The institutional legacy of the Ottoman Empire: Islamic rule and financial development in South Eastern Europe

Pauline Grosjean

University of San Francisco, Cowell 426, 2130 Fulton Street, San Francisco, CA 94117, United States

ARTICLE INFO

ABSTRACT

Grosjean, Pauline—The institutional legacy of the Ottoman Empire: Islamic rule and financial development in South Eastern Europe

This paper uses a historical experiment – the occupation of South Eastern Europe by the Ottoman Empire – to shed light on the persistence of financial development. Interest-lending prohibition persisted under Islamic rule much longer than in the rest of Europe. The unique history and political fragmentation of the region allows investigating within-country effects, in six countries that were formerly only partly occupied by the Ottoman Empire. Former Islamic rule is consistently associated with lower contemporaneous formal financial development, both across and within countries. It is associated with a decrease in bank penetration by 10% across countries and 4% within countries. However, within country, the effect of the Ottoman Empire is confined to financial development. There is no association between former Ottoman rule, income, small and medium sized enterprise development or entrepreneurship. The effect is robust to controlling for a wide number of observable characteristics. Moreover, localities with Armenian, Jewish or Greek minorities, who were allowed to practice interest lending under Ottoman rule, have higher levels of bank penetration. By contrast, Islamic religion and trust in the financial system play no role in explaining such long-term persistence. *Journal of Comparative Economics* **39** (1) (2011) 1–16. University of San Francisco, Cowell 426, 2130 Fulton Street, San Francisco, CA 94117, United States.

1. Introduction

A large literature, since the seminal work of Acemoglu et al. (2001) has explored the long-term legacy of historical institutions and their effect on economic outcomes, in particular growth (Acemoglu et al., 2001, 2009) and financial development (La Porta et al., 1998; Djankov et al., 2003). The literature on legal origins has documented a strong relationship between legal and colonial origins and current financial development. This literature argues that a major influence of past institutions on financial development stems from the hysteresis of legal systems (Beck et al., 2003) and essentially focuses on cross-country variation. However, more recent work has pointed to the importance of local financial development, even within an integrated financial market and legal framework (Guiso et al., 2004, hereafter GSZ). This paper explores whether colonial origins have implications for financial development that go beyond the quality of legal systems. To do so, it investigates the effect of historical institutions not only across but also within countries.

E-mail address: pagrosjean@usfca.edu

The analysis exploits the unique history and political fragmentation of South Eastern Europe and examines more particularly the long lasting effect of historical governance by an Islamic Empire: the Ottoman Empire. Interest-lending prohibition endured in the former Ottoman Empire way into the 19th century whereas the Catholic Church started relaxing interest-lending prohibition as early as in the 15th century in the rest of Europe (Bekar and Reed, 2003). Belated interest lending reform has been associated with stalled banking sector development in the former Ottoman Empire in the 18th and 19th century (Pamuk, 2004). The question remains whether such prohibition is still associated with weaker financial and real development.

Two particularly interesting dimensions of the Ottoman Empire are notable. Firstly, successor states' borders do not coincide with the borders of the former Empire. Even different localities within contemporaneous administrative regions were subject to Ottoman rule for different durations. Secondly, it was a very diverse Empire from the point of view of its religious and ethnic composition. In other words, it is possible not only to disentangle the effect of former Ottoman rule from the effect of contemporaneous institutions and legal framework at the country level but also from the impact of religion or ethnicity.

I use micro level data from the *Life in Transition Survey (LITS)*, a nationally representative survey implemented in 28 post-transition countries and Turkey in 2006, in order to investigate the financial and real legacies of the Ottoman Empire. This data contains very precise socio-economic information, namely on income and economic occupations. The proportion of households with a debit/credit card and a bank account is used as a measure of formal financial development. Precise respondents' localization data is combined to historical maps to create historical variables that reflect the duration of Ottoman control in each locality.

The results confirm that former Ottoman rule is associated with considerably lower contemporaneous formal financial development. On average, even controlling for a number of respondents' and localities' characteristics, former Ottoman rule is associated with a 10% decrease in bank penetration compared with the rest of Central, Eastern and South Eastern Europe. This result is in line with the legal origins literature, which documents a strong cross-country association between legal origins and financial development. More remarkably, the negative effect of former Ottoman rule on financial development persists, although attenuated, *within country*, in the countries that were only partly occupied by the Ottoman Empire, such as Croatia, Hungary, Montenegro, Romania, Serbia and Ukraine. Within a common national institutional and legal framework, former Ottoman rule is associated with a reduction in bank penetration by 4%, on average. The effect is robust to the inclusion of a wide number of observable individual and localities' characteristics that may be correlated both with Ottoman rule and financial development, such as urbanization, average education or income. The effect is also robust to the inclusion of administrative region dummies. The methodology proposed by Altonji et al. (2005) is used to calculate how much greater the influence of unobservable factors would need to be, relative to observable factors, to explain away the full negative relationship between Ottoman rule and financial development. It would require unobservable factors to be about 5–23 times greater than observable factors in cross-country regressions and 3–5 times greater in within-country regressions, making it unlikely that the estimate can be fully attributed to unobserved heterogeneity.

Although the former Ottoman Empire as a whole is poorer than the former Habsburg Empire or Prussia, the within-country legacy of Ottoman rule is limited to the financial sector, without any corresponding real effects, measured by household expenditures, small and medium sized private enterprise development or self-employment.

Several potential causality channels between Ottoman occupancy and financial developments are explored. There is no evidence that Islamic religion or beliefs and trust in the financial system play any role. However, formal finance is more developed in areas of the former Ottoman Empire with Armenian, Greek or Jewish minorities, which were not subject to interest-lending prohibition. Given the numerous changes in legal institutions since the fall of the Ottoman Empire, this suggests a very strong persistence of former Ottoman institutions on formal financial development.

This paper contributes to the literature on the role of history for financial and economic development. It follows the legal origins literature (La Porta et al., 1998), which discusses the origins and importance of legal rules for financial development. This paper extends existing literature by relying on within-country evidence and thus identifies some of the effects of history that go beyond legacies on formal rules and institutions. Furthermore, recent literature has shown that local financial development matters (GSZ), so that aggregate data for credit development at the country level – even within industries – may not capture all the relevant dimensions of financial development. This is not the first paper to use within-country evidence. Berkowitz and Clay (2005, 2006) explore the legacy of French and Spanish legal origins in 10 US states. However, state legislation in the US is rather influential on the legal system so that the direct legacy of states' legal origins on state legislation might still play a role. This paper exploits regional variations at an even more disaggregated level and in countries that are much more centralized than the US and makes use of both country and administrative regions dummies.

This paper also contributes, albeit more indirectly, to the literature on finance and development. The main finding of this paper is that within country, former Ottoman rule has a sizeable and negative effect on financial development. However, former Ottoman regions, within a country, do not have significantly lower levels of household income, regional GDP, small and medium sized enterprises development or entrepreneurship. Admittedly, the framework used in this paper does not make possible the identification of a causal effect of financial development on real outcomes. There are two main reasons for this. Firstly, former Ottoman rule may not influence real outcomes exclusively through finance. Secondly, available measures of income and regional GDP are post-tax and post-transfer measures and may thus be subject to an attenuation bias. Still, such a gap between financial and real legacies of former Ottoman rule contrasts with the existing literature that has found a strong association between financial development and economic growth within countries (GSZ; Jayaratne and

Strahan, 1996; Dehejia and Lleras-Muney, 2003). Most existing work deals with the case of a unique and developed country – Italy or the United States, whereas this paper hinges on a sample of emerging and transitioning economies. The source of internal variation in this paper is also much more distant in the countries' history, making it is less susceptible to an endogeneity bias and implying that agents had more time to adjust to the institutional environment. Nevertheless, the results in this paper are consistent with Acemoglu and Johnson (2005), who find that former colonial rule has a sizeable effect on contractual institutions, which in turn affect the type of financial intermediation but have no impact on economic growth or investment.

The rest of the paper is organized as follows. Section 2 discusses some historical background on Ottoman institutions and the Ottoman Empire's occupation in South Eastern Europe. Section 3 presents the data. Section 4 presents cross-country and within-country evidence on financial and real development. Section 5 concludes.

