Banks and Development: Jewish Communities in the Italian Renaissance and Current Economic Performance

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Abstract

Do banks affect long-term economic performance? I answer this question by relying on an historical development that occurred in Italian cities during the 15th century. A sudden change in the Catholic doctrine had driven the Jews toward money lending. Cities that were hosting Jewish communities developed complex banking institutions for two reasons: first, the Jews were the only people in Italy allowed to lend for a profit; second the Franciscan reaction to Jewish usury led to the creation of charity lending institutions that evolved into many of the current Italian banks. Using Jewish demography in 1450 as an instrument, I estimate large effects of current banking development on the income-per-capita of Italian cities. Additional firm-level analyses suggest that well-functioning local banks exert large effects on aggregate productivity by reallocating resources toward more efficient firms. Controlling for province effects, using additional historical data on Jewish demography and exploiting the expulsion of the Jews from the Spanish territories in Italy in 1541, I argue that my results are not driven by omitted institutional, cultural and geographical characteristics. In particular, I show that the difference in current income between cities that hosted Jewish communities and cities that did not exists only in those regions that were not Spanish territories in the 16th century. These difference-in-difference estimates suggest that the Jewish Diaspora can explain at least 10% of the current income gap between Northern and Southern Italy.

JEL: O43, G21, O10

Keywords: Banks, Economic development, Persistence, Jewish demography.

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1 Introduction

Do banks affect long term economic performance? This question is central to our understanding of the role of financial institutions in explaining cross-country and cross-regional differences in per capita income. A causal relationship has implications for both economists and policymakers. In terms of policy, if better functioning among banks has large effects on economic performance, then this increases the importance of legal and regulatory reforms designed to stimulate banking development. However, the economic theory is divided. A large body of literature dating back to Schumpeter emphasizes the positive influence of the development of a country's financial sector on the level and the rate of growth of its per capita income. The main argument is that financial intermediaries reduce the cost of acquiring information and allow for the better assessment, selection and monitoring of investment projects. For example, in Greenwood and Jovanovic (1989), the ability of financial intermediaries to improve information collection results in an increase in the efficiency of resource allocation and hence in economic performance[1]. However, according to some theoretical contributions (for example Bencivenga and Smith (1991); King and Levine (1993b)), an improvement in the reallocation of resources that results in an increase in the return to savings may actually depress saving rates and harm future economic growth. Because the theoretical literature is divided, it remains the task of the empirical literature to shed light on the effect of finance on development. In the 1990s, starting with the studies by King and Levine (1993a, 1993b), a new body of empirical evidence began to indicate a positive relationship between the level of development achieved by the banking system and economic performance, both at the national [2] and at the regional level[3]. Italy has represented a good "laboratory" for these empirical studies[4]

[1] See also Townsend (1979), Diamond (1996) and Boyd and Prescott (1985).

[2] On a pure cross-country basis, the first work that documents a positive correlation between finance and growth dates back to Goldsmith (1969). King and Levine (1993a) and King and Levine (1993b) extend this work adding more countries and controls and examining in details two channels through which finance might affect growth: capital accumulation and productivity growth. Levine and Zervos (1998) show that both stock market liquidity and banking development positively predict growth. Using similar data, Levine (1998), Levine (1999) and Levine, Loayza, and Beck (2000) provide evidence of a causal relationship from finance to growth using the legal origin of the country as an instrument for financial development. A substantial literature has documented the same causality direction using panel data techniques instead (for example see Beck, Levine, and Loayza (2000); Levine, Loayza, and Beck (2000); Loayza and Ranciere (2006)). At industry level, Rajan and Zingales (1998) show that the same industries that rely on external financing in US grow faster in financially developed countries. Finally a large literature has used time-series techniques. For example, Rousseau and Wachtel (1998) use a series of tests to determine the Granger causality direction between finance and growth in 5 countries and document that the dominant direction of causality runs from financial development to economic growth. Xu (2000) uses a VAR approach in a broad study of 41 countries to identify the long term cumulative effects of finance on growth.

[3] For example, at the US state level, Jayaratne and Strahan (1996) find that economic growth increases in states that relax intrastate bank branching restrictions. At European regional level, Hasan, Koetter, and Wedow (2009) show that more profitable banks spur regional growth.

[4] Lucchetti, Papi, and Zazzaro (2001) examine how the efficiency of local banks affects regional economic development. Angelini and Cetorelli (2003) study the effects of regulatory reforms on bank mark-ups. Bonaccorsi di Patti and Dell'Ariccia (2004) focus on firm creation. Guiso, Sapienza, and Zingales (2004) present evidence of the effect of local financial development on a wide set of outcomes, such as business formation, firm entry and growth. Guiso, Sapienza, and Zingales (2006) study the effect of banking regulation on the cost and access to credit. Alessandrini, Presbitero, and Zazzaro (2006) present evidence that higher branch density reduces the probability of firms of being financially constrained. Benfratello, Schiantarelli, and Sembenelli (2008) concentrate on the effects of branch density on the probability that firms engage in R&D.

for two reasons. First of all, focusing on Italy allows researchers to isolate the role of banks in fostering economic performance. The Italian financial system can be characterized as bank-based. The capitalization of the Italian stock market is low compared to that of most of the other developed countries, and Italian firms have traditionally used debt rather than equity to finance their activity. Therefore, banking development is likely to be particularly important for Italian firms. Second, there is considerable spatial diversity in the degree of banking development. Until the early nineties, the competition among Italian banks was dampened by restrictions on lending and branching across geographical areas. This led to the development of deep-seated differences in the local credit markets of Italian cities.

A possible objection could be that the local conditions of the credit market become irrelevant as long as individuals and firms can tap markets other than the local one. There is a growing body of literature, however, documenting that distance matters in the provision of funds, especially for small firms (Petersen and Rajan (2002); Bofondi and Gobbi (2004); Lerner (1995)). Moreover, the fact that distance is an important barrier to lending is consistent with the views of bankers. Guiso, Sapienza, and Zingales (2004) report that "the president of the Italian Association of Bankers (ABI) declared in a conference that the banker's rule of thumb is to never lend to a client located more than three miles from his office."

Although a large amount of empirical literature has documented a strong correlation between banks and development, assessing the direction of causality has proved to be a difficult task. There is little agreement on what determines banking institutions, making it difficult to isolate exogenous sources of variation and estimate their effects on performance. In this paper, I conduct an empirical analysis of Italian municipalities and argue that the presence and size of a Jewish community in the Renaissance could have been a source of exogenous difference in the local credit market. My argument rests on the following premises:

(1) Jews arrived in Rome at the time of the Roman Empire as a result of mass deportation following the defeat of rebels in Judea by the Roman Empire. For commercial reasons, because of temporary expulsions from Rome and especially because they were deported as slaves, they spread from Rome to the rest of Italy. For centuries, they lived mostly in the proletarian sectors, and their religion prevented them from acquiring economic and social prominence in Italy. However, at the end of the fourteenth century a sudden change in the Catholic doctrine prohibited the Catholics from lending for a profit while allowing the Jews to do so.

(2) Cities that hosted a Jewish community developed complex credit markets. This happened for two reasons. The first was that several Jewish bankers were competing on the local market. According to Shulvass (1973), the Italian Jewish communities used to derive their livelihood mainly from usury, pawnshops and lending. Second, Italian Renaissance society was still devoutly Christian and thus by definition hostile to Jews. The Franciscan propaganda against usury, particularly ferocious during the fifteenth century, led to the creation of charitable loan banks, called "Monti di Pietà" (mount of piety), in cities where the Jewish minority was more influential; they were intended to drive the Jews out of the financial market.

(3) Finally, I argue that banking institutions tend to be very persistent over time. As I will document later in the paper, a significant portion of current Italian banks traces its origins to the period between 1470 and 1570, directly from the experience of the Monti. An intuitive reason for this persistence is that a bank's major asset is its reputation, which usually appreciates over time.

Consider for example the cities of Ivrea and Chivasso. Ivrea has 23,714 residents and is located thirty miles east of Turin; Chivasso has 23,649 residents and is located fifteen miles south of Ivrea. These two cities have a very similar demographic history[5] and shared the same rulers for at least eight centuries[6]. Today, they share the same legislators and the same courts because they both belong to the province of Turin. However, Ivrea hosted a Jewish community in 1450 (tourists can still visit an ancient Jewish cemetery and a synagogue), while Chivasso did not. In 1591, a Monte di Pietà was created in Ivrea; its constitution act was motivated by the need to protect the Catholic masses from Jewish usury. Although the Jewish community disappeared at least a century ago, the Monte operated until 1984 as the main lending institution in the city. In 2005, based on the two measures of local banking development that I will use in my analysis, Ivrea dominated Chivasso. The ratio of private credit to GDP is 98% in Ivrea and 42% in Chivasso; the ratio of bank branches to residents is 0.001 in Ivrea and 0.0006 in Chivasso.

To conduct the analysis in a more systematic way, I identify the largest towns in Italy in 1861, for which I reconstruct the size of the Jewish population in 1450 and collect several measures of current banking and economic development. Then, I study the effect of local banking development on current GDP per capita in Italian municipalities, using data on Jewish demography in 1450 A.D. as an instrument for banking development. The exclusion restriction implied by my instrumental variable regression is that, conditional on the controls included in the regression, Jewish demography five centuries ago has no effect on GDP per capita today other than through its effect on current banks.

A formal test of this exclusionary restriction is impossible. However, let me argue that the restriction is plausible. Starting from the early 17th century and for at least two centuries, Jews lived segregated from the rest of the Italian population. Often, Catholics were only allowed to interact with Jews for business-related reasons and Jews lived almost exclusively on money-lending. Not until 1848 did the Kingdom of Piedmont establish equal civil and political rights for all citizens independent of their religion but, by this time, most of the Jewish communities had disappeared. Therefore, Jewish demography in 1450 could hardly affect current economic development if not through its effects on banks.

Notice, however, that if there is a location advantage (not captured by eventual controls) that led the Jews to settle in a particular city and at the same time fostered local banks and economic development, then my instrument will still be inappropriate. To address this issue, I use a difference-

[5] According to Malanima, they had less than 5 thousands residents until the early 19th century. According to the first Italian census, in 1861 Ivrea had around 6 thousands residents and Chivasso few hundreds less.

[6] In the 13th century they are both under the domain of the emperor Frederick II who assigned them to the marques of Monferrato. In the 14th century, they passed under the House of Savoy where they remain until the unification of Italy.

in-difference approach based on an historical counterfactual. Between 1493 and 1541, Jews were fully expelled from the regions under the Aragon crown (Southern Italy, some provinces in Central Italy, some cities close to Rome, Sicily and Sardinia), to which they would not be allowed to return for three centuries. This event is exogenous with respect to the Italian social and economic situation of that period. It was in fact the result of the attitude of the Spanish crown toward the Jews: the edict was promulgated in Spain and then extended to the Spanish possessions in Italy. We would expect that in these regions, the presence of a Jewish community in 1450 should have no effect on current credit institutions and economic performance. I document that within these regions, there is no difference in current credit availability or economic development between cities that previously hosted Jewish communities and cities that did not. Instead, in those regions where Jews were not banned, cities that used to host Jewish communities nowadays have larger credit-to-GDP ratios and GDP per capita. I interpret this result as an indication that there are no geo-morphological variables that affect both the presence of Jewish communities in 1450 and the current banking and economic development.

Finally, to rule out the possibility that institutional features are driving my results, I will use province fixed effects. Cities within Italian provinces have shared the same rulers (with a small number of exceptions) for at least ten centuries and, moreover, they still share the same courts and legislators.

Having established the validity of my instrument, I can use it to estimate the impact of banks on economic development. I find that an increase in credit availability of 1% (as measured by credit over GDP ratio) increases GDP per capita by at least 0.20%[7]. The effect of branch density is even stronger: an increase in the ratio of bank branches to total residents of 1% increases GDP per capita by at least 0.7%. These estimates support the view that credit institutions have strong positive effects on economic development.

Interestingly, according to the estimates coming from the difference-in-difference estimation, at least one-third of the gap in current credit availability between the North and the South of Italy can be attributed to the expulsion of the Jews from the Aragon kingdom. Based on the IV results, this implies that at least 10% of the north-south gap in GDP per capita is attributable to the lower current credit availability for which this event was responsible.

In the last part of the paper, I illuminate a particular channel through which the improvement of credit institutions affects economic development. At the beginning of the twentieth century, Joseph Schumpeter argued that innovations drive economic development (e.g. "different employment of existing services and labor and land", Schumpeter 1934). The so-called "Shumpeterian view" in the literature in finance and growth is based on the idea that banking institutions affect economic performance through their ability to foster aggregate productivity (e.g., the total output produced by the economy for a given set of inputs) rather than capital accumulation. My results validate this view. An increase in credit availability of 1% increases aggregate productivity by at least 0.11% (0.52% for branch density). Most of the theoretical literature focuses on two channels through which

[7] These estimates refer to the years 2002-2004.

banks could affect aggregate productivity. First, banks produce ex-ante information about possible investments, and this causes a reallocation of capital towards more productive firms. Second, banks monitor investments ex-post and exert corporate governance, and this implies an average increase in firm productivity. In order to distinguish between these two channels, it is helpful to break down productivity figures in Italian cities into two parts as suggested by Olley and Pakes (1996): the unweighted average productivity of the firms in the city and a reallocation term that captures whether higher shares of value added go to more productive firms in the city.

The effects of banks on aggregate productivity seem to come into being through the reallocation of resources towards more productive firms rather than through a boost in the average productivity of firms. This seems to validate theories that stress the importance of the role of the banks in exploiting ex-ante information on investment opportunities to select the most promising ones.

This paper is organized as follows. Section 2 goes briefly into the previous literature on the effects of financial development on economic performance. Section 3 presents some historical background on the Italian Jewish communities; in particular, it focuses on the origin of Jewish money-lending during the Renaissance. Section 3 tests the hypothesis that the presence of a Jewish community in 1450 caused an improvement in current credit institutions. Section 4 examines the relationship between current credit institutions and GDP per capita in Italian cities using Jewish demography in 1450 as an instrument. Finally, in section 5, I switch to firm-level data and examine how local aggregate productivity is affected by financial development. Some concluding remarks close the paper.

2 Previous literature

In the 1990s, starting with the studies by King and Levine (1993a, 1993b) a new body of empirical evidence began to consider the effects of the financial system on economic performance at both the national and the regional level. There are four main approaches used in this literature.

In an important contribution, King and Levine (1993a) show that on a cross-country basis, the predetermined component of financial development is a good predictor of growth over the next 10 to 30 years. However, skeptics offer two arguments against this methodology for analyzing causality.

First, there could be some omitted variable, like the propensity of households to save, driving both financial development and economic development. Second, there could be a reverse causality problem because the usual measures of financial development (capitalization of the stock market and availability of credit to the private sector) may respond to expectation of future growth.

