The Poor Stay Poor, the Rich Get Rich: Intergenerational Wealth Mobility in Italy

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Abstract

This paper contributes to the emerging literature on wealth mobility across parents and children by measuring the degree of intergenerational wealth persistence in Italy. Due to the lack of information about parental wealth in Italian datasets, we apply the two-sample two-stage least squares (TSTSLS) method to impute parental wealth by exploiting children-reported retrospective socio-economic conditions of their parents.

In more detail, we make use of repeated cross-sections of the Bank of Italy's survey on household income and wealth (SHIW) to build two samples of adult children and pseudo-parents when they were aged around 40. We compute both intergenerational elasticities and rank-rank slopes as measures of parents-children association.

Our preferred estimate shows an intergenerational age-adjusted wealth elasticity (IWE) of 0.451 and a rank-rank slope of 0.349. Reassuringly, both estimates are robust to the use of different socio-economic predictors of parental economic status. These findings support the argument that Italy suffers a very low intergenerational mobility when using wealth as the measure of economic status.

Furthermore, we find results supporting the hypothesis of a U-shaped pattern of the measures of the intergenerational wealth association according to children's age. We also focus on geographical differences in the degree of wealth mobility by estimating elasticities and rank-rank slopes according to individuals' geographical area of residence, finding the South of Italy is much less mobile than the North. Finally, we investigate mechanisms behind the intergenerational wealth association to disentangle roles played by inheritance, savings and children's preferences.

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Introduction

Net wealth, measured as the sum of all financial and real assets minus liabilities, is becoming an increasingly popular research topic over the last few years for many reasons. Firstly, wealth can be considered as a good proxy for permanent economic resources as opposed to other frequently used flow variables since it is strongly influenced by cumulative, rather than yearly, net earnings, hence less affected by transitory shocks. Moreover, unlike income or earnings, it could be directly transmitted from one generation to another through bequests or inter-vivos transfers.

The belated interest on wealth has encouraged many studies on economic inequality. For instance, the rising concentration of wealth inequality and inheritance inequality has been widely investigated by Piketty (2014) in his worldwide bestseller "Capital in the 21st Century"

Unfortunately, only few studies have attempted to estimate wealth persistence across two subsequent generations[3], mainly due to the lack of data. Therefore, estimates of intergenerational wealth associations are only available for the Unites States (Charles and Hurst, 2003; Pfeffer and Killewald, 2017), France (Arrondel, 2008) or Scandinavian countries (Boserup et al., 2013; Fageren et al., 2015; Black et al., 2015; Adermon et al., 2016; Boserup et al., 2016). These empirical studies, while confirming that United States is a less mobile society than Denmark or Norway, highlight some of the mechanisms related to the transmission of wealth from one generation to the subsequent.

This paper contributes to the literature on wealth mobility fin many ways. Firstly, it provides a first estimate of the degree of wealth mobility across two generations for Italy, which can be used as a proxy for the broader wealth mobility in Southern-European countries. Italy is an interesting case study since is characterized by higher levels of income inequality and intergenerational income immobility and lower levels of wealth inequality than other developed countries (D'Alessio, 2012; Maestri et al, 2014; OECD, 2015). The lower degree of wealth inequality in Italy is

[3] Two studies estimate the degree of wealth mobility in the very long run in England (Clarks and Cummins 2015), and in Florence (Barone e Mocetti, 2016) using rare surnames to track families.

mainly related to the high share of estate wealth on total net wealth which is less dispersed than financial wealth.

To measure intergenerational wealth mobility, we use both intergenerational wealth elasticities and rank-rank slopes. The latter is important to obtain proper estimates of mobility that do not exclude those with zero and negative wealth. Since direct information about parental economic status is not available, we estimate the IWE by exploiting the two-sample two-stage least squares method (TSTSLS). This approach, which has been already used in the empirical literature to estimate the degree of intergenerational earnings or income mobility, uses two independent samples and some socio-economic information about actual parents recalled by offspring to impute parental wealth ad obtain estimated intergenerational elasticities. The rank-rank slope is instead obtained by computing offspring's rank and parental imputed rank. The latter is obtained after imputing parental wealth using again socio-economic information about actual parents given by offspring.

Another important aspect analysed in this paper is the robustness of estimated IWEs and rank-rank slopes to the selection of different samples of offspring by age. In fact, most of the evidence on the degree of wealth mobility provided in previous literature, has been obtained by considering offspring and parents at different ages. This is due to the lack of data which cover two or more generations over their life-cycle. However, it is well acknowledged in the literature on wealth mobility that choosing too young offspring is likely to influence the consistency of estimated elasticities if the younger generation have had no enough time to accumulate wealth (Charles and Hurst, 2003; Conley and Glauber, 2008 Pfeffer and Killewald, 2017).

Nevertheless, since wealth is related to cumulative economic performances and intergenerational transfers that individuals may receive also when they are very young, estimates of wealth persistence across generations are likely to be less affected by transitory shocks and affected in a different way by the lifecycle bias compared to estimates of income or earnings intergenerational persistence. More specifically, as described by Boserup et al. (2016) wealthy parents are likely to make a larger amount of economic transfers to their children at the beginning of their adulthood. Subsequently, at early stages of their careers, children from wealthy households will have lower yearly incomes and propensity to save but higher expected permanent incomes and wealth accumulation than other young individuals. This is the reason why Boserup et al. (2016) find that the intergenerational wealth correlation in Denmark is U-shaped over the lifecycle, with lower estimated mobility when children are taken at the beginning of their adulthood or in their 40s.

Additionally, in this paper we measure geographical differences in intergenerational wealth mobility. Since the sample of offspring is not as large as it is needed to obtain 20 different estimates of wealth mobility by region, we decided to compare intergenerational wealth mobility by considering only two different areas of Italy, the north/centre and the South/Islands.

Finally, we decompose the IWE into different factors which may explain why wealth is correlated across generations. In particular, there may be a positive intergenerational wealth association because of bequests and donations or if preferences, which may influence both the rate of return on savings and the propensity to save, and permanent income, which affects the amount of lifetime savings, are positively correlated across generations.

Our baseline estimate shows an age-adjusted elasticity of 0.451, which is very close to the value obtained by Pfeffer and Killewald (2017) for the US, and higher than estimated elasticities obtained for other countries. Similarly, the estimated rank-rank slope of 0.349 is close to that obtained for the US and Sweden. These two different measures of mobility appear to be robust to different socio-economic characteristics used to predict parental wealth and less affected by the lifecycle bias if individuals of the second generation are taken when they are extremely young or in their 40s. This result seems to confirm previous evidence that showed a U-shaped pattern of the intergenerational wealth correlation as a function of children's age.

Intergenerational wealth mobility appears to be extremely lower in the southern part of Italy than in the rest of the country with an estimated IWE of 0.621 and a rank-rank slope of 0.407. These results suggest a strong incidence of parental background on economic well-being for those living in the less developed regions of Italy even though spatial mobility across different areas of the country may partially explain estimated differences.

The division of the intergenerational association into different mediating mechanisms shows that permanent labour income of the second generation, among other mediating factors such as preferences and bequests or donations, is associated with most of the overall wealth elasticity across generations.

The paper is structured as follows. Section 1.1 describes the conceptual framework behind the intergenerational transmission of wealth and the reasons why it may be useful to focus on wealth over income as a measure of parental background. Section 1.2 presents the empirical strategy used to estimate the degree of wealth mobility. Section 1.3. describes the data and the selection of offspring and parents into the final samples. Section 1.4 discusses the results obtained in terms of IWE and rank-rank slopes. Section 1.5 discusses the results regarding the mediating role of different intergenerational mechanisms. Section 1.6 concludes.

1.1. Intergenerational wealth mobility: measurement issues and intermediate channels of transmissions

1.1.1. Measurement issues

Estimates of economic persistence across generations are usually intended to capture correlations in lifetime resources. Unfortunately, intergenerational elasticities obtained by using earnings or income as a measure of economic status are likely to be downward biased because of various types of measurement errors deriving from the lack of suitable data which capture permanent earnings of two generations (Solon 1992, Zimmerman 1992; Mazumder, 2005; Haider and Solon, 2006). Moreover, correlations in earnings do not consider all possible mediating channels related to the transmission of economic status across different generations, such as the ones related to inheritances or direct donations. This is the reason why intergenerational mobility may be alternatively measured by considering wealth as a more comprehensive proxy of permanent economic resources of two generations when panel data which follow individuals during their entire careers are not available.

As described by Boresup et al. (2013), at time T the amount of wealth owned by an individual may be expressed in the following form:

$$W_{i,T} = W_{i,T-1}(1 + r_{i,T}) + Y_{i,T}(1 - c_{i,T}) + Tr_{i,T} \quad (1)$$

where $W_{i,T-1}$ is the stock of net wealth held in the previous period, $r_{i,T}$ is the rate of return on investments, $Y_{i,T}$ is the amount of net income, $(1 - c_{i,T})$ is the propensity to save and $Tr_{i,T}$ is the difference between the amount of direct wealth transfers received from the previous generation and those given to the next.