2. Historical background

2.1. The Ottoman Empire in South Eastern Europe

The Ottoman, Habsburg and Russian Empires and Prussia occupied most of Central, Eastern and South Eastern Europe[1] from about 1300 to the start of the First World War. The Ottoman Empire's territorial expansion in South Eastern Europe occurred mainly over the 14th century (Bulgaria, South Serbia, FYROM) and 15th century (Albania, Bosnia and Herzegovina, Crimea, Moldavia, Wallachia and Montenegro). Territorial losses of the Ottoman Empire took place in two waves. Northern Bulgaria and the Ottoman regions of Romania, Serbia and Montenegro gained independence after the Russo-Turkish war in 1877–1878. Bosnia–Herzegovina was ceded to the Habsburg Empire, while the Russian Empire annexed Bessarabia. Nationalistic aspirations in the new nation-states as well as in states that were still under Ottoman control, in particular Albania, led to the Balkan wars in 1911–1912, which led to the loss of all South-Eastern European territories by the Ottoman Empire (Southern Bulgaria, Macedonia, Kosovo and Southern Serbia). Borders were again redrawn substantially at the Treaty of Versailles in 1919 and after the Second World War and today nation states' borders are still the objects of contentious nationalistic claims. Ottoman successor's states in the Balkans are Albania, Bulgaria, Bosnia and Herzegovina, FYROM and Moldova. Croatia, Montenegro, Hungary, Romania, Serbia and Ukraine encompass large territories that were partly subject to Ottoman control for varying periods of time.

To the North West of the Ottoman Empire were the Kingdom of Hungary and the Austrian Empire, which became the Austria-Hungarian – or Habsburg-Empire – Austria-Hungarian or Habsburg Empire after the 1867 Ausgleich. Successor states acceded to independence after the Saint-Germain and Sevres treaties of 1918 and include territories that now belong to Croatia, Hungary, the Czech Republic, Poland, Romania, the Slovak Republic, Slovenia, Serbia and Ukraine. To the North East of the Ottoman Empire was the Russian Empire, whose territorial expansion in Europe occurred mainly under Peter the Great in the 17th century and Catherine the Great in the 18th century. The Russian Empire encompassed more or less what became the Soviet Union, with the addition of Polish and Turkish territories, but a much smaller Ukraine, not all territories of the Baltic States and without Kaliningrad. Prussia[2] encompassed territories that are today part of Poland, Lithuania and Czech Republic, as well as Germany, Denmark, Belgium and the Netherlands. Most territories outside of today's Germany were lost at the Treaty of Versailles in 1919.

2.2. Ottoman institutions and financial development

The Ottoman Empire was a highly centralized state, ruled by bureaucratic orders, which consisted in the Sultan, the Grand Vizier and the Porte, and by religious institutions. The sacred law of Islam, *seriat*, was supposed to regulate all aspects of life, both secular and religious. The Sultan himself was subject to the sacred law and as a result his power was limited. Inalcik (1973, p. 171) writes that: "according to Muslim theory, political authority was merely a means for the application of the Seriat".

Religious and ethnic minorities were respected in the Empire, as a consequence of the recognition of Jews and Christians as people of the Book and of an attempt to incorporate many different minorities in the Empire. The Millet system of Ottoman Islamic law aimed at legally protecting religious minority groups other than the ruling Sunni and has been called an early example of pre-modern religious pluralism (Sachedina, 2001).

Interest lending was forbidden under Islamic law and such prohibition endured for much longer than in the rest of Europe. The Catholic Church started relaxing interest-lending prohibition as early as the 15th century (Bekar and Reed, 2003). The influence of the reformation then paved the way for the gradual abandonment of blanket prohibitions on usury from the early 17th century onwards among the states of Western and Eastern Europe. Similar reforms took place much later in the Ottoman Empire, well into the 19th century (Kuran, 2005, 2008). Kuran (2005, p. 600) states that the "persistence of the

---

[1] The main exception is Upper Zeta, the central region of Montenegro. Parts of Croatia (Dalmatia, Ragusa) were integrated in the Duchy of Venice, but switched allegiance to the Ottoman Empire in 1482. The Duchy of Venice won control of the region again as part of the Treaty of Karlowitz in 1699 that ended the Great Turkish War, before switching to France's control after Napoleon installed his Kingdom of Italy in 1805. The province fell under Habsburg control in 1813.

[2] Here considered as Prussia per se (1525–1947) as well as Old Prussia and the Teutonic Order.

illegality of interest presented a constant threat to interest claims, [...] raised the prevailing rates" and "blocked the emergence of durable financial intermediaries, recognizable as banks". Even the bill of credit appeared un-Islamic (Kuran, 2005).

Yet, Ottoman historians acknowledge that there were many ways to circumvent anti-usury prohibition. Firstly, Armenians, Greeks and Jews were not subjected to the prohibition of interest lending, so that: "The Greeks and especially the Armenians, often in partnerships of two, emerged as the leading *sarrafs*" (moneylenders and moneychangers) (Pamuk, 2004, p. 21). Secondly, some forms of credit arrangements were allowed, such as financial partnerships (*cash waqf*) and credit arrangements within city guilds, which controlled manufacturing and trade. Pamuk (2004, p. 12) states that: "numerous other commercial techniques were developed which played the same role as interest-bearing loans and thus made the use of loans unnecessary". There were also a variety of business partnerships to finance larger commercial ventures, in particular long-term trade, such as the *mudaraba*, where people could pool capital and use it for commercial purposes. In short, what was lacking was not access to credit: "Dense networks of credit and finance [developed] in and around Ottoman urban centers" (Pamuk, 2000, p. 78), but rather the development of banking institutions and financial intermediation on a large scale.

Another important dimension of Ottoman rule that has been associated with the slow development of banking institutions is Islamic inheritance law, which discouraged the formation of corporations. For example, it was not possible to merge *cash waqf* and provide credit on a large scale, which has been offered as a reason for the failure to develop banks: "As late as early 19th century, there was not a single Middle Eastern Bank analogous to those established in the West in the 1400s" (Kuran, 2005, p. 603). The first Ottoman bank: the Banque de Constantinople was established in Istanbul in 1847 that is to say after most of the Empire's territorial losses in the Balkans.

3. Data

3.1. Financial and economic data: the life in transition survey

The main source of data for the analysis is the *Life in Transition Survey* (LITS), a nationally representative survey conducted by the European Bank for Reconstruction and Development and the World Bank in 28 post-transition countries and Turkey in 2006.[3] Respondents to the survey were drawn randomly, using a two stage sampling method, with census enumeration areas as Primary Sampling Units (PSUs) and households as secondary sampling units. One thousand households in 50 PSUs were surveyed in each country.

Two main samples of countries are considered in the analysis. In order to reflect the differences between the former Ottoman Empire as a whole and the other Empires (Habsburg, Russia and Prussia), the first sample includes 20 countries of Central, Eastern and South Eastern Europe.[4] In order to have a consistent sample of European countries, the Caucasus, Central Asia and Mongolia are excluded because of their very different historical and cultural background, as well as Turkey in order to have a more homogenous sample of transition economies. However, results are unchanged when all countries, including Turkey are included in the analysis.[5] Within-country variation is investigated in the second sample of six countries that were divided between the Ottoman Empire and the Habsburg or Russian Empires or independent provinces: Croatia, Hungary, Montenegro, Romania, Serbia and Ukraine.

The legacy of the former Ottoman Empire is captured by five main dependent variables. The legacy on financial development is measured by a bank penetration index. Legacies on the real sector are quantified by household income, an industrial index, which reflects the share of Small and Medium Sized enterprises, the average age of entrepreneurs and regional GDP.

Bank penetration is measured by the proportion of households, at the PSU level, who have a bank account and/or a debit/credit card. This financial index takes values between 0 and 2, with an average of 0.87. It is lowest in Ukraine and the Former Yugoslav Republic of Macedonia (0.33) and highest in Estonia (1.76) and Slovenia (1.70). This paper is not the first to use household level data on access to finance as a measure of financial development. GSZ rely on household level reported access to bank loans as a measure of local financial development in Italy. As discussed in GSZ, such measures of financial development through household access to finance capture both the demand and the supply of credit, but that should not be a concern. This paper deals with the long-term persistence of former Ottoman rule, or lack thereof, and its effect. The measure of access to finance may perfectly well capture the combined effect of Ottoman rule on the availability and the demand of formal finance.

Real economic development is captured by household income, an industrial index, entrepreneurship measures and regional GDP. Household income is proxied by survey measures of household expenditures.[6] The industrial index, developed by Grosjean and Senik (forthcoming) uses questions about the respondents' first, second and third jobs,[7] to compute the proportion, at the PSU level, of respondents in the active labor force who are self-employed with more than five employees or either: work in a small or medium sized (SME), private firm, or newly created enterprise (since 1989).[8] Socialist economies were

---

[3] Neither Turkmenistan nor Kosovo were included in the survey.

[4] Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, the Former Yugoslav Republic of Macedonia, Hungary, Latvia, Lithuania, Moldova, Montenegro, Poland, Romania, Russian Federation, Serbia, Slovak Republic, Slovenia and Ukraine.

[5] Results not reported here but available upon request.

[6] Harmonized in USD at time-of-survey exchange rates.

[7] Multiple jobs are frequent in transition countries.

[8] This index thus excludes workers in state run enterprises or collective farms, enterprises that were already existing in 1989, large enterprises of more than 100 employees, self employed with strictly less than five employees.