The second approach aims to rule out omitted country-level factors by focusing on interaction effects rather than on the main effects of financial development. On a cross-country basis, using industry-level data, Rajan and Zingales (1998) test the idea that financial development should disproportionately help industries that are relatively more dependent on external finance for their growth. As a proxy for external need of finance in a certain industry, the authors use data on the difference between investments and cash flow in the analogous industry in the US. This variable is

directly interacted with the usual proxies of a country's financial development and is then regressed on measures of growth at the industry-country level. The main problem with this approach is that the magnitude of the coefficient on the interaction term is hard to interpret without making some dubious assumptions (that all countries share the same technologies and perform the same tasks within each industry, and that capital markets in the US are perfect).

The third approach focuses on the time series dimension and studies the effect of one-time exogenous financial liberalization. For example, at the US state level, Jayaratne and Strahan (1996) find that economic growth increases in states that relax intrastate bank branching restrictions. The main problem with this approach is that normally, changes in financial institutions tend to be associated with changes in other institutions, and this makes it difficult to disentangle the effect of financial development alone. According to Fry (1995), the simultaneity of reforms appears binding for researchers: "Most clear-cut cases of financial liberalization were accompanied by other economic reforms (such as fiscal, international trade and foreign exchange reforms). In such cases it is virtually impossible to isolate the effects of financial components of the reform package".

The last approach that has been widely used in the literature is the instrumental variable one. Most authors have used GMM estimators developed for panel data where the instruments come from lagged values of a financial development proxy. Levine, Loayza, and Beck (2000) use data on a panel of 77 countries over the period 1960-1995. The main advantage of this methodology is that it controls for cross-sectional fixed effects. On the other hand, the procedure is data-intensive, and researchers cannot normally count on long time series. As Levine (2005) notes: "Levine, Loayza, and Beck (2000) employ data averaged over a five-year period, yet models we are using to interpret data are typically models of steady state growth. To the extent that five years do not adequately proxy for long-run relationship, the panel methods may imprecisely asses the finance growth link". In order to overcome this problem, the literature has searched for "external" instruments that could explain cross-sectional differences in financial development without requiring long time series of data.

For example, a large body of literature has exploited the fact that historical and geographical factors could be exogenous driving forces of local financial institutions. Because the latter tend to be very persistent over time, the effect that legal tradition, colonial history and cultural factors had on the initial development of local financial markets may have persisted until the present day.

Levine (1998), Levine (1999) and Levine, Loayza, and Beck (2000) use the Porta, de Silanes, Shleifer, and Vishny (1998) measures of the legal origin of the country as instruments for current financial development. Because the legal origin of a country could emerge through occupation and colonization, this variable is treated as exogenous. Stulz and Williamson (2003) argue that different religions may imply different attitudes toward finance. For example, historically, Catholics had deep misgivings about anything related to finance and this could have prevented the brightest individuals in a Catholic country from entering finance-related professions.

These kinds of analysis have three main drawbacks. 1) It is difficult to exclude the possibility that these instruments have affected not only financial institutions but also other institutions. For

example, the legal origin of the country could have strong effects on the contractual institutions of the country (see La Porta et al, 2001). The religion of the country could have effects on educational institutions and human capital; for example, the positive effects of the Protestant Reformation on the literacy of the European masses are well known. 2) It is difficult to rule out missing geo-morphological variables that could drive both instrumental and instrumented variables. 3) Generally, these studies are based on a small number of observations (usually less than eighty).

In conclusion, although there is a very large body of empirical literature on the effects of financial development on growth, further empirical analysis on the direction of causality is necessary. This paper will use an instrumental variable approach on a pure cross-section dimension. I will argue that the usual drawbacks of these kinds of analysis will not apply in my case for the following reasons:

1) I will study the effects of credit availability on the economic development of Italian cities. Concentrating on a single country and using regional and province fixed effects, I will be able to rule out the presence of other institutional changes that could be correlated with both my instrument and local financial development. I will argue that my instrument, Jewish demography in the early Renaissance, had effects on financial development and nothing else: in this period, almost all Jews lived off of money-lending; they lived segregated in ghettos and were allowed to speak with Christians only for business-related reasons. Moreover, they were not allowed to hold any public positions and did not participate in the government of the cities. Their presence was crucial in the development of local financial markets but did not persist until today as a consequence of the migrations in the nineteenth century and the Nazi persecution. 2) A difference-in-difference analysis, based on the fact that Jews were expelled in the sixteenth century from some but not all Italian regions, will allow me to exclude the possibility that some missing geo-morphological characteristic is driving my results. 3) Moving to cross-city analysis rather than cross-country analysis will allow me to increase the number of available observations.

3 The Jews in the Italian Renaissance

Jews were already present in Italy in the second century B.C.E.[8] The first large communities were the result of mass deportations following the Jewish struggle and defeat in Judea by the Roman Empire[9]. Bonfil (1991) describes their role in the Roman society in the following way:

> "The fact that the Jews in Italy were of petty bourgeois or even servile origin and that they were not infrequently suspected of opposing Roman policy abroad prevented

[8] The first evidence of Jewish presence in Italy dates back to 168 B.C.E. A Jewish general, Maccabees was leading the struggle to free Palestine from the Syrian domination and sent an embassy to Rome asking for military support.

[9] The first large wave of Jewish prisoners arrived in Italy in 61 B.C.E. after Pompey and the Roman legions had submitted Judea under the Roman Empire and conquered Jerusalem. In 66 C.E., Judea rebelled against the invaders: the war lasted four years and ended up with the complete defeat of the Jews. Again, a large portion of the Jewish prisoners was brought to Italy. According to later sources, 1500 arrived in Rome alone and 5000 in Apulia. The last mass deportation of Jewish prisoners in Italy dates back to 134, when the Jewish struggle against the Romans ended up with the wholesale destruction of Jerusalem and more than one thousand of other Jewish towns.

individual Jews from attaining prominence in economic or social life. [..] They engaged in humble occupations and lived in the proletarian sections. Cultural standards were not high, although there were painters, actors, and poets."

It has been estimated that around fifty thousand Jews were living in Italy during the first century. For commercial reasons, because of temporary expulsions from Rome and especially because they were deported as slaves, the Jews spread from Rome to the rest of Italy. Whenever possible, they established themselves in more cosmopolitan cities where the local population was more tolerant of their religious convictions and customs. For these reasons, we find them concentrated in cities with important ports or where commerce was a prominent activity (Milano (1963), p. 29).

Even after the fall of the Roman Empire, the strong opposition of the Christian Church confined the Jews to the margins of Italian society. According to Bonfil, until the end of the 13th century Jews remained a group of petty bourgeois, mainly artisans (especially dyers and silk weavers) and small merchants. Typically, they owned houses in towns, but occasionally, some Jews also engaged in farming[10].

This situation dramatically changed in the 14th century. During this period, Jews in Italy engaged in a new sphere of economic activity as money-lenders. There were three main motives that drove the Jews towards the loan business. First, during the Middle Ages, the Catholic Church, through several Ecclesiastical Councils, had banned the practice of lending to earn a profit[11]. This prohibition, which had previously been limited to the Catholic clergy, was extended to the Catholic laics. On the other hand, the Lateran Council in 1215, having forbidden the Jews from lending for high and immoderate interest rates, silently allowed them to lend in exchange for normal interest. Second, between 1260 and 1340, the Italian peninsula experienced a strong expansion of merchant and craft guilds (Morelli (2008)). These organizations acquired full control of the main economic activities in the largest Italian cities. Because membership required adherence to Catholicism, a large number of Jews had to leave their traditional occupations. Moreover, Jews could not continue their farming activities because they were not allowed to own land in a majority of the Italian states. Third, some Jews in Central Italy who had engaged in trade during the Middle Ages had accumulated sizable wealth and had both the capital and the expertise to become money-lenders.

These three factors drove the Jews *en masse* toward money-lending. By the start of the 15th century, the geographic expansion of the loan business by the Jews was complete and had become a general economic phenomenon in all parts of Italy. According to Shulvass (1973), Italian Jews in this period primarily derived their livelihood from usury, pawnshops and lending[12]. This led

[10] In the middle of the thirteenth century, Saint Thomas Aquinas wrote that, unlike in other countries, Jews in Italy earned their livelihood through their own work and not through money-lending.

[11] The Christian prohibition to lend for a profit tracks its origin in the ancient times and is inspired by two principles. First, the Aristotelian maxim "Pecunia pecuniam parere non potest (money cannot beget money)" excluded the possibility that investing for future profits could be beneficial for the society. Second, lending for a profit was considered at odds with the principle "Mutuum date nihil inde sperantes (give without hoping to receive anything in return)", enunciated in the Gospel according to Saint Lucas.

[12] In 1320, Kalonymos ben Kalonymos (1286-1328 A.D.), a Spanish Jewish philosopher, wrote in his Maseket Purim: "no usurious loans are to take place on Purim that is in the land of Israel, but it is permitted in Babylonia and in

to the accumulation of small fortunes in the hands of several Jewish bankers. A large number of Jews adopted the manners of the gentile upper class, with a taste for the letters and the arts: this period is remembered as one of unprecedented prosperity of the Italian Jewry. These achievements, however, were undermined by two factors.

The first was the attitude of the Spanish Aragon crown toward its Jewish subjects. In March 1492, the Aragon crown promulgated an edict of expulsion of the Jews from its territories. At that time, Sicily and Sardinia were under the Aragon rule, thus the edict applied there as well. Then, in 1503 the Kingdom of Naples (which included all of Southern Italy, the region of Abruzzi and some cities close to Rome) came under the Aragon crown, and in 1510 the expulsion of the Jews from these territories was ordered. The opposition to the edict by both the Christian masses and the local aristocracy led to some exceptions. In particular, about 200 wealthy families were formally permitted to remain. However, in 1541, these exceptions were abrogated, and the law excluding Jews from the Kingdom remained in force for over three centuries.

Meanwhile, other Italian states experienced increasing opposition towards Jewish loan-banking from among the Christian population. According to Shulvass,

> "The economic depression of the masses caused by endless wars waged throughout all of Italy, contrasted with a rise in the living standard of Jewish pawnbrokers, aroused strong anti-Jewish feelings. The movement was led by the Franciscans, who during this period had a number of outstanding itinerant preachers with tremendous influence upon the masses. [..] They believed that the abolition of the Jewish loan business would heal all social ills. The masses also believed that the loan business was ruining the country."

With the explicit intention of keeping Christians in need of loans away from Jewish moneylenders, Franciscan leaders such as Bernardino da Siena (1380-1444), Giacomo della Marca (1391-1476), Giovanni da Capistrano (1386-1456), and Bernardino da Feltre (1439-1494) laid the foundations for the "Monti di Pietà", lending institutions sponsored by wealthy Christians that would extend credit on a non-profit basis. Dependent upon the largesse of wealthy Christians and fueled by the anti-Jewish sermons of the Franciscan preachers, the "Monti" flourished in Umbria, Marches, Veneto, Lombardy, Emilia, Tuscany and beyond; an estimated twenty institutions were founded in northern Italy between the years 1462 and 1496. Consider Florence, for example: here, the propaganda of a Franciscan preacher, Girolamo Savonarola, urged the wealthy to contribute to the creation of a Monte. In 1495, his sermons led the city council to authorize the creation of a Monte di Pietà. The text of the law motivates the Monte's creation, citing the high interest rates imposed by Jewish bankers. A few years later, Jewish pawnshops closed, and the Jews were

Greek Italy [..]. Jews of Babylonia and Italy have nothing else but usury upon which to rely [for their support]". Two centuries later, Jehiel Nisim da Pisa (1507-1574 A.D.), a rich Italian Jewish banker, also attested that "in these lands [Italy] more than everywhere else in the entire Diaspora has the custom of lending to non-Jew become widespread". Famous rabies were also moneylenders and, according to Sonne (1948), most of the North Italian rabbis were bankers even at a time when they functioned as heads of rabbinical schools. Leon da Modena (1638) charged that "in our generation all interest lenders are regarded honorable and not only are they not ineligible to testify and to judge, it is quite the reverse, namely, their word is as reliable as a hundred of witnesses, they are our leaders and judges".

expelled from the city. In her study on the Florentine Monte, Carol Bresnahan Menning explains: "As brokers of small loans against pawns, Italian Monti di Pietà were expected not only to replace Jewish moneylenders but also to set up the conditions in which all Jews could be expelled."[13] In 1539, a Monte was established in Naples, and in the following two decades, the Monti expanded their activities to Southern and Central Italy as well.

By the end of the 16th century, local credit markets in Italian cities could be sorted into two groups.

The first group was composed of cities that did not host Jewish communities. Here, most of the credit extended to the private sector came from inter-household loans in which, at least formally, no interest could be charged. Sometimes, a Jewish lender was invited to move into the city through the mechanism of the "condotta". The condotta was a bilateral contract of limited duration, usually lasting from three to five years (in rare circumstances for fifteen or more) stipulated by the rulers of the city and a Jewish lender. These charters regulated the number of Jews who could move into the city (normally, the limit was one person or one family) and the interest rates that could be charged (ranging from thirty to sixty percent annually). Jewish lenders were guaranteed to operate in a monopoly, and in exchange, they had to pay an annual tax and agree to lend (sometimes under favorable terms) to the government.

The second group was composed of cities that were hosting Jewish communities. Here, the financial markets were far more complex. First of all, several Jewish lenders were competing in the local credit market. Moreover, in these cities, the Monti di Pietà were particularly successful in raising charity funding: it was here that the Franciscan preachers concentrated their efforts against usury and where anti-Jewish feelings had grown stronger[14]. The Monti di Pietà certainly succeeded in lowering the interest rates imposed by the Jewish pawn banks. However, the lack of a firm business base undermined their stability. They were continuously dependent on charity for financing, and the lack of any profit motive made them particularly inefficient. The size of the loan that each person was allowed to ask for from the Monte was limited, and people had to turn to the Jews for larger amounts. Moreover, in periods of general hardship, it was difficult for the Monti di Pietà to raise sufficient funds to satisfy the demand for loans because all their depositors lived in the same town and were subjected to correlated shocks. On the other hand, Jewish lenders were able to provide access to credit even in the presence of negative aggregate shocks. Through a network of family ties, social relationships and economic partnerships, Jewish lenders in different

[13] One of the main Franciscan preacher of that time, Bernardino da Siena, used to depict Jewish lenders as blood-suckers. In his sermon 43 on usury he says: "It is usually the case that when wealth and money are concentrated into fewer and fewer hands and purses, it is a sign of the deteriorating state of the city and the land. This is similar to when the natural warmth of the body abandons the extremities and concentrates only in the heart and the internal organs; this is seen as the clearest indication that life is slipping way and that the person is soon to die. And if this concentration of wealth in the hands of the few is dangerous to the health of the city, it is even more dangerous when this wealth and money is concentrated and gathered into the hands of the Jews. For in that case, the natural warmth of the city—for this is what its wealth represents—is not flowing back to the heart to give it assistance but instead rushes to an abscess in a deadly hemorrhage, since all Jews, especially those who are moneylenders, are the chief enemies of all Christians."

