BANCA D'ITALIA
EUROSISTEMA

Temi di Discussione

(Working Papers)

Intergenerational mobility in the very long run:
Florence 1427-2011

by Guglielmo Barone and Sauro Mocetti

April 2016

Number 1060

Temi di discussione
(Working papers)

Intergenerational mobility in the very long run:
Florence 1427-2011

by Guglielmo Barone and Sauro Mocetti

The purpose of the Temi di discussione *series is to promote the circulation of working papers prepared within the Bank of Italy or presented in Bank seminars by outside economists with the aim of stimulating comments and suggestions.*

The views expressed in the articles are those of the authors and do not involve the responsibility of the Bank.

INTERGENERATIONAL MOBILITY IN THE VERY LONG RUN:
FLORENCE 1427-2011

Guglielmo Barone[♦] and Sauro Mocetti[♠]

Abstract

We examine intergenerational mobility in the very long run, across generations that are six centuries apart. We exploit a unique dataset containing detailed information at the individual level for all people living in the Italian city of Florence in 1427. These individuals have been associated, using their surnames, with their pseudo-descendants living in Florence in 2011. We find that earnings elasticity is about 0.04, much higher than predicted by traditional models of intergenerational mobility. We also find an even stronger role for real wealth inheritance and evidence of persistence in belonging to certain elite professions. Our results are confirmed when we account for the quality of the pseudo-links and when we address the potential selectivity bias due to the differential survival rates across surnames. We argue that the quasi-immobility of pre-industrial society and the positional advantages in the access to certain professions might explain (in part) the long-lasting effects of ancestors' socioeconomic status.

JEL Classification: J62, N33, D31.
Keywords: intergenerational mobility, earnings, wealth, professions, informational content of surnames, Florence.

Contents

[♦] Bank of Italy, Regional Economic Research Division, Bologna and RCEA.
[♠] Bank of Italy, Regional Economic Research Division, Bologna.

1. Introduction ♣

> *"Prestige is an accident that affects human beings. It comes into being and decays inevitably. […] It reaches its end in a single family within four successive generations"*
> Ibn Khaldun

> *"Almost all the earnings advantages or disadvantages of ancestors are wiped out in three generations"*
> Gary Becker and Nigel Tomes[1]

Almost all of the theoretical and empirical studies on intergenerational mobility have focused on the correlation in socioeconomic status between two successive generations – parents and their children – and have shared a common view that the economic advantages and disadvantages of ancestors vanish in a few generations.[2] In this paper, we question this view and empirically document the persistence of socioeconomic status across generations that are six centuries apart. This result is even more surprising: the huge political, demographic and economic upheavals that have occurred in the city across the centuries were not able to untie the Gordian knot of socioeconomic inheritance.

Linking people belonging to generations that are distant from each other is difficult because of data limitations. In this paper, we exploit a unique dataset containing the main socioeconomic variables, at the individual level, for people living in the Italian city of Florence in 1427. These individuals (the ancestors) have been associated, using their surnames, to their pseudo-descendants living in Florence in 2011. Empirically, we use a two-sample two-stage least squares (TS2SLS) approach: first, we use the sample of ancestors and regress the log of

[1] Ibn Khaldun was one of the greatest Arab historians, and he is considered among the founding fathers of modern sociology, historiography and economics; the citation has been drawn from his influential book *The Muqaddimah* (1377). Becker and Tomes provided, in their seminal contributions, the theoretical framework that represented the main building block of research on intergenerational mobility; the citation was drawn from Becker and Tomes (1986).

[2] Earnings persistence has been observed in all countries studied so far, although to varying degrees. See Black and Devereux (2011) and Corak (2013) for recent surveys. Chetty et al. (2014) moved the analysis at the local level, providing evidence across commuting zones within the U.S.

earnings on a full set of surname dummies (and, in some specifications, also on age and gender); second, we observe the current taxpayers present in the 2011 Florence tax records and regress the log of their earnings on that of their ancestors, as predicted by the surname in the first step. The same strategy has been repeated using the log of real wealth or dummies for professions, instead of the log of earnings, as dependent variables.[3]

We find that the elasticity of descendants' earnings with respect to ancestors' earnings is positive and statistically significant, with a point estimate around 0.04. Stated differently, being the descendants of the Bernardi family (at the 90th percentile of earnings distribution in 1427) instead of the Grasso family (10th percentile of the same distribution) would entail a 5% increase in earnings among current taxpayers. Intergenerational wealth elasticity is significant and equals about 0.02, though the magnitude of the implied effect is even larger: the 10th-90th exercise entails more than a 10% difference in real wealth today. Looking for non-linearities, we find some evidence of the existence of a glass floor that protects the descendants of the upper class from falling down the economic ladder.

These results suggest that the persistence of socioeconomic status in the long run is much higher than previously thought. In order to rationalize these findings, we provide two explanations. First, we show that intergenerational mobility in the 15th century was much lower than at present: using the methodology recently proposed by Güell et al. (2015b), we estimate an intergenerational earnings elasticity (between two successive generations) between 0.8 and 0.9, thus depicting a quasi-immobile society in 1427. Second, we find evidence of dynasties in certain (elite) professions. This latter result is consistent with our baseline evidence on the long-run persistence of socioeconomic status. Moreover, it also highlights a potential channel of inheritance – related to the market and non-market mechanisms governing access to certain professions – and it helps to explain why earnings elasticity does not necessarily decline geometrically, as commonly thought.

Our empirical findings may suffer from two potential sources of bias. First, the strength of the pseudo-links may be questioned, as we work with generations that are six centuries apart. However, a rich set of robustness checks – including

---

[3] Björklund and Jäntti (1997) were the first to apply the TS2SLS approach to intergenerational mobility estimation. Thenceforth, the same strategy has been adopted for many country studies, typically using occupation, education and sector of activity to predict pseudo-fathers' earnings. On the contrary, Aaronson and Mazumder (2008) used state and year of birth, while Olivetti and Paserman (2015) exploited the information conveyed by first names. Some of these variables, however, are partly endogenous, since they are related to parental characteristics, but they may also directly affect children's outcomes (e.g. parents' education or state of residence), thus leading to an upward bias. Surnames, in contrast, are markers that are more exogenous.

placebo regressions where we randomly reassign surnames to the descendants and regressions exploiting rare and Florence-specific surnames – is largely reassuring on the strength of the pseudo-links. If any, our estimated elasticity is downward biased. Second, family survival rates – and, therefore, the likelihood of finding descendants of Florentine families in the 15th century among current taxpayers – may vary across families. If the variation in the survival rate was correlated with current earnings and/or wealth, this would bias our estimates. To address this issue, we simulate earnings and wealth realizations for missed (unobserved) families, assuming that the economic outcomes of their descendants are independent from those of their ancestors (i.e. setting the intergenerational elasticity to the lower bound of zero) and rerun the baseline regressions. We also adopt a more standard Heckman approach, accounting for selectivity biases due to the survival rate. Both exercises qualitatively confirm our main findings.

To the best of our knowledge, we are the first to provide evidence on intergenerational mobility over the very long run, linking ancestors and descendants that are six centuries apart (i.e. about 20 generations of 30 years each). This is the main element of novelty in the paper. Linking people through more than one generation has rarely been done. In no other case has such a long time span been studied. Chan and Boliver (2013) showed a statistically significant association between grandparents' and grandchildren's class positions, even after parents' class position is taken into account. Lindahl et al. (2015) used Swedish data that links individual earnings (and education) for three generations and found that persistence is much stronger across three generations than predicted from simple models for two generations. More similar to our paper, Collado et al. (2012) and Clark and Cummins (2014) exploited the distribution of surnames to estimate social mobility over the long run. Collado et al. (2012), using data from two Spanish regions, found that socioeconomic status at the end of the 20th century still depends on the socioeconomic status of one's great-great grandparents; however, they also suggested that the correlation vanishes after five generations. Clark and Cummins (2014) used the distribution of rare surnames in England and found significant correlation between the wealth of families that are five generations apart.[4]

Our empirical analysis also has other prominent strengths and elements of novelty. First, we consider different socioeconomic outcomes, including earnings, wealth and belonging to a profession. Indeed, most of the empirical evidence is

---

[4] In the data used by Clark and Cummins (2014), the wealth is estimated at death, thus ignoring inter-vivos transfers. Our data, on the contrary, have the advantage of being available when an individual is an adult. Moreover, we can control for the evolution of the outcome variable in the lifecycle by adding age among the controls.

focused on labor income, though wealth inheritance has recently attracted renewed interest (Piketty, 2011; Piketty and Zucman, 2015). Second, ancestors' socioeconomic status has been predicted using surnames at the city level, thus generating more precise links across generations with respect to other studies that use names or surnames at the national level. Moreover, the huge heterogeneity and "localism" of Italian surnames further strengthen the quality of the pseudo-links and represent an ideal setting for analyses that exploit the informational content of surnames. Third, the Italian cities offer a unique background to trace family dynasties and investigate the transmission of inequalities across the centuries. In the 15th century, Florence, unanimously recognized as the cradle of the Renaissance, was already an advanced and complex society, characterized by a high level of economic development, a rich variety of professions and significant occupational stratification. Today, Florence continues to display the same features, and it can be considered as a representative city of an advanced country. Hence, our results are, in principle, generalizable to other prosperous and developed societies. Fourth, we are the first to provide a measure of (two-generation) intergenerational earnings mobility in a pre-industrial society.

The rest of the paper is structured as follows. Section 2 presents the empirical strategy. Section 3 provides background information and describes the data and the variables. Section 4 shows the main empirical results, while Section 5 examines potential biases due to the quality of the pseudo-links and to selectivity issues, and other robustness issues. Section 6 suggests some mechanisms behind long run persistence. Section 7 concludes.

2. Empirical strategy

The main requirement when analyzing socioeconomic mobility is an appropriate data set that spans over generations. Unfortunately, such a suitable dataset is not easily available, and this is even more true if we consider generations that are centuries apart. To overcome the problem, we adopt an approach that combines information from two separate samples (TS2SLS) and whose properties are discussed in Inoue and Solon (2010).

In the first sample, we have information about ancestors' socioeconomic outcomes (e.g. log of earnings), their surnames and some other covariates, and we run the following regression:

$$y_i^a = \delta S_i^a + \gamma X_i^a + \mu_i^a \qquad (1)$$

where y_i is the outcome of individual i living in Florence in the 15th century, X_i^a is a vector of controls, including age, age squared and gender, S_i^a is a set of dummies for each surname, and μ_i^a is the error term.

In the second sample, we have information about pseudo-descendants, i.e. taxpayers currently living in Florence. For reasons of data availability, the data are aggregated at the surname level. The regression of interest is:

$$y_k^d = \beta(\hat{\delta}S_k^d) + \rho X_k^d + \mu_k^d \tag{2}$$

where y_k^d is the average outcome of individuals with surname k currently living in Florence, X_k^d is, as above, a vector of controls for (average) age, age squared and gender, $\hat{\delta}S_k^d$ is the log of ancestors' outcomes, imputed using surnames and the surname coefficients estimated in equation (1), and μ_k^d is the residual; the parameter β is the TS2SLS estimate of the intergenerational elasticity. To replicate the original population, the regressions are weighted by the frequency of the surnames. The standard errors have been bootstrapped with 1,000 replications in order to take into account the fact that the key regressor is generated.