Table 1
Descriptive statistics. Source: LITS and EUROSTAT.

Variable	Sample of 20 countries: 1000 obs.				Sample of 6 divided countries: 300 obs.			
	Mean	Std. dev.	Min	Max	Mean	Std. dev.	Min	Max
Finance index	0.87	0.60	0	2	0.84	0.57	0	2
Log exp	7.75	0.60	4.87	9.31	7.84	0.52	6.50	9.31
Industrial index	2.40	0.52	0.39	4	2.36	0.52	0.39	3.64
Age entrepreneur	42.24	10.11	19	87	42.55	9.82	21	70
Regional GDP (i)	8940.70	5322.03	2300	23,300	7342.96	3390.45	2900	14,800
Ottoman Weight	8.51	11.55	0	32	9.61	11.07	0	32
Age	47.19	7.15	23.10	72.56	47.55	7.68	24.82	72.56
Compulsory educ	0.19	0.17	0	0.89	0.19	0.16	0	0.72
Secondary educ	0.22	0.16	0	0.90	0.17	0.15	0	0.63
Professional training	0.34	0.20	0	0.97	0.39	0.18	0	0.88
University	0.19	0.15	0	0.78	0.18	0.15	0	0.67
Post grad	0.01	0.03	0	0.26	0.01	0.03	0	0.24
Atheist	0.14	0.20	0	1	0.07	0.11	0	0.68
Christian	0.72	0.34	0	1	0.88	0.18	0	1
Muslim	0.09	0.25	0	1	0.04	0.14	0	1
Jewish	0.01	0.01	0	0.18	0.01	0.01	0	0.11
Rural	0.40	0.49	0	1	0.38	0.49	0	1
Urban	0.40	0.49	0	1	0.40	0.49	0	1
Poor	0.32	0.21	0	1	0.32	0.22	0	0.96
Rich	0.36	0.22	0	1	0.35	0.23	0	1
Trust in banks	3.26	0.70	1.02	5.78	3.078	0.65	1.08	5.29
Greek, Armenian or Jewish minority	0.003	0.018	0	0 .27	0.0026	0.013		0.11

(i): Regional GDP is at the NUTS 2 level. It is only available for seven countries overall (Croatia, Czech Republic, Hungary, Romania, Slovak Republic, Slovenia) and 3 "divided" countries (Croatia, Hungary, Romania).

distinguished by their exceptionally low proportion of SMEs. The presence of SMEs is thus interpreted as an indicator of market development. The presence of private, newly created firms and self-employed is also a sign of dynamism of the local economy and of progress in the transition towards a market economy. Self-employed persons with less than five employees are not included on the grounds that those are less likely to be small firms than forms of quasi-unofficial economy. This index varies from 0 to 5 with an average of 2.37. It is highest, on average, in Latvia (2.78), followed by the two other Baltic States, and is lowest in Belarus (1.92). In an alternative set of results, I use only the proportion of self-employed at the PSU level, as in GSZ. Following GSZ, the average age of entrepreneurs is taken as an indicator of real effects of financial development: better access to finance should enable people to become entrepreneurs at a younger age. Regional GDP data is from the EUROSTAT database and is available at the NUTS 2 level but only for the sub-sample of 6 EU members[9] and Croatia. All descriptive statistics are displayed in Table 1. For survey-based measures, sampling weights are used throughout for the aggregation of individual variables at the PSU, regional or country level.

One concern is the lack of representativeness of the survey data at the sub-national level. Unfortunately, there are no alternative regional indices of financial development and private sector development that are comparable across countries of our sample.

As a validation of the measure of income, the per capita household expenditure data is compared to per capita GDP in 2006, both at the country and sub-national regional level. At the country level, the correlation coefficient between the household expenditures based measure of income and per capita GDP in 2006 is 0.85 and significant at 1%. At the sub-national level, the correlation coefficient between the LITS based measure of income and regional GDP per capita in 2006 is 0.74 and significant at 1%.

Similarly, the industrial index correlates well with other available indices of market liberalization and privatization at the country level and with SME development measures at the regional level. Grosjean and Senik (forthcoming) provide a number of validation tests of this index.

Another potential limitation of the analysis is the presence of unobserved characteristics that potentially correlate both with Ottoman occupation and with weak financial development. At the country level, I include as additional controls governance and democracy indicators, such as Freedom House democracy score (Freedom House, 2006), Polity IV (CIDCM, 2006) or BTI indicators (Bertelsmann, 2005). Of course, regional heterogeneity is still a concern. Former Ottoman province may, for example, be systematically rural. However, if anything, the former Ottoman Empire is relatively urban, with cities such as Istanbul, Sofia, or Bucharest formerly Ottoman.[10] Still, the rural, urban or metropolitan character of the location is controlled for in all regression results.

---

[9] Here: Bulgaria, Czech Republic, Hungary, Romania, Slovak Republic and Slovenia.
[10] A *t*-test rejects the hypothesis that the former Ottoman Empire is more rural than the rest of the region.
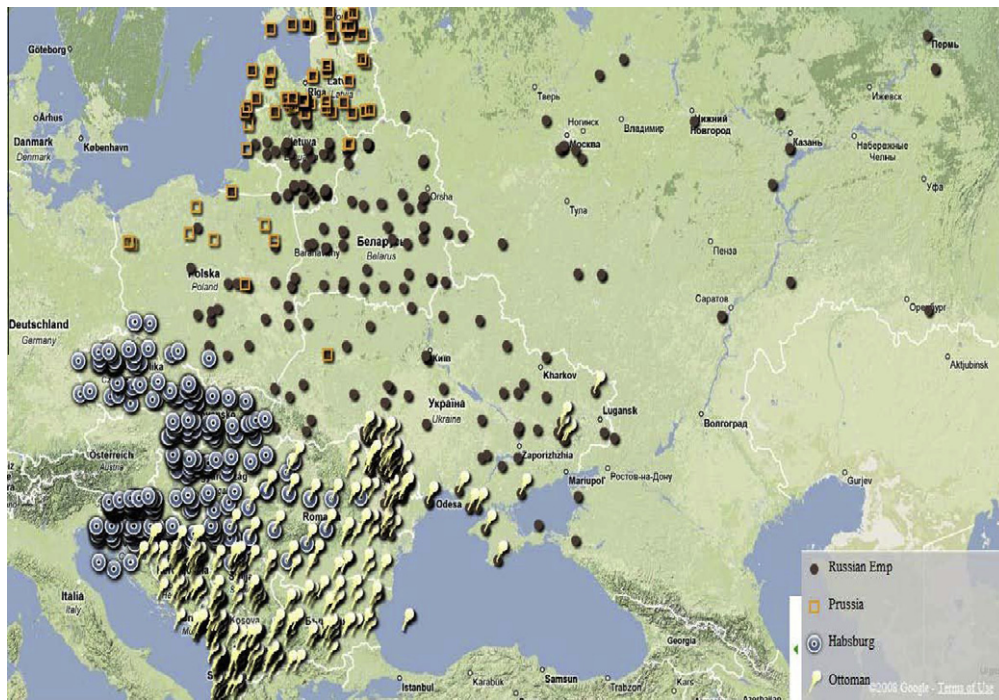
Fig. 1. The Ottoman, Russian, Habsburg and Prussian Empires in Central, Eastern and South Eastern Europe. Markers represent sampled villages. Markers indicate Empire occupation for more than 100 years. *Source*: LITS and Periodical Atlas of Europe (Euratlas, 2008).

It is also possible that the former Ottoman sphere of influence corresponds to a region where individuals are, inherently, good or bad borrowers. To circumvent this issue, controls for a number of respondents' observable characteristics, such as age, education, religion and income are included. Moreover, as argued by GSZ, even if unobservable characteristics make borrowers within the former Empire inherently bad borrowers, this is not an issue for the interpretation of the results, as long as banking discrimination is based on characteristics that are unobservable both to the econometrician and to the banker. Also, the geographical extent of the Ottoman Empire varied greatly over the six centuries considered in the analysis. It is unlikely that unobservable variables that determine self-selection into Ottoman domination happen to be exactly correlated with those that determine financial development. Last, regional dummies are included in robustness tests.

3.2. Historical data

The Periodical Atlas of Europe (Euratlas, 2008) is used to reconstruct Empire delimitations and their evolution across time, from 1300, the start date of Empire consolidation in Medieval Europe, to 2000. Fig. 1 in Appendix plots which of the locations included in the LITS belonged to the Ottoman, Habsburg and Russian Empires and Prussia for at least 100 years.