[14] Daniele Montanari (1991), using historical data on the Monti di Pieta' and Jewish bankers in the 16th century documented the effects that Jewish presence had on the location and the initial endownment of the Monti di Pietà.

cities shared risk and thereby were able to provide the citizens with access to external sources of credit[15].

4 Data description

I combine three sets of data: one including historical data for Italian cities; one including geographic, demographic, educational, economic and financial characteristics of Italian cities; and one including detailed characteristics of Italian firms.

The first dataset contains Italian demography data from the early Renaissance. The historical Jewish demography data come from the work of an Italian scholar, Attilio Milano. His book, "Storia degli Ebrei in Italia" (e.g. History of the Jews in Italy, 1963), includes a map of the Jewish communities in Italy in 1130 A.D. and in 1450 A.D. (the map is reproduced in Figure 2). In particular, he distinguishes among three types of communities: small (a dozen families), medium (some dozen families) and large (several dozen families)[16]. Particularly interesting is the original source of most of the data about the communities in 1130. They come from the chronicles of a Spanish merchant, Benjamin de Tudela, who traveled around Italy (and many other countries) at the beginning of the 12th century and wrote detailed descriptions of the Jewish communities he visited, including their total populations and the names of notable community leaders. He also provided some information about the communities he did not visit but had heard of. Data on Jewish communities in 1450, in contrast, come from several historiographic studies that have examined Jewish communities in different Italian regions. The historical urban population data come from Malanima (1998). Malanima compiled a dataset with urban population estimates for over 500 Italian cities on a centennial basis over the period 1300-1861, relying heavily on the seminal work on Italian population history by Beloch (1963). The sample comprises all of the Italian cities with an estimated average population of at least five thousand people for a century or more in the historical period considered. Table 1a reports the summary statistics for this dataset. There are 544 Italian cities: 41 percent of them used to contain a Jewish community. Of the 223 Jewish communities in 1450, approximately half were small (115), while the other half was equally divided among medium-sized (55) and large (53) communities. An interesting observation from the urban population data is that the average city population increased nearly threefold in the period 1300-1861, but decreased markedly in the fourteenth century: most likely, this is explained by the epidemics of the plague.

The second set of data contains the current information on Italian cities. The geomorphological data come from the Italian Geographical Institute De Agostini. The information on population and average years of education in each city comes from the Italian National Statistical Institute (ISTAT). The same source provides me with value-added data. These are available not at the city level but rather at the level of the "local labor system" (LLS). This unit is defined on the basis of

[15] An interesting discussion on the complementarities between Jewish money lenders and Monti di Pietà can be found in Botticini (2000). See also Montanari (1999) (p. 10).

[16] The same map is reported by Bonfil (1991).

the Population Census data and is composed of a set of contiguous municipalities with a high degree of self-containment of daily commuter travel and similar economic and geographic characteristics. There are a total of 854 LLSs in Italy, and all cities in my sample are located in separate ones. In the rest of my analysis, I will assume that the GDP per capita of each city is the same as that of the LLS where the city is located. Financial data on branch density and private credit come from the Bank of Italy. Table 1b reports summary statistics for these city-level data. It is interesting to notice the large variation in the level of economic development across Italian cities. The richest city has a GDP per capita that is more than eight times that of the poorest city. Looking at financial data, the private credit to GDP ratio has a surprisingly large mean (0.69) and standard deviation (0.60). For example, using a sample of 75 countries and a similarly constructed measure of private credit to GDP ratio, Levine, Loayza and Beck (2000) report a mean of 0.4 and a standard deviation of 0.29. This reinforces the idea that Italy has a bank-based financial system and features a very large degree of variation in the level of financial development across cities.

The third dataset contains current information about Italian firms. The main source of information is Amadeus, a comprehensive firm-level pan-European database developed by Bureau Van Dijk. For every firm, it provides data on the industry in which the firm operates (at the 4-digit NACE level), the location, the year of incorporation, the ownership structure and the number of employees, in addition to the complete balance sheets and the profit and loss accounts. The data set includes both publicly traded and non-traded companies and accounts for nearly 90 per cent of the sales reported in the national accounting data. In order to deflate firms' sales, materials, intermediates and capital, I have merged this dataset with an industry-level dataset that comprises output and input prices for industries at roughly the 2-digit level of aggregation coming from the EU-KLEMS project. Table 1c reports summary statistics for firms' deflated quantities.

5 Jewish settlements in the Italian Renaissance and current credit institutions

This paragraph documents the effects of Jewish demography in 1450 on the level of current banking development in Italian cities. Table 3 reports an ordinary least squares (OLS) regression of the ratio of private credit to GDP against the presence of a Jewish community in 1450. The linear regressions are for the following equation:

$$F_i = \alpha_1 J_i + \beta X_i + \epsilon_i$$

where F_i is the current financial development of city i, J_i is a dummy that identifies those cities where there were Jewish communities in 1450 and X_i is a vector of covariates. In column 1, I report estimates of α_1 without adding any control variable other than the year dummies. Having had a Jewish community in the city in 1450 is related to an increase of 0.40 in my measure of credit availability, which corresponds to a 58% increase with respect to the average level. This effect is statistically significant at 1% and remains significant when controlling for province dummies

(column 2), a series of geomorphological characteristics (column 3), a dummy for whether the city is a province capital (column 4) and the extension of the municipality (column 5).

This positive correlation, however, does not necessarily indicate a causal effect. It is still possible, in fact, that some unobserved or poorly measured characteristics might drive these results. In particular, it could be that the same local advantage that led Jews to settle in a particular city is also responsible for a higher level of current credit availability. To address this issue, I use a difference-in-difference approach based on an historical event: the expulsion of the Jews from the lands under the Aragon crown between 1493 and 1541. This event is exogenous with respect to the Italian social and economic situation during the period. It was in fact the result of the attitude of the Spanish crown toward the Jews; the edict was promulgated in Spain and then extended to the Spanish territories in Italy.

A useful framework for studying the effect of Jewish communities during the Italian Renaissance on actual financial development is provided by the following matrix, which divides Italian cities along two dimensions: the presence of a Jewish community in 1450 and the definite expulsion of Jews in the following century. F represents today's level of average financial development in each cell.

Table 1: Difference in difference

		Jewish community in 1450	
		No	Yes
Region where Jews were expelled in 1500	Yes	F_{00}	F_{01}
	No	F_{10}	F_{11}

A simple test for the magnitude of the effect of a Jewish community during the Renaissance can therefore be conducted by concentrating on those regions that were not under Aragonese rule (and where Jews were not expelled) and determining the degree to which cities that hosted Jewish communities in 1450 are more financially developed today, or $F_{11} - F_{10}$. This estimate is analogous with the regression above and may suffer from omitted variable bias. A more compelling test would be to see whether the difference in today's financial development of cities that hosted Jewish communities in 1450 versus cities that did not is higher in regions where the Jews were not expelled compared to regions where they were, or:

$$(F_{11} - F_{10}) - (F_{01} - F_{00})$$

This difference-in-difference estimate is consistent under the assumption that the factors that led to the creation of a Jewish community were the same in regions where the Jews were subsequently expelled as in regions where they were not.

As usual in the literature, I can express the difference-in-difference results in a regression format. My measure of financial development, F_i, is regressed on a dummy that identifies the cities where there were Jewish communities in 1450, J_i, a dummy that identifies cities where Jews were able to

stay after the end of the fifteenth century, S_i, and the interaction between these two dummies, plus a vector of cities covariates, X_i.

$$F_i = \alpha_0 S_i + \alpha_1 J_i + \alpha_2 J_i * S_i + \beta X_i + \epsilon_i \quad (1)$$

Table 4 reports the results. In column 1, the only controls that I use are a set of year dummies and a dummy that identifies province capitals and is motivated by the fact that until the late nineties, national banks could open their branches only in these cities. There are two striking results. The first is that having a Jewish community in 1450 does not have any effect on current banking development per se. This seems to suggest that, after distinguishing the capital from the other cities within the province, there are no missing variables that systematically drive the Jewish population in the Renaissance and credit today. The second striking result is that the coefficient of the interaction term is statistically significant at 1 per cent and very large. Having had a Jewish community in 1450 in regions from which the Jews were not expelled increases private credit to GDP today by 0.26, which corresponds to an increase of almost 40% with respect to the average level. In contrast, Jewish demography has no effect in regions from which Jews were subsequently expelled. This result is robust to the inclusion of a set of province dummies and a set of geomorphological characteristics (columns 3 and 4).

A possible concern is that the factors that led to the creation of a Jewish community were different among the different Italian regions. For this reason, in column 4, I limit my analysis to Central Italy, focusing on a set of more comparable cities in terms of history and geography. Qualitatively, the results do not change, although the estimate for the coefficient of the interaction term increases by a third. This increase is probably related with the fact that Franciscan preachers began their crusade against Jewish usury specifically in Central Italy. Here, Jewish lenders started to compete with Catholic lending institutions earlier than elsewhere in Italy, and this probably accentuated their effect in fostering local banking development.

In column 5, I rerun the regression controlling for the size of the urban population in 1300, 1400 and 1500. Cities that were larger in the Renaissance could today be more economically developed as a result of having inherited a higher level of human and social capital (see Guiso, Sapienza, and Zingales (2008); Percoco (2009)). This could bias my results if the Jews in the Aragonese regions were living in smaller cities as compared to the Jews in other Italian regions. This is plausible because most of the large Italian cities were concentrated in the Central and Northern Italy. The ancient urban population is clearly an endogenous regressor in equation 4: there may be some omitted features that both drive credit today and affected the urban population five centuries ago. However, the fact that the coefficient of the interaction term is affected very marginally by its inclusion suggests that my results are not driven by the distribution of the urban population in the Renaissance.

Most of the Jews were able to read and write during the Renaissance while most of the other Italians were not. In order to exclude the possibility that the effects of Jewish communities on credit were driven by human capital factors (in particular if Jews in a region from which they were

expelled were less educated than Jews in a region from which they were not), I add average years of schooling in 2000 to the regressors (columns 6 and 7). Again, this variable is clearly endogenous, but it is reassuring the fact that its inclusion does not significantly affect the coefficient of the interaction term.

5.1 What if Jews had not been expelled from the South?

The estimates of equation 1 suggests that in those regions that were not under the Aragon crown, the current credit over GDP ratio in the cities that used to host Jewish communities is at least 40% higher than in those cities that did not.

Imagine increasing the credit availability in those regions that were under the Aragon crown by 40% only in those cities that used to host Jewish communities (that were subsequently expelled). Since, most of the regions that were under the Aragon crown in 1500 are concentrated in the South of Italy, in this way we can infer how much in the North-South gap in current Italian banking institutions can be attributed to the expulsion of the Jews.

The answer is surprising. At least one third of the gap in current credit availability between the North and the South of Italy can be explained by this event. I don't have reasonable elements to explain the remaining gap. However, it is possible (in fact, likely) that this estimate on the effect of the expulsion of the Jews is conservative. Probably, through temporary migration (due to the mechanism of the condotta), the positive effect of Jewish communities spilled over into neighboring towns, further contributing to the development of financial institutions in the Center-North.

Therefore, the expulsion of the Jews from the regions under the Aragon crown can be read as an exogenous negative shock on current banking development. It would be interesting to know how much of the North-South gap in economic development is explained by this shock. In the next section, I will estimate the effects of a shock on credit availability on GDP per capita. For now, let me anticipate that the most reliable result in the next section implies that an exogenous increase in credit availability by 1% causes an increase in GDP per capita by at least 0.2%. This implies that the expulsion of the Jews is responsible of at least 10% of the north-south gap in GDP per capita[17].

6 Financial development and income

6.1 OLS regressions

Table 5 reports the ordinary least-squares (OLS) regressions of per capita income on the private credit-to-GDP ratio. I focus on all Italian cities that were not under the Aragon crown in the Renaissance and estimate the following equation:

$$\log Y_i = \alpha \log F_i + X_i' \beta_Y + \upsilon_{1,i} \tag{2}$$

[17] There is a large literature in history that attributes the decline of Spain and South of Italy at the beginning of the Renaissance to the edict of expulsion of the Jewish communities.

where Y_i is income per capita in city i and X_i is a set of covariates that affect economic performance. The coefficient of interest throughout the paper is α, which captures the effect of increasing the availability of credit on per capita income.

In column 1, there are no covariates. As expected, the effect of credit availability on GDP per capita is positive and significant. An increase in the private credit to GDP ratio of 1% is associated with an increase in GDP per capita of 0.1%. However, the addition of province fixed effects (column 2) induces a tenfold reduction in the coefficient of interest, which even becomes negative when I control for the political and economic importance of the city by including among the covariates: the extension of the municipality (column 4), a dummy for regional capitals (column 5) or a dummy for province capitals (column 6). This result is surprising and at odds with the previous findings of the literature, but it should be kept in mind that this correlation cannot be interpreted as a causal relationship. The coefficient is probably strongly downward-biased due to the measurement error in the GDP at the city level, which creates a spurious negative correlation between GDP per capita and the ratio of credit over GDP. However, two other potential biases lean in the opposite direction. First, there is a reverse causality problem because richer economies may be able to afford better banks and ask for more credit. Second, there are many omitted determinants of income differences that will be naturally correlated with differences in financial institutions. All these problems could be resolved using a valid instrument for credit availability. Such an instrument should be able to account for variations in the availability of credit that have no direct effect on economic performance.

6.2 IV regressions

Consider a system of equations that (in addition to equation 2, which describes the relationship between current credit availability and economic performance) includes the following:

$$\log F_i^{1450} = \alpha_1 J_i^{1450} + X_i' \beta_J + \upsilon_{3,i} \tag{3}$$

$$\log F_i = \gamma_C \log F_i^{1450} + X_i' \beta_C + \upsilon_{2,i} \tag{4}$$

where J_i^{1450} is a dummy variable that identifies cities that used to host a Jewish community in 1450, F_i^{1450} is a measure of credit availability in 1450 and X' is a vector of covariates that affect all variables.

Equation 3 captures the fact that the presence of a Jewish community during the Renaissance was able to foster credit availability in the city. As we have seen, this was mainly for two reasons. First, only Jews were allowed to lend for a profit and the presence of a Jewish community tended to be associated with greater competition among Jewish moneylenders. Second, with the explicit objective of counteracting the influence of Jewish money-lending, the Franciscan movement had promoted the creation of the Monti di Pietà. These institutions were particularly successful in cities that hosted Jewish communities because it was here that Franciscan preachers had concentrated

their efforts.