In the second part of the paper, we complement the evidence on the long run elasticities with an empirical exercise aimed at testing the persistence in belonging to the following professions: lawyers, bankers, medical doctors and pharmacists, and goldsmiths. We restrict the analysis to them because they are affluent professions already existing in 1427 and for which data are currently publicly available (see more on that in Section 6.2). By merging information drawn from the surname distribution in the province of Florence with the public registers containing the surnames of the above mentioned professions, we built a dataset at the individual level where, for each taxpayer, we are able to define a dummy variable indicating whether she belongs or not to a given profession. Finally, for each profession, we regress this dummy variable on the share of ancestors in the same profession. Namely, for each profession p (p = lawyers, bankers, medical doctors and pharmacists, and goldsmiths), we estimate a probit model whose estimating equation reads as:

$$Pr\{d_{ikp} = 1\} = \Phi(\gamma z_{kp}) \tag{3}$$

where d_{ikp} is a dummy variable that equals 1 if individual i with surname k belongs to profession p in 2005 and 0 otherwise, z_{kp} is the share of ancestors with surname k belonging to profession p and $\Phi(.)$ is the cumulative distribution function of the standard normal distribution. Since the estimation combines

individual-level data for the dependent variable and aggregate, surname-level data for the covariate, the standard errors are clustered at the surname level (Moulton, 1990).

3. Data and descriptive analysis

3.1 Data sources

Florence originated as a Roman city, and later, after a long period as a flourishing medieval trading and banking commune, it was the birthplace of the Italian Renaissance. According to the *Encyclopedia Britannica*, it was politically, economically and culturally one of the most important cities in the world from the 14th to 16th centuries.[5] In 1427, in the midst of a fiscal crisis provoked by the protracted wars with Milan, the Priors of the Republic decreed an entirely new tax survey that applied to the citizens of Florence and to the inhabitants of the Florentine districts (1427 Census, henceforth). The assessments were entrusted to a commission of ten officials and their staff, and were largely complete within a few months, although revisions continued during 1428 and 1429. It has been acknowledged as one of the most comprehensive tax surveys to be conducted in pre-modern Western Europe. The documentary sources are fully described in Herlihy and Klapisch-Zuber (1985).

The 1427 Census represents our first sample, containing information on the socioeconomic status of the ancestors. Indeed, the dataset reports, for each household, among other variables, the name and the surname of the head of the household, occupation at a 2-digit level, assets (i.e. value of real property and of private and public investments), age and gender. The data were enriched with estimates of the earnings attributed to each person on the basis of the occupations and the associated skill group.[6]

The Florence 2011 tax records represent our second sample, containing information on the socioeconomic status of the pseudo-descendants. From the tax records, we draw information on incomes and the main demographic characteristics (age and gender). The income items reported on personal tax returns include salaries and pensions, self-employment income, real estate income, and other smaller income items. In order to comply with the privacy protection

---

[5] The Medici, the most renowned rulers, gathered to court the best artists, writers and scientists of the time, such as Botticelli, Dante, Galileo, Leonardo da Vinci, Michelangelo and Machiavelli.

[6] The data on earnings were kindly provided by Peter Lindert (University of Davis). See the document gpih.ucdavis.edu/files/BLW/Tuscany_1427.doc for further information. The same data were also used in Milanovic et al. (2011) for an analysis on inequality in the pre-industrial societies.

rules, the variables have been collapsed at the surname level, and only surnames with a frequency equal to 5 or above have been included. We define as earnings the total income net of real estate income, while real wealth has been estimated from real estate income.[7]

Examining the persistence across centuries in certain professions, as in equation (3), requires additional datasets, because the tax records do not contain information on professions. We proceeded as follows. First, we have individual level data on the universe of taxpayers in the province of Florence in 2005, for which we observed only surnames, drawn from the Italian Internal Revenue Service. Second, we merged this dataset with the public registers containing the surnames of lawyers, bankers, medical doctors and pharmacists, and goldsmiths. For example, suppose that there are n taxpayers with a certain surname and that we know that there are p_1 lawyers and p_2 bankers with the same surname. We assumed, without loss of generality, that the first p_1 individuals are lawyers and the second p_2 are bankers (obviously, with $\sum_i p_i < n$). The public archives for these professions are the following: bankers are taken from the *ORgani SOciali* ORSO archive, which is managed by the Bank of Italy and contains registry information on the members of the governing bodies of banks (we restrict the analysis to Tuscan banks, as Tuscany is the Italian region where Florence is located); lawyers, doctors and pharmacists came from the archives of the local professional orders; finally, the National Business Register database contains registry information on the members of the governing bodies of goldsmith firms and shops (again, we focused on surnames in the Florence area).

3.2   The origin and distribution of surnames

Pseudo-links between ancestors and their descendants are generated using (implicitly) geographical localization – since we consider people living in Florence in both samples – and exploiting the informational content of surnames.

Italians surnames have some interesting peculiarities. They are inherited from one generation to the next through the patriline, and most Italians began to assume hereditary surnames in the 15th century. Some surnames derived from one's father's names (patronymics) through the use of the Latin genitive (e.g.

---

[7] Specifically, from the biannual Survey of Household Income and Wealth carried out by the Bank of Italy (we used the waves from 2000 to 2012), we selected people living in the province of Florence, we regressed the log of real assets on age, gender and incomes from the building (actual and imputed rents), and we stored the coefficients. Then, we imputed real wealth for the individuals included in the tax records using age, gender, real estate incomes and the coefficients estimated and stored above.

Mattei means son of Matteo)[8] or formed by the preposition of "di"/"de" followed by the name (e.g. Di Matteo or De Matteo meaning the son of Matteo). The origin or residence of the family gave rise to many surnames such as the habitat – Della Valle (i.e. "of the valley") – specific places – Romano (i.e. "Roman") – or nearby landmarks – Piazza (i.e. "square"). The occupations (or utensils associated with the occupation) were also a widespread source of surnames, such as Medici ("medical doctors"), Martelli ("hammer") or Forni ("ovens"). Finally, nicknames, typically referring to physical attributes, also gave rise to some family names, e.g. Basso ("short") or Grasso ("fat"). The huge variety of surnames was amplified by the extraordinary linguistic diversity of Italy. Many surnames' endings are region-specific, such as "-n" in Veneto (e.g. Benetton), "-iello" in Campania (e.g. Borriello), "-u" or "-s" in Sardinia (e.g. Soru and Marras) and "-ai" or "-ucci" in Tuscany (e.g. Bollai and Balducci).

To our aim, the context we analyzed has two striking features. First, in Italy, there are a large number of surnames, likely one of the largest collections of surnames of any ethnicity in the world. This is associated with a high fractionalization: for example, the first 100 most frequent surnames only account for 7% of the overall population, against 22% in England. Second, and unsurprisingly, the surnames present in our data are highly Florence-specific: on average, the ratio between the surname share in Florence and the corresponding figure at the national level, which measures a specialization index centered on 1, is nearly 6. Therefore, the informational content of the surname is presumably much higher than elsewhere, supporting our empirical strategy in the identification of the pseudo-links.

The creation of the pseudo-links between the two samples through surnames has been pursued with some necessary degree of flexibility to account for slight modifications in the surnames across the centuries. For example, current taxpayers with surnames such as "Mattei", "De Matteo" or "Di Matteo" are all considered descendants of "Matteo".

3.3 Descriptive analysis

In the 1427 Census, there are about 10,000 families (1,900 surnames), corresponding to nearly 40,000 individuals. The descriptive statistics reported in Table 1 refer to household heads. The earnings and real wealth were equal, on average, to 36 and 291 florins, respectively. Moreover, the two variables were

---

[8] The large number of Italian surnames ending in "-i" is also due to the medieval habit of identifying families by the name of the ancestors in the plural (which have an "-i" suffix in Italian).

characterized by an unequal distribution across the families: the Gini index was nearly 40% for earnings and about 65% for real wealth. Members of the guilds were at the top of the economic ladder and held influential positions in society and politics. The most powerful guilds were those involved in the manufacture or trade of wool and silk, and money changers. Indeed, many Florentine families were successful bankers (e.g. Bardi, Medici and Peruzzi), and they were known throughout Europe as well, for they established banking houses in other important cities such as London, Geneva and Bruges.

Figure 1a groups the occupations, providing a complete picture of occupational diversity and stratification. More than two fifths were artisans, such as those who combed, carded and sorted wool, or carpenters. Entrepreneurs and members of guilds, in turn, represented nearly one fifth of the workers. The vibrant economic activity favored the development of lettered bureaucrats and professionals (nearly one tenth of the workers) such as lawyers, judges, medical doctors and pharmacists (the oldest pharmacy in Europe was set up in Florence). Other significant occupational groups were those of merchants and of government servants (e.g. firemen, town criers and soldiers). At the bottom of the occupational ladder, there were unskilled workers, such as people beating, cleaning and washing the raw wool, urban laborers and the servants of private families. When mapping occupations into sectors of activity (Figure 1b), nearly half of the sample was employed in manufacturing (mainly makers of wool and leather products). Other important sectors were trade, food and wine, and public services. The agriculture share, in contrast, was very small, because the data do not include the countryside, which is where the agricultural activity was concentrated.

For slightly less than half of the surnames listed in the 1427 Census, we found pseudo-descendants in the 2011 tax records. They correspond to about 800 surnames and 52,000 taxpayers. On average, they earn about 24,000 Euros per year, and the real wealth is estimated to be larger than 160,000 Euros (Table 1). Table 1 also shows that the professions under scrutiny are niche professions, both in 1427 and in the 2000s: they account for a very small share of the workers.

Table 2 combines the tax records from 1427 and 2011 through surnames and provides a first explorative assessment of persistence: we report for the top 5 and bottom 5 earners among current taxpayers (at the surname level), the modal value of the occupation and the percentiles in the earnings and wealth distribution in the 15th century (the surnames are replaced by capital letters for confidentiality reasons). The top earners among the current taxpayers were already at the top of the socioeconomic ladder 6 centuries ago: they were lawyers or members of the wool, silk and shoemaker guilds; their earnings and wealth were always above the

median. On the contrary, the poorest surnames had less prestigious occupations, and their earnings and wealth were below the median in most cases.

4.   Main results

As shown in equation (1), in the first stage, we regress the log of the ancestors' earnings or the log of the ancestors' real wealth on the surname dummies (and, in some specifications, the controls included in the vector X_i^a) using the 1427 Census data. We find that the surnames account for about 10% of the total variation in the log of earnings and 17% of the total variation in the log of wealth. These results support the hypothesis that the surnames carry information about socioeconomic status. The coefficients for the surnames estimated in the first stage are then used to predict the ancestors' earnings and real wealth for the taxpayers included in the 2011 tax records.