I follow the methodology developed by Dimitrova-Grajzl (2007) based on historians' accounts to construct weights that reflects the depth of influence of Ottoman rule. The proxy for Ottoman legacy, *Ottoman Weight*, is a variable that reflects the number of years a given region spent under Ottoman rule. A one-point weight is assigned for every 25 years before 1700 and a two-point weight for every 25 years after and including 1700 spent under Ottoman rule. This weight distribution is intended to discount years that are further away in the past and to reflect historians' view that the main legacies of the Ottoman Empire came from the latter period rather than from the initial years when the Ottomans were establishing power in Europe (Dimitrova-Grajzl, 2007).

Table 2 displays the countries and regions that were under Ottoman domination, the dates and duration of Ottoman rule. Although the weights used in regression analysis are defined at the PSU level, weights are aggregated at the regional level in Table 2, for simplicity.

There are several differences between Dimitrova-Grajzl's weights and the weights used in this paper. Firstly, the weighting scheme in this paper is much more detailed, since within-country variation is considered. Different weights are allocated to different regions of the six countries highlighted in bold in Table 2, which were divided between the Ottoman and the Habsburg or Russian Empire or that were or became independent earlier. Secondly, the sample is larger than Dimitrova-Grajzl's, which dealt with the former Habsburg and Ottoman Empires only. Here, countries that were occupied either at the same time or consequently by the Ottoman and the Russian Empire, such as Moldova and Ukraine; or divided between the Ottoman and independent regions, such as Montenegro are also included.

Table 2
The Ottoman legacy in Europe. Source: Dimitrova-Grajzl (2007) (from L. Carl Brown: Imperial Legacy: The Ottoman Imprint on the Balkans and the Middle East, 1996) and author's own calculations from the Periodical Atlas of Europe (Euratlas, 2008). The weight is 1 every 25 years before 1700, and 2 every 25 years after 1700.

Country	Whole country/regions	Dates Ottoman rule	Duration Ottoman rule	Weight
Albania	Whole	1468–1912	444	27
Bosnia and Herzegovina	Bosnia	1463–1878	415	24
	Herzegovina	1482–1878	396	23
Bulgaria	Whole country	1396–1878	483	26
Croatia	Dalmatia, Ragusa	1481–1699	218	9
Hungary	Eastern Hungarian Kingdom	1526–1699	173	7
Macedonia, FYR	Whole	1371–1913	542	29
Moldova	Whole	1512–1812	300	16
Montenegro	Montenegro less Upper Zeta (independent) and coastal (Venice)	1498–1878	380	32
Romania	Wallachia	1476–1829	353	19
	Moldavia	1504–1829	325	18
	Transylvania	1541–1690	149	6
	Bessarabia	~1419–1878	459	25.5
Serbia	Vojvodina	1527–1716	189	8
	Other regions	1389–1829	440	23
Ukraine	Crimea Khanate	1441–1783	342	17

4. Cross- and within-country evidence: the Ottoman legacy on financial and real development

4.1. Econometric specification

This section explores the Ottoman legacy on financial and real outcomes, at the PSU level. Each of the following regressions is performed for all dependent variables: the financial index, household income, industrial index, entrepreneurs' age and regional GDP:

$$Y_{pi} = \alpha_1 + \beta_1 X_{pi} + \gamma_1 W_{pi} + \varepsilon_1 \tag{1}$$

$$Y_{pi} = \alpha_2 + \beta_2 X_{pi} + \gamma_2 W_{pi} + \delta C_i + \varepsilon_2 \tag{2}$$

where X_{pi} includes a number of economic and demographic characteristics of PSU p in country i, such as average age or education level, the proportion of each main religious denomination, or whether the PSU belongs to an urban or rural area. W_{pi} is the Ottoman Weight of PSU p in country i, as defined in Section 3, and C_i is a set of country dummies. Hence: (1) exploits only the cross-country variation between countries that were submitted to Ottoman rule to varying degrees or not at all. (2) Exploits the within-country variation between provinces of the same country. Within-country regressions exploit the fact that contemporaneous countries' borders do not coincide with former Empires' borders and are performed on the sample of divided countries only, controlling for country fixed effects. In addition, for robustness, additional specifications include dummies for administrative regions.

4.2. Ottoman legacy on financial development: results

The underdevelopment of formal finance in the former Ottoman Empire and provinces is evident from descriptive statistics, which are displayed in Table 3 and mapped in Fig. 2. The mean value of the financial index is 0.51 in the former Ottoman Empire, compared with 1.20 in the former Habsburg, or 1.43 in Prussia. Within the six countries that were only partly under Ottoman domination, the financial index is lower in all former Ottoman provinces, significantly so for Croatia, Hungary, Montenegro and Ukraine. For example, in – former Ottoman – Crimea, the index is 0.18, compared with 0.39 in the rest of Ukraine.

To refine on the analysis, results of cross-country regressions on financial development are displayed in Table 4. Columns 1–3 present results for the sample of 20 countries and columns 4–6 for the sub-sample of divided countries. Standard errors are clustered at the country level throughout. In the two samples and all different specifications, former Ottoman rule is strongly, significantly and negatively associated with the level of formal financial development. This effect is robust to controlling for many observable characteristics of localities, such as average education, age, religion and income categories as well as whether the locality is urban or rural and to country characteristics such as the Polity IV index. Furthermore, the coefficient on the *Ottoman Weight* variable does not change very much when all observable characteristics are included. Altonji et al. (2005) develop a measure to gauge how much greater the influence of unobservable factors would need to be, relative to observable factors, to explain away the full negative relationship, here between financial development and former Ottoman rule. This test is based on the ratio of coefficients of regressions including full or restricted sets of control variables. The first coefficient $\hat{\beta}^R$ is obtained when only the Ottoman Weight variable is controlled for. The second, $\hat{\beta}^F$ is obtained when the full set of observable characteristics are controlled for (column 3 for the 20 countries sample and column 6 for the divided

Table 3
Descriptive statistics of main outcomes of interest, by empire, country and regions. Source: LITS, Dimitrova-Grajzl (2007) and author's own calculations from the Periodical Atlas of Europe (Euratlas, 2008).

Empire/country	Whole country/regions	Ottoman Weight	Finance index		Log expenditures		Industrial index		Age, self employed	
			Mean	sd	Mean	sd	Mean	sd	Mean	sd
Ottoman	NA	NA	0.51	0.42	7.61	0.46	2.34	0.52	42.1	9.32
Habsburg	NA	NA	1.20	0.52	8.06	0.5	2.41	0.52	43.6	9.82
Russia	NA	NA	0.57	0.52	7.5	0.6	2.45	0.5	42.7	11.39
Prussia	NA	NA	1.43	0.4	8.02	0.3	2.72	0.47	42.74	10.87
Albania	Whole	27	0.36	0.34	7.60	0.40	2.25	0.55	41.63	7.85
Bosnia and Herzegovina	Whole	23	0.67	0.45	7.72	0.51	2.28	0.64	40.36	10.23
Bulgaria	Whole	26	0.58	0.34	7.38	0.42	2.66	0.42	45.46	10.78
Croatia	Dalmatia, Ragusa	9	1.23	0.58	7.96	0.33	2.45	0.26	39.00	–
	Other regions	0	1.59	0.31	8.41	0.36	2.36	0.48	44.27	11.01
Hungary	Eastern Hungarian Kingdom	7	0.96	0.43	7.80	0.33	2.53	0.56	45.91	8.41
	Other regions	0	1.20	0.36	7.96	0.38	2.38	0.75	46.51	9.15
Macedonia, FYR	Whole	29	0.33	0.30	7.57	0.36	2.22	0.50	40.73	9.39
Moldova	Whole	16	0.20	0.27	6.79	0.51	2.28	0.40	42.34	6.83
Montenegro	Ottoman Montenegro	32	0.42	0.40	8.09	0.43	2.11	0.42	39.82	8.79
	Rest	0	0.66	0.38	8.25	0.25	2.25	0.40	38.10	7.49
Romania	Wallachia, Moldavia	19	0.56	0.46	7.42	0.56	2.70	0.48	55.14	15.10
	Transylvania	6	0.67	0.49	7.49	0.54	2.31	0.32	44.22	9.05
	Bessarabia	25.5	0.53	0.50	7.38	0.46	2.56	0.62	37.88	4.19
Serbia	Vojvodina	8	1.04	0.39	7.77	0.41	2.38	0.48	42.77	6.50
	Other regions	23	0.83	0.46	7.63	0.22	2.14	0.59	41.04	7.01
Ukraine	Crimea Khanate	17	0.18	0.19	7.62	0.45	2.30	0.35	34.85	12.98
	Other regions	0	0.39	0.33	7.48	0.47	2.39	0.47	39.81	9.55
Belarus	Whole	0	0.39	0.39	7.41	0.52	1.94	0.30	45.45	13.99
Czech Republic	Whole	0	1.38	0.39	8.25	0.31	2.60	0.43	45.33	8.21
Poland	Whole	0	1.10	0.41	8.02	0.29	2.34	0.51	39.64	10.68
Slovak Republic	Whole	0	1.26	0.29	8.02	0.25	2.53	0.46	41.67	8.22
Estonia	Whole	0	1.76	0.19	8.08	0.24	2.80	0.40	45.72	11.44
Latvia	Whole	0	1.28	0.35	7.96	0.35	2.77	0.40	42.35	10.06
Lithuania	Whole	0	1.22	0.37	7.82	0.36	2.73	0.52	44.66	12.47
Russian Federation	Whole	0	0.52	0.36	7.78	0.45	2.34	0.40	36.32	10.08

countries sample). The ratio is calculated as: $\hat{\beta}^F/(\hat{\beta}^R - \hat{\beta}^F)$. The intuition behind this formula is that the smaller is the difference between the two coefficients, the less the estimate is affected by selection on observables so that the larger the selection on unobservables needs to be, relative to observables, in order to explain away the entire effect of $\hat{\beta}^F$. Based on this ratio, explaining away the full negative relationship between Ottoman rule and financial development would require unobservable factors to be 5–23 times greater than observable factors, making it unlikely that the estimate can be fully attributed to unobserved heterogeneity.

