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(Working Papers)

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FINANCIAL DEVELOPMENT AND GROWTH IN EUROPEAN REGIONS

by Paola Rossi[*] and Diego Scalise[*]

Abstract

In this paper we study the relationship between financial development and economic growth across European regions, exploiting the within-country variability of our data. First, we collect a number of indicators to capture the financial structure for each of the 110 EU27 regions. Then, the multiplicity of indicators (the number of bank branches, the presence of bank headquarters, the value added by the financial sector and the presence of a stock exchange) is decreased through a principal component analysis to show summary measures capturing the capillarity of bank branches and the agglomeration and complexity of the financial industry at large. In order to establish a causal nexus, we control for country fixed effects and we instrument financial variables. We use two instruments derived from the historical religious affiliations across European regions: the presence of Protestant communities in the 16th century (the Peace of Augsburg in 1555 allocated each region within the Holy Roman Empire to a different faith according the Prince's religion) and the presence of Jewish communities in the 18th century. Our estimates point to a positive nexus between financial development and economic growth, showing that what matters most is the presence of a complex and diversified financial sector rather than the capillarity of bank branches.

Contents

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1. Introduction[1]

In the past three decades, financial integration inside the European Union has been a main goal to be achieved in order to improve economic integration. In this paper we study financial development within European regions and empirically investigate the relationship between different types of financial development and the growth of GDP per capita across European territories.

The regional approach is preferable to cross-country studies both historically and from an empirical point of view. The European financial structure is partially an historical heritage and financial centres agglomerated in few territories, emerging more as a regional rather than a national phenomenon. Therefore, as pointed out by Hasan et al. (2009), inference drawn from cross-country studies covering very different economies most likely suffers from excessive sample heterogeneity. Moreover, financial development is a complex phenomenon; both banks' headquarters and branches, as well as other forms of financial intermediation should be considered in order to disentangle their different contributions to economic growth. Notwithstanding the regional differences in financial development and the importance of financial markets in the European integration, quantitative information on the financial structure of European regions is scant, and research at this disaggregated level is limited and mostly focused on single country studies.[2]

Our contribution to the empirical literature is twofold. First, in order to pinpoint the heterogeneity of the various aspects of the regional financial structure across Europe, we build a completely new dataset containing a number of indicators capturing different aspects of the financial development for 110 regions within the European Union as of 2007. The dataset covers the number of bank branches, the presence of bank headquarters, the value added by the financial sector and the presence of a stock exchange. By a principal component analysis, we single out the two different aspects of financial development behind these indicators: the first one is linked to the capillarity of bank branches throughout the territories; the second is connected to the agglomeration and complexity of the financial industry at large. For both our

[2] Guiso, Sapienza and Zingales (2004) and Moretti (2014) consider Italian regions, Koetter and Wedow (2010) regions within Germany, Kendall (2012) Indian districts. Few exceptions are Hasan, Koetter and Wedow (2009) and Belke, Haskamp and Setzer (2016), who take into account regional bank efficiency within Europe.

measures, we then exploit the significant heterogeneity across European regions to study the relevance of various dimensions of the financial development in fostering regional economic growth (real GDP per capita).

To tackle the well-known endogeneity issue that characterizes the relationship between finance and growth, we exploit a peculiar feature in the history of financial centres. The establishment of few European financial centres is indeed an historical inheritance (Hoggson, 1926). Among the factors that shaped over time individual and institutional attitude towards finance, religion was crucial. The prohibition of usury by the Catholic Church in medieval centuries restricted banking activity mainly to Jewish communities, whereas Catholics had to develop a series of strategies to circumvent the ban to lend at interest. The Protestant Reformation (and the Calvinist rule to a greater extent) overturned this limitation, considering the banking activity as normal part of commerce (Gilbart, 1834). According to Stulz and Williamson (2003), religion is a better predictor for cross-country differences in creditor rights than, for example, a country's openness to trade, its language, income per capita and its legal origin. Pascali (2016) provides evidence that religion, and especially the presence of Jewish communities, was a crucial determinant of banking development in Italian cities. Therefore we use religion – particularly the existence of Protestant, Calvinist or Jewish communities in a region – as an instrument to study the relationship between financial development and economic growth.[3] For Protestant and Calvinist communities we exploit an exceptional event occurred in 1555, following religion wars within the Holy Roman Empire, that is the Peace of Augsburg signed between Charles V and the league of Lutheran princes. The treaty established the principle *Cuius regio, eius religio*, according to which people living in a different region within the Holy Roman Empire had to embrace a different faith according the Prince's religion or leave. This resulted in a induced migration of people within few years and across borders, which shaped the religion architecture in the following centuries. As for the Jewish population we collect data on (mainly small) Jewish communities across Europe dated back to 1750. Jewish minorities were small and their cultural traits were more likely passed on through the financial sector, rather than to the population as a whole. We show that the presence of Protestant and Calvinist enclaves or Jewish communities were important in determining financial development and thereby recent economic growth.

We use a cross-section regression framework controlling for different factors. We use indicators of past economic development (starting level of GDP per capita), labour and capital

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[3] Previous studies that use religion as instrument for financial development include Beck and Levine (2002), Dyck and Zingales (2004), Hsu et al. (2014) and La Porta et al. (1999).

endowments, human capital (percentage of population with a tertiary degree), fertility rates, innovative inputs such as investments in R&D and the percentage of active population employed in science and technology. We also control for large metropolitan areas, as well as cultural traits such as work ethics, independence of judgment and general trust in people, which have been shown by literature to impact important aspects of the economy and that are related also to religious affiliation. In addition, employing regional data, we are able to introduce in the estimates fixed effects at country level, a simple, but powerful method to control for all other unobserved factors (such as culture, legal origins, property rights etc...), which is not available in other studies at national level. In this way, we are also able to control for different cross-country regulatory restrictions on bank and financial market activities. We then seek to explain whatever is left as the effect of finance to output, by instrumenting the financial variables with the already mentioned religion divide.

Our results show that a well-developed financial sector is crucial to the economic growth of a region. This result is driven essentially by the size and scope of financial intermediation (picked up by the share of value added of the financial sector itself on overall value added), the presence of a stock exchange and the density of bank headquarters. On the contrary, the capillarity of bank branches alone does not seem to exert a significant effect on regional growth. This positive and significant relationship between financial agglomeration and real GDP per capita is robust to different specifications and to the inclusion of a rich set of controls at regional level.

The paper is organized as follow. After a brief review of the background literature (Section 2), in Section 3 we describe our novel data and build a synthetic index of financial deepening by employing data reduction techniques such as the principal component analysis. In Section 4 we discuss the link and study the relationship between this index and regional indicators of economic performance. In Section 5 we tackle the issue of endogeneity and in Section 6 we perform different robustness checks. Section 7 concludes.

2. Background literature

The relevance of financial development in fostering economic performance is widely discussed in literature. According to Schumpeter, finance is one of the pre-requisite to spur growth within the economy: it improves innovation and allows capital reallocation towards more profitable uses (Schumpeter, 1911). Banks may sustain productive firms by reducing information asymmetries and intermediation costs. Well-developed capital markets improve long-term investments, thereby boosting productivity (Levine, 1991, Bencivenga et al., 1995; Levine, 2002; Beck and Levine, 2002).

A number of studies, however, pointed toward the view that different kinds of financial development (namely banking oriented vs. financial centres agglomeration) have potentially different effects on economic growth. Hsu et al. (2014) find that the banking sector development impacts on economic growth very differently from financial and stock markets at large. R&D of new ideas and novel products is typically a high risk-high return activity and, therefore, it is more easily financed by venture capitalists rather than banks (Holmstrom, 1989). Other papers emphasize the advantages of well agglomerated financial centres over banking intermediation (Levine, 2002, Beck e Levine, 2002).