Since yearly income is affected by transitory shocks it is possible to rewrite equation 1 this way:

$$W_{i,T} = W_{i,T-1}(1 + r_{i,T}) + (Y_i + \vartheta_{i,T})(1 - c_{i,T}) + Tr_{i,T} \quad (2)$$

where Y_i is the permanent component of net income and $\vartheta_{i,T}$ captures all transitory shocks and fluctuations affecting yearly net income. Then, if we assume a constant rate of return to investment equal to zero for the sake of simplicity, it is possible to express $W_{i,T-1}$ as the sum of all incomes and donations received in the past and on preferences in terms of propensity to save:

$$W_{i,T-1} = \left\{\sum_{t=1}^{T-1}\left[(Y_i + \vartheta_{it})(1 - c_{i,t})\right] + \sum_{t=1}^{T-1}(Tr_{i,t})\right\} \quad (3)$$

Then, as it is commonly assumed in the empirical literature, if it is assumed that transitory shocks of income have zero-mean such that for a T large enough $\sum_{t=1}^{T-1} \vartheta_{i,t} \cong 0$, it is possible to re-write equation 3 in the following form:

$$W_{i,T-1} = \sum_{t=1}^{T-1}\left[(Y_i)(1 - c_{i,t})\right] + \sum_{t=1}^{T-1}(Tr_{i,t}) \quad (4)$$

In this case, we are assuming that yearly wealth is measured when individuals are old enough such that they have had enough time to accumulate wealth. Therefore, one period later it is possible to write:

$$W_{i,T} = \sum_{t=1}^{T} [(Y_i)(1 - c_{i,t})] + \sum_{t=1}^{T} (Tr_{i,t}) \quad (5)$$

Equation 5 is very useful to get an idea of why wealth could be preferred over income as a measure of permanent economic status of the two generations when data which cover parents and children over their entire lifecycle are not available. Unlike current income $Y_{i,t}$, which is affected by transitory shocks, current wealth $W_{i,t}$ automatically incorporates a measure of cumulate economic status which depends on the sum of all incomes earned in the past. This means, that estimates of intergenerational wealth correlations obtained by regression wealth of children on that of parents could be, at least from a theoretical point of view, higher than estimates of income correlations which use measures of incomes that are not averaged over many years. However, this is only true if individuals are taken at median ages or older such that transitory shocks cannot cause attenuation biases in estimates of wealth persistence.

1.1.2. Intermediate channels of transmission

According to the empirical framework formalised in equations 1 and 2, in a two generations model, the amount of wealth owned by the first generation is positively correlated to that owned by the second for three main reasons. Firstly, there may be a positive intergenerational wealth association as real or financial assets are directly transmitted from one generation to the subsequent by means of donations or bequests. Secondly, preferences in terms of risk and attitudes toward future that influence both the rate of return on financial and real assets and the propensity to save, can be correlated across generations. Lastly, as it is well known from the literature on intergenerational income mobility, permanent net income, which affects the amount of lifetime savings, is positively correlated across generations through several channels. For instance, parents are likely to transmit some cognitive or non-cognitive abilities to their children that can be useful in the labour market. Moreover, in the presence of imperfect capital markets and liquidity constraint, wealthy parents are able to invest a greater amount of resources in their children human capital, boosting their economic outcomes in the labour market (Becker and Tomes, 1979, 1986). Finally, children growing up in higher income families may exploit their parents' social networks and economic power to obtain better occupations and higher wages than other children[4].

However, as in the case of income mobility, also estimates of wealth mobility may be influenced by the age at which wealth of the two generations is measures since the importance of each single intergenerational channel may vary over the lifecycle. For instance, the component $Tr_{c,t}^{2}$ is likely to be very important at the beginning of the adulthood, when wealthy parents make inter-vivos transfers to their children, and later during the lifecycle when offspring receive direct transfers by means of bequests. In any case, there is a lack of empirical evidence on the robustness of estimates of intergenerational wealth mobility to the lifecycle bias. The only empirical study which attempts to assess the pattern of intergenerational wealth correlation as a function of offspring's age is that by Boserup et al (2016). They found a U-shaped pattern of intergenerational wealth correlation as a function of children's age, with higher estimated intergenerational correlations if children are taken at the beginning of their adulthood or from their 40s and up. They explain this pattern trough lifecycle variations in transfers, earnings and consumption. More specifically, wealthy parents are likely to make a larger amount of transfers early in children's life. Subsequently, their children have low current income when investing in human capital, but higher expected permanent income than other individuals their age.

[4] See, among others, Meade (1973), Bowles and Gintis (2002) and Franzini and Raitano (2009) for a detailed description of the channels of influence of parental background on children's economic outcomes.

1.2. Empirical framework

1.2.1. Imputed intergenerational wealth elasticity

Starting from the seminal work of Björklund and Jäntti (1997), the two-sample two-stage least squares method (TSTSLS) method has been largely used to provide estimates of mobility when data on economic status which cover two generations are not available[5]. Instead of estimating fathers' earnings and the intergenerational earnings elasticity as it is common in the empirical literature, this paper uses the TSTSLS method to impute parental wealth and evaluate the degree of persistence of wealth across generations, together with its intergenerational transmission channels. Unlike the literature on intergenerational income mobility which usually estimate the correlation between fathers' and sons' economic status, the empirical literature on intergenerational wealth mobility, use wealth of both parents as a measure of economic status of the first generation and do not exclude women from the second generation.

The TSTSLS methodology implemented in this paper uses a sample of adult children that report some retrospective information about parents and an independent sample of pseudo-parents to estimate the intergenerational wealth elasticity in a two-stage approach. In the first stage, the same set of socio-economic characteristics of parents reported by adult children is exploited in the sample of pseudo-parents to predict net wealth:

$$W_{i,t}^{pp} = \alpha + \theta \, Z_i^{pp} + \omega_{i,t} \tag{6}$$

where $W_{i,t}^{pp}$ is the logarithm of pseudo-parents's yearly wealth, Z_i^{pp} is a vector of socio-economic characteristics of pseudo-parents and $\omega_{i,t}$ is a disturbance including both time-varying and time-invariant components of wealth which are not predictable from auxiliary variables included in Z_i^{pp}.

In the second stage, the vector of predicted coefficients $\hat{\theta}$ allow us to predict wealth of actual parents i.e. $\widehat{w}_i^P = \hat{\theta} \, Z_i^P$. The IWE is thus estimated in the following way:

[5] For a review of empirical studies which exploit the TSTSLS approach, see Jerrim et al. (2016)

$$w_{i,t}^{O} = \alpha + \beta \widehat{w}_i^{P} + \omega X_i + \epsilon_{i,t} \tag{7}$$

where $w_{i,t}^{O}$ is the logarithm of offspring's wealth, $\widehat{w}_i^{P} = \hat{\theta}\, Z_i^{P}$ is the imputed logarithm of parental wealth and $X_{i,t}$ is a vector of control which include age and age squared of offspring to consider the influence of age on both the process of accumulation and the probability of receiving bequests from parents as individuals get older.

As it is common in the literature on wealth mobility, we want to use parental wealth as a measure of economic status of the first generation. Thus, we exploit several socio-economic characteristics of both parents which are likely to predict their permanent economic status. More specifically, we take educational attainments, work status and an age polynomial of both parents plus the region of residence of the family of origin as predictors in the first stage regression. All socio-economic characteristics taken to impute parental wealth are commonly used in the empirical literature on mobility for their capacity to predict lifetime socio-economic status of parents. Obviously, as when the TSTSLS method is used to predict income of the first generation, we are likely to make some errors in predicting wealth of the first generation as the set of auxiliary variables is not able to capture part of the variance related to any characteristic of individuals which is correlated across generations[6].

In order to compare the probability limit of the imputed estimator to the one that we could have been obtained if data of actual wealth of parents were available, it is possible to exploit an approach similar to the one described by Olivetti & Paserman (2015) in their study on intergenerational mobility in the US. In particular, we can express offspring's wealth and parental wealth in the following two forms:

[6] Most of studies which use the TSTSLS to impute income of the first generation exploit either educational attainments or educational attainments and other socio-economic characteristics in the first stage regression. In the last few years, many studies on intergenerational mobility started using surnames (see Barone & Mocetti, or names to predict the socio-economic status of the older generation.

$$w_i^O = \beta w_i^P + \varphi_i^P + \epsilon_i \tag{8}$$

$$w_i^P = \hat{\theta} Z_i^P + \omega_i \tag{9}$$

where, as in previous equations, w_i^O is offspring's wealth, w_i^P is net wealth of actual parents, Z_i^{PP} is the vector of socio-economic characteristics used to predict parental wealth in the sample of pseudo-parents and $\widehat{w}_i^P = \hat{\theta} Z_i^P$ is the imputed wealth of parents.

The term φ_i^P captures the direct influence of all socio-economic characteristics used to predict parental wealth on offspring's wealth, and ω_i is uncorrelated to $\widehat{w}_i^P$ and φ_i^P by construction. Then, it is possible to decompose ϵ_i in a component which is correlated to $\widehat{w}_i^P$ and another one which is not, such that the residual term $\epsilon_i = c_i + u_i$. The term $\widehat{w}_i^P$ may be correlated to c_i if most skilled parents (i.e. the ones with a better combination of socio-economic characteristics) transmit their cognitive and non-cognitive abilities, which can be useful to obtain higher lifetime incomes and wealth accumulation, to their children later during the lifecycle.

Thus, the probability limit of the "OLS" estimator (i.e. the one obtained if actual parental wealth were available) is:

$$\hat{\beta}_{OLS} \xrightarrow{p} \frac{cov(w_i^O, w_i^P)}{var(w_i^P)} = \beta + \frac{cov(\varphi_i^P + c_i, \widehat{w}_i^P)}{var(\widehat{w}_i^P) + var(\omega_i)} + \frac{cov(u_i, \omega_i)}{var(\widehat{w}_i^P) + var(\omega_i)} \tag{10}$$

Obviously, $\hat{\beta}_{OLS}$ is not meant to capture the causal effect of parental wealth on offspring's wealth (i.e. the β coefficient) because of unobservables which are correlated across generations[7].

