (0.243)
Mean Control Group	0.11	0.1	0.1	0.1	0.1
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Wave Fixed Effects	Yes	Yes	Yes	Yes	Yes
Controls for religious affiliation	Yes	Yes	Yes	Yes	Yes
No. of PSUs	438	622	946	1174	1397
Observations	4,145	5,988	9,281	11,929	14,677
Adjusted R ²	0.025	0.020	0.015	0.012	0.012

Note: Standard errors (clustered at the level of PSUs) in parentheses: *significance at 10, **5, ***1%. *Source:* OeNB Euro Survey

Table A16 Geographic Regression Discontinuity Design - Debit Card

	<i>Dependent variable:</i>				
	Debit Card				
	25km (1)	50km (2)	100km (3)	150km (4)	200km (5)
Ottoman	0.057*** (0.019)	−0.016 (0.014)	−0.050*** (0.011)	−0.048*** (0.010)	−0.034*** (0.009)
log(Age)	5.974*** (0.324)	5.752*** (0.279)	5.699*** (0.231)	5.706*** (0.207)	5.870*** (0.187)
log(Age)2	−0.803*** (0.044)	−0.778*** (0.038)	−0.776*** (0.031)	−0.779*** (0.028)	−0.804*** (0.025)
Female	0.015 (0.013)	0.022* (0.011)	0.003 (0.009)	−0.007 (0.008)	−0.014* (0.008)
Constant	−10.511*** (0.588)	−9.998*** (0.507)	−9.789*** (0.420)	−9.780*** (0.378)	−10.030*** (0.342)
Mean Control Group	0.63	0.69	0.68	0.67	0.66
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Wave Fixed Effects	Yes	Yes	Yes	Yes	Yes
Controls for religious affiliation	Yes	Yes	Yes	Yes	Yes
No. of PSUs	438	622	946	1174	1397
Observations	4,162	6,013	9,324	11,993	14,760
Adjusted R ²	0.130	0.112	0.095	0.091	0.091

Note: Standard errors (clustered at the level of PSUs) in parentheses: *significance at 10, **5, ***1%. *Source:* OeNB Euro Survey