Simultaneity between financial and economic development is a well-documented issue in literature. Kindleberger (1974) pointed out that financial intermediaries tend to agglomerate in well developed areas, to take advantage from the externalities from the presence of both productive activities and other financial intermediaries. Financial and banking activities benefit from a rich economic environment, and financial market development could stem from, rather than cause, the economic performance of an area: the well-known statement by Joan Robinson (1952) is that "where enterprise leads, finance follows". The direction of causality problem emerged as one of the main issue in this literature. However, the attempt to identify this causal link is relatively recent, essentially because of data availability and the difficulties to disentangle the different links in this virtuous circle. King and Levine (1993) document the importance of financial development as a crucial engine of economic growth using a panel of 77 countries observed between 1960 and 1989. Rousseau and Wachtel (1998) follow a long-term approach to test the causality direction between financial intermediation and economic performance in the United States, United Kingdom, Canada, Norway, and Sweden over the 1870-1929 period. They find a leading role of financial variables in determining real economy outcomes, crucial in shaping the rapid industrial transformations experienced by these five countries. Rajan and Zingales (1998) employ a panel of 42 countries and 36 industries to show that sectors more dependent from external finance tend to grow faster in economies with higher levels of financial development. Levine (1999) uses the legal and regulatory determinants of financial development to highlight the financial channel in economic growth. Beck and Levine (2002), La Porta et al. (1999), and Hsu et al. (2014) use the religious composition of European regions as an instrument for financial development to cope with endogeneity between financial and economic development. According to Stulz and Williamson (2003), a country's religion predicts the cross-sectional variation in creditor rights better than other variables, such as a country's position in international trade, its language, income per capita, or the origin of its legal system; furthermore, they show that in Catholic

countries creditor rights are less protected than in Protestant ones, regardless of their legal origin. This gives a further rationale to the fact that religion is frequently used as an instrument, since it appears as a candidate factor to capture differences in cultural origins and moral standards, which are particularly important for the development of the financial sector (Stulz and Williamson, 2003; Dyck and Zingales, 2004). This evidence adds to the traditional view put forward by the seminal work by Max Weber (Weber, 1930), who emphasized the role of changes in culture driven by religion reformation, especially Calvinism, on capitalism and its institutions.

Within-country regional studies are rare and often limited to a single country (consequently their findings are hardly generalizable). Yet, the regional approach appears to be preferable from an historical point of view. National states were born relatively lately in Europe, which for a long time was essentially a conglomerate of partially autonomous regions and cities. This feature is especially true for countries such as Italy and Germany, whose actual formation dates back only to the XIX century. Yet, it is partially true also for countries such as Spain and France, in which trades and financial centres were concentrated in very few rich areas (Catalogna, Paris, Lyon, etc.). Tabellini (2010) finds significant variety across European regions in individual values and beliefs, which in turn are influenced by political and social history and have a causal effect on current regional economic development. Notwithstanding this feature, very few information are available at regional level even nowadays and only a handful of studies takes into account the regional dimension. Affinito and Piazza (2008) evaluate the role of different barriers across Europe – such as linguistic and cultural differences, different legal and supervisory frameworks, and relationship lending – by examining banking systems in 147 European regions. Guiso, Sapienza and Zingales (2004) analyze the importance of financial development for the economic performance of Italian regions using instrumental variables techniques, in which the characteristics of the Italian financial system in 1936 are used as an instrument of the banking structure in the following decades. Similarly, Lucchetti, Papi and Zazzaro (2001) find that Italian regions with more efficient banks grow faster than other regions. Also, Moretti (2014) focuses on Italian provinces to investigate the effects of local financial development on firms productivity, finding that real effects of financial development are conditional on the quality of the socio-institutional environment. Kendall (2012) investigates the connection between banking sector development, human capital, and the economic growth in Indian districts, showing a non-linear relationship between the local banking sector development and economic growth, with human capital as a crucial variable in reducing financial constraints. To our knowledge, Hasan,

Koetter and Wedow (2009) are the first to analyze the relation between growth across European regions and banks' abilities to provide efficiently financial services and products in these areas, criticizing the usual cross-country approach to study the finance-growth link. In this line of reasoning, more recently, Belke, Haskamp and Setzer (2016) study European regions, finding that economic growth is faster in those areas where (local) banks have a higher intermediation quality, measured either as profit or cost efficiency.

3. Agglomeration vs. capillarity in financial services: stylized facts in European regions

3.1 Data

Our novel dataset covers different dimensions of financial development and corresponding statistics for 110 European regions (NUTS) in the EU27. The reference year is 2007. We consider asymmetric NUTS levels (NUTS1 or NUTS2) in order to take into account areas with a similar population, between 4 and 5 millions.

First, we use data on the number of bank branches from various sources. The number of bank branches in a region is commonly interpreted as a measure of the capillarity of banking services (IMF, 2005). The data come mainly from Structural Business Statistics (Eurostat). For countries for which data are either missing or without the desired territorial breakdown, we used other databases (European Banking Statistics, Bank of Italy Statistics, National Central Bank of Greece). We normalize the number of branches by the number of inhabitants. This approach is recommended by international institutions (IMF, 2005) to capture the banking system's capacity to meet the banking service demand from the population. A possible limitation of this type of normalization is the underestimation of the capillarity of the offer of the banking system in densely populated areas[4].

Subsequently, we consider information on the number of bank headquarters (normalized by area[5]) using the European Central Bank Statistics. The number of bank headquarters in an area shows the existence of a complex financial system, which agglomerates in an area driven mainly by the spill-over effects among financial intermediaries (Affinito and Piazza, 2008 and IMF, 2005). The location of the banks operating in the European Union is available on the ECB's website.

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[4] We checked the robustness of our results by employing other normalization approaches, for example normalizing the number of bank branches by region area.

[5] We follow IMF (2005) that recommends normalizing bank headquarters by area size, in order to stress the potential for spill-over effects among intermediaries located in the same area, rather than the ability of intermediaries to meet the capillary demand of retail services. Again, we checked the robustness of our results by normalizing the number of bank headquarters by regional population, and the results are confirmed.

Thirdly, we include the share of value added generated by the financial sector and the number of stock exchanges in every region. The former (sector K, Eurostat) stands as an additional indicator of size and scope of financial intermediation relative to the size of the regional economy. The presence of a stock exchange (rarely more than one) has historically indicated the development of a financial sector at large: the presence of a security market makes it easier for companies to go public and to raise funds; on the other hand, it exercises a power of attraction on bank headquarters (Hsu et al. 2014).

3.2 Stylized facts and principal component analysis

Table 1 reports the main descriptive statistics for the measures of financial development considered and Table 2 shows the correlation coefficients among the financial development variables.

Correlations show that headquarters tend to concentrate into the main financial centres, where there is a stock exchange and the sector value-added is higher. On the contrary, bank branches capillarity does not appear to be correlated to these dimensions. Correlation analysis points toward the existence of two different dimensions of financial development: one is essentially linked to the bank branches capillarity, while the other is related to the concept of the agglomeration and complexity of financial intermediaries.

Principal component analysis[6] (PCA) appears an appropriate tool to formally check whether these dimensions are able to explain most of the variance underlying financial development and to construct synthetic indicators for them. Table 3 reports the results of the PCA performed on our set of indicators.

Two components emerge from the analysis, both according to Kaiser and the variance criteria[7], which explain more than 72 percent of total variance. Looking at factor loadings, it can be noted that the first component is linked to the share of financial sector on the overall regional value added, to the presence of a stock exchange and of banks' headquarters: this component can hence be interpreted as an indicator of *financial agglomeration*. The second factor is correlated almost one to one to the number of bank branches per capita and hence can be read as a proxy for *banking services capillarity* in each region. Figure 1 represents the distribution of the two components across Europe.