On the contrary, the probability limit of the "TSTSLS" estimator is:

[7] Usually the main goal of studies on mobility is not to obtain the causal effect of parental economic status on offspring's economic status. This the reason why we are comparing the "TSTSLS" estimator to the "OLS" estimator without assuming the exogeneity of auxiliary variables used in the first-stage.

$$\hat{\beta}_{TSTSLS} \xrightarrow{p} \frac{cov(w_i^O, \hat{w}_i^P)}{var(\hat{w}_i^P)} = \frac{var(\hat{w}_i^P)}{var(\hat{w}_i^P) + var(\omega_i)} \beta + \frac{cov(\varphi_i^P + c_i, \hat{w}_i^P)}{var(\hat{w}_i^P)} \quad (11)$$

Therefore, the "TSTSLS" estimator may be different from the "OLS" estimator because of many reasons. For instance, the first component of equation 11 captures the classical attenuation bias due to measurement errors in the imputation of parental wealth[8]. A second attenuation bias occurs if the set of socio-economic characteristics is not able to capture other characteristics of individuals (e.g. soft skills, social networks, cultural factors, cognitive and non-cognitive abilities), which are positively correlated across generations (i.e. the last term in equation 10 is not present in equation 11). Eventually, the second term in equation 11 is larger than the second term in equation 10 if the variance of the imputed parental wealth is lower than the variance of wealth of actual parents.

According to this framework, the "TSTSLS" estimator may be either higher or lower than the "OLS" estimator. In fact, the sign and the amount of the bias depend on the size of each different component of equation 11 compared to the analougus term in equation 10. In any case, the difference between the "OLS" estimator and the "TSTSLS" estimator should become lower as the unexplained component of parental wealth decreases (i.e. the higher the fraction of the variance explained from the set of auxiliary variables exploited to predict parental wealth is, the lower the bias will be).

Usually the TSTSLS method it is assumed to perform quite well at estimating intergenerational income mobility. Therefore, we evaluate if auxiliary variables can do an equally good job at predicting parental wealth by comparing the R^2 of the first stage regression with those obtained by Mocetti (2007) and Piraino (2007) in their studies on income mobility in Italy. Moreover, as a further robustness check, we

[8] Observe however that the attenuation bias may be higher if adult children make some errors when reporting retrospective information of their parents. The consistency of the two-sample estimator depends also on an additional aspect: auxiliary variables used in the first stage should have the same distribution in both the sample of pseudo-parents and the sample of offspring. Nevertheless, as showed by Inoue and Solon 2010, the TSTSLS approach automatically corrects for distributional differences between the two selected samples.

evaluate to what extent the estimated IWE changes as different predictors are taken to impute parental wealth in the first stage regression.

1.2.2. Imputed rank-rank slope

An important disadvantage of using elasticities to measure intergenerational wealth mobility is that they automatically exclude negative or zero wealth individuals because of the logarithm transformation. This may cause a selection problem if the intergenerational correlation is not stable across the wealth distribution (Boserup et al., 2013, Black et al., 2015; Adermon et al, 2018). For instance, excluding the lower tail of the wealth distribution will under (over)estimate the level of mobility if the actual level of intergenerational mobility is higher (lower) at the bottom of the distribution than in the remaining part of the distribution.

A way to overcome this kind of selection problem is to measure wealth mobility by using rank-rank slopes which are usually obtained by estimating the following equation:

$$p(w_i^O) = \alpha + \delta p(\, w_i^P) + \epsilon_i \tag{12}$$

where $p(w_i^O)$ is the percentile of offspring's wealth in their own distribution and $p(\, w_i^P)$ is the percentile of parental wealth. In this empirical framework, an estimated δ of 0.3 means that the expected difference in percentiles between offspring would be 3 percentiles if the difference in percentiles among their parents was 10 percentiles. However, it is not possible to estimate rank-rank slopes by simply re-categorizing wealth of the two generations when data on wealth of actual parents are not available. For this reason, we use a different approach consisting in two different steps.

Firstly, we obtain a prediction of parental wealth by exploiting the sample of pseudo-parents and the same set of auxiliary variables used for obtaining TSTSLS estimates of the IWE. Secondly, predicted parental wealth is percentile ranked so that we can estimate the following equation:

$$p(w_i^O) = \alpha + \delta p(\,\hat{w}_i^P) + \epsilon_i \tag{13}$$

where $p(w_i^O)$ is the percentile of offspring's wealth in her own distribution and $p(\,\hat{w}_i^P)$ is the imputed percentile of parental wealth. This approach, except for the set of auxiliary variables used in the first step, is very close to the ones used by Olivetti et al. (2016) and Barone and Mocetti (2016) to obtain intergenerational and multigenerational rank-rank measures of economic mobility[9].

Consider however, that from a statistical point of view, it is not easy to understand to what extent this imputed rank-rank slope can be compared to rank-rank slopes estimates that one could obtain by percentile ranking wealth of actual parents. Obviously, when percentiles are imputed, we are likely to make some errors in placing all parents in the right percentile of their wealth distribution. For this reason, estimates obtained by using imputed rank are likely to be affected by some extent of attenuation bias. This kind of rank measurement errors cannot be intended as "classical" since both the dependent variable and the regressor in equation 13 are uniformly distributed. More specifically, the correlation between actual and imputed rank is, by definition, between the value of 0 and 1 such that, if parental rank is measured without error, then the correlation will be equal to one and the greater the error is the lower the correlation between actual and imputed rank will be. This means that this kind of measurement error is negatively correlated with actual rank of parents (Nybom and Stuhler, 2016).

Nevertheless, measurement errors related to the imputation of ranks should be lower than the measurement error related to the imputation of continuous values since imputation errors decrease as the categories to be imputed become lower[10] (Jerrim et al., 2016). In any case, we test the robustness of estimated rank-rank

[9] Olivetti et al. (2016) impute father's and grandfather's income rank, which is unobserved, using the average income of fathers with a given first name. Barone and Mocetti (2016) use surnames to track families over different generations and obtain imputed rank-rank slopes.

[10] Jerrim et al. (2016) show that imputed intergenerational correlations are generally less biased than imputed elasticities even when economic status of parents is not categorised by using ranks.

slopes to different sets of socio-economic characteristics considered to impute parental wealth with very good results in terms of stability.

1.3. Data and Sample Selection

1.3.1. Data source

As in previous studies on intergenerational economic mobility in Italy, we use data from the Bank of Italy Survey on Household Income and Wealth (SHIW), a representative survey of the Italian population which is available annually from 1977 to 1987 and every two years after 1987. It is usually considered as the best source of income distribution data in Italy and, starting from the wave of 1987, it also collects both real and financial wealth data at the household level. Another relevant aspect of the SHIW is that, starting from the wave of 1995, respondents, who are heads of the household, are asked to report some characteristics of their parents when the latter were approximately the same age as the former. Some of these retrospective characteristics such as educational attainments, employment status and age are taken in this paper to predict parental wealth.

Net wealth is recorded on an annual basis and obtained as the sum of real and financial assets minus financial liabilities. All economic variables are deflated by the consumer price index. A detailed list of all real/financial assets and financial liabilities used to obtain household wealth is showed in table B1 in appendix B.

1.3.2. Sample Selection

Ideally, one would have used permanent, instead of current, measures of economic status for both generations to measure intergenerational economic mobility. Unfortunately, data which cover two generations over their entire lifecycle are usually not available. For this reason, it is well acknowledged in the literature on earnings or income mobility that obtaining estimated elasticities which are not affected by lifecycle measurement errors is a non-trivial exercise. In fact, despite the classical measurement error assumption, both left-hand and right-hand side errors may affect the consistency of the elasticity. Therefore, Haider and Solon (2006), suggest taking offspring around 40 years old to minimize measurement errors related to lifecycle when using current instead of permanent variables, even if age controls are included in the specification.

However, when moving to analyse the extent of wealth correlation across generations, it is not clear which is the optimal age to choose. Many life-cycle accumulation models predict wealth to be hump shaped over an individual's lifetime (Davies and Shorrocks, 2000). There is also some empirical evidence showing that wealth accumulation reaches its peak at retirement age, since assets are usually accumulated over the working age and decline after retirement age (see OECD, 2008; Finance and Network, 2013). Moreover, the probability of receiving direct transfers is high for young children coming from wealthy households and becomes higher as individuals get older because of bequests. With all this in mind, we try to select the two generations into sample by not considering too young individuals in the baseline model. However, we cannot select retired individuals since we would have needed information on their occupational status when they were employed. Unfortunately, this kind of information is not present in the dataset.

With all this in mind, the sample of pseudo-parents is taken from the wave of 1989 which is the first one that contains information on both real and financial wealth at the household level and educational attainments of both employed and unemployed pseudo-parents. The baseline estimates are provided by including all households composed by an employed father[11] aged 40 to 54, a mother aged 35 to 54 and at least one child in the wave of 1989. On the contrary, the sample of offspring is taken from the waves of 2010 and 2012 which are the latest two which contain all background information about parents. we include all employed heads of the household aged 35 to 48 whose fathers were employed at the same age for a final sample of 1158 offspring and 2062 pseudo-parents[12]. Since financial wealth is measured in both samples at the household rather than at the personal level, we will estimate different specifications to evaluate the robustness of the results to this kind of potential source of bias.

[11] This kind of exclusion is a common procedure when using the TSTSLS method since unemployment of fathers is often transitory.

[12] We cannot select older offspring since we are able to measure their wealth only 21 years after pseudo-parents' wealth.

1.4. Descriptive Statistics

Descriptive Statistics in table 1 show that offspring and pseudo-parents are taken on average in their 40s.