Equation 4 is motivated by the hypothesis that financial institutions tend to be very persistent. After all, the main asset of a bank is reputation, and this is an asset that strongly appreciates over time. In a different paper (Pascali (2009)), I systematically document the long-term persistence of banking institutions in Italian cities. Branch density and credit availability are higher today in cities that had a Monte di Pietà or a Jewish banker in the 16th century. This relationship remains robust even when an instrumental variable approach is used to rule out the possibility of omitted variables that could both have driven financial institutions in the 16th century and be driving them today. In this case, the instrument for banking institutions in early Renaissance is the presence of a bishop in the year 1000 A.D. and is motivated by the fact that in the Renaissance, cities with a deep-rooted Catholic tradition were more likely to challenge Jewish bankers by founding alternative charity loaning institutions. In fact, some of the largest current Italian banks trace their origin to the Monte di Pietà that were created in the early Renaissance. In 1995, the largest Italian banks by number of branches in Southern, Central and Northern Italy were respectively Banco di Napoli, Banca di Roma and San Paolo. Banco di Napoli was funded through the merger of eight Catholic institutions that opened in Naples between 1539 and 1640[18], while Banca di Roma and San Paolo come, respectively, from the Monte di Pietà of Rome [19] and that of Turin[20]. In general, there are hundreds of Italian banks that can be traced back to a Monte di Pietà[21].

Based on the set of relationships identified by equations 2, 3 and 4, I will use the presence of a Jewish community in 1450 to instrument for current availability of credit. This identification strategy will be valid as long as the instruments are uncorrelated with the error term in equation 2;

[18] In 1539, the Monte di Pietà of Napoli was founded with the philanthropic purpose of providing interest-free pawn loans. Later, the Monte di Pietà opened a depository bank that was recognized with a viceregal proclamation in 1584. In the next 50 years other seven Catholic institutions were founded in Naples: the Sacro Monte e Banco dei Poveri (1600); the Banco Ave Gratia Plena or Banco della Santissima Annunziata (1587); the Banco di Santa Maria del Popolo (1589); the Banco dello Spirito Santo (1590); the Banco di Sant' Eligio (1592); the Banco di San Giacomo e Vittoria (1597); and the Banco del Santissimo Salvatore (1640). These eight banks prospered for over two hundred years until they were merged to create the "Banco Nazionale di Napoli" in 1794 by Ferdinand IV of Bourbon.

[19] Banca di Roma regrouped the histories of several notable Rome-based financial houses. The oldest of these was the Monte di Pietà di Roma, founded by a papal bull in 1539 in the aftermath of the sack of Rome in 1527 and the famine of 1538. The rebuilding effort drained the city of credit capital and increases the interest rates placed by the Jewish moneylenders. In response, Pope Paul III issued a bull establishing the Monte di Pietà di Roma, which was placed under the protection of the Franciscan Order . Another Italian bank that participated in the development of what became Banco di Roma is the Banco di Santo Spirito created in 1605 in order to raise funding for the charitable operations of the Arch-hospital Santo Spirito.

[20] The "Campagnia della Fede Cattolica di San Paolo" was created in 1563 after Piedmont had countered the invasion of Phillip II of Spain. The long war had aggravated an already difficult economic situation, increasing famine and poverty in the city of Torino, and the initial aim of the Compagnia was to centralize the collection and distribution of alms. Also in this case, with the formal intent of fighting Jewish moneylenders, the Compagnia created a Monte di Pieta' in 1579 that has operated uninterrupted (with an exception of less than 10 years during the Napoleonic domination of Piedmont) to the present day.

[21] There is no sufficient space in this article to give a complete list of the current Italian banks that tracks their origin in the 16th century and before. As an example, let me cite Banca Monte dei Paschi di Siena (1473), Rolo Banca (descendent of "Banca del Monte di Bologna e Ravenna", 1473), Banca del Monte di Lucca (1516), Banca Monte Parma (1488), Cassa di Risparmio di Udine e Pordenone (descendent of "Monte di Pieta' di Udine, 1496), Banca Carige (descendent of "Monte di Pieta' di Genova, 1483), Banca del Monte di Lombardia (from merging "Banca del Monte di Milano", 1483 and "Banca del Monte di Pavia e Bergamo, 1493).

i.e., $Cov(J_i, \upsilon_{1,i}) = 0$. Let me decompose the residual $\upsilon_{1,i}$ into three parts: $\zeta_{[-\infty;1450],i}$, $\zeta_{[1450;2000],i}$ and ϵ_i so that

$$\upsilon_{1,i} = \epsilon_i + \zeta_{[1450;2000],i} + \zeta_{[-\infty;1450],i}$$

where ϵ_i represents exogenous shocks and measurement errors in the current economic development of city i; $\zeta_{[-\infty;1450],i}$ is the set of unobserved features of city i that affect current economic development and that were already in place before 1450A.D.; and $\zeta_{[1450;2000],i}$ is the set of unobserved features of city i that affect current economic development and that can be traced to after 1450 A.D. The three sufficient conditions for the exclusion restriction to be valid are: $Cov(J_i, \epsilon_i) = 0$, $Cov(J_i, \zeta_{[1450;2000],i}) = 0$ and $Cov(J_i, \zeta_{[-\infty;1450],i}) = 0$.

Although the first condition seems plausible, the other two require further discussion. As a first step, let me argue that $Cov(J_i, \zeta_{[1450;2000],i}) = 0$. This assumption would be invalidated if Jewish demography in the early Renaissance had an effect on current economic performance that was not a consequence of its effect on current credit availability. As a matter of fact, Jews have traditionally displayed a high level of literacy; moreover, historically, Jews used be employed in occupations that were particularly skill-intensive (Botticini and Eckstein (2005)). It could be that either Jewish communities have persisted until now and still affect the level of human capital in their cities or that they did eventually disappear but not before transmitting their knowledge to the rest of the population, thereby contributing to the present level of human capital. However, both cases seem implausible. First, it is well-documented that the distribution of the Jewish population in Italy in the last two centuries has completely changed and, with three notable exceptions (Rome, Florence, Venice), most of the ancient Jewish communities have disappeared or are insignificant in size[22]. Second, it is very unlikely that Jewish communities in the Renaissance could have contributed to the cultural, institutional and economic development of their cities (if not through their effects on financial development). In fact, from the beginning of the 17th century through the middle of the 18th century, Jews lived segregated from the rest of the population in most Italian states and derived their livelihood almost exclusively from money-lending. The Lateran Council forbade Catholics from interacting with the Jews, if not for business reasons. The Jews lived in a dedicated part of the city, the ghetto. They were not allowed to leave the ghetto at night, and during the day they were obliged to wear a distinguishing badge. Moreover, they were excluded from all professions (with some exceptions in medicine), from academia and from all public offices.

The final step in defending the exclusion restriction is arguing that $Cov(J_i, \zeta_{[-\infty;1450],i}) = 0$. This condition would be violated if there were omitted variables driving both Jewish demography in the Renaissance and current economic development. Let me divide these potential omitted

[22] Bonfil writes that "[Between 1815 and 1938], the structure of the Jewish community changed radically. In 1840 there existed about 70 organized communities, in 1938 only 23. [..] The distribution of the Jewish population also changed. Many small rural communities disappeared, while medium-sized urban ones suffered through migration to the large centers.". Some years later the Nazi persecutions in Italy during the Second Word War decimated the Italian Jewry. Through deportations, conversion to other religions and emigration, Italy lost in less than 5 years, almost half of its Jewish population.

variables into four categories: economic, institutional cultural and geo-morphological.

First, I will deal with omitted economic features of a city in 1450. If Jews moved to rich cities, where banks were needed, and if there were some persistence in the level of economic development of Italian cities, then the instrument would not be valid. However, during the early Renaissance, two factors largely prevented the creation of new Jewish communities in Italian cities: first, Jewish communities needed strong links with local aristocracy in order to be protected from the frequent waves of intolerance; and second, Jews could only marry amongst themselves, which kept small groups of families from moving into new cities permanently[23]. In fact, all of the large communities (with the exceptions of Florence and Reggio Emilia) and most of the medium-sized communities that existed in continental Italy in 1450 A.D. were already there at least three centuries earlier (according to the reports of Benjamin de Tudela), well before Jews had been allowed to become money-lenders.[24]

A second possible class of omitted variables is the institutional features of the city in 1450. The main argument is that the same "good rulers" that attracted the Jewish population to a city in 1450 are now responsible for better institutions or higher levels of social capital. I address this possible omitted variable by conducting a city-level analysis and using province fixed effects to rule out the possibility that a Jewish community in the Renaissance could be a proxy for better institutions in a given city. Cities within each Italian province have shared (with very few exceptions) the same rulers during the last 8 centuries. Moreover, today they share the same legislators and courts.

Note, however, that there could be some cultural differences even across cities within the same province. It could be that values or beliefs in some cities were particularly favorable for the establishment of Jewish communities in the Renaissance (for example, a higher level of tolerance towards diversity) and are responsible for better economic outcomes today. It is difficult to rule out this possibility in the absence of data on how tolerant Italian cities were towards the Jewish minority. It is plausible, however, that local cultures were more favorable to the Jewish presence in cities where Jews had been living for a longer period of time than they were in cities where the Jewish presence was more recent. Following this line of reasoning, I examine cities that hosted Jewish communities in 1450 and that were ruled by the Aragons in 1500. Jews were expelled from these cities because of the attitude of the Spanish king rather than that of the local population. Table 6 reports the results of the following regression:

$$Y_i = \alpha_1 J_i^{1130} + \beta X_i + \epsilon_i$$

where J_i^{1130} is a dummy variable that identifies cities that were already hosting a Jewish community in 1130. If local tolerance towards the Jewish minority in the Renaissance is correlated with current economic performance, we should expect that cities that already hosted a Jewish community in 1130 will have a larger income today. However, in all the specifications, independently of

[23] I thank Maristella Botticini for clarifying this point to me.

[24] However, single Jewish families were usually invited from temporary periods in some cities that needed financial services through the mechanism of the "condotta".

whether I control for province fixed effects, geomorphological characteristics, province and regional capitals, the coefficient of J_i^{1130} is very small and is not significantly different from zero. In the last column, I add a dummy that identifies cities with archeological evidence of a Jewish presence at the time of the Roman Empire. Again, the coefficient of this variable is negative and insignificant. This means that even cities under the Aragon crown with a Jewish presence twenty centuries ago (and presumably a culture very favorable to the Jews) are not richer today.

Finally, the last possibility that would invalidate the empirical strategy is that there could be some unobserved geographical and morphological characteristics of Italian cities that drove both the Jewish demography in 1450 and economic performance today. For example, the existence of some amenities could have influenced a Jewish community to settle in a city several centuries before and could also be responsible for the current economic performance of the city. In order to address this issue, I will use a difference-in-difference approach based on the fact that the Jews were expelled from the Aragon-controlled regions. As before, I make the assumption that the factors that led to the establishment of a Jewish community in a particular territory were the same both in regions from which Jews were subsequently expelled and in regions from which they were not. I run a regression similar to equation 1 but using GDP per capita as a dependent variable instead of credit availability:

$$Y_i = \alpha_0 S_i + \alpha_1 J_i + \alpha_2 J_i * S_i + \beta X_i + \epsilon_i$$

The estimates are reported in Table 7. In column 1, the only covariates are a set of year and province fixed effects. The coefficient of J_i is positive and both economically and statistically significant, suggesting that there could be some omitted geomorphological characteristics that were associated with the presence of a Jewish community in 1450 and that affect current income. However, after the inclusion of some observed geomorphological characteristics among the covariates, this result disappears: the coefficient of J_i becomes insignificant, while the coefficient of $J_i * S_i$ is positive and significant. This suggests that after the inclusion of some *observed* geomorphological characteristics as well as a set of province fixed effects, Jewish demography becomes a good instrument of credit availability because there are no other missing variables correlated both with current GDP per capita and with the presence of a Jewish community in the early Renaissance. This result is robust to the several specifications that are reported in the table.

Having discussed the validity of my instruments, I can move to the two-stage least-squares (2SLS) estimates of equation 2. I limit the analysis to cities in regions that were not under the Aragon crown. The results are presented in Table 8. In Panel A, the availability of credit is treated as endogenous and modeled as follows:

$$\log F_i = \xi_1 J_i^S + \xi_2 J_i^M + \xi_3 J_i^L + X_i'\delta + \epsilon_i$$

where J_i^S, J_i^M and J_i^L indicate, respectively, the presence of a small, medium-sized or large community in 1450. The estimate of the elasticity of income per capita with respect to the credit-

to-GDP ratio is 0.25 when the only covariates are a set of year dummies; this estimate is highly significant (with a t-statistic of 5.71). As expected, in contrast with the OLS estimate, it has a positive sign. This suggests that the influence of measurement error on GDP, which creates a downward bias, is likely to be more important than the reverse causality and omitted variable bias. The first-stage regression in Panel B shows that the effect of the size of the Jewish community in 1450 on current credit availability is positive and strongly significant. Interestingly, it is not only the presence of the Jewish community that has effects on the current credit to GDP ratio but also its size: the larger the Jewish community, the larger the current credit availability. The F-test result for the excluded instruments in 0.6, suggesting that the estimates do not suffer of a weak instrument problem. In column 2, I add province fixed effects, and in column 3, I add the usual set of geomorphological characteristics. Again, the estimates of the impact of credit availability are virtually unchanged, and they remain so when I add the extension of the municipality (column 4), a dummy for regional capital (column 5) and a dummy for province capital (column 6) to ensure that my results are not driven by a spurious correlation between the size of the Jewish community in the Renaissance and the current size of the city.

A possible concern related to this result is that the size of the Jewish community could be driven by the need for banking services during the Renaissance. I have already mentioned that most of the medium-to-large-sized Jewish communities of 1450 were already there three centuries before, well before Jews became money-lenders. However, it could still be that their relative size changed depending on the local demand for credit. For this reason, I repeat the 2SLS regressions using the presence of a Jewish community (instead of its size) as an instrument for current credit availability. The results are very similar to the previous ones, with the estimate of the impact of credit availability on income per capita ranging from 0.2 to 0.25 (see Table 9).

In table 10, I use branch density instead of the credit to GDP ratio as a measure of local banking development. The results are surprising. The effect of banks on income appears much larger than in any other previous result: a 1% increase in branch density increases GDP per capita by 0.7-1.3% depending on the econometric specification. This seems to validate the view that banks affect economic performance not only through the provision of credit but also by supplying a larger variety of services.