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[6] For a discussion of the advantages of PCA over other methods of multivariate statistical analysis see Righi and Scalise (2019).

[7] The Kaiser rule suggests dropping all components with eigenvalues under 1.0 (this being the eigenvalue equal to the information accounted for by an average single item); according to the variance criterion one should retain enough components to explain some cumulative total percent of variance, usually 70% to 80%.

There is a great deal of both cross-country and within-country heterogeneity for both dimensions. Financial agglomeration is highly heterogeneous within country, being driven by the concentration of the financial centre in one region. Capillarity of banking services appears less spatially concentrated, with some countries, such as Spain, France and (partially) Italy and Germany, with the highest number of branches per inhabitant.

Figure 1: Financial agglomeration and capillarity of banking services in European regions
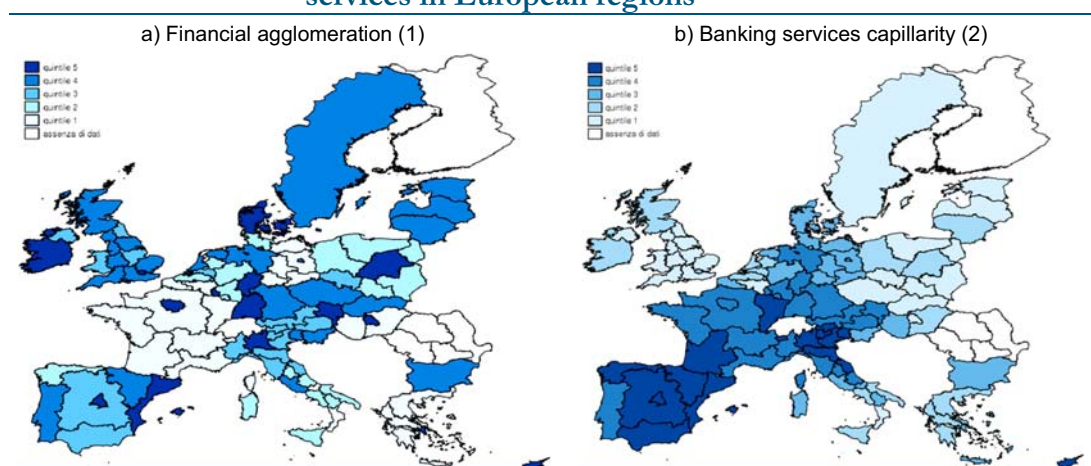
Source: Eurostat and national statistics
(1) First principal component defined in Table 3. - (2) Second principal component defined in Table 3.

Table 4 documents some interesting bivariate correlations at regional level between the two indicators of financial development presented and some economic outcomes (level of real GDP per capita, firms' expenditure in R&D and the share of active population with a tertiary degree in 2007). It shows that financial agglomeration is associated with higher levels of GDP per capita, of investments in R&D and of human capital; the diffusion of banking services appears to be far less important and is only weakly (never significantly), if not at all, correlated to indicators of economic development.

These pieces of evidence suggest that financial agglomeration is significantly and positively associated with many potential engines and critical inputs to economic growth (see Hsu et al., 2014), while bank branches density seems less relevant. These correlations, however, are to be interpreted as evidence of co-movement because of the problems of reverse causality and omitted variables that affect this type of analysis (Rajan and Zingales, 1998). In the next Section we address the issue of the relationship between regional financial structure and economic growth by employing a cross-section econometric framework,

controlling for a wide set of regional characteristics and country fixed effects and an instrumental variables strategy.

4. Agglomeration vs. capillarity in financial services and economic growth: empirical evidence

4.1 Empirical framework and baseline estimates

Our empirical approach is based on a cross-section regression framework, where the growth rate and the explanatory variables are observed once per region. As pointed out by Barro (1997), the loss of information related to the time dimension (within region) is not material[8], since in this type of set-up the main evidence turns out to come from the cross-sectional (between regions) variation. Our basic specification is the following:

$$\Delta y_i = \beta_0 y_{i,t-N} + \beta_1 Fin_i + \beta_2 Bank_i + \sum_{j=1}^{J} \beta_j X_{ij} + \delta_c + \varepsilon_i \qquad (1)$$

where the dependent variable is the rate of growth of real GDP per capita from 2000 to 2009. The window 2000-2009 is the one maximizing the number of observations. [9] The first regressor is the logarithm of the initial level of real GDP per capita: the neoclassical model of growth (see Barro and Sala-i-Martin, 2003) predicts a negative coefficient according to the hypothesis of conditional convergence.

Fin_i and $Bank_i$ are our main variables of interest, namely, the degree of financial agglomeration (the first component defined in Table 3) and the capillarity of banking services supply (the second component defined in Table 3). One advantage of these indicators is that they are orthogonal by construction and hence they can be used simultaneously in a regression framework to study the different effects on economic growth of banking capillarity versus financial agglomeration[10].

We then insert into the specification a large set of regional covariates, including all the main variables suggested by previous literature (Barro and Sala-i-Martin, 2003) as possible determinants of GDP per capita growth: labour and capital endowments, innovative inputs (R&D expenditure over GDP and the percentage of active population employed in science and technology), the presence of metropolitan areas, social capital (proxied by the question in the European Social Survey on general trust), cultural differences (on the value of hard work

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[8] The time information is greater for variables that have a good deal of variation within region over time, such as terms of trade and inflation (Barro, 1997).

[9] The period considered has been described as the one in which financial innovation played a major role in spurring economic growth. However, we checked the robustness of our results to different time-windows, and they are confirmed (see Section 6).

[10] We checked the robustness of our results to the construction of the main covariates by using, instead, raw financial development variables (again, see Section 6). All our results hold robust.

and independence in children education[11]), fertility rates, human capital (% of active population with tertiary degree). All our controls are lagged as close as possible[12] to 2000 to limit additional simultaneity issues (see the next section). Definition and descriptive statistics for the variables used are reported in Table 5 and 6 in the Statistical Appendix; Table 7 reports the correlation matrix among variables. The model includes country fixed effects to take into account all unobserved country invariant characteristics that can influence economic growth (like, for example, legal origin and rule of law index). We consider only those countries for which we have more than one region.

The different controls are added progressively one by one as reported in Table 5, starting from a minimal set of controls, which include the initial level of real GDP per capita, the indices for trust from the European Social Survey and the dummy for metropolitan areas. This initial estimate is performed both with and without fixed effects for the country, considering 97 regions.

The first specification we present (Table 8, first column) includes only the starting level of GDP (in logarithm) per capita, trust and the metropolitan area dummy. In the second column we add country fixed effects. The coefficient on the index of financial agglomeration is positive and significant at 1 percent level; the variable measuring the capillarity of banking services does not seem to exert any significant impact on regional growth. The negative and statically significant sign on initial GDP confirms the conditional convergence hypothesis (Barro, 1997; Barro and Sala-i-Martin, 2003), whereas trust and large metropolitan areas have a positive effect on economic growth.

Then, we check whether this correlation is robust to the inclusion of several regional variables, which (current theories suggest) may explain both economic growth and financial development. Economic growth may be spurred by a wide range of factors other than financial development. The results on the coefficients of our controls go in the expected direction, but are mainly not significant. The coefficient on the fertility rate is negative and significant at the 10 percent significant level in the last specifications, confirming the results of previous literature (Becker and Barro, 1988). However, financial agglomeration maintains always a high level of significance across all specifications and sample size. In addition, the coefficient is fairly stable across all specifications; on the contrary, the banking capillarity

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[11] Kaasa, Vadi and Varblane (2014) study within-country differences in indicators of cultural dimensions using the European Value Survey. Their results reveal a wide diversity of regional cultural variability among European countries. We use the same data, focusing on these two indicators, which proved slightly significant.