Table 3 presents our TS2SLS estimates of the intergenerational earnings elasticity, as shown in equation (2). We consider three different empirical specifications, with the first including only the predicted ancestors' earnings, the second and the third adding gender, and gender, age and its square, respectively. The controls in the first stage regressions are adjusted accordingly. The earnings elasticity is fairly stable across specification, with a magnitude around 0.04, and is statistically significant at the 5% level. Table 3 also reports the standardized beta coefficient and the rank-rank coefficient. According to the former, a one standard deviation increase in the pseudo ancestors' log earnings increases the pseudo descendants' log earnings by 6% of its standard deviation. The effect, besides being positive and significant, is also non-negligible from an economic point of view. Put differently, being the descendants of a family at the 90th percentile of earnings distribution in 1427, instead of a family at the 10th percentile of the same distribution, would entail a 5% increase in earnings among the current taxpayers.

Table 4 replicates the estimation with respect to the real wealth elasticity. The parameter ranges from 0.02 to 0.03, and it is, again, highly significant. The standardized beta coefficient equals 7% and is slightly larger than in the earnings case. Stronger wealth persistence, with respect to earnings, is confirmed by the results of the rank-rank regression (and similar findings are obtained, even if we restrict the estimation to the same sample of families). The 10th-90th exercise entails a 12% difference in real wealth today. The larger inertia in the real wealth case is somewhat expected, as real wealth is accumulated through income (net of consumption) over the life-cycle, but can also be directly passed down to subsequent generations through bequests or inter-vivos transfers.

Intergenerational elasticities are useful summary measures, but they may conceal interesting details about intergenerational mobility at different points of the distribution. Researchers have used different techniques to relax the linearity assumption, including spline, higher-order terms or quantile regressions. Unfortunately, the sample size at our disposal prevents us from applying these techniques, and we rely on more traditional and simpler transition matrices, dividing ancestors' and descendants' economic outcomes into three classes, according to terciles (lower, middle and upper classes). In Table 5, we report the transition matrix referred to earnings. For those originating from the lower class, there are fairly similar opportunities to belong to one of the three destination classes. For those coming from the upper class, in contrast, the probability of falling down to the bottom of the economic ladder is relatively low. A similar "glass floor" is observed for the wealth transition matrix (Table 6); moreover, in this case, we also observe a "sticky floor": more than two fifths of descendants from the lower class remain there after centuries.

The results in Tables 3-6 suggest that the persistence of socioeconomic status in the long run is much higher than previously thought. They are even more striking given the huge political, demographic and economic upheavals that have occurred in the city across the centuries. On the political ground, Florence has passed from the capital city of a small city-state (see Figure 2) to a city within a larger State (with the Italian unification in 1861), whose capital city is located elsewhere. Regarding demography, the population was fairly stable between 1400 and 1800 and experienced a huge increase in the 19th and 20th centuries (see Figure 3a). Finally, the GDP per capita was basically flat in the pre-industrial era, while it recorded an exceptionally high growth rate during the 20th century (see Figure 3b), accompanied by the industrial revolution, the tertiarization, and finally, the technological revolution.

One might wonder whether these results can be generalized to other societies. According to the evidence at our disposable, we argue that they can be thoughtfully extended to other advanced countries, presumably in Western Europe, that share a similar long run development pattern with Florence. Indeed, Milanovic et al. (2011) showed that the gross domestic income per capita and the Gini index in Florence in 1427 were comparable to those of other pre-industrial societies for which we have data, such as England, Wales and Holland. Looking at more recent evidence, according to the Eurostat data, in 2013, the purchasing power standard GDP per inhabitant in Tuscany was just slightly above the EU28 average. Moreover, Güell et al. (2015a) provided evidence on the degree of intergenerational mobility for all Italian provinces (the data are referred to 2005); according to their evidence, the (simulated) intergenerational income elasticity for

the province of Florence would be between 0.4 and 0.5, a figure that is slightly lower than that of Italy as a whole and broadly comparable with that of other advanced countries, such as the United States, the United Kingdom and France (Corak, 2013).[9] In sum, Florence does not seem to be a polar case in terms of economic development and (static and dynamic) inequality.

5.   Robustness

5.1   Imputation procedures and outliers

Table 7 provides a first set of robustness checks. First, we address the imputation procedures. As far as earnings are concerned, the tax records, as is well known, may suffer from a severe underestimation due to tax evasion. In the first columns, we upwardly revise the variables from the tax records with the correction factors suggested by Marino and Zizza (2011).[10] The results are unchanged, and this may be explained by the fact that tax evasion is not correlated with the pseudo-ancestors' earnings. As far as wealth is concerned, this variable is not directly observed in the 2011 tax records and has been obtained through an imputation process based on the real estate income. In the third column, we directly regress the real estate income on the ancestors' wealth in order to avoid our results from being driven by our imputation procedure. The results are basically unchanged.

Second, we address the sensitivity to outliers, as the distributions of earnings and wealth have long tails that might drive the results. In the second and fourth columns, we trim both the dependent variable and the key regressor at the 1% and the 99% levels, and we re-estimated equation (2): again, the estimates of positive and significant intergenerational elasticities are fully confirmed.

5.2   Robustness of pseudo-links

Our empirical strategy relies on the assumption that the probability that one

---

[9] Güell et al. (2015a) do not estimate intergenerational elasticity, but the Informative Content of Surname (*ICS*) indicator that is monotonically related to the intergenerational elasticity. The reported figures have been obtained by mapping the *ICS* values into elasticities using Figure 2 in Güell et al. (2015b). See also Section 6.1 below.

[10] Marino and Zizza (2011) compared incomes from tax records with those collected through the Survey of Household Income and Wealth. This approach is based on the hypothesis that, as the survey questionnaire is multipurpose and replying is not compulsory, it is likely that respondents do not feel threatened or suspicious and would hence reply truthfully. On this basis, they provided, for each income type, a proxy of tax evasion (as measured by the difference between the income from the survey and the income from the fiscal source).

taxpayer (randomly) taken from the 2011 tax record is a descendant of one taxpayer (randomly) selected from the 1427 Census is strictly higher if the two share the same surname. Two facts challenge our working hypothesis. First, people sharing the same surname may well not belong to the same family. Second, the city of Florence is not a closed system. For instance, it may well happen that an immigrant, having the same surname as those living in Florence in 1427, settled in Florence from outside in the following centuries. Our methodology erroneously treats the latter as a pseudo-descendant of the former.

We start by noting that our pseudo-links are more reliable with respect to those adopted in previous studies, as they are generated by surnames living in the city of Florence. For example, if the same data were available for all Italian cities, our strategy would entail the prediction of the ancestors' socioeconomic status using the interaction between surnames and cities. This is arguably a more demanding and more precise approach to creating links across generations than the one adopted in previous studies (i.e. surnames at the national level). Moreover, the huge heterogeneity and "localism" of Italian surnames further strengthens the quality of the pseudo-links.

Nevertheless, we propose three tests aimed at showing the robustness of our findings to the lineage imputation procedure. The first test is based on the idea that the more common a surname is, the less sharing the surname is likely to be informative about actual kinship. In the first two columns of Table 8, we re-estimate equation (3) by weighting observations with the inverse of the relative frequency in 1427, thus giving more weight to rare surnames. Our results are confirmed, and if anything, they are upwardly revised, consistent with the fact that the mismeasurement of the family links should lead to an attenuation bias.

The second test exploits the extent to which a surname is Florence-specific (specificity is measured as the ratio between the surname shared in Florence and the corresponding figure at the national level): the idea is that the more a surname is Florence-specific, the less the same surname is likely to be contaminated by in- and out-migration patterns. In the last two columns of Table 8, we split our key parameters by interacting them with a dummy variable that equals 1 for more typical Florentine surnames (those with a value of the ratio above the median) and 0 otherwise. The results are reassuring: the elasticities are larger (and significant) for more Florence-specific surnames.

The two exercises discussed above *indirectly* test the robustness of the pseudo-links. We complement them with a *direct* test that goes as follows. We randomly reassigned surnames to taxpayers in 2011 and re-estimated the TS2SLS intergenerational elasticities. If the positive correlations we detected were not related to the lineage (whose measurement might be affected by error), but would

emerge by chance, we should find that our estimates are not statistically different from those stemming from a random reshuffling of surnames. Figure 4 shows the distribution of the estimated earnings elasticity for 1 million replications. The two dashed vertical lines are the 95th and the 99th percentiles, while the red line indicates our estimate based on the observed surnames. These results provide a clear graphical representation of the informational content of the surnames and the goodness of the pseudo-links: the simulated p-value in this exercise is lower than 1%. Figure 5 shows the corresponding results for wealth, where the result of the test is even more telling.

5.3 Selectivity bias due to families' survival rate

As said above, we are able to match only a subsample of the surnames in the 1427 Census with the 2011 tax records. This is clearly a reflection of the demographic processes that are involved in the analysis of intergenerational mobility in the very long run: the families' survival rate depends on migration, reproduction, fertility and mortality, which, in turn, may differ across people with different socioeconomic backgrounds.

As far as migration is concerned, some of the families recorded in the 1427 Census might have decided to migrate during the following centuries. Since they are not necessarily a random sample of the original population, this might bias our estimates. Borjas (1987) provided a theoretical model that shows that migrants are mainly drawn from the upper or lower tail of the skill (i.e. income) distribution. Analogously, a dynasty's reproduction rate (i.e. fertility/mortality rate) may be correlated with income and/or wealth. Jones et al. (2010) showed a strong and robust negative relationship between income and fertility, though they also argued that, in the agrarian (pre-industrialization) economies, the reverse could have been possible, as documented, for example, in Clark and Cummins (2009). On the other side, it is reasonable to expect that the wealthiest families were those better equipped to survive across the centuries (and therefore, those that can be matched to the current tax records).

How do we address these issues? First, we compare the distributions of earnings and wealth in 1427 between the families who are still present in the tax records of 2011 and those who are not in order to have a general assessment of the relevance of the selection issue. Figure 6a shows that the distributions of earnings are rather similar, although the density of missing families has a larger mass of probability for the lower level of earnings. As far as wealth is concerned, the two distributions overlap each other (Figure 6b). Table 9 confirms the visual inspection: with respect to the missing families, the surviving ones had 6% higher

earnings, while the difference in the real wealth is not significant from a statistical point of view. Overall, these differences do not seem huge, and therefore, the selection concerns are somewhat downsized.