The effect of former Ottoman rule on financial development is sizeable. Every 25 additional years of Ottoman rule before 1700, or every 12.5 years after 1700 is associated with a reduction of bank penetration by about 1–1.2% for the sample of 20 countries and by about 0.1% for the sample of six divided countries.[11] On average, the Ottoman Weight is equal to 8.51 in the 20 countries sample and 9.61 in the six countries sample. Ottoman rule is thus associated with a 10% and 8% reduction in banking penetration in the two samples, respectively.

Admittedly, the results of within-country regressions may potentially confound the effect of former Ottoman rule that transits through country level effects. Indeed, cross-country analysis does not address the simultaneity bias between governance and institutional quality at the country level and development of financial institutions. Including governance quality indicators such as the Polity IV score as an additional covariate in cross-country regressions is an attempt at controlling for such institutional quality. As expected, the Polity IV score is positively and significantly correlated with financial development. The coefficient on former Ottoman rule is still significant, and is actually bigger when the Polity IV score is controlled for. Similar results hold when alternative indicators of institutional quality, such as the Freedom House or BTI indices, or EBRD transition indicators are included (results not reported here).

Nevertheless, such institutional quality measures may not capture all the relevant institutional, legal or even cultural dimensions that vary at the country level and that may be correlated with Ottoman rule. The purpose of relying on within-country variation is to keep such factors constant. Results of within-country regressions are displayed in Table 5. Even controlling for country dummies, the effect of former Ottoman control remains not only statistically significant but also sizeable. Every 25 additional years of Ottoman rule before 1700, or every 12.5 years after 1700 is associated with a reduction of

---

[11] The financial index takes values between 0 and 2. The Ottoman weight variable is associated with a reduction by about 0.21–0.24% points of the financial index for the sample of 20 countries and 16–19 percentage points for the sample of six divided countries, a 0.10-0.12% and 0.08-0.10% reduction of bank penetration, respectively.
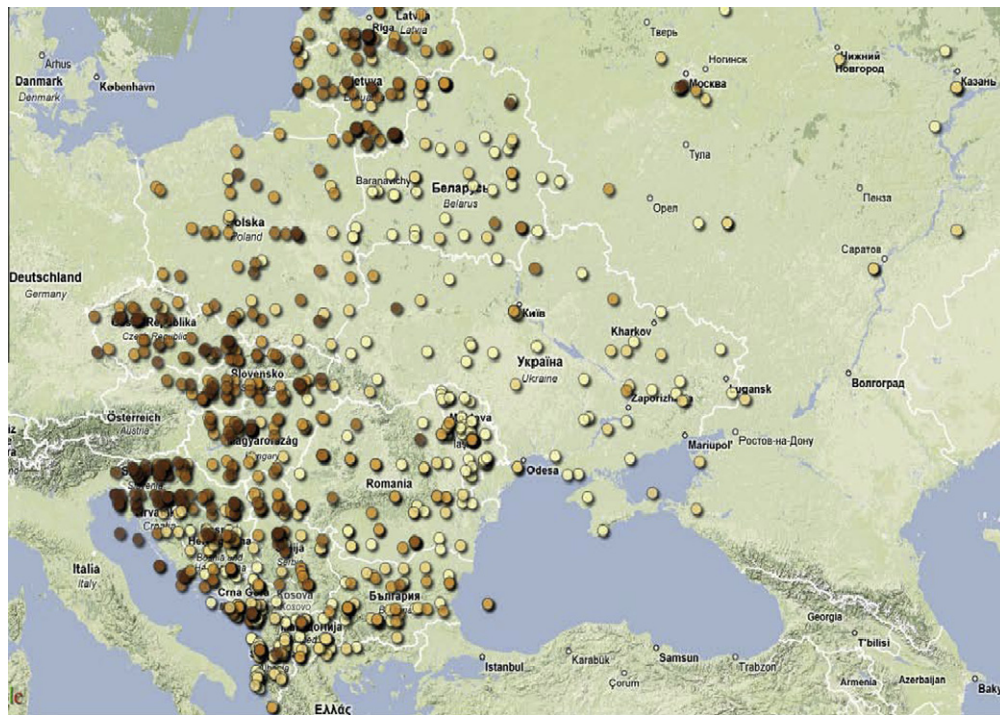
Fig. 2. Formal Financial Development in Central, Eastern and South Eastern Europe. Markers represent sampled villages. Markers represent the average value of the financial index. *Source*: LITS and Periodical Atlas of Europe (Euratlas, 2008).

bank penetration by a 0.4% in bank penetration, even when controlling for local income, age, religion, average education level of inhabitants and whether the location is urban, rural or metropolitan area. This is equivalent to reduction in banking penetration by nearly 4% overall. Even controlling for administrative region dummies, former Ottoman rule is still associated with a significant decrease in bank penetration (column 3).[12] The Altonji et al. (2005) ratio is computed with the restricted coefficient corresponding to the coefficient reported in column 1 (with *Ottoman Weight* and country dummies as the restricted set of controls) and the full coefficient reported in column 2. Explaining away the full negative relationship between Ottoman rule and financial development within-country would require unobservable factors to be 3–5 times greater than observable factors, making it, again, unlikely that the estimate can be fully attributed to unobserved heterogeneity.

In alternative specifications not reported here, the influence of the Ottoman Empire is compared to that of the other Empires of Central, Eastern and South Eastern Europe. Formal financial development is significantly higher in the former Habsburg and Russian Empires and even in formerly independent Central Montenegro.

Other covariates have expected effects on the index of formal financial development. Localities where people are older are financially less developed. The average education level of the local population has a positive effect on formal financial development. Household income is, as expected, positively and significantly correlated with the index of formal financial development.

For additional robustness, individual regressions at each divided country's level are performed in order to check the robustness of the effect of former Ottoman rule on bank penetration.[13] The effect of former Ottoman rule is negative in all countries and significant in most, with the exception of Serbia and Romania. In Romania, despite the fact that the Ottoman Weight is not significant in the regression, descriptive statistics still reveal that the level of formal financial development is lower in former Ottoman Provinces: the level of financial development is higher in former Habsburg Transylvania (mean: 0.67, sd 0.49) than in former Ottoman Wallachia (mean: 0.56, sd 0.46) or Moldavia (mean 0.27, sd 0.36). Serbia is an interesting case because Serbian provinces always benefited from a higher degree of autonomy than other provinces of the Ottoman Empire within the Balkans (Palairet, 1997). Serbia was also the first country to obtain its independence from the Ottoman Empire. This may explain the absence of a significant effect in this country. All the results discussed above are also robust to specifying Ottoman influence as a dummy variable taking value 1 if localities spent more than 100 years under Ottoman control.

---

[12] However, when controlling for administrative dummies, the variation only comes from a very limited sub-sample: 2 regions in Hungary, 3 in Romania and 4 in Serbia.

[13] The results are not reported here but are available upon request.

Table 4
Ottoman legacy on financial development – cross-country results.