Table 11 reports a set of robustness checks. In the first three columns, I limit the analysis to Central Italy: surprisingly, it seems that in these regions the effect of credit availability on GDP per capita is even stronger. The coefficient of interest almost doubles. Based on the first-stage estimates, notice that the effects of Jewish demography in 1450 on current credit availability are also much stronger in Central Italy, with coefficients increasing by a third on average. This is probably because the creation of the "Monti di Pietà" started in Central Italy and it was in these regions that the Franciscan preachers concentrated their efforts against Jewish usury. In columns 4 to 6, I add the populations of the city in 1300, 1400 and 1500 among the covariates. The main concern that motivates this robustness check is that the presence of a Jewish community in the Renaissance could work as a proxy for the size of the city in this period. The effect of credit

availability on income drops slightly from 0.20 to 0.17-0.18 (depending on the other covariates). Finally, in the last three columns, I add the difference-in-difference analysis that I used to validate my instrument earlier in this paragraph directly to the IV regressions. For the sample of all Italian cities, I estimate the following regression:

$$\log Y_i = \alpha \log F_i + \psi_1 J_i^S + \psi_2 J_i^M + \psi_3 J_i^L + X_i' \beta_Y + \upsilon_{1,i} \tag{5}$$

where availability of credit, $\log F_i$, is considered endogenous and modeled as

$$\log F_i = \xi_1 J_i^S * S_i + \xi_2 J_i^M * S_i + \xi_3 J_i^L * S_i + X_i' \delta + \epsilon_i$$

Practically, the dummies J_i^S, J_i^M and J_i^L should control for those city-level characteristics that are common across the cities where Jewish communities were hosted in 1450. At the same time, the interaction terms between these dummies and a dummy that identifies territories that were not under the Aragon crown are used as instrumental variables in the 2SLS regression. The estimate of α is larger compared to my baseline model, increasing from 0.20 to 0.30. As expected, the direct effect of the size of Jewish communities on income is statistically insignificant (and negative most of the time). This confirms that the cities where there were Jewish communities in the Renaissance do not have any advantage today in terms of income per capita if Jews were expelled. In contrast, from the first stage estimates, the effect of the the size of Jewish communities in regions where they were not expelled has been positive and significant.

Overall, the 2SLS results show a large effect of local banking development on economic performance. This effect is robust to different measures of banking development, different samples and different econometric specifications.

7 Financial development and technology

Joseph Schumpeter argued that economic development is driven by innovations (e.g., "different employment of existing services and labor and land", Schumpeter 1934). The so-called "Shumpeterian view" in the literature on finance and growth is based on the idea that banking institutions affect economic performances via their ability to foster aggregate productivity (e.g., the total output produced by the economy for a given set of inputs) rather than capital accumulation. According to this literature, financial intermediaries are able to identify the more innovative entrepreneurs and the more productive production processes and provide them with the necessary purchasing power by diverting the means of production from their previous uses. By selecting the more promising investments within a firm and across different firms, banks are able to foster aggregate productivity.

To test the Shumpeterian hypothesis, I use a detailed dataset for Italian firms in the manufacturing sector to study the effect of local banking development on aggregate productivity in Italian cities. First, I will infer the productivity of each firm in the sample as the residual of an estimated production function. Then, I will compute a measure of the aggregate productivity in Italian cities

from the productivity of the local firms. Finally, I will provide evidence that financial institutions matter for aggregate productivity, shedding light on two channels through which local banks could affect aggregate productivity.

Assume that the (gross) production function in industry j is a Cobb-Douglas:

$$\log Y_{fit} = \varepsilon_L^j \log L_{fit} + \varepsilon_K^j \log K_{fit} + \varepsilon_M^j \log M_{fit} + \delta_{it} + \eta_{jt} + \alpha_f + \omega_{fit} \tag{6}$$

where Y_{fit} denotes the total sales of firm f in city i, L_{fit}, K_{fit} and M_{fit} are the firm's production factors, δ_{it} is a city-specific component of productivity, η_{jt} an industry-specific common component of productivity, α_f a time-invariant firm level component and ω_{fit} an idiosyncratic component. I have estimated equation 6 (at the 3-digit industry level) using several methodologies: OLS, Difference OLS, Olley and Pakes, Difference GMM and System GMM. The advantages and disadvantages of each choice are well known, although there is no agreement on which estimator should be used[25]. The results in this section are robust to these different methodologies.

Having obtained the estimates of the output elasticity to each production factor, I recover the total factor productivity of firm f, t_{fi}, as follows:

$$\log t_{fi} \equiv \log Y_{fi} - \widehat{\varepsilon}_L^j \log L_{fi} - \widehat{\varepsilon}_K^j \log K_{fi} - \widehat{\varepsilon}_M^j \log M_{fi}$$

Finally, I compute a measure of the aggregate productivity of city i as a weighted average of the productivity of the firms operating within the city:

$$\log T_i \equiv \sum_{f \in i} w_{fi} \log t_{fi}$$

where the weights are $w_{fi} \equiv VA_f / \sum_{f \in i} VA_f$ and VA_f is the value added produced by firm f. T_i is a valid measure of aggregate productivity in city i because it captures whether the economy is able to produce more output for a given set of inputs. Note that it does not generally coincide with the usual Solow residual, which is computed from aggregate data on value added and primary inputs. A large body of literature has shown that the Solow residual is a good measure of aggregate technology under very restricted hypotheses. For example, Hall (1988, 1990) notes that with imperfect competition, the Solow residual rises when the use of primary inputs rises. Basu and Fernald (2002) note that if firms have different markups of price over marginal cost or face different wages, then reallocation of resources towards firms with higher mark ups or those that pay higher

[25] One fundamental estimation problem is the endogeneity of the input variables, which are likely to be correlated both with α_f and ω_{fit}. Correlation with ω_{fit} may reflect both simultaneity of input choices or measurement errors. Given the shortness of the panel, elimination of α_f through a within transformation is not the appropriate strategy. Differencing of (6) and application of the difference GMM estimator (Arellano and Bond (1991)) is a possibility, but appropriately lagged values of the regressors may be poor instruments if inputs are very persistent. Application of the GMM System estimator (Blundell and Bond (1998) and Blundell and Bond *(2000)* is probably a better option. An alternative approach is the one proposed by Olley and Pakes (1996). This estimator addresses the simultaneity (and selection) problem by using firm investment as a proxy for unobserved productivity and requires the presence of only one unobserved state variable at the firm level and monotonicity of the investment function. A recent survey of different methodologies to estimate the production function is provided by Beveren (2007).

wages raises the Solow residual.[26]

The measure of aggregate productivity, T_i, is then regressed on local credit availability according to the following equation:

$$\log T_i = \alpha \log F_i + X_i' \beta_Y + \upsilon_{1,i} \tag{7}$$

OLS estimates are reported in Table 12: local credit availability seems to have no effect on aggregate technology. The results change dramatically when we move to 2SLS using the usual instruments for local banking development. The results are reported in Table 13. Column 1 reports the 2SLS estimates for the coefficient of interest α when the only covariates are the province dummies. The fact that this coefficient is positive and both economically and statistically significant seems to validate the Shumpeterian theory: banks have strong effects on local productivity. This result is consistent across different specifications (namely adding geographic characteristics, a region capital dummy, province dummies and population figures for 1300, 1400 and 1500). However, the effect of local banks on productivity does not fully account for their effect on the GDP per capita of Italian cities: while an increase in credit availability of 1 percent increases GDP per capita by at least 0.2 percentage points, the effect on aggregate technology in the manufacturing sector is much smaller, ranging between 0.12 and 0.13 percentage points. Table 14 repeats the same analysis using branch density as a measure of local banking development. The effect of branch density on productivity is statistically and economically significant, but even in this case, it does not fully account for the effect on GDP per capita. While an increase in branch density of 1 percent increases GDP per capita by at least 1 percent, the effects on aggregate technology range between 0.6 and 0.7 percentage points. One possible interpretation of this result is that while the Shumpeterian channel is responsible for the bulk of the effect of banks on GDP per capita, other channels could be operating as well. For example, it could be that better banking institutions increase the propensity of households to save and therefore boost the accumulation of capital in the economy. Note, however, that my results regarding the effect of banks on firm productivity could be downward-biased because of sample selection. First, it could be that banks have stronger effects on innovation in non-manufacturing sectors (which are not covered in this analysis because the estimation of a production function is problematic). A second possible interpretation is that although Amadeus covers 86 percent of the total revenues of Italian firms operating in manufacturing, it does not capture the smallest firms (with revenues smaller than one million), which are probably those that benefit more from local financial development.

Most of the theoretical literature focuses on two channels through which banks could affect firm productivity. First, banks produce ex ante information about possible investments; this implies a reallocation of capital towards more productive firms. Second, banks monitor investments ex post and exert corporate governance; this implies an average increase in firm productivity. In order to distinguish between these two channels, it is helpful to decompose productivity figures in Italian cities into two parts as suggested by Olley and Pakes (1996):

[26] For a detailed discussion on the differences between the measure of aggregate productivity in this paper and the Solow residual see Basu and Fernald (2002) and Basu, Pascali, Schiantarelli, Serven (2009).

$$\log T_{i,t} = \sum_{f \in i} \Delta \log t_{fit} \Delta w_{fit} + \overline{\log t_{it}} \tag{8}$$

where:

$$\Delta \log t_{fit} \equiv \log t_{fit} - \overline{\log t_{fit}} \quad \text{and} \quad \Delta w_{fit} \equiv w_{fit} - \overline{w_{it}}$$

and:

$$\overline{\log t_{it}} \equiv \sum_{f \in i} \log t_{fit} \quad \text{and} \quad \overline{w_{it}} \equiv \sum_{f \in i} w_{fit}$$

The first term in equation 8 represents the sample covariance between productivity and value added. The larger this covariance, the higher the share of value added that goes to more productive firms and the higher city i's productivity. The second term is the unweighted average of firm-level productivity figures.

Table 16 presents 2SLS estimates for the following equation:

$$\mathrm{Re}\, all_i = \alpha \log F_i + X_i' \beta + \epsilon_i$$

where $\mathrm{Re}\, all_i \equiv \sum_{f \in i} \Delta \log t_{fit} \Delta w_{fit}$ and X_i is the usual set of covariates. Local financial development has a positive and statistically significant effect on the variations in aggregate productivity that are due to the reallocation of resources towards more efficient firms. This seems to validate the original Shumpeterian view that banks exert their effects on growth by identifying the best entrepreneurs and diverting resources to finance their innovations. Ceteris paribus an increase in credit availability by 1% increases the reallocation term by 0.5-0.6%. Again, the effect of branch density is much stronger because an increase in the latter of 1% increases the reallocation term by 1.3-1.8%. Thus, the effect of local banking development on the reallocation of resources toward more productive firms is very sizeable from an economic point of view. In contrast, I do not find the same effect when looking at the unweighted average of firm productivity figures.

Table 15 presents 2SLS estimates for the following equation:

$$\overline{\log t_i} = \alpha \log F_i + X_i' \beta + \epsilon_i$$

Credit availability has a small and statistically insignificant effect on unweighted average firm-level productivity. The effect of branch density is roughly fivefold larger but still statistically insignificant.

In conclusion, local banking development has strong positive effects on city-level aggregate productivity. Moreover, the effects of banks on aggregate productivity seem to operate by reallocating resources towards more productive firms rather than by boosting the average productivity of firms. This seems to validate theories that stress the importance of the role of the banks in exploiting ex

ante information on investment opportunities to select the more promising ones.

8 Conclusion

Many economists believe that differences in the quality of banking institutions are the root of large differences in per capita income. Several empirical works have emphasized the presence of a positive correlation between the quality of banking institutions and economic development both at the country and at the regional level. However, assessing causality in this regard has also proved difficult because of the obvious 'chicken-and-egg' problem of circular causality that bedevils any study confined to a short time frame. I depart from the standard approach by looking for an exogenous source of variation in banks that dates back over five centuries.

My argument rests on the following premises:

1) Local financial markets were extremely heterogeneous across Italian cities during the Renaissance. At one extreme, there were cities in which several Catholic charity institutions and Jewish bankers were competing in the local lending market. At the other extreme, there were cities where lending activity was limited to intra-household transfers.

2) The presence and the size of a local Jewish community had strong effects on the complexity of the local financial markets. This happened for two reasons: first, because the Jews were the only ones allowed to lend for a profit; and second, because of the Franciscan reaction to Jewish usury, which led to the creation of charity lending institutions called Monti di Pietà. These institutions, which were dependent on charity for financing, were particularly successful in those cities where Jewish communities used to live: there, Franciscan preachers had concentrated their efforts against usury, and anti-Jewish feelings had fueled the donations to the Monti.

3) Finally, I argue that financial institutions tend to be very persistent over time. Most of the Italian banks trace their origin in the Monti of the fifteenth and sixteenth century.

First, I document that Jewish demography in the early Renaissance had strong effects on current financial development. Toward this end, I use a difference-in-difference approach based on the fact that in the sixteenth century, the Jews were expelled from some Italian regions but not from others. In practice, I use the regions from which they have been expelled as a control group. This allows me to rule out the possibility that my results are driven by some missing variables that are correlated with the presence of a Jewish community in the Renaissance and could affect current financial development.

Second, I exploit differences in Jewish demography in the Renaissance across Italian municipalities to estimate the impact of banking institutions on economic performance. I find surprisingly large effects, which validates the view that good banks are decisive determinants of development.

Third, I shed light on the channels through which banks affect economic performance. I find that higher availability of private credit implies higher aggregate productivity. In particular, the effect of banks on aggregate productivity seems to operate through a reallocation of resources towards more productive firms rather than by boosting the average productivity of firms. This seems to

validate theories that stress the importance of the role of banks in exploiting ex-ante information regarding investment opportunities as they seek to select the more promising opportunities.

Let me conclude by pointing out that my findings do not imply that banking institutions today are predetermined by local historical events and cannot be changed. I emphasize Jewish demography as one of the many factors affecting Italian local financial institutions; because it is arguably exogenous, it is useful as an instrument for isolating the effects of banks on development. In fact, my reading of the results of this paper is that improvements in financial institutions may be substantially beneficial to the economic environment.

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Table 2: Summary Statistics for the Samples Used in Estimation

PANEL A	City level data (historical)					
	Mean	*Median*	Standard *Deviation*	*Min*	*Max*	*N*
Small Jewish Community	0.21	0.00	0.41	0.00	1.00	544
Medium Jewish Community	0.10	0.00	0.31	0.00	1.00	544
Large Jewish Community	0.09	0.00	0.29	0.00	1.00	544
Population 1300	4.68	0.00	11.99	0	150	543
Population 1400	2.03	0.00	7.53	0	100	543
Population 1500	3.50	0.00	11.42	0	150	543
Population 1600	5.49	0.00	17.51	0	280	543
Population 1700	5.26	0.00	15.92	0	220	543
Population 1800	8.30	6.00	19.81	0	320	543

PANEL B	City level data					
	Mean	*Median*	Standard *Deviation*	*Min*	*Max*	*N*
GDP per Capita	15.96	14.92	6.38	4.59	37.54	542
Credit /GDP	0.69	0.53	0.60	0.03	4.71	448
Branches /Population	0.0005	0.0004	0.0002	0.0001	0.0012	540
Altimetry Min	0.11	0.06	0.14	-0.00	0.80	542
Altimetry Max	0.76	0.64	0.61	0.00	3.32	542
Altimetry Average	0.29	0.23	0.26	0.00	1.12	542
Seismicity	0.00	0.00	0.00	0.00	0.00	542
Sea	0.13	0.00	0.34	0.00	1.00	541
Close to Sea	0.12	0.00	0.33	0.00	1.00	541
Province Capital	0.17	0.00	0.38	0.00	1.00	542
City Area	0.12	0.09	0.12	0.00	1.50	542

PANEL C	Firm level data: Amadeus database					
	Mean	*Median*	Standard *Deviation*	*Min*	*Max*	*N*
Sales	15900	3530	99700	13	6400000	92316
Net Value of Capital	3120	495	22500	1	2010000	92316
Wages	2230	585	11400	1	619000	92316
Cost of Intermediates	12200	2570	83000	11	6000000	92316
Employees	71.03	24.00	310.94	1	18100	76301

Note:Panel A reports statistics on historical data. The sample is limited to the towns in Italy that had a population of at least 5000 people in 1861. Historical data on urban populations are in thousands (source: Malanima (1998)). Data on the size of Jewish demography refer to the end of the fifteenth century (source: Milano (1963)). In Panel B, "GDP per Capita" is the per capita value added in 2002 in the municipality, expressed in thousands of euros (source: INSTAT). "credit/GDP" is the ratio of claims on nonfinancial private sector to GDP in the municipality (source: Bank of Italy). "Brances/Population" is the ratio of the number of bank branches to residents (source: Bank of Italy). Altimetry is expressed in thousands of meters (source: ISTAT). "Sea" is a dummy that identifies cities on the sea; "Close to Sea" is a dummy that identifies cities that are less than 5 miles from the sea. "Province Capital" is a dummy variable equal to one if the city is the capital of its province (year 2002). "City Area" is the extension of the municipality in square meters (year 1991). Panel C reports statistics for the Amadeus firm-level data in the year 2005. "Sales", "Net value of capital", "Wages" are expressed in thousands of euros.