[12] Data availability was a binding constraint. Going back in time reduced sample size significantly. We checked extensively the robustness of our results to different sample dimensions trying different timing for the controls.

variable has a positive coefficient, but is not statistically significant apart for the specification in which no fixed effects are considered.

5. Endogeneity

5.1   Instruments

An important source of bias derives from the fact that economic growth itself may have an effect on financial development. Our main strategy to deal with this issue is based on an instrumental variable approach.

While an ideal source of exogenous variation of financial development is difficult to find, religious composition in European regions appears a promising candidate as an instrument. The view that religion is an important determinant of economic institutions has a long tradition. As Tawney (1926) shows, the prohibition of usury was a fundamental tenet of the medieval church since the third Lateran Council in 1179 and the second Council of Lyon in 1274. Receiving interest on loans was interpreted as usury and led to excommunication. The Catholic doctrine prohibited explicitly Catholics from lending for a profit, while still allowing the Jews to do so. On the contrary, the Protestant and even more the Calvinist reformation viewed the payment of interest as a normal part of commerce, thereby making it possible for modern competitive debt markets to develop.

In the aftermath of the Reformation, creditor rights started to differ sharply across Protestant and Catholic countries. Stultz and Williamson (2003) document that creditor rights are stronger in countries where the main religion is Protestant regardless of legal origin. Additionally, Protestant countries tend to have better enforcement of rights than Catholic ones. Religion seems to explain a greater deal of cross-sectional variations in creditor rights than "hard" variables like trade openness (à la Rajan and Zingales, 1998). As a consequence Protestantism has been widely used as an instrument for financial development in many econometric studies (Beck and Levine, 2002; McCaig and Stengos, 2005).

To build our first instrument, we exploit the Peace of Augsburg signed in 1555: according to the famous motto *cuius regio eius religio*, the princes had the right to introduce the Lutheran faith and the population had to adopt it or migrate. Therefore we construct a discrete variable taking value of 1 if Protestants groups (or Anglicans groups in Great Britain) were located within the region and 2 if there was also a Calvinist community; 0 otherwise[13]. As it can be seen in Figure 2 the variable has a good deal of variation within each country. Our

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[13] We repeated the analysis using just a dummy taking the value of 1 for any non-catholic community, 0 otherwise and all results hold robust (see Section 6).

identification assumption relies on this historical episode, since regions were assigned to different confessions exogenously with respect to their economic characteristics. The division among confessions was the result of the religion turbulence after the Reformation. We considered also other areas where Protestants (and Anglicans) were present. These were small minorities (e.g., Italy) or did not last long (most regions of France; see Figure 2), but correlation with current protestant presence is high.[14]

Figure 2: Peace of Augsburg
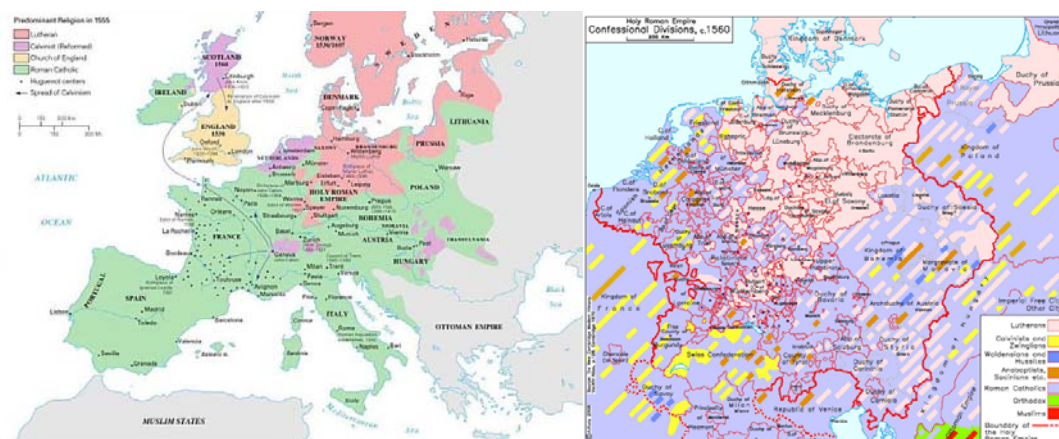
Source: John P. McKay et al. (2010).

Furthermore, the instrument needs to have influence on the degree of financial development, but no direct impact on economic growth. Therefore our exclusion restriction hypothesis relies on the fact that religion does not affect regional economic growth through channels other than financial development and those we control for through all the covariates. In this aspect, as pointed out by Acemoglu and Robinson (2013), differences in economic development across areas may be affected by beliefs, values and ethics, which - in turn - could have well been influenced by religion itself (Weber, 1930). We deal with this issue inserting a large number of controls in our IV specifications. In addition we insert a set of country fixed effects which clean up all country fixed cultural factors.

Protestantism could still have affected regional growth potential through channels other than financial development and not accounted for by controls inserted and country fixed effects. To improve our identification strategy and following Pascali (2016), we consider a second instrumental variable: the geographical distribution of Jewish population across Europe (Figure 3) in 1750. Jewish demography exerted a large influence on the development of financial centres and cities that hosted a Jewish community developed complex financial

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[14] As a robustness, we restrict the analysis to a subsample of countries in Central Europe and the results hold true; see Section 6.

markets (Pascali, 2016). This happened essentially because, first, Jewish communities specialized in the money-lending business and, second, because Catholic communities reacted to religion constraints creating merchants banks or charitable banks to circumvent usury laws.[15] Exogeneity restrictions seem to hold plausibly. The jewish population tended to be a very small minority in European regions, usually segregated from the rest of the population and frequently living on revenues from money-lending activities. Hence it is not likely to have influenced economic growth through channels other than those captured by our covariates. Second, Jews spread throughout European regions as a result of mass deportations under the Roman rule and multiple expulsions in the 16th century. Afterwards, as documented by Pascali (2016), the Jewish population has been quite stable across Europe, especially before 1800s. After Napoleon enacted laws that lifted restrictions on Jews residence and property rights, both in France and in countries conquered during the Napoleonic Wars, a slow movement of Jewish people towards main European cities begun (Leitenberg, 2008).[16] Using data dating back to 1750 (Figure 3), before this urban migration of Jewish population, improves the plausibility of the exogeneity hypothesis of this variable with respect to economic development. Since information are drawn from a detailed map (Figure 3; Crystall Bow and Leitenberg, 2014), we define a discrete variable taking value of 1 if there was a Jewish community in a specific region, 0 otherwise. This instrument is not correlated with the previous one (the correlation with the Protestant dummy is 0.098, see Table 7).

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[15] Typically, the "Monti di Pietà" were created in those cities were the Jewish minority was most influential. For example, Pascali (2016) reports the case of the cities of Ivrea and Chivasso: with similar demographic history, the same rulers, legislation and courts (both belong to the province of Turin), Ivrea hosted a Jewish community in 1500, while Chivasso did not. In 1591, a Monte di Pietà was created in Ivrea. Nowadays, Invrea has still a much more developed financial system than Chivasso (the credit to GDP ratio is 98% versus 42%), whereas the Jewish community disappeared one century ago.

[16] At the beginning of the nineteenth century, these minorities were still dispersed in small and medium-sized urban or semi-rural localities, with a strong presence in the Eastern regions of the continent, and they moved towards large cities only in the second half of the century (Leitenberg, 2008). For example in Lombardy, after the expulsion of Jews under the Spanish rule, Milan did not host a Jewish community up until the Napoleon conquest, when the ban was lifted. The first synagogue was built around 1860 (Hamaui, 2016). Before that, the main Jewish community in the region was in Mantua.