	1	2	3	4	5	6
	Finance index (PSU)					
Ottoman Weight	−0.026***	−0.020***	−0.023***	−0.019*	−0.016**	−0.016*
	[0.005]	[0.005]	[0.005]	[0.009]	[0.006]	[0.006]
Age		0.002	0		−0.004	−0.005
		[0.004]	[0.004]		[0.004]	[0.003]
Comp. educ		−0.149	−0.37		−0.317	−0.541
		[0.291]	[0.264]		[0.359]	[0.331]
Sec. educ		0.162	0.027		−1.092*	−1.192*
		[0.371]	[0.333]		[0.530]	[0.528]
Prof. training		0.044	−0.015		−0.148	−0.209
		[0.184]	[0.164]		[0.151]	[0.238]
University		−0.36	−0.209		−0.832	−0.838
		[0.382]	[0.352]		[0.700]	[0.661]
Post grad educ		0.971	0.619		0.117	−0.075
		[0.571]	[0.609]		[1.207]	[1.241]
Atheist		−0.324	−0.362		0.031	0.092
		[0.321]	[0.330]		[1.035]	[1.070]
Christian		−0.875**	−0.838*		−0.229	−0.137
		[0.358]	[0.421]		[1.021]	[1.063]
Muslim		−0.924**	−0.791*		−0.338	−0.26
		[0.369]	[0.432]		[1.186]	[1.230]
Jewish		−2.859	−3.001*		−6.005**	−5.860**
		[1.710]	[1.632]		[1.802]	[1.984]
Rural		−0.189*	−0.14		−0.296	−0.266
		[0.100]	[0.089]		[0.175]	[0.166]
Urban		−0.109	−0.062		−0.154	−0.133
		[0.075]	[0.065]		[0.118]	[0.109]
Poor		−0.455***	−0.374***		−0.588**	−0.578**
		[0.113]	[0.103]		[0.194]	[0.181]
Rich		0.292**	0.267***		0.414	0.381*
		[0.103]	[0.091]		[0.224]	[0.183]
Polity IV			0.045***			0.036
			[0.008]			[0.067]
Sample	20 countries			6 divided countries		
Observations	1000	1000	1000	300	300	300
R^2	0.256	0.413	0.477	0.129	0.373	0.379

Excluded categories are proportion with no education (not completed compulsory schooling) metropolitan area, proportion of "other religion" (grouped with Buddhists) and proportion in middle income group. Robust standard error clustered at country level.
   * Significant at 10%.
  ** Significant at 5%.
 *** Significant at 1%.

4.3. Ottoman legacy on real outcomes: results

The legacy of the former Ottoman Empire on survey-based measures of real outcomes is explored in Table 6. In the sample of 20 countries, the former Ottoman zone of influence is found to be significantly poorer. Additional results reveal that it is significantly so than the former Habsburg or Prussian spheres of influence.[14] The effect is sizeable: former Ottoman rule is associated with more than 14% points decrease in expenditures at the household level.[15] For the more homogenous sample of divided countries, however, former Ottoman rule is not significantly associated with a decrease in income.

Results of within-country regressions are reported in Table 7. Within a given country, provinces that were integrated to the Ottoman Empire are not significantly poorer.[16]

The effect of former Ottoman control on the industrial index[17] is never significant. Former Ottoman domination also has no significant effect on the age at which people become entrepreneurs.

Other covariates have expected effects. Older and non metropolitan (in particular rural) areas are poorer and less dynamic, as measured by the industrial index. Education is positively associated with income. Similar results are obtained when Ottoman influence is specified as a dummy variable.

---

[14] It is richer, but not significantly so, than the former Russian Empire. Results of Empire comparisons are not reported here but are available upon request.
[15] Computed as 0.017 ∗ 8.51.
[16] In fact, in the case of Montenegro, the former Ottoman sphere of influence is today richer than provinces that were independent. Results of individual within country regressions are not reported here but are available upon request.
[17] Or on self employment.

Table 5
Ottoman legacy on financial development – within-country results.

	1	2	3
	Finance index (PSU)		
Ottoman Weight	−0.011[***]	−0.008[***]	−0.006[**]
	[0.002]	[0.002]	[0.002]
Age		−0.010[**]	−0.010[**]
		[0.003]	[0.004]
Comp. educ		−0.144	−0.081
		[0.195]	[0.208]
Sec. educ		0.619[*]	0.618[*]
		[0.248]	[0.257]
Prof. training		0.379	0.4
		[0.281]	[0.295]
University		0.599[*]	0.780[**]
		[0.259]	[0.249]
Post grad educ		0.141	0.428
		[0.774]	[0.839]
Atheist		−0.467	−0.481
		[0.449]	[0.581]
Christian		−0.525	−0.483
		[0.451]	[0.605]
Muslim		−0.688	−0.657
		[0.535]	[0.691]
Jewish		−3.917[***]	−3.610[**]
		[0.751]	[1.229]
Rural		−0.072	−0.107
		[0.119]	[0.162]
Urban		−0.043	−0.087
		[0.079]	[0.125]
Poor		−0.184	−0.192
		[0.124]	[0.112]
Rich		0.203	0.102
		[0.179]	[0.171]
Country dummies	Yes	Yes	Yes
Region dummies	No	No	Yes
Observations	300	300	300
R^2	0.528	0.738	0.776

Excluded categories are proportion with no education (not completed compulsory schooling) metropolitan area, proportion of "other religion" (grouped with Buddhists) and proportion in middle income group. Robust standard error clustered at country level.
  [*] Significant at 10%.
  [**] Significant at 5%.
  [***] Significant at 1%.

Analysis performed using EUROSTAT regional GDP per capita as the main real outcome of interest draws a similar picture (see Table 8). Across the sample of seven countries for which data is available, the former Ottoman region, as a whole, is poorer than the former Habsburg region. However, former Ottoman rule is not significantly associated with regional GDP in the restricted sample of more homogenous countries that were divided between the Habsburg and Ottoman Empires, whether country effects are controlled for (column 5) or not (columns 3 and 4).[18,19] The coefficient on the Ottoman Weight is negative in that sample, but not significant.

4.4. Ottoman financial and real legacies: discussion

When the Ottoman Empire is considered as a whole and compared with the rest of the region, both financial development and levels of income are smaller. However, it is very difficult to disentangle from such aggregated results the direct legacy of Ottoman institutions on real or financial development from that on the quality of institutions at the country level, which in turn influences both financial and real development. Dimitrova-Grajzl (2007) indeed finds that former Ottoman rule is associated with negative outcomes on a number of institutional quality measures. In turn, institutional quality has been found to be a strong (positive) predictor of growth (Acemoglu et al., 2001; Rodrik et al., 2004) and of financial development (Djankov et al., 2003; La Porta et al., 1998). This is an important limitation of cross-country analysis, which plagues many studies of the influence of past institutions on contemporaneous development. It has, of course, been noted before. Acemoglu et al. (2001)

---

[18] These countries are: Croatia, Hungary and Romania.
[19] Similarly, there is no significant association between former Ottoman rule and regional GDP growth, using EUROSTAT regional GDP growth data in the subsample of countries included in the EUROSTAT database.

Table 6
Ottoman legacy on real outcomes – cross-country results.

	1	2	3	4	5	6
	Log of expenditures		Industrial index		Entrepreneurs' age	
Ottoman Weight	−0.017***	−0.008	−0.003	−0.005	0.009	−0.045
	[0.006]	[0.007]	[0.004]	[0.004]	[0.036]	[0.025]
Age	−0.015***	−0.021**	−0.001	−0.013**	0.601***	0.515***
	[0.003]	[0.006]	[0.004]	[0.004]	[0.071]	[0.115]
Comp. educ	−0.27	−0.950**	0.003	−0.618	−1.165	−20.619
	[0.316]	[0.257]	[0.291]	[0.689]	[5.033]	[13.111]
Sec. educ	0.297	−0.99	0.055	−0.361	0.182	−11.719
	[0.392]	[0.570]	[0.254]	[0.467]	[4.194]	[7.585]
Prof. training	0.461*	0.11	0.036	−0.713	−3.101	−13.252
	[0.235]	[0.381]	[0.252]	[0.375]	[4.673]	[6.826]
University	0.511	0.134	−0.065	−0.677	1.756	−7.112
	[0.364]	[0.429]	[0.235]	[0.348]	[5.423]	[13.005]
post grad educ	0.744*	0.442	−0.482	−2.382	−1.736	22.141
	[0.372]	[0.765]	[0.839]	[1.705]	[14.950]	[19.747]
Atheist	0.04	0.558	−0.012	0.274	7.73	3.713
	[0.175]	[0.464]	[0.181]	[1.119]	[5.051]	[19.260]
Christian	−0.366**	0.299	−0.353	0.035	2.934	2.328
	[0.172]	[0.333]	[0.209]	[1.101]	[4.567]	[16.758]
Muslim	0.124	0.754**	−0.441*	−0.204	2.292	5.971
	[0.262]	[0.251]	[0.219]	[1.015]	[5.198]	[17.616]
Jewish	−2.645***	−1.419	0.159	1.013	−47.794	−48.287
	[0.566]	[1.727]	[0.711]	[1.636]	[33.974]	[46.573]
Rural	−0.220**	−0.291**	−0.024	−0.045	1.576	2.167
	[0.098]	[0.110]	[0.068]	[0.156]	[1.400]	[3.150]
Urban	−0.133*	−0.220**	−0.100*	−0.061	0.763	−0.194
	[0.065]	[0.060]	[0.053]	[0.114]	[1.393]	[2.809]
Poor			−0.376**	−0.324	−2.576	5.168
			[0.158]	[0.324]	[4.159]	[3.316]
Rich			−0.166	−0.133	−0.587	5.714
			[0.108]	[0.204]	[3.988]	[7.653]
Polity IV	0.044***	0.065	0.028***	0.038	−0.178	1.443*
	[0.007]	[0.057]	[0.006]	[0.037]	[0.115]	[0.678]
Sample	20 countries	Divided countries	20 countries	Divided countries	20 countries	Divided countries
Observations	1000	300	996	298	546	161
R^2	0.425	0.414	0.101	0.089	0.159	0.215

Excluded categories are proportion with no education (not completed compulsory schooling) metropolitan area, proportion of "other religion" (grouped with Buddhists) and proportion in middle income group. Robust standard error clustered at country level.
  * Significant at 10%.
  ** Significant at 5%.
  *** Significant at 1%.