Table 1: Two-Sample Descriptive Statistics (Full sample)

	Pseudo-Parents	Offspring	Sign of the Variation
Age (Mean)	45.61	41.49	
	(4.15)	(3.67)	
Percentiles of Net Wealth:			
p1	-3255.20	-9700.00	-
p5	1583.41	-486.04	-
p10	4715.08	1000.00	-
p25	18209.19	12812.92	-
p50	78875.77	96401.10	+
p75	164871.90	202983.80	+
p90	305527.70	384500.00	+
p95	440607.00	519971.50	+
p99	792127.90	1506128.00	+
Average Net wealth	127472.72	164302.01	+
	(172738.66)	(275969.20)	
Zero/Negative Wealth	2.7%	7.1%	+
Observations	2062	1158	

Author's elaboration based on the SHIW. Standard deviations in parenthesis. All economic variables are expressed at 2010 prices

This selection into sample is likely to prevent our estimates to be downward biased as offspring and pseudo-parents are not too young. Table 1 also presents summary statistics on wealth levels and dispersion in the two full samples which show that the wealth dispersion in Italy has increased over the last two decades. For instance, the ratio between the 90^{th} and the 10^{th} percentile (p90/p10) of the wealth distribution rose dramatically from 64 in the sample of pseudo-parents to 384 in the sample of offspring. Nearly all this variation is to be ascribed to an increase in the p50/p10 rather than in the p90/p50 ratio: while the former is about 6 times higher in the sample of offspring than in the sample of pseudo-parents, the latter remained basically stable during the period. Increasing inequality in the lower tail of the net wealth distribution is likely to be closely related to the growth of financial liabilities: over the last two decades, the share of households with zero or negative net wealth rose from 2.7 to 7.1 percentage points. Regarding wealth dispersion in the upper tail of the distribution, the p99/p90 ratio has increased from 2.59 to 3.91 across the two generations.

Table 2: Two-Sample Descriptive Statistics after the logarithmic transformation

	Pseudo-Parents	Offspring	Sign of the Variation
Age	45.60	41.49	
	(4.16)	(3.67)	
Percentiles of Net Wealth:			
p1	6.67	6.19	-
p5	8.05	7.60	-
p10	8.76	8.49	-
p25	10.03	10.10	+
p50	11.31	11.57	+
p75	12.04	12.26	+
p90	12.65	12.89	+
p95	13.00	13.18	+
p99	13.58	14.25	+
Log Net wealth	10.95	11.11	+
	(1.57)	(1.76)	
Observations	2007	1076	

Author's elaboration based on the SHIW. Standard deviations in parenthesis. All economic variables are expressed at 2010 prices

Table 2 shows descriptive statistics of the final sample used to estimate IWE after the logarithm transformation which excludes zero or negative wealth individuals. The extent of wealth dispersion in this subsample is obviously lower than the one showed in the full sample since less wealthy households are now excluded. In this case, the p90/p10 ratio remains basically stable across the two generations. On the contrary, a slight increase of the wealth dispersion across generations can be seen in the upper tail of the distribution. Finally, it is important to note that the average age of the two generations does not change moving from the full sample to the sub-sample of positive wealth households.

1.5. Estimated elasticities

This section reports estimates of the intergenerational wealth elasticity in Italy. we perform the TSTSLS method by exploiting a set of parental characteristics given by offspring in the surveys of 2010 and 2012, that can be used to predict their parents' wealth. More specifically, we use 5 education categories of both father and mother (none, elementary, lower secondary, upper secondary and university degree), 6 occupational qualifications of fathers (production worker, teacher or clerical worker, junior manager, manager, member of the arts or professions, other self-employee), 5 occupational qualifications of mothers[13] (not employed, production worker, teacher or clerical worker, manager or junior manager, self-employer/member of the arts), region of residence (Piemonte, Lombardia, Trentino-Alto Adige, Veneto, Friuli-Venezia, Liguria, Emilia-Romagna, Toscana, Umbria, Marche, Lazio, Molise, Abruzzo, Campania, Basilicata, Puglia Calabria, Sicilia, Sardegna) and a third grade polynomial for age of both parents. Since the region of residence is reported only for pseudo-parents, we use the offspring's region of birth as a proxy of the region in which actual parents were resident in 1989[14].

Table A2 in appendix A reports the whole set of auxiliary variables used to predict parental wealth and some first stage post-estimation statistics. In particular, the R^2 of the first stage regression equal to 0.28 suggests that the set of auxiliary variables performs pretty well at predicting parental wealth. In fact, the estimated

[13] Excluding not employed mothers would have reduced significantly the sample dimension.
[14] The distribution of parental socio-economic characteristics in the two samples is reported in table A1 in appendix A

R^2 is not that far from the ones obtained by Piraino (2007) and Mocetti (2007) in their first-stage regressions implemented to predict fathers' income[15].

The usual way to obtain elasticities in the second stage, is to regress the logarithm of offspring's wealth on the logarithm of parental wealth, such as it is formalised in equation 7. This commonly used approach excludes all observations lower than or equal to zero. In this case, the TSTSLS age-adjusted intergenerational wealth elasticity estimate is 0.499 (table 3, column 1). This means that a 10 percent variation in parental wealth is associated with a 4.99 percent variation in offspring's.

Since data on financial net wealth of offspring are available only at the household level, we are overestimating the IWE if those adult children with a better economic background are more likely to marry wealthy partners increasing their overall household net wealth. Thus, we try to reduce this potential source of bias by controlling for a proxy of the amount of personal saving capacity over household saving capacity. More to the point, we control for the fraction of personal net income of the head over total household disposable income. The main assumption is that personal financial wealth and household financial wealth are more likely to be equal as the fraction of personal net income of the head over total household disposable income increases. This derive from the fact that the personal capacity of accumulate wealth is strongly correlated to personal lifetime income. Observe however, that this kind of control is not perfect. For instance, it may not work if at least a fraction of financial wealth at the household level is inherited by members other than the head of the household.

Table 3 (column 2) reports an estimated IWE of 0.451 when the fraction of personal net income of the head over total household disposable income is included in the specification. This result seems to confirm that some mechanisms related to assortative mating were likely to upward bias the estimated elasticity obtained without adding this control variable. A further way of controlling for this potential source of bias is to use personal estate wealth as a proxy of total personal net wealth,

[15] The R^2 of the first stage regression is 0.301 in the study of Mocetti (2007) and 0.322 in that of Piraino (2007).

measured as the sum of all personal estate assets minus the total amount of mortgages. The IWE reported in the third column of table 3 seems to confirm that estimated elasticities seem to be robust to the use of household financial wealth instead of personal financial wealth.

Table 3: Estimated intergenerational wealth elasticities

	[1]	[2]	[3][a]
Parental net wealth	0.499***	0.451***	
	[0.061]	[0.061]	
Parental estate wealth			0.478***
			[0.074]
Pers. income share		Yes	
R-squared	0.078	0.124	0.062
Obs.	1076	1076	729

Author's elaboration based on the SHIW. Bootstrapped standard errors (reps 100) in parentheses. [a] Personal estate wealth is used as a dependent variable instead of total net wealth. All regressions include offspring's age and age squared as a control.
* p<0.10, ** p<0.05, *** p<0.01

The main advantage of estimating the IWE by using a classical log-log specification is that it is possible to compare the obtained elasticity with most of previous estimates for other countries, which are based on the same transformation (table 4). Table 4 shows that the degree of wealth mobility appears to be lower in Italy than in France (Arrondel, 2008), Norway (Fageren et al., 2015), Denmark (Boserup et al., 2013), Sweden (Adermon et al., 2018; Black et al., 2015) and very close to the values of 0.37 and 0.44 obtained by Pfeffer and Killewald (2017) for the US. However, this kind of comparison should be taken carefully since the studies listed in table 4 use actual rather than imputed parental wealth.

Table 4: Intergenerational wealth mobility: cross-country comparison

Country	Source	Parent's Age	Offspring's Age	IWE	R2R
US	Charles and Hurst (2003)	52	37.5	0.37	/
US	Pfeffer and Killewald (2017)	43.4	44.5	0.44	0.39
Italy	Current	45.6	41.5	0.45	0.35
Denmark	Boserup et al. (2013)	48.6	33.9	0.27	0.23
Denmark	Boserup et al. (2016)	47.9	47.2	0.24	0.27
Sweden	Adermon et al. (2018)	57-63	42-49	0.32	0.39
Sweden	Black et al. (2015)	63.9	43.8	/	0.35
Norway	Fageren et al. (2015)	62.7	36.1	0.2	0.18
France	Arrondel (2009)	58.9	33.8	0.22	/

1.5.1. IWE: Robustness check

A usual way to test the robustness of estimated elasticities based on imputed values is to check how the elasticity changes as a single socio-economic predictor of parental wealth is excluded from the first stage regression[16]. Results presented in Appendix A (table A3) show that the estimated elasticity tends to be stable in all cases but when fathers' occupational qualification is excluded from the set of predictors in the first stage regression. This result may suggest a direct correlation between this auxiliary variable and offspring's wealth. Nevertheless, excluding occupational qualification of the father reduces substantially the variance of predicted parental wealth: the first stage R^2 in this case is 0.167 (i.e. 0.11 lower than when all auxiliary variables are included in the first stage). Hence, imputed parental wealth seems to be less accurate when the occupational qualification of the father is not used as a predictor in the first stage regression.

[16] We perform the Sargan test to evaluate if the full set of instruments used in the first stage in uncorrelated with the error term of the second stage regression. Even though the test does not reject the null hypothesis, we can hardly assume that the set of auxiliary variables is exogenous.

