# The Rastignac's Dilemma: the Role of Inheritance and Labor Income in Marital Choices

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## Abstract

This paper investigates the importance of inherited wealth in marital choices. In France, there is clear evidence of positive assortative mating based on inheritance. Our preferred estimate indicates that the correlation of inheritance between spouses equals 0.25. We also show that it is very unlikely for a non-inheritor to marry a top inheritor. Inheritance and labor income are poor substitutes since labor income only partially compensates a lack of parental wealth. Our results are robust to several econometric specifications. We discuss two explanations: the socialization process and the effect of preferences. These new results are crucial to deeply understand the dynamics of inequalities and more especially the consequences of the long-run evolution of inheritance as a fraction of aggregate wealth.

JEL classification: J12, D10, D31

Keywords: assortative mating, inheritance, marriage market, inequality

# 1 Introduction

In many nineteenth century novels, the role of inheritance[1] in marital choices appears to be decisive. Eugène de Rastignac, the main character of Honoré de Balzac's novel *Le Père Goriot*, represents a perfect example. In absence of parental wealth, he has two options to become rich: to work hard or to marry an heiress[2]. Today, people probably marry more frequently for love and family has less power than during the nineteenth century but has the importance of inheritance in marital choices disappeared? The return of capital and inheritance in rich countries[3] makes this question crucial to understand the dynamics of inequalities. Marital sorting allows us to explore the microeconomic perspective of this macroeconomic evolution. So far the existing literature has mostly looked at assortative mating with respect to labor income or education. This paper investigates the importance of inherited wealth in the choice of spouse for the first time. Moreover, the return of inherited wealth raises the issue of the source of wealth in marital choices. Can human capital compensate a lack of parental wealth? Therefore, we can directly assess the likelihood for a Rastignac of today to marry an heiress. The aim of this second research question is to explore the relationship between acquired and inherited traits. Such bidimensional analysis of the marriage market is a novelty.

In this paper, we use the French wealth surveys (1992, 1998, 2004 and 2010). Our use of these surveys overcomes two main drawbacks of existing studies. First, the French wealth survey ignores the expected inherited wealth while this aspect of their own (or their spousal) inheritance definitely matters in people's decisions. We use information about parental wealth to estimate respondents' expected inherited wealth and so to consider the total inherited wealth someone will receive instead of the sole observed estate declared at the time of the survey. Second, we face endogeneity issues by using current labor income since female labor supply, and so income, depends on decisions after the formation of the couple. That is why we provide estimates of permanent income to solve this issue. These data corrections allow us to establish new results and to greatly improve the quality of our analysis.

Our empirical strategy is divided into two parts. First, we estimate the extent of assortative

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[1]Throughout the paper, the words "inheritance", "inherited wealth" or "bequest" will refer to the sum of bequests and gifts, unless otherwise noted.

[2]At some point in the novel, there is a dialogue between two characters, Vautrin and Rastignac, in which the former explains to the latter how to become rich in absence of parental wealth. Vautrin enumerates several jobs (lawyer, doctor, notary...) and describes how much effort one has to make to earn a comfortable income after some years. Then he provides an alternative by suggesting to marry an heiress and to benefit from her income.

[3]Piketty (2011), Piketty and Zucman (2013)

mating for each source of wealth by relying on correlations and risk ratios. Then we focus on the substitutability between inheritance and labor income. For each type of statistical test, we estimate a net effect by controlling for potential differences in observable characteristics between inheritors and income earners. Lastly we test the robustness of these results by modifying the definitions of labor income or inheritance and by focusing on specific sub-samples. We find empirical evidence of positive assortative mating for inheritance and labor income after controlling for age and education. Our preferred estimate indicates that the correlation between spouses' inherited wealth equals 0.25. Marital sorting is significantly stronger for inherited wealth than for labor income especially at the top of the distribution. Neither the timing of inheritance nor the selection into or out of marriage affect our results. The second research question we address in this paper relates to people's sensitivity to their spouse's source of wealth. There is clear proof that labor income and inheritance are not substitutes. Specifically, there is a clear partition between the two dimensions: heirs marry heiresses and income earners marry income earners.