Table 7
Ottoman legacy on real outcomes –within-country results.

	1	2	3	4	5	6
	Log of expenditures		Industrial index		Age of entrepreneurs	
Ottoman Weight	−0.006*	−0.004	−0.002	−0.002	−0.021	−0.014
	[0.003]	[0.003]	[0.004]	[0.003]	[0.062]	[0.061]
Socio-economic and demographic controls	No	Yes	No	Yes	No	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	300	300	298	298	161	161
R^2	0.384	0.733	0.046	0.131	0.092	0.244

Socio-economic and demographic controls include age, education categories, religion categories, urban, rural or metropolitan area. Columns 3–6 also control for income categories. Robust standard error clustered at country level.
  * Significant at 10%.
  ** Significant at 5%.
  *** Significant at 1%.

indeed acknowledge that they cannot reject that all the effect of history, as measured by colonial origins, is fully captured by current institutions.

A considerable advantage of the region studied here with respect to econometric identification is that contemporaneous nation states' borders do not coincide with former Empires'. It is thus possible to use some of the variation in historical institutions for a given set of contemporaneous institutions and get around the identification problem just mentioned. When current, formal institutions are controlled for through the inclusion of country dummies, the coefficient on former Ottoman

Table 8
Ottoman legacy on regional GDP – cross- and within-country results.

	1	2	3	4	5
	Regional GDP EUROSTAT – NUTS 2 level				
Ottoman Weight	−313.058[***]	−315.508[***]	−199.419	−199.341	−132.523
	[53.156]	[53.255]	[69.805]	[70.795]	[75.597]
Socio demo and eco controls	Yes	Yes	Yes	Yes	Yes
Polity IV	No	Yes	No	Yes	No
Country dummies	No	No	No	No	Yes
Observations	343	343	149	149	149
R^2	0.559	0.563	0.599	0.599	0.632

Socio demographic and economic controls include age, education categories, religion categories, urban, rural or metropolitan area. Columns 1 and 2 consider the 7 countries for which EUROSTAT data is available. Columns 3–5 consider the sub-sample of countries divided between Ottoman and another Empire (in this case he Habsburg Empire) Robust standard error clustered at country level.
 [*] Significant at 10%.
 [**] Significant at 5%.
 [***] Significant at 1%.

control drops significantly. This reflects the legacy of Ottoman domination on political and legal institutions at the country level. It is consistent with the institutional legacy hypothesis by Acemoglu et al. (2001): past institutions continue to exert a real effect, and part of this effect is captured by contemporaneous institutions.

Regarding financial development, former Ottoman rule has a significant and negative effect that is robust even *within country*. By contrast, when country dummies are included, former Ottoman rule no longer has any significant effect on real outcomes, measured by income, SME development, entrepreneurship or regional GDP. In other words, when holding formal institutions constant, the negative impact of former Ottoman rule on financial development is not associated with negative real outcomes. Admittedly, the framework used in this paper does not allow the identification of a causal effect of financial development on real outcomes for two main reasons. Firstly, former Ottoman rule may not influence real outcomes exclusively through finance. Secondly, available measures of household income and regional GDP are post-tax and post-transfer measures and may thus be subject to an attenuation bias. Still, such a gap between financial and real legacies of former Ottoman rule contrasts with the existing literature, which concludes to sizeable effects of financial development on growth, even within countries (Dehejia and Lleras-Muney, 2003; GSZ, Jayaratne and Strahan, 1996). Nevertheless, the results are consistent with Acemoglu and Johnson (2005), who find that colonial rule has a sizeable effect on contractual institutions, which in turn affect the type of financial intermediation but have no impact on economic growth or investment.

The next Section explores in more detail different potential causality channels. It also presents evidence supporting further the causal effect of former Ottoman rule by investigating whether areas with large Armenian, Greek or Jewish minorities, who were allowed to lend with interest, are today more developed financially.

5. Robustness and causality channels

5.1. The contemporaneous role of Islam

One possible explanation for the persistence of Ottoman rule on formal financial development is religion. If the delimitation of the Ottoman Empire coincides with the expansion of Islam in South Eastern Europe and if Muslims rely less on formal finance for religious reasons, the effect observed above may have more to do with contemporaneous religious beliefs rather than former Ottoman institutions. An interesting dimension of the Ottoman Empire consists in its religious diversity, with many Christian and Jewish minorities. There are also some Muslims outside of the former Ottoman Empire, namely in Croatia, Slovenia, Ukraine and the Russian Federation. In order to investigate the issue econometrically, an interaction term between Muslim and former Ottoman Empire is included in specifications (1) and (2), in addition to the direct effect of being Muslim. This interaction term thus investigates whether Muslims in the former Ottoman Empire are any different from other religious denominations within the former Ottoman Empire in how much they rely on formal finance. The fact that some Muslim minorities are present outside the former Ottoman Empire rules out perfect colinearity between being Muslim and having belonged to the former Ottoman Empire. Results are displayed in column 1 and 2 of Table 9.

Neither the main effect of Islam nor the interaction term between Islam and former Ottoman rule are ever significant. In other words, not only is contemporaneous formal financial development not significantly lower in predominantly Muslim areas, but within the former Ottoman Empire, the negative effect of Ottoman Empire on formal financial development is also not more pronounced where Muslims are more numerous. This is a quite notable result, which seemingly rules out Islamic religion as the channel of long-term persistence of Ottoman rule on financial development. This result also contributes to the debate on the role of Islam on economic development: it does not seem that what constituted an obstacle to the development of formal finance is Islam, as a religion, but rather the Islamic institutions implemented by the Ottoman Empire.

Table 9

The role of religion and Armenian, Greek and Jewish minorities.

	1	2	3	4	5
	Finance index (PSU)				
Ottoman Weight	−0.009***	−0.008***	−0.008***	−0.008***	−0.008***
	[0.001]	[0.002]	[0.002]	[0.002]	[0.002]
Muslim	−0.172	0.034	0.044	0.034	0.041
	[0.238]	[0.127]	[0.129]	[0.127]	[0.129]
Ottoman Weight * muslim	0.008				
	[0.007]				
Greek or Armenian		0.323	−1.449***		
		[0.675]	[0.097]		
Greek or Armenian * Ottoman Weight			0.089***		
			[0.006]		
Greek, Armenian or Jewish				0.323	−1.745*
				[0.675]	[0.841]
Greek, Armenian or Jewish * Ottoman Weight					0.104**
					[0.039]
Socio-economic and demographic controls	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes
Observations	1000	1000	1000	1000	1000
R^2	0.771	0.771	0.772	0.771	0.772

Socio-economic and demographic controls include age, education categories, religion categories, urban, rural or metropolitan area. Robust standard error clustered at country level.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

Table 10

Individual trust in banks – cross- and within-country results.

	1	2	3	4
	Trust in banks			
Ottoman Weight	−0.017*	−0.017*	0.002	0.003
	[0.009]	[0.009]	[0.003]	[0.003]
Country fixed effect	No	No	Yes	Yes
Socio-economic and demographic controls	Yes	Yes	Yes	Yes
Additional controls: income categories	No	Yes	No	Yes
Observations	19,524	19,524	19,524	19,524
R^2	0.01	0.01	0.033	0.033

Individual level data. Socio-economic and demographic controls: age, education levels, religion, rural, urban or metropolitan area. Robust standard errors clustered at the country level.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

5.2. Attitudes and beliefs

Another possible channel of persistence is that inhabitants of the former Ottoman Empire hold different beliefs about the banking system, which may have been transmitted to them through vertical transmission of preferences (Tabellini, 2010). In order to investigate this cultural transmission channel, I test whether former inhabitants of former Ottoman provinces trust banking institutions less. Because trust is defined at the individual level, regressions are performed on the sample of indi-vidual respondents to the survey, clustered at the PSU level.[20] Results of cross-country and within country regressions are pre-sented in Table 10. When country fixed effects are controlled for, the effect of former Ottoman Empire on the level of trust in banks is not significant. When only the cross-country variation is exploited, the coefficient on Ottoman Weight is negative and marginally significant (at the 10% level) but, again, this may be due to country level effects: banks may indeed be less trustwor-thy in the former Ottoman Empire, as a whole.