Nevertheless, in the following, we propose two tests aimed at addressing the selectivity bias. The first is aimed at fixing a lower bound for our estimates with respect to the potential selectivity bias induced by selective migration. The test goes as follows. Since the elasticity is usually bounded between 0 and 1, we assume that for missing families, the elasticity is 0, meaning that the migrated families were able to cut the Gordian knot of socioeconomic inheritance. Note that this is the most unfavorable assumption we can make; moreover, this working hypothesis is also not very plausible, because the available evidence also shows a significant socioeconomic persistence across generations among immigrants.[11] We add these missing families to the estimating sample, and having assumed that the elasticity is null, impute their earnings/real wealth in 2011 by randomly drawing from a lognormal distribution whose moments are taken from the corresponding distribution of the surviving families. Then, we regress equation (2) on the augmented sample and repeat this procedure (drawing and regression) 1 million times. The parameters of interest are still significant from a statistical and economic point of view: the average estimated elasticity equals 0.016* (with standard deviation equal to 0.009) in the earnings case and 0.010*** (with standard deviation equal to 0.004) for real wealth. These parameters represent a lower bound to intergenerational elasticity estimates, as far as selection is concerned.

Second, we adopt a more traditional two-stage Heckman correction. In the first stage, we exploit further information recorded in the 1427 Census. Namely, we estimate a probit model with the survival rate as a function of the family size; the latter should have a direct (and mechanical) positive effect on the survival rate. The identifying assumption is that this variable observed in 1427 does not have a direct effect on earnings and wealth in 2011. Like any exclusion restrictions, this assumption cannot be directly tested. However, the correlation between family size and earnings and wealth in 1427 was close to zero and not statistically significant, thus reassuring us on its exogeneity in the two-step Heckman procedure. Table 10 shows that a larger family size positively influences the survival rate and enters with the expected signs. In the second stage, the selectivity term is statistically significant only for wealth elasticity, and more importantly, the

---

[11] Borjas (1993) showed that the earnings of second-generation Americans are strongly affected by the economic conditions of their parents in their source countries. According to Card (2005), the intergenerational transmission of education is about the same for families of immigrants as for other families in the US.

coefficients of interest are very close to the baseline results, and if anything, they are slightly upwardly revised.

6.   Discussion of long-run persistence

Intergenerational mobility scholars typically presume that correlations across generations decline geometrically (i.e. the correlation between grandparent and child is the square of the parent–child correlation, the correlation between great-grandparent and child is the cube, etc.). If this were true, our estimates, which are referred to about 20 generations, would be not consistent with the prevailing estimates on earnings mobility.[12] Some recent papers have questioned the assumption that the intergenerational transmission process of human capital has a memory of only one period. Indeed, for example, grandparents can directly transmit their cultural capital to their grandchildren through childrearing or other forms of interactions. Similarly, they can directly pass their wealth to their grandchildren. However, even the two-period memory hypothesis is not enough, by itself, to fully explain our findings.

A deep and exhaustive insight into the underlying mechanisms of long-run persistence is beyond the scope of the paper (and probably represents a promising area for future works). However, in the following, we discuss two explanations and provide the related empirical evidence for the observed persistence across the centuries.

6.1   Intergenerational mobility in the 15th century

An earnings elasticity (between two successive generations) close to 1 in the pre-industrial era may help to explain why we still find some degree of inheritance of socioeconomic status after six centuries. Indeed, in the pre-industrial era, the persistence in social standing across the generations has been perceived as large, while some scholars tend to believe that industrialization and the rise of capitalism have brought a more fluid society.[13]

In order to provide some empirical support to this claim, we rely on the approach by Güell et al. (2015b), who developed a novel measure of

---

[12] In Italy, according to Mocetti (2007), the intergenerational earnings elasticity is equal to 0.5; Güell et al. (2015a) provided an estimate for the province of Florence in the interval between 0.4 and 0.5, slightly less than that for Italy as a whole.

[13] See Erikson and Goldthorpe (1992) and Piketty (2000) for a discussion of liberal and Marxist theory about the degree of intergenerational mobility in the industrial society. See Clark (2014) for an interesting picture of social mobility in various societies (and in various historical periods).

intergenerational mobility that needs only cross-sectional data and is based on the informational content of surnames (ICS). Specifically, the ICS is defined as $ICS \equiv R_D^2 - R_F^2$. The first term (R_D^2) is obtained from the regression $y_{i,s} = b'D + residual$ where $y_{i,s}$ is the log of the income of individual i with the surname s and D is an S-vector of the surname-dummy variables with $D_S = 1$ if individual i has the surname s and $D_S = 0$ otherwise. The second term (R_F^2) is obtained from the regression $y_{i,s} = b'F + residual$ where F is an S-vector of "fake" dummy variables that randomly assign surnames to individuals in a manner that maintains the marginal distribution of surnames. The authors showed that the ICS is a monotonically increasing function of the (more conventional) intergenerational earnings elasticity and draws such a function for some baseline parameters.

Following this methodology, we estimate that earnings elasticity in the 15th century was between 0.8 and 0.9, thus depicting a quasi-immobile society. Then, we compare these figures with those drawn from Güell et al. (2015a) for the province of Florence in 2005 and analogously mapped into elasticity. These findings are shown in Figure 7. Though they should be interpreted with some caution, given the different nature of the data sources, they support the view that, in the past, intergenerational mobility was (much) lower than it is today.

If one assumes that elasticities close to 1 were prevailing until the 20th century – i.e. before the effects of the industrial revolution were fully deployed in Italy and before mass schooling – then one would obtain a long-run earnings elasticity across six centuries that is comparable to ours.

6.2 Dynasties in elite professions

Our last empirical evidence concerns the existence of some degree of persistence in certain (elite) professions. On the one hand, this represents a further perspective (beyond earnings and wealth) on intergenerational mobility. On the other hand, this evidence can provide some insight on the channels behind intergenerational mobility processes.

Many social institutions contribute to status inheritance over multiple generations, especially at the bottom (e.g. due to ethnic or social discrimination) and at the top (e.g. membership of exclusive clubs and/or elite professions) of hierarchies. In a society of perfect status inheritance (e.g. a pure caste system), the children, parents, grandparents, and earlier ancestors are identical in their social and economic positions; in this society, the perfect correlations between each generation make alternative types of intergenerational effects (e.g. children-parents, children-grandparents, etc.) indistinguishable. Zylberberg (2014)

underlined the existence of unobservable variables that are transmitted by parents: The sons of successful families may preserve the high prospects for their descendants, even when their own earnings are not very high. In his theoretical framework, dynasties move across careers, rather than across income levels, and a society can be modelled as a Markov process in which the transition matrix is block-diagonal: only within-block mobility is allowed (e.g. the block of manual jobs vs. the block of cognitive jobs). This is consistent with an earnings elasticity that does not decline geometrically and with a society characterized by some form of dynastic transmission of professions.

On the empirical side, we examine whether one's probability of being employed in a certain elite profession today is higher, the more one's pseudo-ancestors were employed in the same profession. Namely, we selected the professions of lawyers, bankers, medical doctors and pharmacists, and goldsmiths. We consider only these professions for several reasons. First, because of data availability, we are forced to focus on professions that already existed in 1427 and for which we currently have access to publicly available data. Second, they should be elite or niche professions, consistent with the fact that there should be unobservable variables that favored career following (e.g. specific human capital or guild privileges). As shown in Figure 8, the earnings in the selected professions are larger than the average, both in 1427 and today. Third, the available empirical evidence documents the existence of career dynasties precisely for (some of) these professions.[14]

The results from the estimation of equation (3) are reported in Table 11. In each column, we consider each profession separately, and we find a positive and statistically significant correlation for lawyers, bankers and goldsmiths, and a positive, but not significant, correlation for doctors and pharmacists. The magnitude of the impact is clearly small. A one-standard deviation increase in the independent variable increases the dependent variable by 0.5%, 0.2% and 0.6% of its standard deviation for lawyers, bankers and goldsmiths, respectively. Nevertheless, these results are, again, surprisingly high and strong if evaluated across six centuries. Moreover, these results are consistent with earnings persistence, and in particular, with larger persistence at the top of the earnings distribution.

---

[14] See Lentz and Laband (1989) for doctors, Laband and Lentz (1992) for lawyers and Mocetti (2016) for pharmacists.

7. Conclusions

We have examined intergenerational mobility in the very long run, using a unique dataset that combines the tax records from the Italian city of Florence in 1427 and in 2011, and exploiting a favorable setting for this kind of analysis.

We have found that earnings elasticity, across generations that are six centuries apart, is positive and statistically significant. Its point estimate is about 0.04, much higher than that predicted by traditional models of intergenerational mobility. We also find evidence of an even stronger real wealth inheritance and of persistence in certain elite professions. Simple descriptive analysis from transition matrices also indicates the existence of a glass floor that protects descendants of the upper class from falling down the economic ladder. Our findings on elasticities are robust to a number of sensitivity checks, particularly to the lineage imputation and to the potential selectivity bias due to the heterogeneous survival rates across families.

We also provide two tentative explanations (and the related empirical support) for the surprisingly low level of mobility: first, mobility in the past was much lower than it is today; second, social status and other unobservable variables may also be highly persistent, implying that earnings elasticity might not decline geometrically, as commonly thought.

In our view, looking for the same evidence in different cities or nations and shedding light on the underlying mechanism behind socioeconomic persistence in the long run represent promising directions for future research.

References

Aaronson, D. and B. Mazumder (2008), Intergenerational economic mobility in the United States, 1940 to 2000, *Journal of Human Resources*, 43, pp. 139-172.

Becker, G.S. and N. Tomes (1986), Human capital and the rise and the fall of families, *Journal of Labor Economics*, 4, pp. 1-39

Björklund A. and M. Jäntti (1997), Intergenerational income mobility in Sweden compared to the United States, *American Economic Review*, 87, pp. 1009-1018.

Black, S.E. and P.J. Devereux (2011), Recent developments in intergenerational mobility, in O. Ashenfelter and D. Card (eds.), *Handbook in Labor Economics*, North Holland.

Borjas, G.J. (1987), Self-selection and the earnings of immigrants, *American Economic Review*, 77, pp. 531-553.

Borjas, G.J. (1993), The intergenerational mobility of immigrants, *Journal of Labor Economics*, 11, pp. 113-135.

Card, D. (2005), Is the new immigration really so bad? *Economic Journal*, 115, pp. 300-323.

Chan, T.W. and V. Boliver (2013), The grandparents effect in social mobility: Evidence from British birth cohort studies, *American Sociological Review*, 78, pp. 662-678.

Chetty, R., N. Hendren, P. Kline and E. Saez (2014), Where is the land of opportunity? The geography of intergenerational mobility in the United States, *Quarterly Journal of Economics*, 129, pp. 1553-1623.

Ciapanna, E., M. Taboga and E. Viviano (2015), Sectoral differences in managers' compensation: Insights from a matching model, working paper, Bank of Italy.

Clark, G. (2014), *The son also rises: Surnames and the history of social mobility*, Princeton: Princeton University Press.

Clark, G. and N. Cummins (2009), Urbanization, mortality, and fertility in Malthusian England, *American Economic Review: Papers & Proceedings*, 99, pp. 242-247.