While spousal education explains a large part of marital sorting based on permanent income it only accounts for one quarter of the overall correlation for inherited wealth. We suggest two complementary ideas to rationalize these results. First, the socialization process may explain why there is not only a greater opportunity for interaction but also common tastes for people from the same socioeconomic background. Moreover, matrimonial strategies and social prestige attached to inheritance are likely to reinforce the attraction towards inheritance. Second, inherited wealth and labor income differs because of their timing and their degree of uncertainty but also because divorce laws distinguish the sources of wealth. These differences influence marital choices and so explain part of our findings.

This paper provides the first estimates of the extent of sorting by inherited wealth and these new results are decisive for several related literatures. First of all, our conclusions are crucial to deeply understand the dynamics of inequalities. Indeed, this paper relies on recent evidence about the long-run evolution of inheritance as a fraction of aggregate wealth. Piketty (2011) states that "modern economic growth did not kill inheritance". In France, the annual flow of inheritance was around 20%-25% of national income between 1820 and 1910, down to less than 5% in 1950, and back up to 15% by 2010. Whether this situation is important for the dynamics of inequalities over time depends, among other things, on marital decisions: do heirs marry heiresses? Indeed, family plays a decisive role in the transmission of capital, whatever its

nature: human, social or material. Atkinson (1975) provides a relevant illustration. Suppose that all households have two children (one boy and one girl) and that all the wealth is held by only 5% of the households. In the extreme case in which the rich marry the rich, the degree of wealth concentration will be extreme. In this case, class marriage, where wife and husband come from families with the same level of wealth, leads to the same situation as where all property is inherited by the sons; "it is equivalent to everyone marrying his sister".

This article is also related to the literature about marital decisions. Becker's (1973) seminal work has inspired a vast literature about the economics of marriage. Among other topics, Gary Becker initiated a debate about the substitutability/complementarity of spouses' characteristics. He argues that optimizing behavior on the marriage market leads to negative assortative mating with respect to labor income because of the specialization of spouses resulting from comparative advantages of market and non-market productivities. On the other hand, Lam (1988) invokes the maximization of a household's common good as a source of complementarity between spouses. Several papers try to provide empirical evidence to this debate. Most papers concentrate on income[4] or education[5]. However, works on spouses' parental traits are much scarcer while it has important implications regarding the intergenerational transmission of socioeconomic status. Some studies focus on social origins by studying similarities in parents' occupational class[6] but this variable imperfectly measures financial resources. Charles *et al.* (2013) study marital sorting by parental wealth and they find evidence of positive assortative mating. However, the authors do not take into account inherited wealth *per se* (i.e. the actual share of parental wealth received). Inheritance taxation but also the number of siblings need to be considered to go from total parental wealth to inheritance. Some articles study directly the role of inheritance in marital choices but they focus either on the role of dowries in the bargaining process between spouses (Zhang and Chan, 1999) or on the rationales of dowries (Botticini and Siow, 2003). This paper provides several contributions to this literature. First, our main contribution is to use, for the first time, direct estimates of inherited wealth instead of proxies of parental wealth. It allows us to provide a much more precise analysis of the implications of marital sorting on inequality. Moreover, this paper explores a new dimension of assortative mating by focusing on permanent labor income. In comparison with education, marital sorting based

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[4]Smith (1979), Becker (1981), Zimmer (1996), Nakosteen *et al.* (2004) or Lise and Seitz (2011)
[5]Mare (1991), Schwartz and Mare (2005)
[6]Burgess and Wallin (1943), Kalmijn (1991) or Uunk, Ganzeboomon and Robert (1996); with French data, Bozon (1991) and Thélot (1982).

on education offers a more accurate measure of financial resources and indications about the extent of household specialisation. Finally, existing works on marital sorting in France only focus on education[7] or socioeconomic status[8]. Our estimates for both inheritance and labor income represent a novelty and allow us to provide international comparisons.