Another way to test the robustness of the results is to evaluate how the elasticity changes as different measures of wealth of the two generations are used. Results presented in table 5 show that the estimated elasticity is extremely stable across different specifications either taking total net wealth (column 1) or estate/non-estate wealth (column 2/3) as a measure of economic status of both generations. Interestingly, the estimated elasticity remains stable even though the prediction ability of the set of auxiliary variables used in the first stage increases when non-estate wealth rather than total net wealth is taken as a measure of economic status. In particular, the R^2 of the first stage regression rises to 0.395 using non-estate wealth (table A2).

Table 5: IWE by different measures of wealth

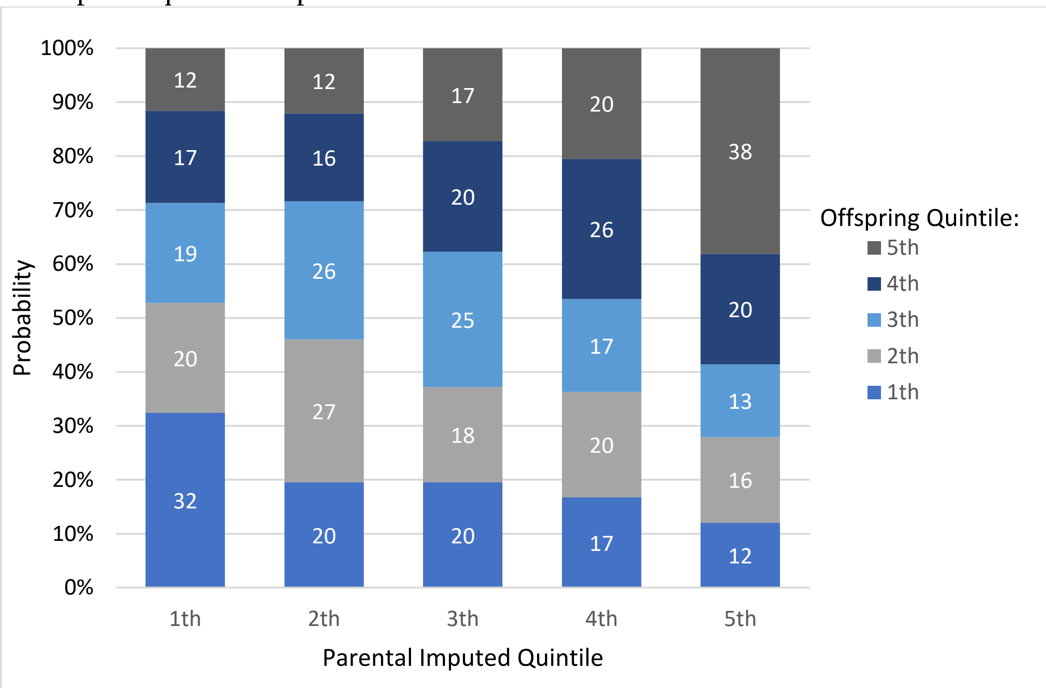
	[1]	[2][a]	[3][b]
Parental Net Wealth	0.451***		
	[0.061]		
Parental Estate Wealth		0.478***	
		[0.074]	
Parental Non-Estate Wealth			0.455***
			[0.049]
R-squared	0.124	0.064	0.170
First stage R-squared	0.278	0.240	0.395
Obs.	1076	729	1027

Author's elaboration based on the SHIW. Bootstrapped standard errors (reps 100) in parentheses. [a]Estate wealth is used as a dependent variable instead of total net wealth. [b]Financial wealth is used as a dependent variable instead of total net wealth. All regressions include, as further controls, offspring's age, age squared and the ratio between personal income and total household income. * p<0.10, ** p<0.05, *** p<0.01

1.6. Intergenerational transmission of wealth across the distribution

Although the elasticity is useful to summarize the degree of persistence of wealth across generations, it gives no information about the pattern of wealth transmission at different points of the distribution. A low level of mobility may be associated to either the lack of opportunities of the poor or the persistence of wealth at the top or both. There are many recent studies showing a higher intergenerational transmission of income and earnings at the top (e.g. Björklund et al. 2012) or stronger intergenerational correlations at higher percentiles of the parental wealth distribution (Charles and Hurst, 2003; Killewald, 2013; Hansen, 2014; Pfeffer and Killewald 2017, Adermon et al. 2018). As in many previous studies on economic mobility, we evaluate the pattern of mobility along the wealth distribution by computing the offspring's probability of ending up in a specific quintile of the wealth distribution given the quintile of their parents (figure 1).

Figure 1: Probability of ending in a specific quintile of the wealth distribution given the imputed quintile of parental wealth



Author's elaboration based on the SHIW.

Results show that in Italy for each quintile of the wealth distribution, offspring are more likely to ends up in the same quintile as their parents (diagonal probabilities are all greater than 20 percent). In any case, the degree of persistence of wealth across generations is higher at the top and at the bottom of the distribution: 38 percent of offspring whose parents were collocated in the highest quintile of the distribution remains in the same quintile and about 60 percent in one of the highest two quintiles. Conversely, only about 12 percent of offspring from the best parental wealth background ends up in the worst wealth quintile.

The degree of persistence is also high at the bottom-end of the wealth distribution: about 52 percent of offspring coming from the lowest quintile of the parental wealth distribution ends up in one of the bottom two quintiles and only about 12 percent makes its way to the top.

1.7. Estimated Rank-Rank slope

As already specified, the disadvantage of using elasticities to measure intergenerational wealth mobility is that they exclude, by definition, negative or zero wealth individuals. This may cause a serious selection bias in estimated mobility if the intergenerational correlation is not stable across the wealth distribution. This is the reason why, we estimate also rank-rank slopes with or without zero and negative wealth individuals.

Results are obtained by estimating equation 13 and are reported in Table 6. According to imputed rank-rank slopes, the degree of intergenerational wealth mobility seems to be slightly higher when negative or zero wealth households are not excluded from the analysis. This difference seems to confirm results presented in figure 1 which suggested that the degree of intergenerational mobility is not stable across the wealth distribution, with lower mobility at the top and the bottom of the distribution. In any case, the selection bias due to the exclusion of the lower tail of the wealth distribution doesn't appear to be huge since the fraction of indebted households in Italy is not high compared to other countries such as Sweden (Davies, 2009). As already said in previous sections, when one tries to impute parental rank he is likely to make some errors so that estimated rank-rank slopes may be downward biased because of non-classical measurement error. This is the reason why one should be cautious in comparing rank-rank slopes obtained in this paper to the ones obtained in previous studies for other countries which exploit actual instead of imputed rank of the first generation.

Table 6: Rank slopes by including/excluding zero or negative wealth individuals

	[Full Sample]	[Excl. zero/negative wealth households]
Parental Rank	0.349***	0.312***
	[0.029]	[0.029]
R-squared	0.122	0.096
Obs.	1158	1076

Author's elaboration based on the SHIW. Bootstrapped standard errors (reps 100) in parentheses. Both offspring's wealth and parental wealth are percentile ranked by offspring and parents birth cohort. * p<0.10, ** p<0.05, *** p<0.01

In any case, although measurement errors related to the imputation of the economic status of the first generations is likely to be lower for rank-based measures, we evaluate the robustness of the estimated rank-rank slope to the set of auxiliary variables used to predict parental wealth and impute parental rank. Therefore, different estimates of the rank-rank slope are obtained by excluding a single predictor of parental wealth at a time from the first stage regression. Results reported in table A4 in appendix A show that the estimated rank-rank slope is extremely robust to the exclusion of each single predictor at a time in the first stage regression. More specifically, its value is comprised between 0.322 and 0.350 using different sets of auxiliary variables. This result seems to suggest that rank-rank slopes seem to be even more robust to the selection of different socio-economic predictors than elasticities.

1.8. The pattern of intergenerational wealth mobility over the lifecycle

Estimates of the intergenerational economic mobility are usually sensitive to the age at which the economic status of the two generations is measured (Grawe, 2006, Haider and Solon, 2006, Nybom and Stuhler, 2016) In particular, estimates of income mobility are assumed to be downward biased if economic status is measured at early stages of the second generation's career. Thus, Haider and Solon (2006) suggest offspring should be around 40 years old to minimize measurement errors related to lifecycle when using current instead of permanent variables, even if age controls are included in the specification.

In the case of intergenerational wealth mobility, there is a lack of evidence regarding the optimal age at which wealth of the two generations should be measured. For instance, most of studies listed in table 4 do not observe the two generations of parents and offspring in the same age. This is the reason why estimates of intergenerational wealth mobility obtained in the literature could be downward biased if too young offspring have had no enough time to accumulate the same amount of wealth as its parents.

The only empirical study which tries to assess the pattern of intergenerational wealth correlation as a function of offspring's age is that by Boserup et al (2016). Contrary to expectations, they find a U-shaped pattern of intergenerational wealth correlation as a function of child age in Denmark, with higher intergenerational correlations obtained if offspring are taken when they are very young or from their 40s and up. They explain the pattern of intergenerational wealth mobility over the life-cycle through life-cycle patterns in transfers, earnings and consumption. More specifically, wealthy parents are likely to make a larger amount of transfers early in offspring's life. Subsequently their children have low current income when investing in human capital, but high permanent income.

To test this theoretical assumption, we re-estimate the intergenerational wealth elasticity and rank-rank slope by using three different samples of offspring by age. In a first estimate, we consider a sample of offspring aged 22 to 34 whose wealth is measured in the waves of 2000 and 2002 and 2004. Then, we raise the age at which offspring's wealth is measured by considering individuals aged 27 to 37 in the waves of 2004, 2006 and 2008[17]. We thus compare these two obtained elasticities and rank-rank slopes to baseline estimates obtained in all the rest of the paper by considering adult children aged 35 to 48 whose wealth is measured in the waves of 2010 and 2012.