Clark, G. and N. Cummins (2014), Intergenerational wealth mobility in England, 1858-2012: Surnames and social mobility, *Economic Journal*, 125, pp. 61-85.

Collado, M.D., I. Ortuño-Ortin and A. Romeu (2012), Long-run intergenerational social mobility and the distribution of surnames, working paper, Universidad de Alicante.

Corak, M. (2013), Income inequality, equality of opportunity, and intergenerational mobility, *Journal of Economic Perspectives*, 27, pp. 79-102.

Erikson, R. and J.H. Goldthorpe (1992), *The constant flux: A study of class mobility in industrial societies*, Oxford: Clarendon Press.

Güell, M., M. Pellizzari, G. Pica and J.V. Rodriguez Mora (2015a), Correlating social mobility and economic outcomes, unpublished paper.

Güell, M., J.V. Rodriguez Mora and C.I. Telmer (2015b), Intergenerational mobility and the informational content of surnames, *Review of Economic Studies*, 82, pp. 693-735.

Herlihy, D. and C. Klapisch-Zuber (1985), *Tuscans and their families: A study of the Florentine Catasto of 1427*, New Haven: Yale University Press.

Inoue, A. and G. Solon (2010), Two-sample instrumental variables estimators, *Review of Economics and Statistics*, 92, pp. 557-561.

Jones, L.E., A. Schoonbroodt and M. Tertilt (2010), Fertility theories: Can they explain the negative fertility-income relationship? In J.B. Shoven (ed.), *Demography and the economy*, University of Chicago Press.

Laband, D.N. and B.F. Lentz (1992), Self-recruitment in the legal profession, *Journal of Labor Economics*, 10, pp. 182-201.

Lentz, B.F. and D.N. Laband (1989), Why so many children of doctors become doctors, *Journal of Human Resources*, 24, pp. 396-413.

Lindahl, M., M. Palme, S. Sandgren Massih and A. Sjögren (2015), Long-term intergenerational persistence of human capital: An empirical analysis of four generations, *Journal of Human Resources*, 50, pp. 1-33.

Marino, M.R. and R. Zizza (2011), Personal income tax evasion in Italy: an estimate by taxpayer's type, in M. Pickhardt and A. Prinz (eds.), *Tax evasion and the shadow economy*, Cheltenham: Edward Elgar.

Milanovic, B., P.H. Lindert and J.G. Williamson (2011), Pre-industrial inequality, *Economic Journal*, 121, pp. 255-272.

Mocetti, S. (2007), Intergenerational earnings mobility in Italy, *B.E. Journal of Economic Analysis and Policy*, 7, (2).

Mocetti, S. (2016), Dynasties in professions and the role of rents and regulation: Evidence from Italian pharmacies, *Journal of Public Economics*, 133, pp. 1-10.

Moulton, B. (1990), An illustration of a pitfall in estimating the effects of aggregate variables on micro unit, *Review of Economics and Statistics*, 72, pp. 334-338.

Olivetti, C. and D.M. Paserman (2015), In the name of the son (and the daughter): Intergenerational mobility in the United States, 1850-1940, *American Economic Review*, 105, pp. 2695-2724.

Piketty, T. (2000), Theories of persistent inequality and intergenerational mobility, in A.B. Atkinson and F. Bourguignon (eds.), *Handbook of Income Distribution*, 1, pp. 429-476, Amsterdam: North Holland.

Piketty, T. (2011), On the long-run evolution of inheritance: France 1820-2050, *Quarterly Journal of Economics,* 126, pp. 1071-1131.

Piketty, T. and G. Zucman (2015), Wealth and inheritance in the long run, in A.B. Atkinson and F. Bourguignon (eds.), *Handbook of Income Distribution*, 2, pp. 1303-1368, Amsterdam: North Holland.

Zylberberg, Y. (2014), Dynastic income mobility, unpublished paper.

Tables

Table 1. Descriptive statistics

Variable:	Mean	Standard deviation
Panel A: 1427 Census		
Earnings (florins)	36.2	44.8
Real wealth (florins)	291.2	705.0
Age (years)	45.92	16.46
Female (share)	0.153	0.360
Lawyer (share)	0.012	0.090
Banker (share)	0.009	0.072
Medical doctor or pharmacist (share)	0.039	0.141
Goldsmith (share)	0.009	0.068
Panel B: 2000s data		
Earnings (euros)	24,234	4,929
Real wealth (euros)	160,729	70,961
Age (years)	58.39	3.03
Female (share)	0.521	0.050
Lawyer (share)	0.006	0.080
Banker (share)	0.001	0.033
Medical doctor or pharmacist (share)	0.010	0.101
Goldsmith (share)	0.002	0.044

Source: In Panel A, data are taken from the 1427 Census. In Panel B, data on earnings, real wealth, gender and age are taken from the Florence statistical office (fiscal year 2011); data on professions are obtained combining information taken from the Italian Internal Revenue Service (surnames of the taxpayers for the province of Florence in 2005) and data from the registry of the professional orders for lawyers (http://www.consiglionazionaleforense.it/site/home.html), and for medical doctors and pharmacists (http://www.ordine-medici-firenze.it and http://www.ordinefarmacisti.fi.it, respectively), data from the OR.SO. archive for bankers and data from the National Business Register database for goldsmiths.

Table 2. Persistence in families' socioeconomic status

Surname	Average Euros (2011)	Modal occupation (1427)	Earnings percentile (1427)	Wealth percentile (1427)
5 top earners in 2011:				
A	146,489	Member of shoemakers' guild	97%	85%
B	94,159	Member of wool guild	67%	73%
C	77,647	Member of silk guild	93%	86%
D	73,185	Messer (lawyer)	93%	85%
E	64,228	Brick layer, sculptor, stone worker	54%	53%
5 bottom earners in 2011:				
V	9,702	Worker in combing, carding and sorting wool	53%	45%
W	9,486	Worker in combing, carding and sorting wool	41%	49%
X	9,281	Sewer of wool cloth	39%	19%
Y	7,398	Medical doctor	84%	38%
Z	5,945	Member of shoemakers' guild	55%	46%

Source: Tax records from the 1427 Census of Florence and from the Florence statistical office (fiscal year 2011); surnames are not reported for privacy reasons.

Table 3. Earnings mobility: baseline

Dependent variable:	Log of earnings	Log of earnings	Log of earnings
Log of ancestors' earnings	0.039**	0.040**	0.045**
Standardized beta coefficient	*0.064*	*0.052*	*0.058*
	(0.017)	(0.019)	(0.022)
Rank-rank coefficient	0.058**	0.061**	0.056**
	(0.027)	(0.025)	(0.025)
Female	NO	YES	YES
Age and age squared	NO	NO	YES
Observations	806	806	806
R-squared	0.007	0.025	0.048

Bootstrapped standard errors in parentheses (1,000 replications); *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 4. Real wealth mobility: baseline

Dependent variable:	Log of wealth	Log of wealth	Log of wealth
Log of ancestors' wealth	0.027***	0.026***	0.018**
Standardized beta coefficient	*0.103*	*0.102*	*0.069*
	(0.008)	(0.008)	(0.008)
Rank-rank coefficient	0.105***	0.105***	0.073**
	(0.031)	(0.031)	(0.030)
Female	NO	YES	YES
Age and age squared	NO	NO	YES
Observations	679	679	679
R-squared	0.018	0.020	0.110

Bootstrapped standard errors in parentheses (1,000 replications); *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 5. Earnings mobility: transition matrix

Origin ↓ / Destination→	Lower class	Middle class	Upper class
Lower class	32.8	36.4	30.8
Middle class	43.0	29.1	27.9
Upper class	25.3	34.8	39.9

Table 6. Real wealth mobility: transition matrix

Origin ↓ / Destination→	Lower class	Middle class	Upper class
Lower class	41.6	29.8	28.6
Middle class	31.6	34.3	34.1
Upper class	26.8	36.2	37.0

Table 7. Earnings and real wealth mobility: robustness

Dependent variable:	Log of earnings		Log of wealth	
Log of ancestors' earnings/wealth	0.065*	0.061**	0.023**	0.016**
	(0.033)	(0.030)	(0.010)	(0.008)
Controls	YES	YES	YES	YES
Specification	Imputation procedure	Trimming	Imputation procedure	Trimming
Observations	806	790	679	667
R-squared	0.068	0.048	0.085	0.101

In column 1, earnings are corrected using the parameters estimated by Marino and Zizza (2011); in column 3, we use real estate incomes instead of real wealth imputed through the SHIW; columns 2 and 4 refer to the exclusion of the top and bottom percentile of both the dependent and independent variables. Controls include a dummy for female and age and age squared. Bootstrapped standard errors in parentheses (1,000 replications); *** p<0.01, ** p<0.05, * p<0.1.

Table 8. Mobility for rare and Florence-specific surnames

Dependent variable:	Log of earnings	Log of wealth	Log of earnings	Log of wealth
Log of ancestors' earnings/wealth	0.076**	0.019**		
	(0.034)	(0.009)		
× Less typical Florentine surnames			0.021	0.014
			(0.036)	(0.010)
× More typical Florentine surnames			0.053*	0.020*
			(0.027)	(0.011)
Controls	YES	YES	YES	YES
Specification	More weight to rare surnames in 1427		Differences by low- high- Florence-specific surnames	
Observations	806	679	806	679
R-squared	0.061	0.119	0.049	0.110

More (less) typical Florentine surnames are those for which the ratio between the surname share in Florence and the corresponding figure at the national level is above (below) the median. Controls include a dummy for female and age and age squared. Bootstrapped standard errors in parentheses (1,000 replications); *** p<0.01, ** p<0.05, * p<0.1.