Table 3: Jewish communities in Renaissance and current credit availability

	(1) CREDIT	(2) CREDIT	(3) CREDIT	(4) CREDIT	(5) CREDIT
JEW	40.58***	31.97***	32.01***	15.48***	15.68***
	(3.721)	(3.195)	(3.259)	(3.100)	(3.126)
PROVINCE CAPITAL				53.76***	54.37***
				(3.488)	(3.707)
AREA					-0.00628
					(0.0128)
_cons	53.08***	33.65	33.74	1.999	2.645
	(3.727)	(24.17)	(24.54)	(22.00)	(22.05)
GEO. CHARACTERISTICS	NO	NO	YES	YES	YES
PROVINCE DUMMIES	NO	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES
r2_a	0.104	0.566	0.572	0.659	0.659
N	1020	1020	1020	1020	1020
SAMPLE	All	All	All	All	All

The table reports OLS estimates for the years 2002-2004. The unit of observation is the municipality. The left hand side variable, CREDIT, is the ratio of claims on nonfinancial private sector to GDP in the municipality; GDP is GDP per capita and is imputed by looking at the per capita GDP in the "local labor system" to which the municipality belongs to. JEW is a dummy variable equal to one if the municipality hosted a Jewish community in 1450 A.D. PROVINCE CAPITAL is a dummy variable equal to one if the city is the capital of its province. AREA is the extension of the municipality in square meters (data refers to 1991). The set of PROVINCE DUMMIES refers to the Italian provinces in 1992. Geographical variables are elevation of the municipality (minimum, maximum), seismicity (as reported by the Italian national statistical institute) and two dummies for whether the city is located on the coast or close to the cost (less than 5 miles distant). Standard errors are reported in parentheses. *** significant at less than 1 percent; ** significant at 5 percent; * significant at 10 percent.

Table 4: Jewish communities in Renaissance and current credit availability

	(1) CREDIT	(2) CREDIT	(3) CREDIT	(4) CREDIT	(5) CREDIT	(6) CREDIT	(7) CREDIT
JEW	5.667	6.246	6.197	-20.73	5.177	2.111	2.473
	(3.701)	(3.801)	(3.866)	(16.53)	(3.704)	(3.600)	(3.750)
JEW*STAY	23.63***	24.57***	24.62***	37.50**	11.45*	11.20*	24.36***
	(5.792)	(5.910)	(5.965)	(18.51)	(5.916)	(5.718)	(5.747)
STAY	-28.43**	-27.10**	-27.14**	-26.83	-17.23	0.147	-8.485
	(12.55)	(12.80)	(12.83)	(17.40)	(12.22)	(12.00)	(12.55)
PROVINCE CAPITAL	52.72***	51.77***	51.67***	49.63***	38.56***	15.79***	25.68***
	(3.436)	(3.511)	(3.753)	(6.885)	(3.771)	(4.599)	(4.738)
AREA			0.000903	0.0342**	-0.0176	-0.0105	0.00952
			(0.0128)	(0.0171)	(0.0124)	(0.0121)	(0.0124)
POP1300					1.289***	1.085***	
					(0.271)	(0.263)	
POP1400					0.390	0.558	
					(0.493)	(0.477)	
POP1500					-0.329*	-0.275	
					(0.173)	(0.168)	
EDUC						23.33***	25.81***
						(2.875)	(3.041)
GEO. CHARACTERISTICS	NO	YES	YES	YES	YES	YES	YES
PROVINCE DUMMIES	YES	YES	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES	YES
r2_a	0.664	0.665	0.665	0.549	0.706	0.725	0.689
N	1020	1020	1020	234	1020	1020	1020
SAMPLE	All	All	All	Central Italy	All	All	All

The table reports OLS estimates for the years 2002-2004. The unit of observation is the municipality. The left hand side variable, CREDIT, is the ratio of claims on nonfinancial private sector to GDP in the municipality; GDP is GDP per capita and is imputed by looking at per capita GDP in the "local labor system" to which the municipality belongs to. JEW is a dummy variable equal to one if the municipality hosted a Jewish community in 1450 A.D. STAY is a dummy equal to one if the municipality was under the Aragon crown in 1500 A.D. PROVINCE CAPITAL is a dummy variable equal to one if the city is the capital of its province. AREA is the extension of the municipality in square meters (data refers to 1991). POP1300, POP1400 and POP1500 are respectively the estimated urban population in the municipality in 1300, 1400 and 1500. EDUC is the average number of years of education of the local residents. The set of PROVINCE DUMMIES refers to the Italian provinces in 1992. Geographical variables are elevation of the municipality (minimum, maximum), seismicity (as reported by the Italian national statistical institute) and two dummies for whether the city is located on the coast or close to the cost (less than 5 miles distant). Standard errors are reported in parentheses. *** significant at less than 1 percent; ** significant at 5 percent; * significant at 10 percent.

Table 5: Jewish communities in the Renaissance and current economic development (validating the instrument)

	(1) LGDP	(2) LGDP	(3) LGDP	(4) LGDP	(5) LGDP	(6) LGDP
LCREDIT	0.101***	0.0149	0.0135	-0.0187	-0.0459***	-0.102***
	(0.0138)	(0.0169)	(0.0165)	(0.0167)	(0.0163)	(0.0171)
AREA				0.369***	0.198***	0.188***
				(0.0610)	(0.0626)	(0.0577)
REGION CAPITAL					0.259***	
					(0.0363)	
PROVINCE CAPITAL						0.191***
						(0.0187)
GEO. CHARACTERISTICS	NO	NO	YES	YES	YES	YES
PROVINCE DUMMIES	NO	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES
r2_a	0.0983	0.380	0.445	0.487	0.539	0.585
N	510	510	510	510	510	510
SAMPLE	Cities not under Aragon crown in 1500 A.D.					

The table reports OLS estimates for the years 2002-2004. The unit of observation is the municipality. The left hand side variable, LGDP is the log of GDP per capita and is imputed by looking at the per capita GDP in the "local labor system" to which the municipality belongs to. LCREDIT, is the log ratio of claims on nonfinancial private sector to GDP in the municipality. REGION CAPITAL is a dummy variable equal to one if the city is the capital of the region. PROVINCE CAPITAL is a dummy variable equal to one if the city is the capital of its province. AREA is the extension of the municipality in square meters (data refers to 1991). The set of PROVINCE DUMMIES refers to the Italian provinces in 1992. Geographical variables are elevation of the municipality (minimum, maximum), seismicity (as reported by the Italian national statistical institute) and two dummies for whether the city is located on the coast or close to the cost (less than 5 miles distant). Standard errors are reported in parentheses. *** significant at less than 1 percent; ** significant at 5 percent; * significant at 10 percent.

Table 6: Jewish communities in the Renaissance and current economic development (validating the instrument)

	(1) GDP	(2) GDP	(3) GDP	(4) GDP	(5) GDP	(6) GDP
JEW1130	0.0607	0.0314	-0.0414	-0.0503	0.0264	0.0200
	(0.0491)	(0.0464)	(0.0400)	(0.0409)	(0.0476)	(0.0531)
JEWROMAN						0.0204
						(0.0739)
REGION CAPITAL		0.483***				
		(0.0886)				
PROVINCE CAPITAL			0.493***	0.639***	0.677***	0.670***
			(0.0441)	(0.0466)	(0.0505)	(0.0561)
AREA					0.0126	0.0006
					(0.210)	(0.210)
GEO. CHARACTERISTICS	NO	NO	NO	NO	YES	YES
PROVINCE DUMMIES	NO	NO	NO	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES
r2_a	-0.00325	0.118	0.371	0.567	0.619	0.617
N	213	213	213	213	213	213
SAMPLE	Cities that had a Jewish communities in 1450 and were under the Aragons in 1500					

The table reports OLS estimates for the years 2002-2004. The unit of observation is the municipality. The left hand side variable, GDP, is imputed by looking at the per capita GDP in the "local labor system" to which the municipality belongs to. JEW1130 is a dummy variable equal to one if the municipality hosted a Jewish community in 1130 A.D.; JEWROMAN is a dummy variable equal to one if the municipality hosted a Jewish community during the Roman Empire. PROVINCE CAPITAL is a dummy variable equal to one if the city is the capital of its province. REGION CAPITAL is a dummy variable equal to one if the city is the capital of the region. AREA is the extension of the municipality in square meters (data refers to 1991). The set of PROVINCE DUMMIES refers to the Italian provinces in 1992. Geographical variables are elevation of the municipality (minimum, maximum), seismicity (as reported by the Italian national statistical institute) and two dummies for whether the city is located on the coast or close to the cost (less than 5 miles distant). Standard errors are reported in parentheses. *** significant at less than 1 percent; ** significant at 5 percent; * significant at 10 percent.

Table 7: Jewish communities in the Renaissance and current economic development (validating the instrument)

	(1) GDP	(2) GDP	(3) GDP	(4) GDP	(5) GDP	(6) GDP	(7) GDP	(8) GDP
JEW	0.0751**	0.0304	-0.0107	-0.0223	-0.0573*	-0.0975	-0.0322	-0.0695**
	(0.0320)	(0.0325)	(0.0328)	(0.0317)	(0.0308)	(0.104)	(0.0328)	(0.0318)
JEW*STAY	0.151***	0.218***	0.224***	0.183***	0.117**	0.421***	0.132**	0.182***
	(0.0526)	(0.0519)	(0.0512)	(0.0496)	(0.0486)	(0.116)	(0.0530)	(0.0490)
STAY	0.169	0.197*	0.170	0.208*	0.158	0.0704	0.215*	0.277***
	(0.115)	(0.112)	(0.111)	(0.107)	(0.104)	(0.108)	(0.110)	(0.106)
AREA			0.604***	0.308***	0.160	0.539***	0.398***	0.423***
			(0.104)	(0.106)	(0.104)	(0.118)	(0.107)	(0.101)
REGION CAP.				0.532***				
				(0.0592)				
PROVINCE CAP.					0.395***			
					(0.0312)			
POP1300							0.00822***	
							(0.00250)	
POP1400							-0.00130	
							(0.00461)	
POP1500							0.000619	
							(0.00163)	
EDUC								0.180***
								(0.0172)
GEO. CHARACT.	NO	YES	YES	YES	YES	YES	YES	YES
PROVINCE DUM.	YES	YES	YES	YES	YES	YES	YES	YES
YEAR DUM.	YES	YES	YES	YES	YES	YES	YES	YES
r2_a	0.678	0.700	0.708	0.728	0.745	0.576	0.723	0.735
N	1185	1185	1185	1185	1185	249	1185	1185
SAMPLE	All	All	All	All	All	Central Italy	All	All

The table reports OLS estimates for the years 2002-2004. The unit of observation is the municipality. The left hand side variable, GDP, is GDP per capita and is imputed by looking at the per capita GDP in the "local labor system" to which the municipality belongs to. LCREDIT, is the log ratio of claims on nonfinancial private sector to GDP in the municipality. JEW is a dummy variable equal to one if the municipality hosted a Jewish community in 1450 A.D. STAY is a dummy equal to one if the municipality was under the Aragon crown in 1500 A.D. PROVINCE CAPITAL is a dummy variable equal to one if the city is the capital of its province. REGION CAPITAL is a dummy variable equal to one if the city is the capital of the region. AREA is the extension of the municipality in square meters (data refers to 1991). POP1300, POP1400 and POP1500 are respectively the estimated urban population in the municipality in 1300, 1400 and 1500. EDUC is the average number of years of education of the local residents. The set of PROVINCE DUMMIES refers to the Italian provinces in 1992. Geographical variables are elevation of the municipality (minimum, maximum), seismicity (as reported by the Italian national statistical institute) and two dummies for whether the city is located on the coast or close to the cost (less than 5 miles distant). Column 6 refers only to municipalities in Central Italy (e.g. in the following regions: Lazio, Toscana, Umbria, Marche). Standard errors are reported in parentheses. *** significant at less than 1 percent; ** significant at 5 percent; * significant at 10 percent.

Table 8: credit availability and economic development (IV estimates)

PANEL A	(1)	(2)	(3)	(4)	(5)	(6)
	LGDP	LGDP	LGDP	LGDP	LGDP	LGDP
LCREDIT	0.253***	0.259***	0.268***	0.256***	0.212***	0.209*
	(5.71)	(5.92)	(6.35)	(4.93)	(3.80)	(1.86)
AREA				0.0494	0.00261	0.0618
				(0.54)	(0.03)	(0.74)
REGION CAPITAL					0.124**	
					(2.48)	
PROVINCE CAPITAL						0.0291
						(0.47)
GEO. CHARACTERISTICS	NO	NO	YES	YES	YES	YES
PROVINCE DUMMIES	NO	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES
sarganp	0.0807	0.250	0.478	0.493	0.780	0.497
N	510	510	510	510	510	510
SAMPLE	Cities not under Aragon crown in 1500 A.D.					