Results reported in table 7 and 8 seem to confirm results provided by Boserup et al. (2016) with higher intergenerational correlations obtained when the second generation is very young or around 40s. In particular, the estimated IWE is 0.474

[17] These two different samples of offspring by age are selected such that the distribution of the socio-economic characteristics taken to predict parental wealth in the first stage is similar in the sample of offspring and of pseudo-parents.

when adult children are 22 to 34, 0.409 when they are 27 to 37 and 0.451 when they are 35 to 48.

Table 7: IWE by different age of offspring

	[22-34]	[27-37]	[35-48]
Log Parental Wealth	0.474***	0.409***	0.451***
	[0.07]	[0.07]	[0.06]
R-squared	0.173	0.129	0.120
Obs.	728	657	1116

Author's elaboration based on the SHIW. Bootstrapped standard errors (reps 100) in parentheses. All regressions include, offspring's age, age squared and the ratio between personal income and total household income as a control. Wealth of the youngest generation is measured in the waves of 2000, 2002 and 2004. Wealth of the medium generation is measured in the waves of 2004, 2006 and 2008. Wealth of the oldest generation is measured in the waves of 2010 and 2012. * p<0.10, ** p<0.05, *** p<0.01

A similar pattern of mobility is obtained looking at the estimated rank-rank correlation which is 0.383 for the youngest sample, 0.289 when children are 27 to 37 and 0.349 when the second generation is around 40 years old. Thus, unlike the case of intergenerational income or earnings mobility, the pattern of wealth mobility over the lifecycle is confirmed to be U-shaped. More specifically, estimates seem to be downward biased only if wealth of the second generation is measured when adult children are at early stages of their careers but not too young.

Unfortunately, it is not possible to evaluate the pattern of intergenerational wealth correlation by using older offspring because of data limitations. However, intergenerational correlations are likely to be higher if individuals of the second generation are selected after their parents die because of the role of inheritances. In any case, if the main goal of an empirical analysis is to estimate the degree of lifetime intergenerational wealth correlation, it seems to be better to select both parents and offspring around 40 years old as suggested by Boserup et al. (2016)

Table 8: Rank-Rank slope by different age of offspring

	[22-34]	[27-37]	[35-48]
Parental Rank	0.383***	0.289***	0.349***
	[0.034]	[0.036]	[0.029]
R-squared	0.146	0.083	0.118
Obs.	771	693	1201

Author's elaboration based on the SHIW. Bootstrapped standard errors (reps 100) in parentheses. Both offspring's wealth and parental wealth are percentile ranked by offspring and parents birth cohort. Wealth of the youngest generation is measured in the waves of 2000, 2002 and 2004. Wealth of the medium generation is measured in the waves of 2004, 2006 and 2008. Wealth of the oldest generation is measured in the waves of 2010 and 2012. * p<0.10, ** p<0.05, *** p<0.01

1.9. Geographical differences in intergenerational wealth mobility

In this section, we evaluate to what extent intergenerational wealth mobility changes between different areas of Italy. Ideally, we should estimate regional differences in intergenerational elasticities and rank-rank slopes to obtain a detailed picture of geographical differences in wealth mobility. Unfortunately, the sample of offspring is not as large as it is needed to obtain 20 different estimates of wealth mobility by region. This is the reason why we decide to compare intergenerational wealth mobility by considering only two different areas in Italy, north/centre and south/islands. These two areas are commonly assumed to be very different in terms of socio-economic structure and levels of familism. These aspects are likely to strongly influence offspring's economic opportunities in the labour market and the amount of savings for inheritance purposes.

Results reported in table 9 show large differences in intergenerational wealth elasticities by offspring' area of residence, with higher estimated mobility in the northern/central area of the country than in the southern. More specifically, the IWE is twice as high in the southern part of Italy as in the northern/central part of the country. This means that a 10 percent variation of parental wealth is correlated to a 3.16 percent variation in offspring's wealth considering the North/Centre of Italy and to 6.21 percentage variation considering the South/Islands.

Table 9: Estimated IWE by offspring's area of residence

	[North/Centre]	[South/Islands]	Difference
Parental Net Wealth	0.316***	0.621***	0.306**
	[0.071]	[0.119]	[0.133]
R-squared	0.03	0.152	
Obs.	738	338	

Author's elaboration based on the SHIW. Bootstrapped standard errors (reps 100) in parentheses. All regressions include offspring's age and age squared as a control. * p<0.10, ** p<0.05, *** p<0.01

The lower degree of intergenerational wealth mobility in the southern part of Italy is also confirmed from results presented in table 10. In this case, we evaluate geographical differences in wealth mobility using estimated rank-rank slopes that are usually considered to be particularly appropriate to compare different areas. This is because, as stated by Mazudmer (2015), an estimated elasticity in a specific region or geographical area is only informative about the rate of regression to the mean of wealth in that region or area. On the contrary, rank estimators are obtained by computing ranks that are fixed to the national distribution.

Using this approach to estimate geographical differences in wealth mobility, we find that the rank-rank slope is about 0.15 points higher in the South/Islands than in the North/Centre of Italy. However, these estimated geographical differences in the extent of wealth mobility across generations do not consider spatial mobility as a possible source of bias. More specifically, many individuals who reside in the northern Italy (i.e. the most developed area of the country) were born in less developed regions and moved to the north for educational reasons or to get well paid jobs. Therefore, we re-estimate rank-rank slopes by including a dummy for spatial mobility which assumes the value of one if adult children reside in a different area with respect to the one where they were born. Results showed in table A5 in Appendix A are very close to the ones obtained without controlling for geographical mobility. In any case, this is only an imperfect way of controlling for geographical mobility since individuals may move many times during their adulthood for both educational and occupational reasons.

Table 10: Estimated Rank-Rank slope by offspring's area of residence

	[North/Centre]	[South/Islands]
Parental Net Wealth	0.289***	0.407***
	[0.037]	[0.048]
R-squared	0.082	0.162
Obs.	777	381

Author's elaboration based on the SHIW. Bootstrapped standard errors (reps 100) in parentheses. Both offspring's wealth and parental wealth are percentile ranked by offspring and parents birth cohort. * p<0.10, ** p<0.05, *** p<0.01

1.10. The mediation role of different intergenerational channels

As discussed in section 1.2, there are mainly three different factors that may explain why wealth is positively associated across generations. First, bequests or inter-vivos transfers may directly increase wealth if they are received from the previous generation. Indirectly, wealth may be correlated across generations through income and/or educational attainments since wealthy parents may have higher cognitive or non-cognitive abilities that can be transmitted to their children or greater opportunities of investment in their children's human capital (Becker and Tomes 1979 and 1986). The latter two channels may dramatically increase economic outcomes of offspring once they enter the labour market and thus the rate of lifetime wealth accumulation. Lastly, preferences such as risk propensity or attitudes toward future may as well be transmitted from parents to offspring influencing their saving propensity or the rate of return of investments.

The usual way to decompose the intergenerational wealth elasticity into different mediating factors is to re-estimate the equation 7 (i.e. the baseline elasticity obtained without controlling for any mediating variable) with some additional controls included in the vector $V_{i,t}^{O}$:

$$w_{i,t}^{O} = \alpha + \beta_2 \widehat{w}_i^{P} + \sigma V_{i,t}^{O} + \omega X_{i,t} + \epsilon_{i,t} \qquad [14]$$

The main assumption is that if a mediating variable is positively correlated with both parental and offspring's wealth, then the estimated elasticity will fall once this control is included in the regression. Therefore, the difference between the coefficients $\hat{\beta}$ obtained by estimating equation 7 and the estimator $\hat{\beta}_2$ can be interpreted as the fraction of the elasticity associated to a single mediating factor.

Observe however, that this is true only if a mediating variable included in the vector V_i^O is not correlated with the error term. Conversely, if the mediating variable is positively (negatively) correlated with other unobservable factors that influence offspring's wealth, the coefficient $\hat{\beta}_2$ is upward (downward) biased and the channel of influence is overestimated (underestimated). Moreover, since we are using imputed wealth for the first generation, the correlation between parental wealth and a single mediating factor may be underestimated if the set of socio-economic characteristics used to predict parental wealth are not able to completely capture some characteristics of individuals which are correlated to wealth of both generations. For instance, if an unobservable (for instance propensity to save) which is positively correlated to wealth of the two generations and to a single mediating factor included in the vector $V_{i,t}^O$ (for instance savings) is not totally captured by auxiliary variables used to impute parental wealth (i.e. the imputed parental wealth is less correlated to the vector $V_{i,t}^O$ in equation 14 than actual parental wealth), then we are likely to underestimate the mediating role of that intergenerational channel. On the contrary, the role of a single mediating factors may be also underestimated if yearly measures included in the vector $V_{i,t}^O$ are not able to capture permanent differences in economic performances in the labour market or if saving preferences and attitude toward risk change over the lifecycle.

With all this in mind, we try to analyse the mediating factors behind the intergenerational wealth correlation. The mediating role of abilities and human capital accumulation is captured indirectly by evaluating the difference between the elasticity obtained by estimating equation 7 (i.e. the baseline elasticity obtained without controlling for any mediating variable) and that obtained when labour income and three categories of expected future income (e.g. higher future real income, lower future real income, or no expected variations) are included as controls.