Table 9. Earnings and wealth distribution by survival rate

	Surviving families	Missing families	Difference
Log of ancestors' earnings	3.465	3.406	0.059** (0.026)
Log of ancestors' wealth	4.628	4.504	0.124 (0.115)

Surviving families refer to surnames that are present both in 1427 Census and in 2011 tax records; missing families are surnames existing in 1427 Census but not in 2011 tax records; standard errors in parenthesis; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 10. Heckman corrected estimates

Dependent variable:	Log of earnings	Log of wealth
Log of ancestors' earnings/wealth	0.047*	0.025***
	(0.027)	(0.009)
Controls	YES	YES
Inverse Mills' ratio	0.008	0.226*
	(0.042)	(0.130)
Observations	806	679
	Probability of surviving	
Size of the family in 1427	0.008***	0.003***
	(0.001)	(0.000)
Observations	1,895	1,895

Controls include a dummy for female and age and age squared. Bootstrapped standard errors in parentheses (1,000 replications); *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 11. Probability to belong to a given profession

Dependent variable:	Lawyer	Banker	Doctor or pharmacist	Goldsmith
Share of ancestors in the same profession	0.004***	0.001**	0.001	0.004***
	(0.001)	(0.000)	(0.002)	(0.001)
Observations	133,193	133,193	133,193	133,193
R-squared	0.000	0.000	0.000	0.000

Marginal effects from a probit model are reported. Standard errors clustered at the surname level in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Figures

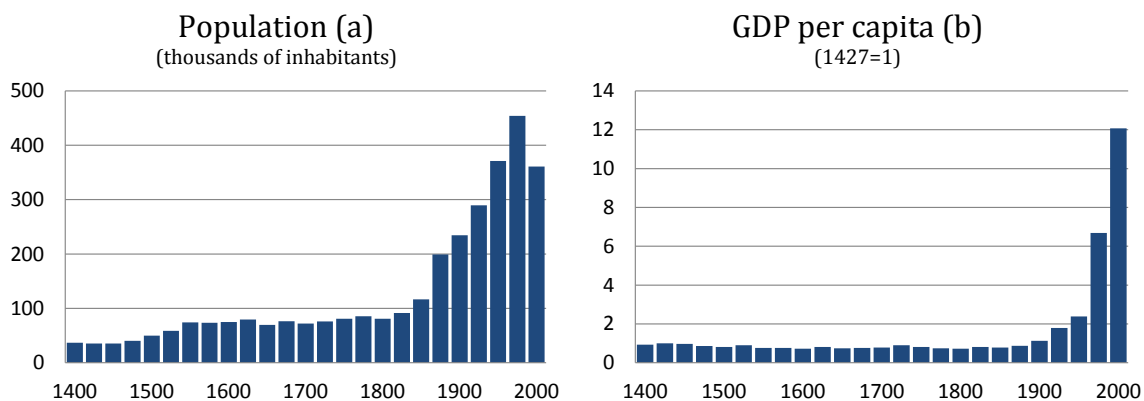## Figure 1. Profession and sector distribution in Florence 1427
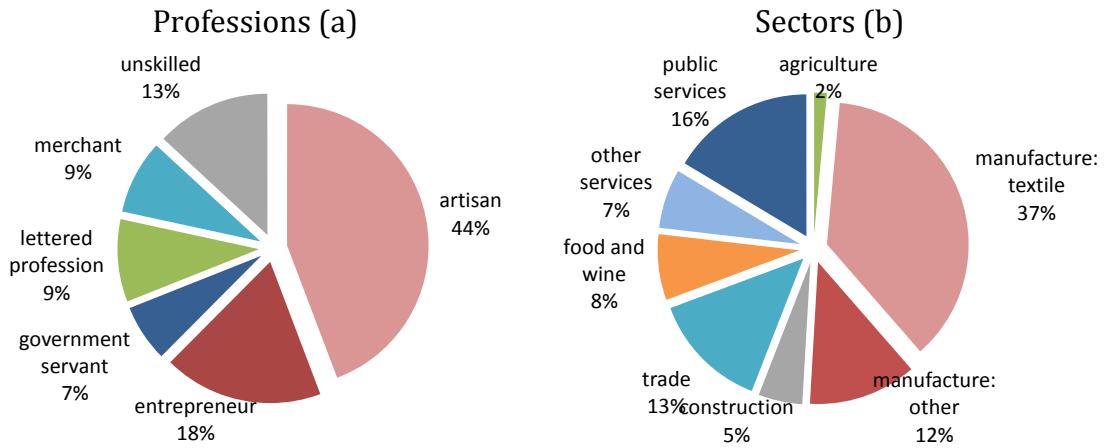
Authors' elaborations on data drawn from 1427 Census of Florence.

## Figure 2. Italian city-states in the 15th century

# Figure 3. Population and GDP per capita over the long run

Population (a)
(thousands of inhabitants)

GDP per capita (b)
(1427=1)

Figures for population refer to the city of Florence (authors' elaborations on data drawn from http://www.paolomalanima.it/ and Census data from 1861 on); figures for GDP per capita refer to Florence or the Italian Centre-North, depending on data availability, and are drawn from http://www.paolomalanima.it/).

# Figure 4. Earnings mobility with randomly assigned surnames
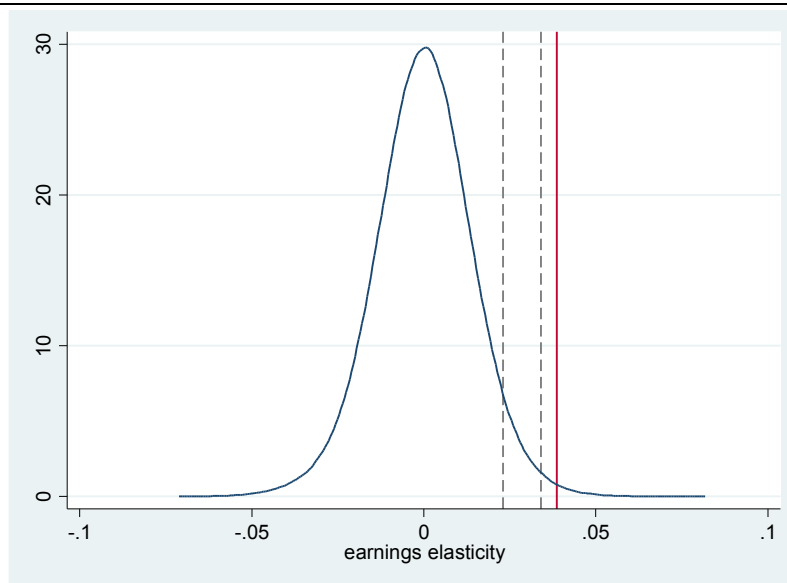
Distribution of estimated earnings elasticity randomly matching ancestors' and descendants' earnings; dashed lines represent 95° and 99° percentile, red line represents the earnings elasticity properly matching ancestors and descendants through surnames.

# Figure 5. Wealth mobility with randomly assigned surnames
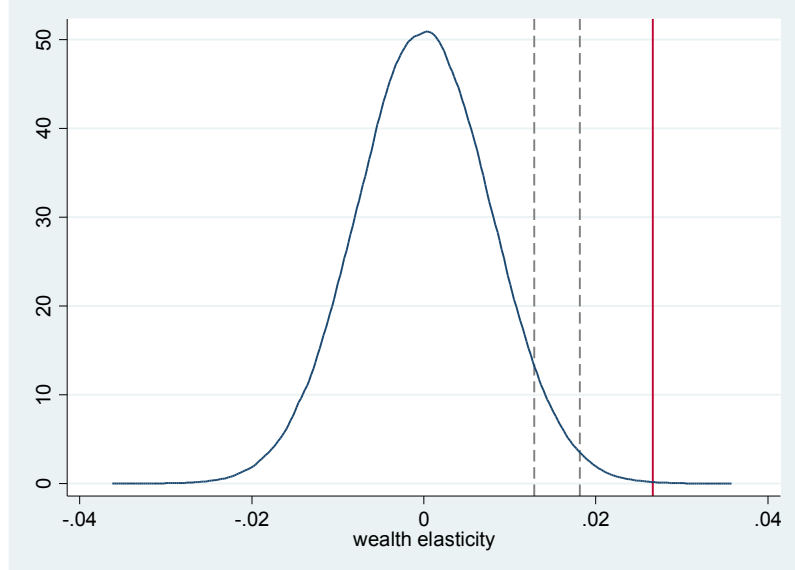
Distribution of estimated wealth elasticity randomly matching ancestors' and descendants' wealth; dashed lines represent 95° and 99° percentile, red line represents the wealth elasticity properly matching ancestors and descendants through surnames.

# Figure 6. Earnings and real wealth distribution by survival rate

Earnings (a)

Real wealth (b)
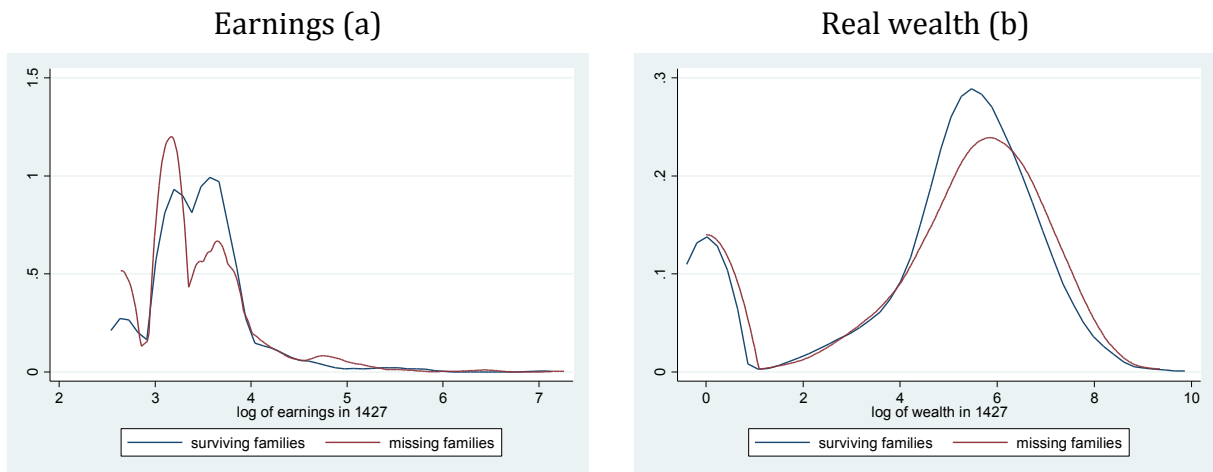
Authors' elaborations on data drawn from 1427 Census of Florence.

Figure 7. Income persistence in Florence: 1427 vs. 2005
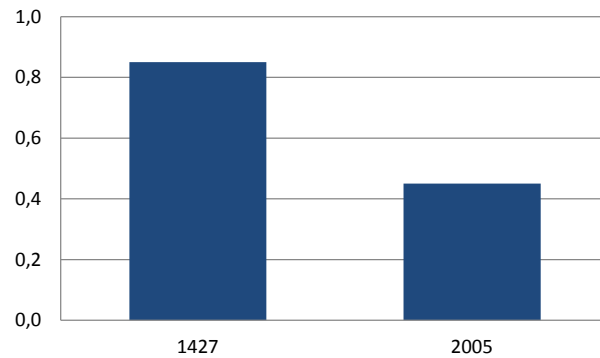
Histograms represent the intergenerational income elasticity obtained as projections of the pseudo-ICS measure by Güell et al. (2015b); figures for Florence in the 1427 are based on authors' elaborations on data drawn from 1427 Census of Florence; figures for Florence in the mid-2000s are drawn from Güell et al. (2015a).