5.3. Greek and Armenian minorities and financial development

According to many historians, what was lacking under Ottoman rule was not access to credit but rather the development of banking institutions and financial intermediation on a large scale. Pamuk (2000, p. 78) writes that "Dense networks of

---

[20] Results are unchanged when regressions are performed on data aggregated at the PSU level.

credit and finance [developed] in and around Ottoman urban centers" despite the formal restriction on interest lending". In particular, this was the case because the Armenians, the Jews and the Greeks emerged as the main moneylenders as they were not subject to interest-lending prohibition under Ottoman rule.

Greek minorities are still found in the region, namely in Delvine and Sarande, near the border between Albania and the Greek region of Ionnina, where the proportion of Greeks today is around 25% of the population. Using two survey questions about ethnic origin and religion, I compute the proportion of Greek, Armenian and Jewish minorities at the PSU level. I include in specifications (1) and (2), in addition to the direct effect of Greek or Armenian minorities, an interaction term between Greek and Armenian minorities and former Ottoman Empire. The regression results in columns 3 to 5 of Table 9 indicate that still today, PSUs where Greek and Armenian minorities are present have a higher level of formal finance development.

6. Conclusion

This paper uses a historical experiment: the Ottoman domination of South Eastern Europe – which generated variation in formal financial development within a given set of countries – to contribute to the literature on the importance of history for development and to the literature on finance and development. Interest-lending prohibition lasted in the Ottoman Empire much longer than in the rest of Europe. I find evidence of persistence of Ottoman rule on contemporaneous financial development. Part of the persistence of financial development is captured through country effects but even within-country, that is to say within a given institutional and legal framework, former Ottoman provinces still experience lower levels of banking penetration today. This is particularly notable, as countries in this region have experienced numerous political regime changes since the time period considered here.

Interestingly, there is no evidence that such lower financial development is associated with negative effects on the development of the real economy. Although the former Ottoman Empire, as a whole, is poorer than the former Habsburg Empire or Prussia, the effect does not hold within country. Furthermore, even across countries, there are no differences in terms of small and medium sized enterprises development or entrepreneurship. However, the analysis in this paper cannot clearly identify the causal impact of financial development on real development in the region. This is the object of future research.

The persistence of financial development in areas where Greek, Armenian and Jewish minorities were allowed to lend with interest and the absence of an effect of Islamic religion or beliefs testify of a causal long-term effect of Ottoman institutions on financial development. One hypothesized channel of transmission is that informal financial networks developed as an alternative to formal finance and persisted until today. Even though data availability does not permit directly testing for such a causality channel in this paper, historical accounts and anecdotal evidence in former Ottoman countries of the Balkans point to the importance of informal financing networks and the reliance of small businesses on informal sources of finance (Poutziouris et al., 1997; Pamuk, 2000).

The results have interesting implications concerning the economic impacts of Islamic law. I find no evidence that the persistence of lower levels of financial development in the former Ottoman region has anything to do with Islamic religion itself but rather with former formal – Islamic-institutions.

The main strength of the paper is to use a historical experiment that generated variation in formal financial development within country and circumvents the simultaneity and aggregation biases that impede many studies of the role of formal vs. informal finance in development. The main caveat is probably the use of household expenditures or regional GDP as income measures. Such measures indeed reflect post-tax and post-transfers income or consumption levels and as such may be influenced by redistribution, which could explain why no Ottoman effect is observed when the within country variation is exploited. If richer regions redistribute to poorer regions, the level of household expenditures could be sufficiently equalized so that no significant regional differences are observed. One should rather rely on pre-tax and pre-transfers income levels, but this data is not available at the sub-national level in the region studied here.

References

Acemoglu, Daron, Johnson, Simon, 2005. Unbundling institutions. Journal of Political Economy 113 (5), 949–995.
Acemoglu, Daron, Johnson, Simon, Robinson, James A., 2001. The colonial origins of comparative development: an empirical investigation. American Economic Review 91 (5), 1369–1401.
Acemoglu, Daron, Cantoni, Davide, Johnson, Simon Robinson, James A., 2009. The Consequences of Radical Reform: The French Revolution. CEPR Discussion Papers 7245.
Altonji, Joseph G., Elder, Todd E., Taber, Christopher R., 2005. Selection on observed and unobserved variables: assessing the effectiveness of catholic schools. Journal of Political Economy 113 (1), 151–184.
Beck, Thorsten, Demirguc-Kunt, Asli, Levine, Ross, 2003. Law and finance: why does legal origin matter? Journal of Comparative Economics 31 (4), 653–675.
Bekar, Clifford, Reed, Clyde, 2003. Religious prohibitions against usury. Explorations in Economic History 40 (4), 347–368.

Berkowitz, Daniel, Clay, Karen, 2005. American civil law origins: implications for state constitutions and state courts. American Law and Economics Review 7 (1), 62–84.

Berkowitz, Daniel, Clay, Karen, 2006. The effect of judicial independence on courts: evidence from the American states. The Journal of Legal Studies 35 (2), 399–400.

Bertelsmann Stiftung, 2005. Bertelsmann Transformation Index 2006: Political Management in International Comparison. <http://www.bertelsmann-transformation-index.de/fileadmin/pdf/BTI_2006_Brosch_re_GB.pdf> (accessed February 2007).

Centre for International Development and Conflict Management (CIDCM), 2006. Polity IV: Political Regimes Characteristics and Transition: 1800-2004, University of Maryland. <http://www.cidcm.umd.edu/polity/> (accessed February 2007).

Dehejia, Rajeev, Lleras-Muney, Adriana, 2003. Why does financial development matter? The United States from 1900 to 1940. NBER WP 9551.

Dimitrova-Grajzl, Valentina, 2007. The great divide revisited: ottoman and Habsburg legacies on transition. Kyklos 60 (4), 539–558.

Djankov, Simeon, La Porta, Rafael, Lopez-De-Silanes, Florencio, Shleifer, Andrei, 2003. Courts. The Quarterly Journal of Economics 118 (2), 453–517.

Euratlas, 2008. Periodical Historical Atlas of Europe. Version 1.2.

Freedom House, 2006. Nations in Transit 2006: Democratization from Central Europe to Eurasia, Rowman and Littlefield Publishers. <http://www.freedomhouse.org/template.cfm?page=42&year=2006> (accessed February 2007).

Grosjean, Pauline, Senik, Claudia, forthcoming. Democracy, Market Liberalization and Political Preferences. The Review of Economics and Statistics.

Guiso, Luigi, Sapienza, Paola, Zingales, Luigi, 2004. Does local financial development matter? The Quarterly Journal of Economics 119 (3), 929–969.

Inalcik, Halil, 1973. The Ottoman Empire: The Classic Age 1300–1600. Praeger Publishers, New York.

Jayaratne, Jith, Strahan, Philip E., 1996. The finance-growth nexus: evidence from bank branch deregulation. The Quarterly Journal of Economics 111, 639–671.

Kuran, Timur, 2005. The logic of financial westernization in the middle east. The Journal of Economic Behavior and Organization 56, 593–615.

Kuran, Timur, 2008. Institutional causes of underdevelopment in the Middle East: a historical perspective. In: Kornai, János, Matyas, Laszlo, Roland, Gérard (Eds.), Institutional Change and Economic Behavior. Palgrave-Macmillan, New York, pp. 64–76.

La Porta, Rafael, Lopez-de-Silanes, Florencio, Shleifer, Andrei, Vishny, Robert, 1998. Law and finance. Journal of Political Economy 106 (6), 1113–1155.

Palairet, Michael, 1997. The Balkan Economies c. 1800–1914: evolution without development. Cambridge University Press, Cambridge.

Pamuk, Sevket, 2000. A Monetary History of the Ottoman Empire. Cambridge University Press.

Pamuk, Sevket, 2004. The evolution of financial institutions in the Ottoman Empire, 1600–1914. Financial History Review 11 (1), 7–32.

Poutziouris, Panikhos, O'Sullivan, Kathleen, Nicolescu, Lumenita, 1997. The [Re]-generation of family-business entrepreneurship in the Balkans. Family Business Review 10 (3), 239–261.

Rodrik, Dani, Subramanian, Arvind, Trebbi, Francesco, 2004. Institutions rule: the primacy of institutions over geography and integration in economic development. Journal of Economic Growth 9 (2), 131–165.

Sachedina, Abdulaziz Abdulhussein, 2001. The Islamic Roots of Democratic Pluralism. Oxford University Press. ISBN 0195139917.

Tabellini, Guido, 2010. Culture and institutions: economic development in the regions of Europe. Journal of the European Economic Association 8 (4), 677–716.