Educational attainments may also have a direct influence on offspring's wealth accumulation, since more educated individuals may be able to obtain higher returns on their investment or may have higher saving rates than the rest of the population. Thus, the direct influence of human capital on offspring's wealth is evaluated by adding a three categories educational dummy as a further control[18].

Regarding the mediating role of the intergenerational correlation in the rate of return on investments and savings, we control for annual savings, three categories of financial risk propensity and the amount of overall income that offspring would save against unexpected events, such as increased uncertainty over future earnings or unexpected expenses (for instance, for health problems or other emergencies). These variables should, at least partially, capture intergenerational wealth correlations trough saving propensity and the return on investments.

Lastly, to test the mediating role of bequests and inter-vivos transfers, we can use two different approaches. Firstly, we can consider the residual wealth elasticity as an upper bound of the fraction of the elasticity related to direct intergenerational transfers. However, in this case, the unexplained elasticity may also capture the influence of other unobservable factors such as altruism, financial literacy or additional parental characteristics. Alternatively, we can analyse the mediating role of inheritance by considering only estate wealth which can be divided in directly accumulated wealth and inherited wealth so that we can obtain estimates of IWE either including or excluding inherited estate wealth as a further control. Descriptive statistics for all covariates taken from the waves of 2010 and 2012 and included in the equation 14 are reported in table 11.

[18] Results are quite similar if more than 3 categories of educational level are included in the regression

Table 11: Second stage covariates: descriptive statistics.

Income	23270.010 (15750.981)
Saving	7520.804 (14908.786)
Precautionary Saving	51698.880 (114528.884)
Expected future real income.	
Lower than current	*0.632*
No expected variations	*0.117*
Higher than current	*0.249*
Educational Level:	
Less than Upper Secondary	*0.400*
Upper Secondary	*0.576*
University Degree	*0.024*
Risk Propensity:	
High	*0.174*
Medium	*0.361*
Low	*0.465*

Author's elaboration based on the SHIW. Mean values, standard deviations in parenthesis. All economic variables are deflated by using the consumer price index.

Unsurprisingly, most of sample offspring in the sample have a medium level of education (upper secondary) and a low level of financial risk propensity. For instance, the share of total households which prefer investments that offer very high returns, but with a high risk of losing part of the capital, is less than 20 percent. Regarding saving preferences, the amount of annual savings is on average about 32% of personal annual income and the amount of cumulate resources that offspring would save against unexpected events such as increased uncertainty over future earnings or unexpected expenses is about 7 times the amount of annual savings. Table 12 reports the elasticity obtained by estimating the equation 7 (column 1) and lower estimates obtained controlling for income and expected future income (column 2); income, three categories of expected future income and educational attainments (column 3); offspring's preferences (column 4); all available mediating variables (column 5).

Table 12: IWE, mediating variables

	[1]	[2]	[3]	[4]	[5]
Log Net Wealth	0.451***	0.254***	0.201***	0.367***	0.203***
	[0.060]	[0.059]	[0.059]	[0.061]	[0.057]
Income		0.738***	0.677***		0.671***
		[0.076]	[0.071]		[0.082]
Precautionary				0.196***	0.107*
				[0.066]	[0.059]
Savings				0.330***	-0.034
				[0.065]	[0.059]
Expected future income		Yes	Yes		Yes
Education			Yes		Yes
Risk Propensity				Yes	Yes
R-squared	0.124	0.249	0.263	0.176	0.268
Obs.	1076	1076	1076	1076	1076

Author's elaboration based on the SHIW. Bootstrapped standard errors (reps 100) in parentheses. Monetary controls are standardized. All regressions include, offspring's age, age squared and the ratio between personal income and total household income as further controls. * p<0.10, ** p<0.05, *** p<0.01

As previously noted, the baseline estimated elasticity is 0.451. The reduction associated to the inclusion of annual income and expected future income is large since the estimated elasticity falls to 0.254. However, this reduction may be downward biased as annual economic measures are likely to be affected by measurement errors. In any case, the result is consistent with the evidence provided by Charles and Hurst (2003) for the United States that report a 52 percent reduction of the elasticity when actual income of both fathers and offspring are included in the regress. Conversely, studies on Scandinavian countries which find higher levels of wealth mobility across generations, report also a minor role of labour income as a mediating factor (Boserup et al, 2013). The influence of parental background on economic opportunities of offspring in the labour market may thus account for most of cross-country differences in the degree of intergenerational wealth mobility.

The direct association between human capital and wealth is described by including educational attainments beside labour income as a further control in equation 14. Controlling for both variables increases the difference between the coefficients $\hat{\beta}_1$ and $\hat{\beta}_2$ of an additional 11 percent. Therefore, educational attainments may be correlated to offspring's saving rates and returns on investment by capturing, for instance, differences among individuals in financial literacy.

Controlling for the amount of overall savings, precautionary savings and risk propensity reduces the estimated IWE to 0.367. This means, that about 19 percent of the overall estimated elasticity may be correlated to the intergenerational transmission of preferences (table 13) which may influence saving propensity and attitudes to risk of both generations.

Table 13: Mediating Variables

Mediating Variable	Fraction of the elasticity explained
Preferences	18.6%
Income	43.7%
Income + Education	55.4%
All Together	55.4%
Unexplained Elasticity	44.6%

Author's elaboration based on the SHIW.

Lastly, when all mediating variables are considered together, we obtain a residual wealth elasticity of 0.203, which is not significantly different from the one obtained controlling only for labour income and education. This seems to exclude the presence of a direct association between offspring's and parental wealth through savings and attitudes to risk.

1.10.1. Intergenerational wealth mobility and inherited estate wealth

In previous section, we could not directly test the role of bequests and inter-vivos transfers by estimating equation 14, since the waves of 2010 and 2012 provide no information about the amount of direct total wealth transfers received from parents during lifetime. Nevertheless, we can use the unexplained elasticity as an upper bound of the mediating role of bequests and inter vivos transfers. In this case, by making the strong assumption that the residual elasticity captures no additional unobservable influences, bequests and donations in the model seem to reduce the IWE by about 45%.

Alternatively, we can estimate the mediating role of bequests and donations by exploiting information on personal inherited estate wealth. Again, we take all heads of the households aged 35 to 48 with positive estate wealth such that we can re-estimate equation 14 by substituting total net wealth with estate wealth for both generations. Thus, we re-estimate equation 14 with or without including inherited estate wealth as further control in the vector $V_{i,t}^{O}$ to assess the fraction of elasticity which is correlated to direct intergenerational transfers. Table 14 reports the estimated elasticity of offspring's wealth with or without controlling for savings, risk propensity, labour income, educational attainments and inherited estate wealth of the second generation.

The estimate of the influence of parental estate wealth on offspring's through donations or inheritance is lower than the one obtained using the unexplained elasticity as a proxy of the role of direct intergenerational transfers. In particular, inheritance and bequest seem to explain about 30% of the overall IWE. However, when all other control variables are included (column 2), the mediating role of inheritance seems to be even lower and equal to about 17% of the baseline estimated

IWE. The latter result seems to confirm that the unexplained elasticity should be considered as an upward biased estimate of the fraction of intergenerational wealth elasticity associated to the mediating role of bequests and donations. Consider however, that usually only a small fraction of offspring in their 40s have already received at least one direct transfer from their parents.

Table 14: Intergenerational Estate Wealth Elasticity: Mediating Variables

	[1]	[2]	[3]	[4]
Parental Estate wealth	0.478***	0.343***	0.260***	0.182**
	[0.070]	[0.063]	[0.077]	[0.071]
Inherited estate wealth		0.304***		0.270***
		[0.026]		[0.031]
Income			0.244***	0.180***
			[0.037]	[0.039]
Precautionary			0.053	0.026
			[0.034]	[0.029]
Savings			-0.017	0.002
			[0.035]	[0.033]
Expected future income			Yes	Yes
Education			Yes	Yes
Risk Propensity			Yes	Yes
R-squared	0.064	0.237	0.169	0.299
Obs.	729	729	729	729

Author's elaboration based on the SHIW. Bootstrapped standard errors (reps 100) in parentheses. Monetary controls are standardized All regressions include offspring's age and age squared as controls. * p<0.10, ** p<0.05, *** p<0.01

For instance, considering a sample of offspring aged 35 to 48 with positive levels of estate wealth, only 37 percent of individuals have inherited some estate wealth (table 15). Moreover, inherited wealth is more dispersed on average, than total net wealth. This means that even though the elasticity of wealth with respect to direct intergenerational transfers is not so high, receiving or not a bequest or a donation is likely to be associated to the probability of ending up in one of the top quintiles of the wealth distribution.