Figure 8. Earnings by professions: 1427 vs. 2000s
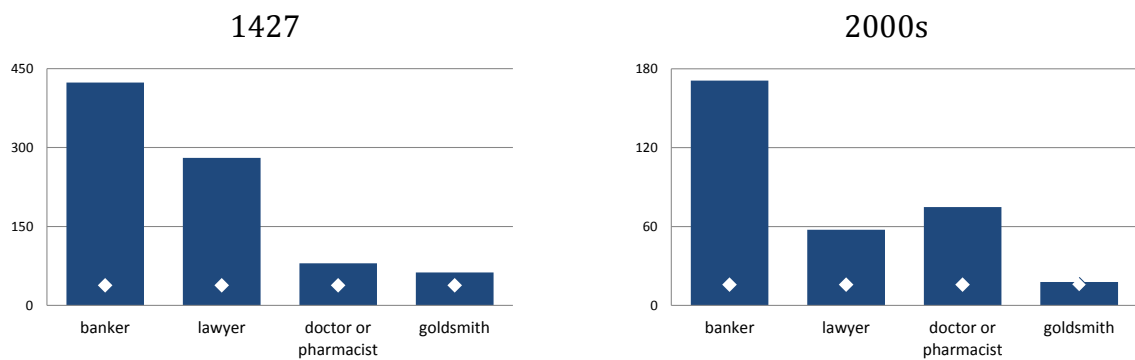
Figures for 1427 are drawn from 1427 Census of Florence; figures for 2005 are drawn from sectoral studies (*Studi di settore*) by the Ministry of Economics and Finance for lawyers, doctors, pharmacists and goldsmiths and from Ciapanna et al. (2015) for bankers. Corresponding average values in the population are reported with diamonds.

RECENTLY PUBLISHED "TEMI" (*)

N. 1037 – *Deconstructing the gains from trade: selection of industries vs. reallocation of workers*, by Stefano Bolatto and Massimo Sbracia (November 2015).

N. 1038 – *Young adults living with their parents and the influence of peers*, by Effrosyni Adamopoulou and Ezgi Kaya (November 2015).

N. 1039 – *Shoe-leather costs in the euro area and the foreign demand for euro banknotes*, by Alessandro Calza and Andrea Zaghini (November 2015).

N. 1040 – *The macroeconomic effects of low and falling inflation at the zero lower bound*, by Stefano Neri and Alessandro Notarpietro (November 2015).

N. 1041 – *The use of fixed-term contracts and the (adverse) selection of public sector workers*, by Lucia Rizzica (November 2015).

N. 1042 – *Multitask agents and incentives: the case of teaching and research for university professors*, by Marta De Philippis (November 2015).

N. 1043 – *Exposure to media and corruption perceptions*, by Lucia Rizzica and Marco Tonello (November 2015).

N. 1044 – *The supply side of household finance*, by Gabriele Foà, Leonardo Gambacorta, Luigi Guiso and Paolo Emilio Mistrulli (November 2015).

N. 1045 – *Optimal inflation weights in the euro area*, by Daniela Bragoli, Massimiliano Rigon and Francesco Zanetti (January 2016).

N. 1046 – *Carry trades and exchange rate volatility: a TVAR approach*, by Alessio Anzuini and Francesca Brusa (January 2016).

N. 1047 – *A new method for the correction of test scores manipulation* by Santiago Pereda Fernández (January 2016).

N. 1048 – *Heterogeneous peer effects in education* by by Eleonora Patacchini, Edoardo Rainone and Yves Zenou (January 2016).

N. 1049 – *Debt maturity and the liquidity of secondary debt markets*, by Max Bruche and Anatoli Segura (January 2016).

N. 1050 – *Contagion and fire sales in banking networks*, by Sara Cecchetti, Marco Rocco and Laura Sigalotti (January 2016).

N. 1051 – *How does bank capital affect the supply of mortgages? Evidence from a randomized experiment*, by Valentina Michelangeli and Enrico Sette (February 2016).

N. 1052 – *Adaptive models and heavy tails*, by Davide Delle Monache and Ivan Petrella (February 2016).

N. 1053 – *Estimation of counterfactual distributions with a continuous endogenous treatment*, by Santiago Pereda Fernández (February 2016).

N. 1054 – *Labor force participation, wage rigidities, and inflation*, by Francesco Nucci and Marianna Riggi (February 2016).

N. 1055 – *Bank internationalization and firm exports: evidence from matched firm-bank data*, by Raffaello Bronzini and Alessio D'Ignazio (February 2016).

N. 1056 – *Retirement, pension eligibility and home production*, by Emanuele Ciani (February 2016).

N. 1057 – *The real effects of credit crunch in the Great Recession: evidence from Italian provinces*, by Guglielmo Barone, Guido de Blasio and Sauro Mocetti (February 2016).

N. 1058 – *The quantity of corporate credit rationing with matched bank-firm data*, by Lorenzo Burlon, Davide Fantino, Andrea Nobili and Gabriele Sene (February 2016).

N. 1059 – *Estimating the money market microstructure with negative and zero interest rates*, by Edoardo Rainone and Francesco Vacirca (February 2016).

"TEMI" LATER PUBLISHED ELSEWHERE

2013

A. MERCATANTI, *A likelihood-based analysis for relaxing the exclusion restriction in randomized experiments with imperfect compliance*, Australian and New Zealand Journal of Statistics, v. 55, 2, pp. 129-153, **TD No. 683 (August 2008).**

F. CINGANO and P. PINOTTI, *Politicians at work. The private returns and social costs of political connections*, Journal of the European Economic Association, v. 11, 2, pp. 433-465, **TD No. 709 (May 2009).**

F. BUSETTI and J. MARCUCCI, *Comparing forecast accuracy: a Monte Carlo investigation*, International Journal of Forecasting, v. 29, 1, pp. 13-27, **TD No. 723 (September 2009).**

D. DOTTORI, S. I-LING and F. ESTEVAN, *Reshaping the schooling system: The role of immigration*, Journal of Economic Theory, v. 148, 5, pp. 2124-2149, **TD No. 726 (October 2009).**

A. FINICELLI, P. PAGANO and M. SBRACIA, *Ricardian Selection*, Journal of International Economics, v. 89, 1, pp. 96-109, **TD No. 728 (October 2009).**

L. MONTEFORTE and G. MORETTI, *Real-time forecasts of inflation: the role of financial variables*, Journal of Forecasting, v. 32, 1, pp. 51-61, **TD No. 767 (July 2010).**

R. GIORDANO and P. TOMMASINO, *Public-sector efficiency and political culture*, FinanzArchiv, v. 69, 3, pp. 289-316, **TD No. 786 (January 2011).**

E. GAIOTTI, *Credit availablility and investment: lessons from the "Great Recession"*, European Economic Review, v. 59, pp. 212-227, **TD No. 793 (February 2011).**

F. NUCCI and M. RIGGI, *Performance pay and changes in U.S. labor market dynamics*, Journal of Economic Dynamics and Control, v. 37, 12, pp. 2796-2813, **TD No. 800 (March 2011).**

G. CAPPELLETTI, G. GUAZZAROTTI and P. TOMMASINO, *What determines annuity demand at retirement?,* The Geneva Papers on Risk and Insurance – Issues and Practice, pp. 1-26, **TD No. 805 (April 2011).**

A. ACCETTURO e L. INFANTE, *Skills or Culture? An analysis of the decision to work by immigrant women in Italy,* IZA Journal of Migration, v. 2, 2, pp. 1-21, **TD No. 815 (July 2011).**

A. DE SOCIO, *Squeezing liquidity in a "lemons market" or asking liquidity "on tap"*, Journal of Banking and Finance, v. 27, 5, pp. 1340-1358, **TD No. 819 (September 2011).**

S. GOMES, P. JACQUINOT, M. MOHR and M. PISANI, *Structural reforms and macroeconomic performance in the euro area countries: a model-based assessment,* International Finance, v. 16, 1, pp. 23-44, **TD No. 830 (October 2011).**

G. BARONE and G. DE BLASIO, *Electoral rules and voter turnout,* International Review of Law and Economics, v. 36, 1, pp. 25-35, **TD No. 833 (November 2011).**

O. BLANCHARD and M. RIGGI, *Why are the 2000s so different from the 1970s? A structural interpretation of changes in the macroeconomic effects of oil prices*, Journal of the European Economic Association, v. 11, 5, pp. 1032-1052, **TD No. 835 (November 2011).**

R. CRISTADORO and D. MARCONI, *Household savings in China,* in G. Gomel, D. Marconi, I. Musu, B. Quintieri (eds), The Chinese Economy: Recent Trends and Policy Issues, Springer-Verlag, Berlin, **TD No. 838 (November 2011).**

A. ANZUINI, M. J. LOMBARDI and P. PAGANO, *The impact of monetary policy shocks on commodity prices*, International Journal of Central Banking, v. 9, 3, pp. 119-144, **TD No. 851 (February 2012).**

R. GAMBACORTA and M. IANNARIO, *Measuring job satisfaction with CUB models,* Labour, v. 27, 2, pp. 198-224, **TD No. 852 (February 2012).**

G. ASCARI and T. ROPELE, *Disinflation effects in a medium-scale new keynesian model: money supply rule versus interest rate rule,* European Economic Review, v. 61, pp. 77-100, **TD No. 867 (April 2012)**

E. BERETTA and S. DEL PRETE, *Banking consolidation and bank-firm credit relationships: the role of geographical features and relationship characteristics,* Review of Economics and Institutions, v. 4, 3, pp. 1-46, **TD No. 901 (February 2013).**

M. ANDINI, G. DE BLASIO, G. DURANTON and W. STRANGE, *Marshallian labor market pooling: evidence from Italy,* Regional Science and Urban Economics, v. 43, 6, pp.1008-1022, **TD No. 922 (July 2013).**

G. SBRANA and A. SILVESTRINI, *Forecasting aggregate demand: analytical comparison of top-down and bottom-up approaches in a multivariate exponential smoothing framework,* International Journal of Production Economics, v. 146, 1, pp. 185-98, **TD No. 929 (September 2013).**

A. FILIPPIN, C. V, FIORIO and E. VIVIANO, *The effect of tax enforcement on tax morale,* European Journal of Political Economy, v. 32, pp. 320-331, **TD No. 937 (October 2013).**

2014

G. M. Tomat, *Revisiting poverty and welfare dominance*, Economia pubblica, v. 44, 2, 125-149, **TD No. 651 (December 2007).**

M. Taboga, *The riskiness of corporate bonds*, Journal of Money, Credit and Banking, v.46, 4, pp. 693-713, **TD No. 730 (October 2009).**

G. Micucci and P. Rossi, *Il ruolo delle tecnologie di prestito nella ristrutturazione dei debiti delle imprese in crisi*, in A. Zazzaro (a cura di), Le banche e il credito alle imprese durante la crisi, Bologna, Il Mulino, **TD No. 763 (June 2010).**

F. D'Amuri, *Gli effetti della legge 133/2008 sulle assenze per malattia nel settore pubblico,* Rivista di politica economica, v. 105, 1, pp. 301-321, **TD No. 787 (January 2011).**

R. Bronzini and E. Iachini, *Are incentives for R&D effective? Evidence from a regression discontinuity approach,* American Economic Journal : Economic Policy, v. 6, 4, pp. 100-134, **TD No. 791 (February 2011).**

P. Angelini, S. Neri and F. Panetta, *The interaction between capital requirements and monetary policy*, Journal of Money, Credit and Banking, v. 46, 6, pp. 1073-1112, **TD No. 801 (March 2011).**