Finally, this article is closely linked to studies about intergenerational inequality. Several papers estimate the role of assortative mating in the persistence of inequalities. Kremer (1997) points out that the effect of assortative matching in marriage on the long-run income distribution is negligible. Conversely, Fernandez and Knowles (2005), Ermisch *et al.* (2006) and Raaum *et al.* (2007) use different methods but agree wholeheartedly with the crucial role played by marriage. More specifically, Ermisch *et al.* (2006) conclude that about 40% of family income persistence in the U.K. and Germany results from assortative mating. The lack of available data prevents us from providing similar estimates for France. In this paper we analyse the implications of our findings by considering the role of the source of wealth as well as the recent evolutions of family.

The remainder of the paper is organized as follows. Section 2 describes the theoretical intuitions. Section 3 presents the data. Section 4 details the empirical results. Section 5 gives economic interpretations to the results and analyzes the consequences in terms of intergenerational mobility. Appendices provide information about data corrections and supplementary results.

## 2   Theoretical framework

The aim of this section is to present the research questions that are addressed in this paper and to describe the basic theoretical intuitions. The starting point of this paper is to measure the extent of marital sorting by inheritance and labor income. Indeed, the monetary inputs of a household $I^s$ can come from two different sources: inheritance or labor income (Equation 1). The input coming from inheritance is defined as the capitalized sum of all the bequests and *inter vivos* gifts received by someone. Similarly, the input coming from labor income is the capitalized sum of the labor income (wages, mixed income, unemployment or retirement pensions). The two sources of wealth are capitalized at a similar interest rate $r$ but their timing is different. Labor income is accumulated and capitalized over the whole working life and after retirement, whereas the capitalization of inheritance only starts once the bequest is received.

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[7] Goux and Maurin (2003)
[8] Bozon (1991), Vanderschelden (2006)

Spouses meet in year $t = 0$ and we observe them after a given period of time $n$.

$$I^s = \underbrace{\sum_{t=0}^{n} Y_t^s * (1+r)^{n-t}}_{Y^s} + \underbrace{\sum_{t=0}^{n} B_t^s * (1+r)^{n-t}}_{B^s} \qquad (1)$$

with $s = m$ (male partner) or $f$ (female partner); $Y_t^s = $ labor income perceived at time $t$ by individual $s$; $B_t^s = $ *inter vivos* gifts and bequests received at time $t$ by individual $s$; $r = $ interest rate; $n = $ end of the period of observation and $t = $ time indicator.

The wealth composition and more specifically the share of inherited wealth vary across households. The first and main goal of this paper is to investigate this question by measuring the extent of marital sorting by inherited wealth and labor income. The main difference between these two sources of wealth relies on the fact that inherited wealth is exogenous to the couple's formation while labor income is likely to be endogenous. As a consequence, the mechanisms of sorting are different depending on the source of wealth we consider. With regard to inheritance, the extent of marital sorting primarily depends on the socialization process. Limited social diversity at school, at work or in neighborhoods conditions people's potential partners. Moreover, people with similar socioeconomic background may also have similar tastes or implement matrimonial strategies that affect sorting. With regard to labor income, household specialisation can lead to large differences between spouses' labor income even though their potential income is close due to sorting based on education. Therefore, the date of meeting matters much more when we consider labor income. Observing a couple immediately after his meeting or 20 years after is likely to lead to different results.

The bi-dimensionality of the analysis allows us to go further by addressing the issue of the substitutability between the sources of wealth. In other words, can labor income compensate a lack of inherited wealth? There are two main categories of reasons why inheritance and labor income may not be substitutes. The first type of explanations regards the differences between income earners and inheritors. Among the observable traits, age and education are obvious candidates. Unobservable traits, like social prestige for instance, can also affect marital decisions. Furthermore, the source of wealth and more generally socioeconomic background influence people's preferences. For instance, if inheritors share the same dynastic preferences then heirs and heiresses may be more likely to meet and to remain together. That is why it is important to compare current and permanent labor income.