PANEL B	(1)	(2)	(3)	(4)	(5)	(6)
	LCREDIT	LCREDIT	LCREDIT	LCREDIT	LCREDIT	LCREDIT
JEWsmall	0.144**	0.245***	0.267***	0.279***	0.261***	0.193***
	(2.41)	(4.47)	(4.70)	(5.00)	(4.70)	(3.62)
JEWmedium	0.441***	0.554***	0.575***	0.503***	0.473***	0.205***
	(5.69)	(7.99)	(8.42)	(7.25)	(6.81)	(2.74)
JEWlarge	0.704***	0.748***	0.728***	0.596***	0.482***	0.106
	(7.05)	(8.21)	(8.20)	(6.39)	(4.85)	(0.99)
R_2	0.0812	0.5523	0.5967	0.6101	0.6192	0.6200

The table reports 2SLS estimates for the years 2002-2004. The unit of observation is the municipality. The sample is limited to municipalities that were not under the Aragon crown in 1500. Panel A reports the second stage estimates. The left hand side variable, LGDP is the log of GDP per capita and is imputed by looking at the per capita GDP in the "local labor system" to which the municipality belongs to. LCREDIT, is the log ratio of claims on nonfinancial private sector to GDP in the municipality. REGION CAPITAL is a dummy variable equal to one if the city is the capital of the region. PROVINCE CAPITAL is a dummy variable equal to one if the city is the capital of its province. AREA is the extension of the municipality in square meters (data refers to 1991). The set of PROVINCE DUMMIES refers to the Italian provinces in 1992. Geographical variables are elevation of the municipality (minimum, maximum), seismicity (as reported by the Italian national statistical institute) and two dummies for whether the city is located on the coast or close to the cost (less than 5 miles distant). Panel B reports the first stage estimates. To save space only the coefficients on instruments are reported. JEWsmall, JEWmedium and JEWlarge are dummy variables equal to one if the municipality hosted respectively a small, a medium or a large Jewish community in 1450. Standard errors are reported in parentheses. *** significant at less than 1 percent; ** significant at 5 percent; * significant at 10 percent.

Table 9: Credit availability and economic development (IV estimates - robustness checks)

PANEL A	(1)	(2)	(3)	(4)	(5)	(6)
	LGDP	LGDP	LGDP	LGDP	LGDP	LGDP
LCREDIT	0.203***	0.244***	0.260***	0.254***	0.223***	0.241**
	(0.0629)	(0.0562)	(0.0521)	(0.0588)	(0.0634)	(0.122)
AREA				0.0511	-0.00588	0.0487
				(0.0964)	(0.0869)	(0.0884)
REGION CAPITAL					0.119**	
					(0.0531)	
PROVINCE CAPITAL						0.0123
						(0.0667)
GEO. CHARACTERISTICS	NO	NO	YES	YES	YES	YES
PROVINCE DUMMIES	NO	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES
N	510	510	510	510	510	510
SAMPLE	Cities not under Aragon crown in 1500 A.D.					

PANEL B	(1)	(2)	(3)	(4)	(5)	(6)
	LCREDIT	LCREDIT	LCREDIT	LCREDIT	LCREDIT	LCREDIT
JEW	0.295***	0.389***	0.424***	0.377***	0.339***	0.195***
	(0.0553)	(0.0522)	(0.0524)	(0.0508)	(0.0509)	(0.0508)
r2_a	0.0507	0.531	0.564	0.599	0.612	0.662

The table reports 2SLS estimates for the years 2002-2004. The unit of observation is the municipality. The sample is limited to municipalities that were not under the Aragon crown in 1500. Panel A reports the second stage estimates. The left hand side variable, LGDP is the log of GDP per capita and is imputed by looking at the per capita GDP in the "local labor system" to which the municipality belongs to. LCREDIT, is the log ratio of claims on nonfinancial private sector to GDP in the municipality. REGION CAPITAL is a dummy variable equal to one if the city is the capital of the region. PROVINCE CAPITAL is a dummy variable equal to one if the city is the capital of its province. AREA is the extension of the municipality in square meters (data refers to 1991). The set of PROVINCE DUMMIES refers to the Italian provinces in 1992. Geographical variables are elevation of the municipality (minimum, maximum), seismicity (as reported by the Italian national statistical institute) and two dummies for whether the city is located on the coast or close to the cost (less than 5 miles distant). Panel B reports the first stage estimates. To save space only the coefficients on instruments are reported. JEW is a dummy variable equal to one if the municipality hosted a Jewish community in 1450 A.D. Standard errors are reported in parentheses. *** significant at less than 1 percent; ** significant at 5 percent; * significant at 10 percent.

Table 10: Branch density and economic development (IV estimates)

PANEL A	(1)	(2)	(3)	(4)	(5)	(6)
	LGDP	LGDP	LGDP	LGDP	LGDP	LGDP
LCREDIT	0.713***	1.336***	1.341***	1.360***	1.166***	1.523
	(0.143)	(0.284)	(0.293)	(0.403)	(0.405)	(1.021)
AREA				-0.0137	-0.0462	-0.0199
				(0.159)	(0.140)	(0.190)
REGION CAPITAL					0.119*	
					(0.0715)	
PROVINCE CAPITAL						-0.0292
						(0.117)
GEO. CHARACTERISTICS	NO	NO	YES	YES	YES	YES
PROVINCE DUMMIES	NO	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES
sarganp	0.0354	0.764	0.829	0.835	0.825	0.857
N	519	519	519	519	519	519
SAMPLE	Cities not under Aragon crown in 1500 A.D.					

PANEL B	(1)	(2)	(3)	(4)	(5)	(6)
	LCREDIT	LCREDIT	LCREDIT	LCREDIT	LCREDIT	LCREDIT
JEWsmall	0.0525	0.0631**	0.0595**	0.0584**	0.0565**	0.0396
	(0.0321)	(0.0246)	(0.0252)	(0.0250)	(0.0251)	(0.0253)
JEWmedium	0.190***	0.117***	0.116***	0.0941***	0.0897***	0.0294
	(0.0420)	(0.0316)	(0.0319)	(0.0328)	(0.0332)	(0.0374)
JEWlarge	0.228***	0.180***	0.169***	0.127***	0.110**	0.0205
	(0.0541)	(0.0415)	(0.0411)	(0.0442)	(0.0474)	(0.0534)
r2_a	0.0506	0.670	0.679	0.683	0.683	0.690

The table reports 2SLS estimates for the years 2002-2004. The unit of observation is the municipality. The sample is limited to municipalities that were not under the Aragon crown in 1500. Panel A reports the second stage estimates. The left hand side variable, LGDP is the log of GDP per capita and is imputed by looking at the per capita GDP in the "local labor system" to which the municipality belongs to. LCREDIT, is the log ratio of bank branches to residents. REGION CAPITAL is a dummy variable equal to one if the city is the capital of the region. PROVINCE CAPITAL is a dummy variable equal to one if the city is the capital of its province. AREA is the extension of the municipality in square meters (data refers to 1991). The set of PROVINCE DUMMIES refers to the Italian provinces in 1992. Geographical variables are elevation of the municipality (minimum, maximum), seismicity (as reported by the Italian national statistical institute) and two dummies for whether the city is located on the coast or close to the cost (less than 5 miles distant). Panel B reports the first stage estimates. To save space only the coefficients on instruments are reported. JEWsmall, JEWmedium and JEWlarge are dummy variables equal to one if the municipality hosted respectively a small, a medium or a large Jewish community in 1450 Standard errors are reported in parentheses. *** significant at less than 1 percent; ** significant at 5 percent; * significant at 10 percent.

Table 11: Credit availability and economic development (IV estimates - robustness checks)

PANEL A	(1) LGDP	(2) LGDP	(3) LGDP	(4) LGDP	(5) LGDP	(6) LGDP	(7) LGDP	(8) LGDP	(9) LGDP
LCREDIT	0.485***	0.460***	0.369*	0.174***	0.177***	0.179*	0.310**	0.309*	0.273*
	(0.148)	(0.163)	(0.192)	(0.0651)	(0.0650)	(0.0997)	(0.157)	(0.160)	(0.150)
AREA	-0.270	-0.287	-0.119	0.0216	-0.00869	0.00569	-0.0606	-0.108	-0.0907
	(0.192)	(0.185)	(0.53)	(0.0881)	(0.0890)	(0.0858)	(0.138)	(0.135)	(0.107)
REGION CAP.		0.0632			0.0894*			0.205***	
		(0.107)			(0.0496)			(0.0706)	
PROVINCE CAP.			-0.0235			0.0152			0.0920
			(0.0999)			(0.0467)			(0.0841)
POP1300				0.000709	0.000502	0.000441	-0.00241	-0.00280	-0.00253
				(0.00178)	(0.00178)	(0.00180)	(0.00352)	(0.00349)	(0.00289)
POP1400				-0.00343	-0.00322	-0.00305	0.00716	0.00639	0.00642
				(0.00362)	(0.00362)	(0.00359)	(0.00569)	(0.00580)	(0.00528)
POP1500				0.00434	0.00349	0.00408	-0.00196	-0.00292	-0.00174
				(0.00272)	(0.00276)	(0.00273)	(0.00184)	(0.00178)	(0.00173)
JEWsmall							-0.0468	-0.0402	-0.0423
							(0.0409)	(0.0419)	(0.0372)
JEWmedium							-0.0678	-0.0669	-0.0779
							(0.0702)	(0.0710)	(0.0506)
JEWlarge							0.00121	-0.00590	-0.0443
							(0.0952)	(0.0951)	(0.0586)
GEO. CHARACT.	YES	YES	YES	YES	YES	YES	YES	YES	YES
PROVINCE DUM.	YES	YES	YES	YES	YES	YES	YES	YES	YES
YEAR DUM.	YES	YES	YES	YES	YES	YES	YES	YES	YES
sarganp	0.154	0.0850	0.0255	0.925	0.892	0.756	0.0605	0.0191	0.0561
N	210	210	210	510	510	510	1020	1020	1020
SAMPLE	Cities not under Aragon in Central Italy |			Cities not under Aragon crown in 1500 A.D. |			All cities	

PANEL B	(1) LCREDIT	(2) LCREDIT	(3) LCREDIT	(4) LCREDIT	(5) LCREDIT	(6) LCREDIT	(7) LCREDIT	(8) LCREDIT	(9) LCREDIT
JEWsmall	0.246***	0.243***	0.212***	0.205***	0.209***	0.160***			
	(0.0863)	(0.0867)	(0.0785)	(0.0592)	(0.0599)	(0.0570)			
JEWmedium	0.223*	0.222*	0.00244	0.429***	0.429***	0.206***			
	(0.114)	(0.114)	(0.109)	(0.0686)	(0.0687)	(0.0742)			
JEW_large	0.546***	0.507***	0.00263	0.249**	0.249**	-0.0680			
	(0.140)	(0.156)	(0.153)	(0.119)	(0.120)	(0.124)			
JEWsmall*STAY							-0.0615	-0.0439	-0.142
							(0.102)	(0.102)	(0.0987)
JEWmedium*STAY							0.103	0.0905	-0.204
							(0.127)	(0.127)	(0.128)
JEWlarge*STAY							0.529***	0.524***	0.570***
							(0.178)	(0.178)	(0.172)
r2_a	0.655	0.654	0.716	0.646	0.645	0.676	0.627	0.628	0.653

The table reports 2SLS estimates for the years 2002-2004. The unit of observation is the municipality. Panel A reports the second stage estimates. The left hand side variable, LGDP is the log of GDP per capita and is imputed by looking at the per capita GDP in the "local labor system" to which the municipality belongs to. LCREDIT, is the log ratio of claims on nonfinancial private sector to GDP in the municipality. REGION CAPITAL is a dummy variable equal to one if the city is the capital of the region. PROVINCE CAPITAL is a dummy variable equal to one if the city is the capital of its province. AREA is the extension of the municipality in square meters (data refers to 1991). The set of PROVINCE DUMMIES refers to the Italian provinces in 1992. Geographical variables are elevation of the municipality (minimum, maximum), seismicity (as reported by the Italian national statistical institute) and two dummies for whether the city is located on the coast or close to the cost (less than 5 miles distant). JEWsmall, JEWmedium and JEWlarge are dummy variables equal to one if the municipality hosted respectively a small, a medium or a large Jewish community in 1450. Panel B reports the first stage estimates. To save space only the coefficients on instruments are reported. STAY is a dummy equal to one if the municipality was under the Aragon crown in 1500 A.D. Standard errors are reported in parentheses. *** significant at less than 1 percent; ** significant at 5 percent; * significant at 10 percent.

Table 12: Credit availability and aggregate productivity (OLS estimates).

	(1) LTFP	(2) LTFP	(3) LTFP	(4) LTFP	(5) LTFP
LCREDIT	0.00725	0.00726	0.00192	-0.0133	-0.000934
	(0.0132)	(0.0137)	(0.0141)	(0.0149)	(0.0144)
REGION CAPITAL			0.0709		
			(0.0443)		
PROVINCE CAPITAL				0.0745***	
				(0.0230)	
POP1300					0.00187
					(0.00184)
POP1400					-0.000702
					(0.00330)
POP1500					-0.0000355
					(0.00121)
GEO. CHARACTERISTICS	NO	YES	YES	YES	YES
PROVINCE DUMMIES	YES	YES	YES	YES	YES
N	381	381	381	381	381
r2_a	0.977	0.977	0.977	0.978	0.977
SAMPLE	Cities not under Aragon crown in 1500 A.D.				

The table reports OLS estimates for the years 2002-2004. The unit of observation is the municipality. The sample is limited to municipalities that were not under the Aragon crown in 1500. The left hand side variable, LTFP is the log of the aggregate productivity of the firms operating in the municipality. It is computed by aggregating the TFP estimated for the firms that operate in the municipality using their share out of total value added as weights. LCREDIT, is the log ratio of claims on nonfinancial private sector to GDP in the municipality. REGION CAPITAL is a dummy variable equal to one if the city is the capital of the region. PROVINCE CAPITAL is a dummy variable equal to one if the city is the capital of its province. POP1300, POP1400 and POP1500 are respectively the estimated urban population in the municipality in 1300, 1400 and 1500. The set of PROVINCE DUMMIES refers to the Italian provinces in 1992. Geographical variables are elevation of the municipality (minimum, maximum), seismicity (as reported by the Italian national statistical institute) and two dummies for whether the city is located on the coast or close to the cost (less than 5 miles distant). Standard errors are reported in parentheses. *** significant at less than 1 percent; ** significant at 5 percent; * significant at 10 percent.

Table 13: Credit availability and aggregate productivity (IV estimates)

	(1) LTFP	(2) LTFP	(3) LTFP	(4) LTFP	(5) LTFP
LCREDIT	0.114***	0.112***	0.112***	0.108	0.135***
	(0.0328)	(0.0336)	(0.0392)	(0.0679)	(0.0513)
REGION CAPITAL			-0.0115		
			(0.0499)		
PROVINCE CAPITAL				-0.00506	
				(0.0488)	
POP1300					-0.000519
					(0.00199)
POP1400					0.00238
					(0.00342)
POP1500					-0.00177
					(0.00137)
GEO. CHARACTERISTICS	NO	YES	YES	YES	YES
PROVINCE DUMMIES	YES	YES	YES	YES	YES
N	381	381	381	381	381
sarganp	0.574	0.373	0.343	0.317	0.444
SAMPLE	Cities not under Aragon crown in 1500 A.D.				