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Figure 3: Jewish population in Europe in 1750
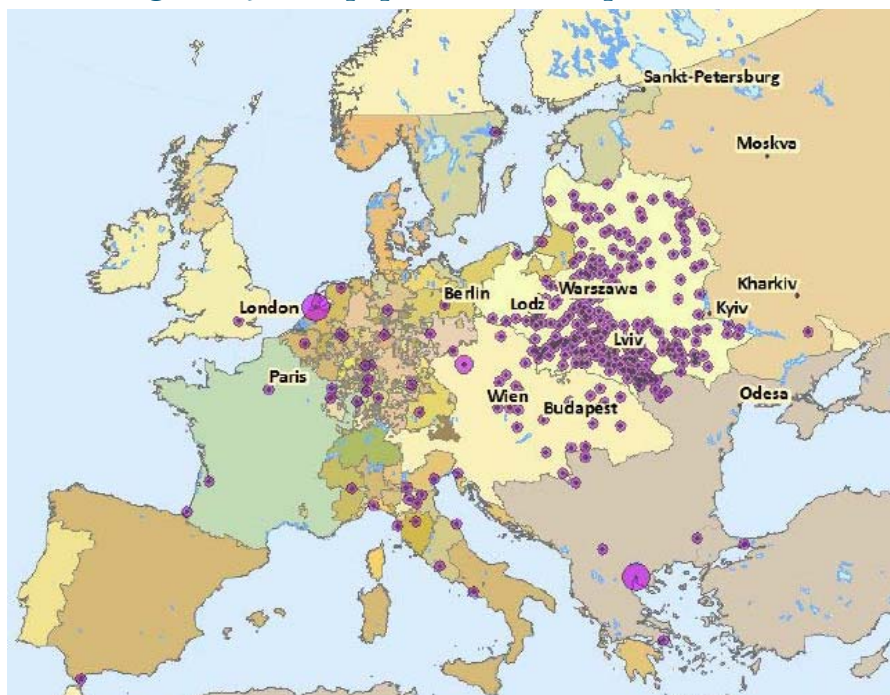
Source: Digital maps of Jewish Populations in Europe (1750- 1950), International Institute for Jewish Genealogy and Paul Jacobi Centre (Crystall Bow and Leitenberg, 2014). Data are available at http://iijg.org/wp-content/uploads/2016/01/maps/Map-1750/WEB-1750/INDEX.HTML

5.2   Results and robustness

We report IV estimates in Table 9, where the degree of financial agglomeration and banking capillarity are instrumented by the Protestant affiliation after the Peace of Augsburg and by the share of Jewish population in 1750. For the first stage we report only the two instruments. However, the various specifications include all the other controls, as well as country fixed effects.

We start by instrumenting both our endogenous variables (column [1]). As in the previous section, bank capillarity was still not significant.

Therefore, we focus on the financial agglomeration variable, instrumented by both the instruments (column [2]). We consider this our preferred specification. The use of two instruments for one variable allows us to formally test their exogeneity. We need also to show statistically that the exclusion restrictions implied by instrumental variable regressions hold. This is to say that – conditional on the controls included in the regression – religion had no effect on the GDP per capita growth in 2000s, other than through its effect on the development of financial centres. The hypothesis of a residual correlation is rejected in our data by the usual diagnostic tests. In the Hansen–Sargan test of over-identifying restrictions, the joint null hypothesis is that the instruments are valid instruments (i.e. uncorrelated with

the error term) and that the excluded instruments are correctly dropped from the estimated equation in the second stage. The Hansen-Sargan statistic accepts with ease the hypothesis that our instruments are valid, thus empowering our economic *a priori*. The estimates of the first stage confirm that the regions that have inherited a Protestant religious orientation are characterized by more developed financial markets. The presence of a Jewish community has a positive impact on financial agglomeration, even though the variable is slightly weaker in the first step. The statistics confirm the relevance of the first stage regression. In addition to the Hansen–Sargan test already discussed, we also report the Kleibergen–Paap (2006) test for under-identification, which controls whether the first stage equation is identified or not, i.e. that the instruments are significantly correlated with the endogenous regressors. We control also for weak identification by using the Cragg–Donald Wald statistic, where a rejection of the null hypothesis suggests a proper instrument. The two latest tests confirm that the model in the first stage is identified and the instruments are appropriate.

As for robustness, we use just one instrument. First we consider Jewish communities (column [3]). Since Jewish lived in very small communities, this approach strongly reinforces our identification strategy. This instrument is significant in the first stage and our previous results in the second stage are essentially confirmed.

Second, we use the presence of Protestant or Calvinist communities [column 4]) and again our previous results are confirmed.

The results of the second stage across various specifications (all include country fixed effects) confirm a strong and positive effect of financial agglomeration on the GDP per capita growth, which is remarkably stable. The magnitude of the estimated effect is significantly larger than in the baseline OLS, pointing to the fact that the IV specifications can better isolate the whole impact of the variable.

In these specifications, bank capillarity acquires some positive significance. Therefore, we focus on bank capillarity in order to reach a better understanding of its role in explaining economic growth. We instrument this variable using either both our instruments (Table 10, column [1]) or only Jewish communities (column [2]), which appears to be more correlated to the variable. Again the results reject the linkage between this variable and economic growth.

6. Further robustness checks

In order to verify the robustness of our results, we perform a number of checks.

First, we investigate a different time span in order to avoid the possible distortive effect of the International financial crisis. To this aim, we consider as dependent variable the growth of per capita GDP between 2000 and 2005 (and again between 2000 and 2007), using the specification reported in Table 6 (column [2]) as the preferred one. The results already discussed in the previous section hold true (Table 11, column [1]). However, since this was a period of innovation and increase in productivity in the financial industry, we extend our analysis to the previous period, considering the 1995-2005 time interval (column [2]) or the whole period between 1995 and 2009 (column [3]), even though in these windows the sample-size is considerably reduced due to data limitations. Again, the results are robust to these different specifications.

The second area in which we conducted a robustness exercise is related to the definition of our instruments. The assignment to religious confessions after the Peace of Augsburg in 1555 primarily regarded the Holy Roman Empire. Therefore we restrict the analysis to Central Europe considering only Germany, The Netherlands, Belgium and Poland (column [4]). Again our results are confirmed. We considered also our instrumental variable related to Protestant affiliation as a simple dummy taking the value of 1 for any non-catholic community, 0 otherwise: again all results hold robust (column [5]).

The final area in which we conducted a robustness exercise is the definition of our main regressors of interest, namely the measures of banking capillarity and financial agglomeration. In Table 12 we present cross section estimates using our raw variables of financial structure employed in the principal component analysis (elementary variables of financial development have been inserted one by one, given the high correlation among them).

This exercise allows us also to answer another empirical question, namely which are the most relevant aspects of financial agglomeration for economic growth. First and foremost, our main results hold robust: banking capillarity has no significant effect on growth. The density of financial intermediaries is not significant, but a high share of value added from financial activities and the presence of a stock exchange are robust determinants of per capita GDP growth. These variables appear to be the main engines that lead economic growth from financial intermediation. The merely presence of financial intermediaries, as captured by the number of bank branches, is not sufficient to boost economic development.

According to our estimates, in the period from 2000 to 2009, GDP per capita has grown around 0.5 percentage points per year in real terms more in regions with a stock exchange than in regions without it; similarly the increase in GDP growth is around 0.4 percentage points per year moving from regions with a low value added from the financial sector (25th percentile) to regions with a high value added from the sector (75th percentile).