The second type of explanations relates to the differences between labor income and inheritance *per se*. First, labor income and inheritance differ with respect to the degree of uncertainty. Inheritance is usually received in one or two transfers and its value is somehow predictable, while labor income is spread over the whole life and may fluctuate. Second, matrimonial property regimes are decisive because they influence the transmission of wealth between spouses and children at death or in the event of divorce[9]. In France, the legal[10] (or by default) regime is the "community of acquisitions" regime, whereby each spouse remains the sole owner of his or her inherited assets and of assets acquired before the marriage (so-called "separate assets"), but the returns to these assets are considered community property, along with other income flows including labor income. In the event of divorce, the community assets are shared by husband and wife on a 50-50% basis but each spouse keeps his or her separate assets. Therefore, inheritance is protected in case of divorce while labor income can be "captured" via the redistribution of common assets.

The identification of a causal effect of inheritance and labor income on spouse's characteristics is *a priori* difficult to achieve since the measure of some differences is complex. However, the empirical strategy followed in this paper tries to address the issues described above by using different econometric specifications.

## 3   Data

### 3.1   The French wealth surveys *Actifs Financiers* and *Patrimoine*

Since 1986, the French National Institute for Statistics and Economic Studies (INSEE) has conducted a national survey on wealth every six years. The aim of this survey is to study the personal wealth of French households: wealth behavior, the evolution in wealth possessed and its composition and also a detailed biography of the household and its members (household formation, education, labor force participation, etc.). In this paper, we use a pool of the last four available waves: 1992, 1998, 2004 and 2010[11]. There are approximately 10,000 households from 1992 to 2004 and around 15,000 in 2010. We consider all couples, married or not. In the end, our sample contains 27,723 couples (7,050 in 1992, 6,708 in 1998, 5,793 in 2004 and 8,172

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[9]Laferrère (2001), Cigno (2012)

[10]People can also sign a marriage contract and choose between a wide range of matrimonial regime going from separate property (no common assets) to full community (no separate assets).

[11]In order to preserve the characteristics of each wave, we normalize their weights.

in 2010).

Labor income is defined as the sum of wages, mixed income, pensions and unemployment benefits. This variable is collected at the individual level on a yearly basis and self-reported in 1992 and 1998. In 2004 and 2010, the information about labor income is matched with fiscal data.

Data on gifts and bequests are collected at the individual level and provide information about all the wealth transmissions received. The value of each transmission is self-reported[12]. For each transmission we know the nature of the transmission (bequest or *inter vivos* gift), the type of assets transmitted, the identity of both legatee and successor and the year of the gift/bequest.

## 3.2 Data corrections

### 3.2.1 Distribution and discounting of wealth transmissions

The value of each wealth transmission is grouped into brackets in 1992, 2004 and 2010[13]. For these waves, we estimate simulated residuals[14] to obtain continuous values. More specifically, we use a set of exogenous variables that can explain the real value that is declared by respondents, conditional on the bracket. Here, we use the characteristics of the transmission: the nature of transmission (bequest or gift), the type of assets received (real estate, land, financial asset, cash etc.) and the socioeconomic status of the respondents' parents. The comparison between surveys does not present any significant differences. To fully control for potential differences, we add a year fixed effect to all econometric specifications.

Moreover, we discount the value of inheritance in order to compare comparable inheritance. Most gifts/bequests comprise real estate and moveable assets. We use a composite index that takes into account the evolution of prices for all types of assets. Appendix A.1 explicates the construction of this index.

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[12]People report the final amount received. So, we observe the net (after tax) amount as well as untaxed transmitted assets (such as some life insurance contracts).

[13]In 2010, people have the two options: continuous or brackets.

[14]Gouriéroux *et al.* (1987) point out that this method offers better statistical properties than a random draw between the lower and upper brackets. See also Lollivier and Verger (1989) for the implementation of this method.