The table reports 2SLS estimates for the years 2002-2004. The unit of observation is the municipality. The sample is limited to municipalities that were not under the Aragon crown in 1500. The left hand side variable, LTFP is the log of the aggregate productivity of the firms operating in the municipality. It is computed by aggregating the TFP estimated for the firms that operate in the municipality using their share out of total value added as weights. LCREDIT, is the log ratio of claims on nonfinancial private sector to GDP in the municipality. REGION CAPITAL is a dummy variable equal to one if the city is the capital of the region. PROVINCE CAPITAL is a dummy variable equal to one if the city is the capital of its province. POP1300, POP1400 and POP1500 are respectively the estimated urban population in the municipality in 1300, 1400 and 1500. The set of PROVINCE DUMMIES refers to the Italian provinces in 1992. Geographical variables are elevation of the municipality (minimum, maximum), seismicity (as reported by the Italian national statistical institute) and two dummies for whether the city is located on the coast or close to the cost (less than 5 miles distant). The instruments are three dummies equal to one if the municipality hosted respectively a small, a medium or a large Jewish community in 1450. Standard errors are reported in parentheses. *** significant at less than 1 percent; ** significant at 5 percent; * significant at 10 percent.

Table 14: Branch density and aggregate productivity (IV estimates)

	(1) LTFP	(2) LTFP	(3) LTFP	(4) LTFP	(5) LTFP
LCREDIT2	0.523***	0.524***	0.511**	0.614	0.556**
	(0.190)	(0.191)	(0.208)	(0.415)	(0.250)
REGION CAPITAL			0.0109		
			(0.0574)		
PROVINCE CAPITAL				-0.0206	
				(0.0647)	
POP1300					0.00266
					(0.00228)
POP1400					-0.000991
					(0.00408)
POP1500					-0.00228
					(0.00186)
GEO. CHARACTERISTICS	NO	YES	YES	YES	YES
PROVINCE DUMMIES	YES	YES	YES	YES	YES
N	381	381	381	381	381
sarganp	0.922	0.880	0.880	0.911	0.925
SAMPLE	Cities not under Aragon crown in 1500 A.D.				

The table reports 2SLS estimates for the years 2002-2004. The unit of observation is the municipality. The sample is limited to municipalities that were not under the Aragon crown in 1500. The left hand side variable, LTFP is the log of the aggregate productivity of the firms operating in the municipality. It is computed by aggregating the TFP estimated for the firms that operate in the municipality using their share out of total value added as weights. LCREDIT, is the log ratio of bank branches to residents. REGION CAPITAL is a dummy variable equal to one if the city is the capital of the region. PROVINCE CAPITAL is a dummy variable equal to one if the city is the capital of its province. POP1300, POP1400 and POP1500 are respectively the estimated urban population in the municipality in 1300, 1400 and 1500. The set of PROVINCE DUMMIES refers to the Italian provinces in 1992. Geographical variables are elevation of the municipality (minimum, maximum), seismicity (as reported by the Italian national statistical institute) and two dummies for whether the city is located on the coast or close to the cost (less than 5 miles distant). The instruments are three dummies equal to one if the municipality hosted respectively a small, a medium or a large Jewish community in 1450. Standard errors are reported in parentheses. *** significant at less than 1 percent; ** significant at 5 percent; * significant at 10 percent.

Table 15: availability and average productivity (IV estimates)

	(1) average LTFP	(2) average LTFP	(3) average LTFP	(4) average LTFP	(5) average LTFP	(6) average LTFP
LCREDIT (credit/GDP)	0.0397	0.0434	0.0468			
	(0.0283)	(0.0293)	(0.0421)			
LCREDIT2 (branch density)				0.191	0.212	0.231
				(0.133)	(0.137)	(0.177)
POP1300			0.000853			0.00195
			(0.00165)			(0.00162)
POP1400			-0.000524			-0.00168
			(0.00285)			(0.00289)
POP1500			-0.000786			-0.00107
			(0.00112)			(0.00126)
GEO. CHARACTERISTICS	NO	YES	YES	NO	YES	YES
PROVINCE DUMMIES	YES	YES	YES	YES	YES	YES
N	381	381	381	381	381	381
sarganp	0.806	0.667	0.580	0.956	0.885	0.868
SAMPLE	Cities not under Aragon crown in 1500 A.D.					

The table reports 2SLS estimates for the years 2002-2004. The unit of observation is the municipality. The sample is limited to municipalities that were not under the Aragon crown in 1500. The left hand side variable, averageLTFP, is the log of the unweighted average of the TFP of the firms that operate in the municipality. LCREDIT is the ratio of claims to non-financial private sector to GDP in the munipality. LCREDIT2, is the log ratio of bank branches to residents. REGION CAPITAL is a dummy variable equal to one if the city is the capital of the region. PROVINCE CAPITAL is a dummy variable equal to one if the city is the capital of its province. POP1300, POP1400 and POP1500 are respectively the estimated urban population in the municipality in 1300, 1400 and 1500. The set of PROVINCE DUMMIES refers to the Italian provinces in 1992. Geographical variables are elevation of the municipality (minimum, maximum), seismicity (as reported by the Italian national statistical institute) and two dummies for whether the city is located on the coast or close to the cost (less than 5 miles distant). The instruments are three dummies equal to one if the municipality hosted respectively a small, a medium or a large Jewish community in 1450. Standard errors are reported in parentheses. *** significant at less than 1 percent; ** significant at 5 percent; * significant at 10 percent.

Table 16: Credit availability and reallocation (IV estimates)

	(1) REAL LTFP	(2) REAL TFP	(3) REAL LTFP	(4) REAL LTFP	(5) REAL LTFP	(6) REAL LTFP
LCREDIT (credit/GDP)	0.651**	0.548**	0.540			
	(0.279)	(0.266)	(0.378)			
LCREDIT2 (branch density)				1.893*	1.750*	1.284
				(1.079)	(1.019)	(1.244)
POP1300			0.00711			0.0138
			(0.0136)			(0.0141)
POP1400			-0.0159			-0.0218
			(0.0248)			(0.0254)
POP1500			0.00211			0.00279
			(0.00874)			(0.00942)
GEO. CHARACTERISTICS	NO	YES	YES	NO	YES	YES
PROVINCE DUMMIES	YES	YES	YES	YES	YES	YES
N	242	242	242	242	242	242
sarganp	0.242	0.558	0.472	0.126	0.396	0.318
SAMPLE	Cities not under Aragon crown in 1500 A.D.					

The table reports 2SLS estimates for the years 2002-2004. The unit of observation is the municipality. The sample is limited to municipalities that were not under the Aragon crown in 1500. The left hand side variable, REALL TFP, equals the difference between LTFP and averageLFTP (LTFP is the weighted average of the TFP of those firms that operate in the municipality using their share out of total value added as weights; averageLFTP is the unweighted average). LCREDIT is the log ratio of claims on non-financial private sector to GDP in the munipality. LCREDIT2, is the log ratio of bank branches to residents. REGION CAPITAL is a dummy variable equal to one if the city is the capital of the region. PROVINCE CAPITAL is a dummy variable equal to one if the city is the capital of its province. POP1300, POP1400 and POP1500 are respectively the estimated urban population in the municipality in 1300, 1400 and 1500. The set of PROVINCE DUMMIES refers to the Italian provinces in 1992. Geographical variables are elevation of the municipality (minimum, maximum), seismicity (as reported by the Italian national statistical institute) and two dummies for whether the city is located on the coast or close to the cost (less than 5 miles distant). The instruments are three dummies equal to one if the municipality hosted respectively a small, a medium or a large Jewish communityin 1450. Standard errors are reported in parentheses. *** significant at less than 1 percent; ** significant at 5 percent; * significant at 10 percent.

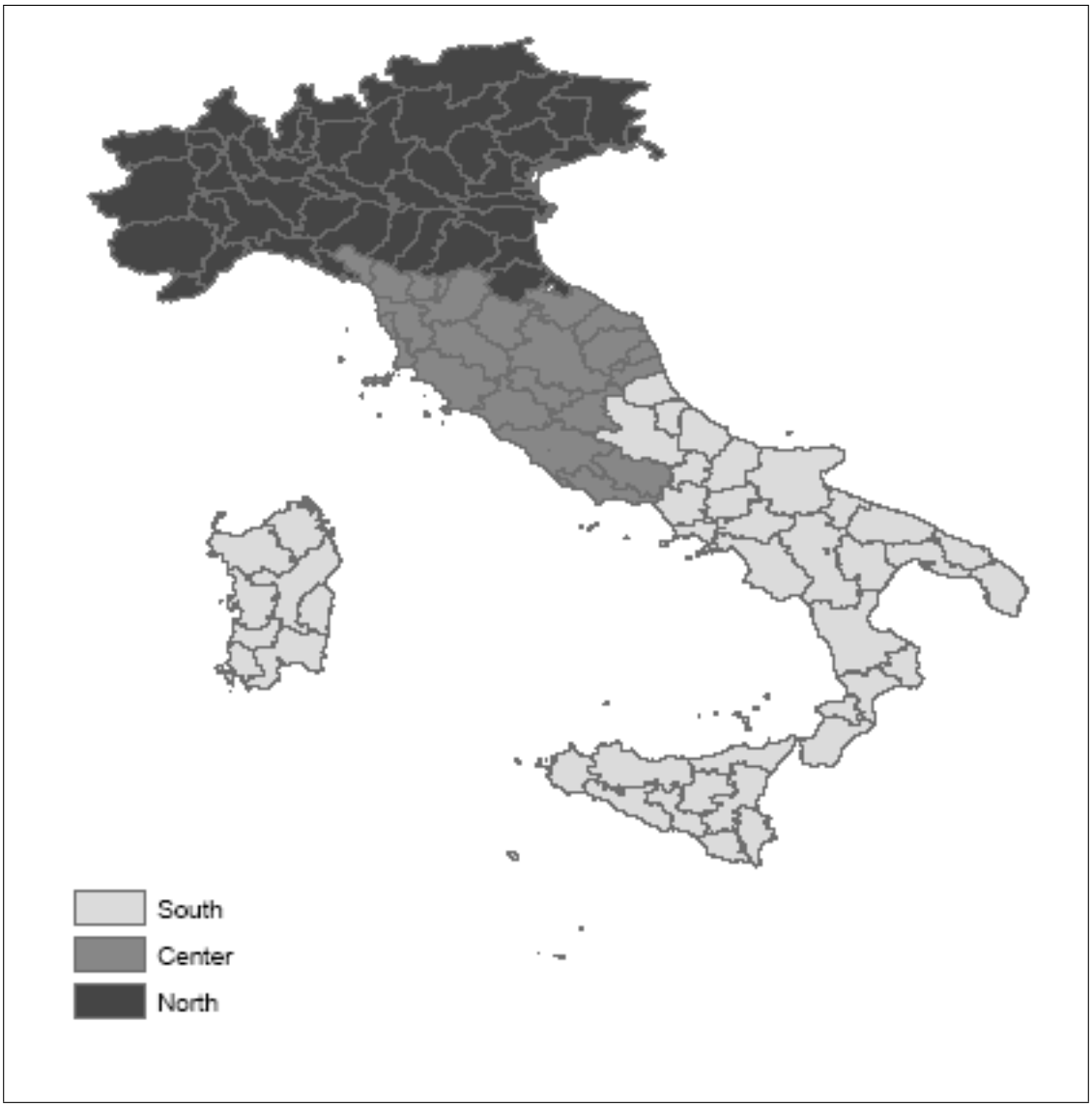

Figure 1: Italian Provinces and Macro-Regions

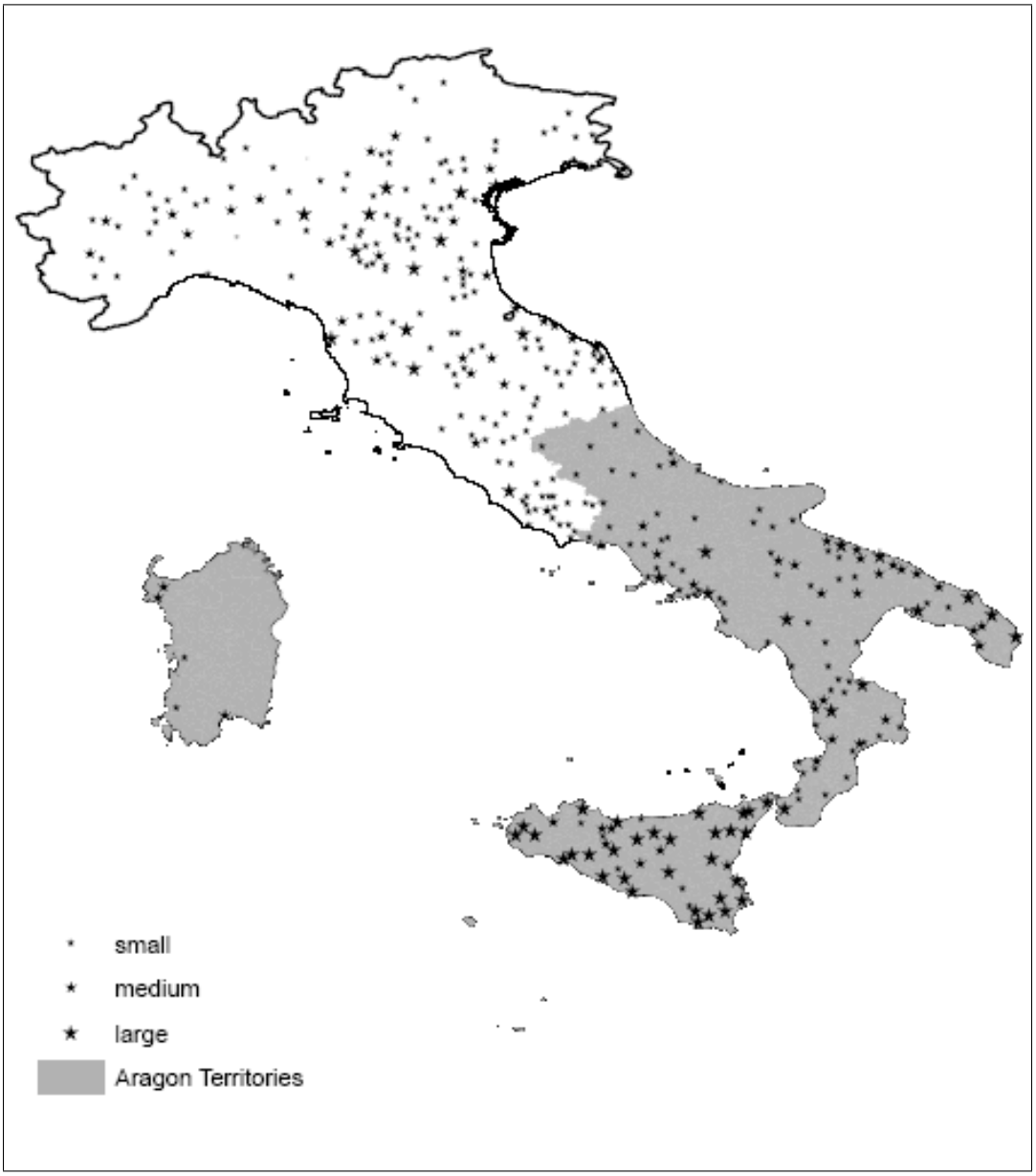

Figure 2: Jewish communities in 1450 A.D.