7. Conclusions

In this paper we analyse the relationship between different dimensions of financial development and economic growth. Our paper contains some important novelties compared to previous studies on the topic. First, we use a unique dataset on the financial structure of European regions. The use of subnational data sheds light on the role of financial factors in determining within-country convergence, since it allows controlling for unobserved country factors. Second, we apply an instrumental variable technique to capture the causal link between financial development and growth, exploiting both information on the religious composition of European regions after the Peace of Augsburg.

Our results, robust to a number of robustness checks, indicate, first, that financial agglomeration and the development of complex and diversified financial centres are strong engines of economic growth. They are consistent with the vast literature emphasizing the advantages of well agglomerated financial centres (Holstrom, 1989; Levine, 2002, Beck and Levine, 2002): diversified financial markets promote innovation, playing a critical role in reducing financing costs, allocating scarce resources, evaluating innovative projects, managing risk, monitoring managers, facilitating the feedback effects of market security prices, in addition to generating positive demand and human capital spill-overs. On the contrary, the capillarity of bank branches alone does not seem to exert a significant effect on regional growth[17].

Our findings are relevant also from a policy perspective and support the view that the presence of an efficient and diversified financial sector, rather than one with capillary diffusion on the territory, is what matters the most for economic growth.[18] As pointed out by Visco (2015) "technological developments call for changes to banks' branch networks, which are still too numerous" to cut cost and improve efficiency. According to our results, a reduction of bank branches would not necessarily have a detrimental effect on economic growth, and banks could exploit new technologies and digital channels to cut costs and gain profitability.

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[17] This does not imply that the location of bank branches is irrelevant. For example proximity to bank branches could make credit access easier for small firms.
[18] See Rossi S., 2015 and Langfield and Pagano, 2015

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Tables

Table 1 - Descriptive statistics for financial development indicators

	Mean	Std. Dev.	Min	Max	Median	# Obs
Headquarters/100 km^2	1.4	5.7	0	54	0.1	110
Share of financial sector on overall value added (%)	4.8	0.03	1.3	21.2	4.2	108
Stock exchange	0.3	0.5	0	1	-	110
# branches / 10,000 inhabitants	4.8	2.6	0.5	12	4.2	106

Table 2 – Correlations between financial development indicators

1	Headquarters/100 km^2	Share of financial sector on overall value added	Stock exchange	# branches /10,000 inhabitants
Headquarters/100 km2	1			
Share of financial sector on overall value added	0.63***	1		
Stock exchange	0.28***	0.40***	1	
# branches /10,000 inhabitants	-0.04	0.00	-0.02	1

***, **, * points to the 99, 95 and 90 percent significance level, respectively

Table 3 - Principal components

	First component	Second component	Third component
# branches /10,000 inhabitants	-0.02	0.99	-0.07
Headquarters/100 km2	0.60	-0.05	-0.48
Share of financial sector on overall value added	0.64	0.03	-0.20
Stock exchange	0.49	0.07	0.85
Cumulative variance (%)	47.9	72.3	91.3
Eigenvalue	1.9	1.0	0.7

Table 4 - Correlation between financial development and economic performance

	Real GDP per capita	R&D by enterprises (€/inhabitant)	Active pop. tertiary degree
Financial agglomeration (2)	0.66***	0.34***	0.45***
Capillarity of bank branches (2)	0.19	-0.05	0.08

***, **, * points to the 99, 95 and 90 percent significance level, respectively. (1) First and second principal component, as reported in table 3.

Table 5- Variables used in the regressions

	Definition
GDP growth (Dependent variable)	Rate of growth of real GDP per capita between 2000 and 2009, by region; Eurostat.
Bank headquarters	European Central Bank Statistics.
Value added of the financial sector	Value added produced by the financial sector (sector K), Eurostat.
List of Stock exchanges	World-stock-exchanges.net/Europe and Wikipedia List of European stock exchanges.
# branches	Structural Business Statistics; European Banking Statistics; Bank of Italy Statistics, National Central Bank of Greece.
Financial agglomeration	First principal component as defined in Table 3.
Bank capillarity	Second principal component as defined in Table 3.
Employment	Number of employees; 2001; Eurostat.
Capital	Capital per employee; 2002; Eurostat.
Fertility rate	Fertility rate; 2003; Eurostat.
Educated	% of active population with a tertiary degree; 2000; Eurostat.
R&D/GDP	R&D expenditure over GDP; 2000; Eurostat.
Metro	Metropolitan areas are defined, according to OECD definition, as cities with a population of more than 2,5 million people; OECD.
Science-tech	% of active population employed in science and technology; 2000; Eurostat.
lgdppc2000	Natural logarithm of real GDP per capita in purchasing parity terms; 2000; Eurostat.
Trust	"generally speaking, would you say that most people can be trusted,? 0 means not too careful, 2 means that most people can be trusted"; 2002; European Social Survey.
Independence	Weighted frequency of persons stating independence is important in response to the question: "Here is a list of qualities which children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five.". European Value survey, 1999-2000.
Hard work	Weighted frequency of persons stating hard work is important in response to the question: "Here is a list of qualities which children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five." European Value survey, 1999-2000.
Protestant	Discrete variable taking value of 1 if, immediately after the Diet of Augsburg (1555), protestants groups were located within the region and 2 if there were Calvinist communities; 0 otherwise. (John P. McKay et al., 2010).
Jewish	Discrete variable taking value of 1 if there was a Jewish community in a certain region in 1750, 0 otherwise. Source: International Institute for Jewish Genealogy and Paul Jacobi Centre. Data are available at http://iijg.org/wp-content/uploads/2016/01/maps/Map-1750/WEB-1750/INDEX.HTML (Crystall Bow and Leitenberg, 2014).

Table 6- Descriptive statistics

Variable	Obs.	Mean	p50	p25	p75	Min.	Max.
GDP growth	97	0.2061633	0.1741362	0.1255779	0.2481794	0.0180187	0.6100807
Financial agglomeration	97	0.0192429	-0.4300757	-0.7594478	0.3684211	-1.079926	8.403778
Bank capillarity	97	-0.0221623	-0.3236192	-0.7773418	0.5868468	-1.679718	2.874475
GDP pro capite (in 2000, logs)	97	9.833192	9.867861	9.62245	10.12663	8.794825	10.79343
Metropolitan areas (1/0)	97	0.0824742	0	0	0	0	1
Trust	97	0.3611268	0.34	0.25	0.42	0.01	1
Fertility rate	95	1.441579	1.36	1.22	1.7	1	2.01
Educated on active population	97	20.16186	20.6	13.7	24.4	7.5	42.5
Employed (in 2002)	97	1990.223	1619.3	960.5	2661.8	59.2	8448.9
R&D on GDP (in 2000)	97	0.7840206	0.52	0.22	1.08	0.01	3.27
Science & Tech on active population	97	24.38969	23.4	20.9	29.3	11.2	38.6
Capital	80	9.483008	9.438098	8.010649	10.83087	1.597003	35.31166
Independence	94	0.4903358	0.4759599	0.3266667	0.6573077	0.1	0.9653418
Hardwork	94	0.398489	0.3600922	0.2266667	0.5196054	.0206693	0.9363509
Protestant or Calvinist communities	94	0.6489362	1	0	1	0	2
Jewish communities	94	0.4468085	0	0	1	0	1