### 3.2.2 Expected inheritance

In the French wealth survey, the information about inheritance is partial. We only know the characteristics of observed (i.e. already received) wealth transmissions and not about future transmissions. If we ignore these expected bequests or gifts we assume that people do not consider their own (or their spousal) future wealth in their decisions as long as they have not received a bequest or a gift. We judge this assumption unrealistic that is why it is necessary to consider the parental wealth that has not been transmitted yet to inheritors. This correction greatly improves the significance of our analysis because it allows us to consider the expected inheritance and so the total inherited wealth. In this section we only describe the basic aspects of these imputations. Appendix A.2 presents the technical aspects of the methodology.

The idea of our imputation is the following. Less than 30% of our sample declare positive inherited wealth at the time of the survey (Table B.3 in appendix). There are two reasons: either people did not inherit because their parents were not rich enough to leave a bequest or they have not inherited yet because their parents are still alive. First, on the basis of information about people's parents (are they still alive?, do they own any assets? have they experienced severe financial difficulties? etc.) we identify people who are likely to receive a bequest. Then we impute the expected inheritance based on information about parents' socioeconomic status, the different types of assets they hold (real estate, lands, equities, bonds, life insurance contracts, professional assets) and the number of siblings.

The final share of inheritors after this imputation is comparable with fiscal data. Indeed, descriptive statistics in Appendix B show that around 55-60% of our sample have received or will receive a bequest. Estate returns provide information about the wealth of the person who died but not about the respective shares received by his or her heirs and heiresses. Going from the legatee's total wealth to the wealth received by each inheritor requires some assumptions about fertility and inheritance taxation notably. Nevertheless, Arrondel and Masson (2008) find that around 60% of people leave a (strictly positive) bequest at death in 1994. So, even if the comparison is imperfect, this figure suggests that we may slightly underestimate the proportion of inheritors. However, it mostly affects the bottom of the distribution since low-value bequests are not well taken into account by survey data.

Appendix B presents the distributions of labor income and inheritance as well as general descriptive statistics.

### 3.2.3 Permanent income

We face endogeneity issues by using current income since female labor supply, and so income, depends on decisions after the formation of the couple. That is why it is essential to consider spouses' permanent income to solve this issue. Moreover, to our knowledge, there is no existing estimate of marital sorting by permanent income. This correction overcomes the drawbacks of current income, mainly measurement errors and life-cycle bias, and it allows to analyse the extent of specialisation. Appendix A.3 presents the methodology in details.

Following Lollivier and Verger (1999), we use the information available in the *Patrimoine* surveys to estimate an individual permanent income from current income. Specifically, we decompose the individual permanent income as a function of two elements: age, to take into account life-cycle evolutions, and a structural part, to take into account evolutions of standard of living. We use education as well as permanent and exogenous characteristics such as socioeconomic background or the job sector to estimate permanent income.

The main limitation of this correction is that this estimate of permanent income cannot be imputed on the whole sample. Specifically, self-employed are excluded because of the high volatility of their labor income. Second, we need to have a strictly positive current income to approximate permanent income. As a consequence, we estimate permanent income on a final sample of 17,384 couples instead of 27,723 initial couples. These corrections affect the size and the composition of the sample. Taking couples for whom current labor income of both spouses is positive obliges us to focus only on two-earner couples. As a consequence, it is necessary not to overinterpret the results given the differences with respect to the initial sample. Nevertheless, we provide evidence that our estimates of marital sorting based on inherited wealth do not diverge between these two samples.

## 4 Empirical analysis

Our empirical strategy is divided into two parts. First, we estimate the extent of marital sorting by spousal inherited wealth and labor income. To do so, we use standard correlations of the logarithm of inheritance and labor income. Then, given the unequal distribution of inheritance, we focus on the top of the distribution to study the linearity of sorting. The top of the distribution is particularly relevant for traits that are unequally distributed because the behavior

of this part of the distribution is decisive to understand the mechanisms that are generating economic inequality. Second, we complete our analysis by studying the substitutability between these sources of wealth. Similar econometric specifications are implemented.