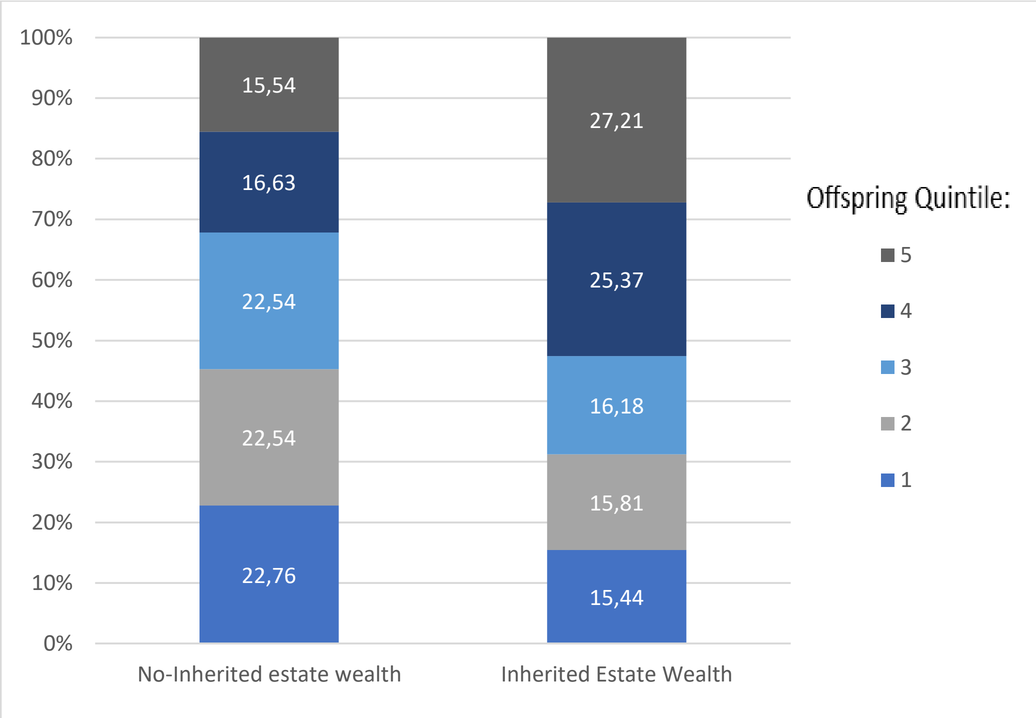
Table 15: Estate wealth: Descriptive Statistics

Estate Wealth	220329.12 [232118.24]
Inherited Estate Wealth	204441.44 [202503.84]
Percentage of individuals with positive inherited wealth	37.3%

Author's elaboration based on the SHIW

For instance, figure 2 shows that about 27 percent of individuals that received at least one estate wealth direct transfer from parents ends up in the top quintile of the estate wealth distribution (more than 50 percent in the top two quintiles) and only about 15 percent in the lower. Conversely, reaching the highest quintile of the wealth distribution without receiving donations or inheritances is far more difficult: only about 15.5 percent of individuals who do not receive any direct intergenerational transfers are likely to reach the highest quintile of the wealth distribution. Observe however that, within the sample, many individuals are likely to have at least one parent still in life. This means that they have not received yet the overall amount of intergenerational transfers since they are aged around 40 years old. Unfortunately, it is not possible to control for the number of parents in life since the SHIW does not provide this kind of information.

Figure 2: Probability of ending in a specific quintile of the estate wealth distribution by having received or not some inherited estate wealth.



Author's elaboration based on the SHIW

1.11. Concluding remarks

In this paper, we provided first estimates of the intergenerational wealth elasticity and rank-rank slope in Italy using data from the Bank of Italy's Survey on Household Income and Wealth (SHIW). In order to address the lack of information on parental wealth, we derived a two-sample two-stage least squares estimate by selecting a sample of offspring that report socio-economic information about their actual parents and an independent sample of pseudo-parents in their 40s

The resulted intergenerational wealth elasticity of 0.451 and rank-rank slope of 0.349 revealed that Italy, as well as the United States and Sweden, is a country with a lower degree of wealth mobility across generations than other Scandinavian countries or France. Moreover, the degree of wealth mobility in Italy appeared to be particularly low at the top and at the bottom of the wealth distribution and in the southern part of the country, where estimated elasticity resulted to be 0.621.

To test the pattern of the intergenerational wealth correlation over the children's lifecycle, the intergenerational wealth elasticity and the rank-rank slope are re-estimated by using three different samples of offspring by age. Results confirmed previous evidence that showed a U-shaped pattern of the wealth correlation as a function of offspring's age with higher intergenerational wealth correlations if offspring are taken when they are at the beginning of their adulthood or in their 40s. This is the reason why, unlike estimates of mobility which use income or earnings as a measure of economic status, estimates obtained by selecting young offspring seems not to be downward biased. However, further evidence is needed to assess the degree of intergenerational wealth mobility if offspring are selected when they are retired.

The decomposition of the intergenerational association into different mediating mechanisms shows that permanent labour income of the second generation, among other factors, seems to be associated with most of the overall wealth association across generations. Specifically, while the intergenerational wealth elasticity became 43.7 percent lower when labour income of offspring is included as a control, a smaller fraction of the wealth association seemed to be related to direct intergenerational transfers such as bequests or donations. This suggests that parental background is likely to be strongly associated to economic opportunities of children once they enter the labour market.

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Appendix A

Table A1: Two sample descriptive statistics

	Pseudo-Parents	Parents described by Offspring
Father's age	46.825	48.018
	(4.230)	(3.837)
Mother's age	43.435	44.666
	(4.811)	(4.175)
Father's educational level:		
None	0.017	0.051
Elementary	0.308	0.407
Lower secondary	0.314	0.309
Upper secondary	0.281	0.185
University degree	0.080	0.048
Mother's educational level:		
None	0.024	0.059
Elementary	0.368	0.463
Lower secondary	0.313	0.301
Upper secondary	0.229	0.149
University degree	0.066	0.028
Father's qualification:		
Production worker	0.357	0.466
Teacher or clerical worker	0.263	0.190
Junior manager	0.099	0.052
Manager	0.035	0.021
Self-Employed	0.201	0.218
Mother's qualification:		
Not employed	0.588	0.527
Production worker	0.129	0.195
Teacher or clerical worker	0.173	0.140
Manager or junior manager	0.021	0.019
Self-Employed/member of the arts	0.090	0.120
Region of residence:		
Piemonte	0.102	0.097
Lombardia	0.195	0.118
Trentino-Alto Adige	0.018	0.076
Veneto	0.063	0.074
Friuli-Venezia	0.024	0.016
Liguria	0.034	0.038
Emilia-Romagna	0.057	0.063
Toscana	0.062	0.057
Umbria	0.012	0.016
Marche	0.016	0.024
Lazio	0.115	0.104
Abruzzo	0.015	0.017
Molise	0.004	0.009
Campania	0.065	0.079
Puglia	0.076	0.073

Basilicata	0.019	0.030
Calabria	0.031	0.040
Sicilia	0.067	0.042
Sardegna	0.025	0.030

Author's elaboration based on the SHIW.

Table A2: First Stage Auxiliary variables and Post-Estimation Statistics

	Net Wealth (Log)	Net Wealth
Father's education (5 Cat.)	Yes	Yes
Mother's education (5 Cat.)	Yes	Yes
Father's qualification (6 Cat.)	Yes	Yes
Mother's qualification (5 Cat.)	Yes	Yes
Region of Residence (19 Cat.)	Yes	Yes
Father’s age polynomial	Yes	Yes
Mother’s age polynomial	Yes	Yes
R-squared	0.278	0.252
F-statistic	18.02	16.56
Obs.	2007	2062

Author's elaboration based on the SHIW

Table A3: IWE using different sets of auxiliary variables in the first stage

	IWE	First-stage R^2
All aux. variables	0.451*** [0.062]	0.278
Excluding fathers’ educational level	0.472*** [0.064]	0.257
Excluding mothers’ educational level	0.476*** [0.062]	0.254
Excluding fathers’ occupational status	0.561*** [0.075]	0.167
Excluding mothers’ occupational status	0.514*** [0.066]	0.237
Excluding region of residence of parents	0.518*** [0.069]	0.211
Excluding fathers’ age polynomial	0.470*** [0.063]	0.256

Excluding mothers' age polynomial	0.477***	0.259
	[0.065]	
Obs.	1076	

Author's elaboration based on the SHIW. Bootstrapped standard errors (reps 100) in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Table A4: Rank to rank slopes using different sets of auxiliary variables in the first stage

	R2R	First-stage R^2
All aux. variables	0.349***	0.252
	[0.030]	
Excluding fathers' educational level	0.350***	0.231
	[0.028]	
Excluding mothers' educational level	0.332***	0.226
	[0.030]	
Excluding fathers' occupational status	0.322***	0.159
	[0.027]	
Excluding mothers' occupational status	0.340***	0.212
	[0.029]	
Excluding region of residence of parents	0.334***	0.209
	[0.027]	
Excluding fathers' age polynomial	0.345***	0.230
	[0.028]	
Excluding mothers' age polynomial	0.349***	0.233
	[0.028]	
Obs.	1158	

Author's elaboration based on the SHIW. Bootstrapped standard errors (reps 100) in parentheses. Both offspring's wealth and parental wealth is percentile ranked within offspring's age. * p<0.10, ** p<0.05, *** p<0.01

Table A5: Estimated Rank-Rank slope by offspring's area of residence. Robustness check

	[North/Centre]	[South/Islands]
Parental Net Wealth	0.285***	0.404***
	[0.036]	[0.047]
Area of birth≠Area of residence	-3.74	4.63
	[2.54]	[7.42]
R-squared	0.084	0.163
Obs.	777	381

Author's elaboration based on the SHIW. Bootstrapped standard errors (reps 100) in parentheses. Both offspring's wealth and parental wealth are percentile ranked by offspring and parents birth cohort. * p<0.10, ** p<0.05, *** p<0.01

Appendix B

Table B1: Components of net wealth as described in the SHIW dataset

Variable	Description
Real Assets:	
AR1	Real Estate: housing, land other buildings
AR2	Businesses
AR3	Valuables
Financial Assets:	
AF1	Deposits, CDs, repos, postal saving certificates
AF2	Government Securities
AF3	Other Securities: bonds, mutual funds, equity, shares in private limited companies and partnerships, foreign securities, loans to cooperatives
AF4	Credit due from other households
Financial Liabilities:	
PF1	Liabilities to banks and financial companies[19]
PF3	Liabilities to other households

Source: Bank of Italy's SHIW.

[19] Short term debts, overdraft on credit cards and current accounts and trade of business debts are not included