Table 7- Correlations

	GDP growth	Financial agglom.	Bank capillarity	GDP pc (in 2000, logs)	Metrop. areas	Trust	Fertility rate	Educated on active population
GDP growth	1							
Financial agglomeration	0.0686	1						
Bank capillarity	-0.1284	0	1					
GDP pro capite (in 2000, logs)	-0.7187*	0.4022*	0.2536*	1				
Metropolitan areas (1/0)	0.137	0.2894*	-0.0257	0.0997	1			
Trust	-0.1383	0.0215	-0.0863	0.4150*	-0.074	1		
Fertility rate	-0.2670*	0.1835	-0.1958	0.2817*	-0.074	0.076	1	
Educated on active population	0.0592	0.3753*	0.004	0.2636*	0.2159	0.2093	0.3408*	1
Employed (in 2002)	-0.0085	0.0985	0.0438	0.1141	0.2135	0.0761	0.147	0.2294
R&D on GDP (in 2000)	-0.2858*	0.1185	-0.1189	0.4617*	0.025	0.4110*	0.3312*	0.3636*
Science & Tech on active population	-0.3125*	0.2988*	-0.0483	0.5971*	0.1482	0.5067*	0.118	0.3790*
Capital	-0.1542	0.1406	0.2066	0.3912*	-0.032	0.2476	0.1491	0.3065*
Independence	-0.0252	0.0951	-0.1736	0.2176	-0.058	0.3170*	-0.107	0.2517
Hardwork	0.5622*	0.1032	-0.2732*	-0.5823*	0.0878	-0.2924*	-0.061	-0.227
Protestant or Calvinist communities	0.2403	0.5296*	-0.1995	0.1298	0.0389	0.1416	0.1243	0.3754*
Jewish communities	0.2068	0.1697	-0.1023	-0.0718	0.1954	-0.072	-0.154	-0.064

	Employed (in 2002)	R&D on GDP (in 2000)	Science & Tech on active pop.	Capital	Independence	Hardwork	Protestant or Calvinist comm.	Jewish comm.
Employed (in 2002)	1							
R&D on GDP (in 2000)	0.4684*	1						
Science & Tech on active population	0.2036	0.5254*	1					
Capital	-0.0152	0.1589	0.2762	1				
Independence	0.0069	0.3023*	0.4305*	0.0723	1			
Hardwork	-0.0004	-0.3265*	-0.3354*	-0.3177*	-0.3782*	1		
Protestant or Calvinist communities	0.1456	0.2505	0.2821*	0.1885	0.2961*	0.0459	1	
Jewish communities	0.2696*	0.0132	0.2154	-0.1462	0.0641	0.2729*	0.0982	1

Table 8 - Cross section estimates adding controls.
Dependent variable: ΔGDP_i

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Financial_agglom.	0.0468***	0.0170**	0.0170***	0.0172***	0.0167***	0.0211***	0.0243***	0.0240**	0.0238**
	[0.0105]	[0.0071]	[0.0058]	[0.0055]	[0.0057]	[0.0064]	[0.0077]	[0.0088]	[0.0086]
Bank capillarity	0.0260***	0.0231	0.0185	0.0188	0.0185	0.017	0.0218	0.0186	0.0196
	[0.0069]	[0.0160]	[0.0162]	[0.0168]	[0.0168]	[0.0169]	[0.0203]	[0.0212]	[0.0236]
GDP_Pc (2000 in logs)	-0.3735***	-0.2113***	-0.2026***	-0.2055***	-0.2027***	-0.2551***	-0.2899***	-0.3088***	-0.3124***
	[0.0306]	[0.0731]	[0.0637]	[0.0698]	[0.0690]	[0.0536]	[0.0763]	[0.0876]	[0.0951]
Trust	0.2763***	0.1630*	0.1471*	0.1503*	0.1507*	0.1526*	0.1669	0.1669	0.1686
	[0.0651]	[0.0822]	[0.0825]	[0.0830]	[0.0838]	[0.0801]	[0.1000]	[0.1128]	[0.1173]
Metropolitan areas (1/0)	0.0706	0.1031**	0.0819*	0.0814*	0.0813*	0.0729	0.0574	0.0405	0.0406
	[0.0437]	[0.0481]	[0.0459]	[0.0460]	[0.0465]	[0.0441]	[0.0481]	[0.0409]	[0.0414]
Fertility rate			-0.1227	-0.1242	-0.1244	-0.1342	-0.1694*	-0.1843*	-0.1802*
			[0.0849]	[0.0870]	[0.0870]	[0.0856]	[0.0897]	[0.0915]	[0.0988]
Educated /active pop.			0.002	0.002	0.002	0.0003	0.0013	0.0017	0.0017
			[0.0013]	[0.0013]	[0.0013]	[0.0026]	[0.0017]	[0.0015]	[0.0016]
Employement (2002)				0.000	0.000	0.000	0.000	0.000	0.000
				[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
R&D/GDP (2000)					-0.0028	-0.003	-0.0027	-0.0041	-0.0039
					[0.0066]	[0.0060]	[0.0074]	[0.0075]	[0.0074]
Science & Tech						0.0048	0.0041	0.005	0.005
						[0.0040]	[0.0031]	[0.0030]	[0.0031]
Capital							0.0003	0.0029	0.0033
							[0.0060]	[0.0044]	[0.0043]
Hardwork								0.0638	0.0652
								[0.0582]	[0.0572]
Indepen									0.0169
									[0.0448]
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
obs	97	97	95	95	95	95	80	79	79
adj-R^2 or overall R^2r	0.7486	0.6822	0.6643	0.6653	0.6605	0.6447	0.7021	0.7202	0.7236
F test	37.88	6.38	6.41	7.74	11.16	15.66	4.34	4.91	4.45

* Significant at the 10% level; ** 5% Level; *** 1% level. Robust standard errors in parenthesis.

Table 9 - IV estimates. Dependent variable: ΔGDP_i

	[1] *Financial agglomeration* and *Bank capillarity* instrumented	[2] Only *Financial agglomeration* instrumented with both instruments	[3] Only *Financial agglomeration* instrumented with Jew-1750	[4] Only *Financial agglomeration* instrumented with Cuius
Financial_agglomeration	0.0537***	0.0455***	0.0336**	0.0508***
	[0.0177]	[0.0122]	[0.0154]	[0.0158]
Bank capillarity_i	-0.0222	0.0248*	0.0254*	0.0237
	[0.0651]	[0.0127]	[0.0141]	[0.0153]
GDP_pc_2000 (in logs)	-0.3282***	-0.3692***	-0.3328***	-0.3837***
	[0.0775]	[0.0479]	[0.0624]	[0.0653]
Trust	0.1895**	0.2265***	0.1904***	0.2444***
	[0.0808]	[0.0561]	[0.0679]	[0.0661]
Metropolitan areas (1/0)	0.0405	0.0533**	0.0544*	0.0538*
	[0.0309]	[0.0226]	[0.0289]	[0.0311]
Fertility rate	-0.2517**	-0.1740***	-0.1765***	-0.1722***
	[0.1167]	[0.0451]	[0.0535]	[0.0554]
Educated/active population	-0.0026	-0.0006	0.0002	-0.0009
	[0.0033]	[0.0017]	[0.0016]	[0.0022]
Employement_2002	0.000	0.000	0.000	0.000
	[0.0000]	[0.0000]	[0.0000]	[0.0000]
R&D_gdp_priv_2000	0.0072	0.0019	-0.0029	0.0039
	[0.0134]	[0.0100]	[0.0079]	[0.0098]
Science & Tech / active population	0.0022	0.0024	0.0029	0.002
	[0.0028]	[0.0024]	[0.0022]	[0.0028]
Capital	0.0018	0.0014	0.0017	0.0011
	[0.0018]	[0.0015]	[0.0013]	[0.0011]
Hardwork	0.0021	0.0202	0.0581	0.0034
	[0.0654]	[0.0535]	[0.0540]	[0.0652]
Independence	-0.0589	-0.016	0.0064	-0.0266
	[0.0865]	[0.0566]	[0.0434]	[0.0517]
Country fixed effects	Yes	Yes	Yes	Yes
centred-R2	0.8856	0.9108	0.9177	0.9051
Obs.	77	77	77	77
Hansen–Sargan test of over-identification	--	0.704 (0.4016)	--	--
Cragg-Donald test for weak identification (20% critical value)	1.257 (3.95)	9.781 (8.75)	7.008 (6.66)	16.189 (6.66)
Kleibbergen-Paap test for under-identification (p-value)	3.365 (0.066)	20.476 (0.0000)	5.802 (0.0160)	6.993 (0.0082)
First stage results				
Dep.: **Bank capillarity**				--
Protestant or Calvinist communities	-0.0061 [0.08498]			
Jewish communities in 1750	0.3155 ** [0.1482]			
Dep.: **Financial Agglom.**				
Protestant or Calvinist communities	0.5192 *** [0.1535]	0.5183 *** [0.1545]	--	0.5852*** [0.1807]
Jewish communities in 1750	0.5317 * [0.2678]	0.5751 ** [0.2804]	0.7876 ** [0.3754]	--
Controls	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes

* Significant at the 10% level; ** 5% Level; *** 1% level. Financial agglomeration instrumented by the two variables: Protestant is a variable taking value of 1 if, immediately after the Diet of Augsburg, protestants groups were located within the region and 2 if there were Calvinist communities; 0 otherwise. Jewish 1750 is a dummy if in the region there was a Jewish community in 1750.

Table 10- Robustness checks

	[1]	[2]
	Only *Bank capillarity* instrumented with both instruments	*Bank capillarity* instrumented only with Jew-1750
Financial_agglomeration	0.0293***	0.0292***
	[0.0061]	[0.0063]
Bank capillarity_i	0.0409	0.0365
	[0.0424]	[0.0243]
GDP_pc_2000 (in logs)	-0.3415***	-0.3347***
	[0.0657]	[0.0547]
Trust	0.1978***	0.1909***
	[0.0689]	[0.0656]
Metropolitan areas (1/0)	0.0588**	0.0578***
	[0.0243]	[0.0214]
Fertility rate	-0.1513*	-0.1582***
	[0.0817]	[0.0488]
Educated/active population	0.001	0.0008
	[0.0020]	[0.0019]
Employement_2002	0.000	0
	[0.0000]	[0.0000]
R&D_gdp_priv_2000	-0.0053	-0.0052
	[0.0090]	[0.0086]
Science & Tech / active population	0.0031	0.0032
	[0.0023]	[0.0024]
Capital	0.0016	0.0017
	[0.0015]	[0.0014]
Hardwork	0.0690*	0.0706
	[0.0409]	[0.0430]
Independence	0.0235	0.0196
	[0.0571]	[0.0597]
Country fixed effects	Yes	Yes
centred-R2	0.9165	0.9174
Hansen–Sargan test of over-identification	3.099 (0.0783)	--
Cragg-Donald test for weak identification (20% critical value)	2.468 (8.75)	11.685 (6.66)
Kleibbergen-Paap test for under-identification (p-value)	6.449 (0.039)	13.293 (0.0003)
First stage results		
Dep.: *Bank capillarity*		
Protestant or Calvinist communities	0.01569 [0.09397]	--
Jewish communities in 1750	0.3379 ** [0.15442]	0.5583*** [0.1633]
Dep.: *Financial Agglom.*		
Protestant or Calvinist communities	--	--
Jewish communities in 1750	--	--
Obs.	77	77
Controls	Yes	Yes
Country fixed effects	Yes	Yes

* Significant at the 10% level; ** 5% Level; *** 1% level. Financial agglomeration instrumented by the two variables: Protestant is a variable taking value of 1 if, immediately after the Diet of Augsburg, protestants groups were located within the region and 2 if there were Calvinist communities; 0 otherwise. Jewish 1750 is a dummy if in the region there was a Jewish community in 1750.

Table 11- IV Estimates - Robustness with subsamples

	[1]	[2]	[3]	[4]	[5]
	Dep. variable: $_{\Delta GDP_i}$ in the following periods:			Protestant communities 1/0	Only Germany, Belgium, Neetherland and Poland
	2000-2005	1995-2005	1995-2009		
	b/se	b/se	b/se	b/se	b/se
Financial agglomeration	0.0354***	0.0411**	0.0510***	0.0373**	0.0381***
	[0.0105]	[0.0204]	[0.0192]	[0.0150]	[0.0139]
Bank capillarity	0.0254***	0.0067	0.0255	0.0535***	-0.0053
	[0.0085]	[0.0157]	[0.0169]	[0.0121]	[0.0215]
GDP_pc_2000 (in logs)	-0.3236***			-0.4426***	-0.2339***
	[0.0404]			[0.0681]	[0.0725]
GDP_pc_1995 (in logs)		-0.3158***	-0.5304***		
		[0.1084]	[0.1030]		
Metropolitan areas (1/0)	0.0292	0.0539	0.0618*	0.0526*	-0.007
	[0.0264]	[0.0398]	[0.0362]	[0.0283]	[0.0125]
Trust	0.3008***	0.2253***	0.2485***	0.2825***	0.0162
	[0.0484]	[0.0676]	[0.0768]	[0.0656]	[0.0655]
Fertility rate	0.0373	-0.1186*	-0.1601**	-0.0099	-0.4260***
	[0.0271]	[0.0678]	[0.0702]	[0.0435]	[0.1122]
Educated/active population	0.0036***	-0.0006	-0.0018	0.0026	
	[0.0014]	[0.0030]	[0.0029]	[0.0017]	
Employement_2002	0.0000*	0.0000*	0.0000**	0	
	[0.0000]	[0.0000]	[0.0000]	[0.0000]	
R&D_gdp_priv_2000	0.0069	0.002	0.0028	0.0046	
	[0.0068]	[0.0113]	[0.0103]	[0.0098]	
Science & Tech/active population	-0.0042**	0.0008	0.0086**	0.0041*	
	[0.0021]	[0.0038]	[0.0039]	[0.0023]	
Metropolitan areas (1/0)	0.0009	0.0007	0.0133***	0.0027*	
	[0.0011]	[0.0049]	[0.0049]	[0.0016]	
Independence	0.1464***	0.1061	0.0475	0.1223***	0.0098
	[0.0471]	[0.1011]	[0.0976]	[0.0465]	[0.0439]
Hardwork	0.0419	0.0029	0.0692	0.0118	-0.0268
	[0.0395]	[0.0742]	[0.0716]	[0.0463]	[0.0516]
Controls	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes
n. observations	77	60	60	77	27
R2	0.7367	0.7750	0.6065	0.7615	0.5822

* Significant at the 10% level; ** 5% Level; *** 1% level. Financial agglomeration instrumented by the two variables: Protestant is a variable taking value of 1 if, immediately after the Diet of Augsburg, protestants groups were located within the region and 2 if there were Calvinist communities; 0 otherwise. Jewish 1750 is a dummy if in the region there was a Jewish community in 1750.

Table 12- Estimates with raw variables. Dependent variable: ΔGDP_i

	[1]	[2]	[3]	[4]
# branches / 10,000 inhabitants	0.0041	0.005	0.0066	0.0037
	[0.0092]	[0.0101]	[0.0088]	[0.0091]
Headquarters/100 km2		0.0014		
		[0.0018]		
Share of financial sector on overall value added (%)			1.1206***	
			[0.3593]	
Stock Exchange				0.0467**
				[0.0187]
Other controls	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes
Country Fixed effects	Yes	Yes	Yes	Yes
Obs.	79	79	79	79
adj-Rsqr	0.7203	0.6980	0.7469	0.7679

* Significant at the 10% level; ** 5% Level; *** 1% level. Robust standard errors in parenthesis.

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