M. Braga, M. Paccagnella and M. Pellizzari, *Evaluating students' evaluations of professors,* Economics of Education Review, v. 41, pp. 71-88, **TD No. 825 (October 2011).**

M. Francese and R. Marzia, *Is there Room for containing healthcare costs? An analysis of regional spending differentials in Italy,* The European Journal of Health Economics, v. 15, 2, pp. 117-132, **TD No. 828 (October 2011).**

L. Gambacorta and P. E. Mistrulli, *Bank heterogeneity and interest rate setting: what lessons have we learned since Lehman Brothers?,* Journal of Money, Credit and Banking, v. 46, 4, pp. 753-778, **TD No. 829 (October 2011).**

M. Pericoli, *Real term structure and inflation compensation in the euro area*, International Journal of Central Banking, v. 10, 1, pp. 1-42, **TD No. 841 (January 2012).**

E. Gennari and G. Messina, *How sticky are local expenditures in Italy? Assessing the relevance of the flypaper effect through municipal data,* International Tax and Public Finance, v. 21, 2, pp. 324-344, **TD No. 844 (January 2012).**

V. Di Gacinto, M. Gomellini, G. Micucci and M. Pagnini, *Mapping local productivity advantages in Italy: industrial districts, cities or both?*, Journal of Economic Geography, v. 14, pp. 365–394, **TD No. 850 (January 2012).**

A. Accetturo, F. Manaresi, S. Mocetti and E. Olivieri, *Don't Stand so close to me: the urban impact of immigration,* Regional Science and Urban Economics, v. 45, pp. 45-56, **TD No. 866 (April 2012).**

M. Porqueddu and F. Venditti, *Do food commodity prices have asymmetric effects on euro area inflation,* Studies in Nonlinear Dynamics and Econometrics, v. 18, 4, pp. 419-443, **TD No. 878 (September 2012).**

S. Federico, *Industry dynamics and competition from low-wage countries: evidence on Italy*, Oxford Bulletin of Economics and Statistics, v. 76, 3, pp. 389-410, **TD No. 879 (September 2012).**

F. D'Amuri and G. Peri, *Immigration, jobs and employment protection: evidence from Europe before and during the Great Recession,* Journal of the European Economic Association, v. 12, 2, pp. 432-464, **TD No. 886 (October 2012).**

M. Taboga, *What is a prime bank? A euribor-OIS spread perspective,* International Finance, v. 17, 1, pp. 51-75, **TD No. 895 (January 2013).**

G. Cannone and D. Fantino, *Evaluating the efficacy of european regional funds for R&D,* Rassegna italiana di valutazione, v. 58, pp. 165-196, **TD No. 902 (February 2013).**

L. Gambacorta and F. M. Signoretti, *Should monetary policy lean against the wind? An analysis based on a DSGE model with banking,* Journal of Economic Dynamics and Control, v. 43, pp. 146-74, **TD No. 921 (July 2013).**

M. Barigozzi, Conti A.M. and M. Luciani, *Do euro area countries respond asymmetrically to the common monetary policy?,* Oxford Bulletin of Economics and Statistics, v. 76, 5, pp. 693-714, **TD No. 923 (July 2013).**

U. Albertazzi and M. Bottero, *Foreign bank lending: evidence from the global financial crisis,* Journal of International Economics, v. 92, 1, pp. 22-35, **TD No. 926 (July 2013).**

R. DE BONIS and A. SILVESTRINI, *The Italian financial cycle: 1861-2011,* Cliometrica, v.8, 3, pp. 301-334, **TD No. 936 (October 2013).**

G. BARONE and S. MOCETTI, *Natural disasters, growth and institutions: a tale of two earthquakes,* Journal of Urban Economics, v. 84, pp. 52-66, **TD No. 949 (January 2014).**

D. PIANESELLI and A. ZAGHINI, *The cost of firms' debt financing and the global financial crisis,* Finance Research Letters, v. 11, 2, pp. 74-83, **TD No. 950 (February 2014).**

J. LI and G. ZINNA, *On bank credit risk: sytemic or bank-specific? Evidence from the US and UK,* Journal of Financial and Quantitative Analysis, v. 49, 5/6, pp. 1403-1442, **TD No. 951 (February 2015).**

A. ZAGHINI, *Bank bonds: size, systemic relevance and the sovereign,* International Finance, v. 17, 2, pp. 161-183, **TD No. 966 (July 2014).**

G. SBRANA and A. SILVESTRINI, *Random switching exponential smoothing and inventory forecasting,* International Journal of Production Economics, v. 156, 1, pp. 283-294, **TD No. 971 (October 2014).**

M. SILVIA, *Does issuing equity help R&D activity? Evidence from unlisted Italian high-tech manufacturing firms,* Economics of Innovation and New Technology, v. 23, 8, pp. 825-854, **TD No. 978 (October 2014).**

2015

M. BUGAMELLI, S. FABIANI and E. SETTE, *The age of the dragon: the effect of imports from China on firm-level prices*, Journal of Money, Credit and Banking, v. 47, 6, pp. 1091-1118, **TD No. 737 (January 2010).**

R. BRONZINI, *The effects of extensive and intensive margins of FDI on domestic employment: microeconomic evidence from Italy*, B.E. Journal of Economic Analysis & Policy, v. 15, 4, pp. 2079-2109, **TD No. 769 (July 2010).**

G. BULLIGAN, M. MARCELLINO and F. VENDITTI, *Forecasting economic activity with targeted predictors,* International Journal of Forecasting, v. 31, 1, pp. 188-206, **TD No. 847 (February 2012).**

A. CIARLONE, *House price cycles in emerging economies,* Studies in Economics and Finance, v. 32, 1, **TD No. 863 (May 2012).**

D. FANTINO, A. MORI and D. SCALISE, *Collaboration between firms and universities in Italy: the role of a firm's proximity to top-rated departments,* Rivista Italiana degli economisti, v. 1, 2, pp. 219-251, **TD No. 884 (October 2012).**

D. DEPALO, R. GIORDANO and E. PAPAPETROU, *Public-private wage differentials in euro area countries: evidence from quantile decomposition analysis,* Empirical Economics, v. 49, 3, pp. 985-1115, **TD No. 907 (April 2013).**

G. BARONE and G. NARCISO, *Organized crime and business subsidies: Where does the money go?,* Journal of Urban Economics, v. 86, pp. 98-110, **TD No. 916 (June 2013).**

P. ALESSANDRI and B. NELSON, *Simple banking: profitability and the yield curve,* Journal of Money, Credit and Banking, v. 47, 1, pp. 143-175, **TD No. 945 (January 2014).**

M. TANELI and B. OHL, *Information acquisition and learning from prices over the business cycle,* Journal of Economic Theory, 158 B, pp. 585–633, **TD No. 946 (January 2014).**

R. AABERGE and A. BRANDOLINI, *Multidimensional poverty and inequality,* in A. B. Atkinson and F. Bourguignon (eds.), Handbook of Income Distribution, Volume 2A, Amsterdam, Elsevier, **TD No. 976 (October 2014).**

V. CUCINIELLO and F. M. SIGNORETTI, *Large banks,loan rate markup and monetary policy,* International Journal of Central Banking, v. 11, 3, pp. 141-177, **TD No. 987 (November 2014).**

M. FRATZSCHER, D. RIMEC, L. SARNOB and G. ZINNA, *The scapegoat theory of exchange rates: the first tests,* Journal of Monetary Economics, v. 70, 1, pp. 1-21, **TD No. 991 (November 2014).**

A. NOTARPIETRO and S. SIVIERO, *Optimal monetary policy rules and house prices: the role of financial frictions,* Journal of Money, Credit and Banking, v. 47, S1, pp. 383-410, **TD No. 993 (November 2014).**

R. ANTONIETTI, R. BRONZINI and G. CAINELLI, *Inward greenfield FDI and innovation,* Economia e Politica Industriale, v. 42, 1, pp. 93-116, **TD No. 1006 (March 2015).**

T. CESARONI, *Procyclicality of credit rating systems: how to manage it,* Journal of Economics and Business, v. 82. pp. 62-83, **TD No. 1034 (October 2015).**

M. RIGGI and F. VENDITTI, *The time varying effect of oil price shocks on euro-area exports,* Journal of Economic Dynamics and Control, v. 59, pp. 75-94, **TD No. 1035 (October 2015).**

FORTHCOMING

G. DE BLASIO, D. FANTINO and G. PELLEGRINI, *Evaluating the impact of innovation incentives: evidence from an unexpected shortage of funds,* Industrial and Corporate Change, **TD No. 792 (February 2011).**

A. DI CESARE, A. P. STORK and C. DE VRIES, *Risk measures for autocorrelated hedge fund returns,* Journal of Financial Econometrics, **TD No. 831 (October 2011).**

E. BONACCORSI DI PATTI and E. SETTE, *Did the securitization market freeze affect bank lending during the financial crisis? Evidence from a credit register,* Journal of Financial Intermediation, **TD No. 848 (February 2012).**

M. MARCELLINO, M. PORQUEDDU and F. VENDITTI, *Short-Term GDP Forecasting with a mixed frequency dynamic factor model with stochastic volatility,* Journal of Business & Economic Statistics, **TD No. 896 (January 2013).**

M. ANDINI and G. DE BLASIO, *Local development that money cannot buy: Italy's Contratti di Programma,* Journal of Economic Geography, **TD No. 915 (June 2013).**

F BRIPI, *The role of regulation on entry: evidence from the Italian provinces,* World Bank Economic Review, **TD No. 932 (September 2013).**

G. ALBANESE, G. DE BLASIO and P. SESTITO, *My parents taught me. evidence on the family transmission of values,* Journal of Population Economics, **TD No. 955 (March 2014).**

A. L. MANCINI, C. MONFARDINI and S. PASQUA, *Is a good example the best sermon? Children's imitation of parental reading,* Review of Economics of the Household, **TD No. 958 (April 2014).**

R. BRONZINI and P. PISELLI, *The impact of R&D subsidies on firm innovation,* Research Policy, **TD No. 960 (April 2014).**

L. BURLON, *Public expenditure distribution, voting, and growth,* Journal of Public Economic Theory, **TD No. 961 (April 2014).**

L. BURLON and M. VILALTA-BUFI, *A new look at technical progress and early retirement,* IZA Journal of Labor Policy, **TD No. 963 (June 2014).**

A. BRANDOLINI and E. VIVIANO, *Behind and beyond the (headcount) employment rate,* Journal of the Royal Statistical Society: Series A, **TD No. 965 (July 2015).**

G. ZINNA, *Price pressures on UK real rates: an empirical investigation,* Review of Finance, **TD No. 968 (July 2014).**

A. CALZA and A. ZAGHINI, *Shoe-leather costs in the euro area and the foreign demand for euro banknotes,* International Journal of Central Banking, **TD No. 1039 (December 2015).**