## 4.1 Assortative mating

### 4.1.1 Correlations

The first indicator used to measure the similarity of endowments between spouses is the partial correlation. More specifically, we regress the logarithm of either labor income or inheritance on covariates (for each spouse, separately) and then we estimate the correlation between error terms. This standard econometric test allows us to compare our estimates with existing literature. The covariates vary depending on the specification. First, we only include the age of spouses to control for potential life-cycle bias. Then, we control for each spouse's human capital (measured by the number of years of education) in order to estimate the share of assortative mating that is explained beyond any sorting in terms of education. Indeed, education conditions the universe of potential partners and affects preferences.[15] For each specification we add a time fixed effect to control for potential differences between surveys. Last but not least, like many existing studies we face a standard selection issue because our sample is a stock of surviving couples. In order to deal with the issues of selection and household specialisation, we run our econometric tests on a sub sample of recent couples who met less than 10 years before the survey. Selection out of marriage is particularly important because it may bias our estimates of marital sorting if we think that couples with less similar traits are more or less likely to separate. Focusing on recent couples allows us to measure the extent of this effect. However, by doing so we may also capture a change in the patterns of assortative mating for young couples. Unfortunately, without panel data we cannot disentangle the selection and cohort effects.

Table 1 presents the estimate of marital sorting by inheritance, current labor income and permanent labor income. In Panel A, we provide estimates for inheritance and current labor income; in Panel B, for permanent income and inheritance (on this specific sample). For inheritance as well as labor income, point estimates are significantly positive. Panel A shows than marital sorting is stronger for inheritance than for labor income (0.25 against 0.12). Controlling

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[15]It could be also interesting to consider the geographical location of households because of the heterogeneous distribution of wealth on the French territory. Unfortunately, the *Patrimoine* survey divides France into 6 geographical areas only (without identifying Paris). The degree of precision is not sufficient to properly consider the impact of geographical location.

for spousal education (column 2) explains a limited share of sorting (25% for inheritance[16], 20% for current income). Panel B confirms the fact that using current labor income leads to an underestimation of marital sorting, mainly because of endogeneity issues regarding female labor force participation. The point estimate for permanent income equals 0.46 while sorting based on inheritance slightly decreases on this specific sample[17]. For the sake of the comparison, we also control for educational attainment. Since permanent income is a function of education, the coefficient logically falls (to 0.13). Even though this result comes as no surprise, this specification demonstrates that the effect of educational assortative mating[18] is much stronger when we consider permanent income rather than current income. The comparison between spouses' current and permanent labor income is striking because it reveals the extent of specialisation and suggests that human capital can be "used" in two ways: as a monetary input or as a dowry to marry up[19].

Columns 3 and 4 of Table 1 provide results for a sub-sample of recent couples (formed less than 10 years before the survey). Even if 10 years is a long period in a relationship[20], we assume than these couples had less time to specialize and to get separated. We show that marital sorting is not notably different for these recent couples except for permanent income. It leads to two conclusions. First, the timing of bequests does not seem to matter. The share of actual inheritors among these recent (and so young) couples is lower than the average but it does not significantly modify the extent of marital sorting. This result suggests that assortative mating relies more on socioeconomic background than on inherited wealth *per se* when spouses meet. Second, two main hypotheses can explain the lower sorting for permanent income: a selection effect (spouses with opposite traits separate more frequently) or a cohort effect (couples have nowadays less similar traits). Recent evidence regarding the increasing educational homogamy[21] suggest that the first hypothesis is more likely to explain this gap. Unfortunately, it is impossible to properly disentangle between these competing theories in the absence of panel data.

Supplementary econometric tests presented in Appendix C.1 demonstrate that these results

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[16]Even if Charles et al. (2013) have an extra control for race (unavailable in French data), they also find that spousal education explains 25% of sorting based on parental wealth.

[17]Self-employed, inactive and more generally, people declaring no current labor income are excluded. This selection may exclude couples for whom inherited wealth is positively correlated.

[18]Fernandez and Knowles (2005) estimate that the correlation between spousal educations equals 0.6 in France.

[19]Chiappori et al. (2009) interpret the rise of female educational attainment in the US through its effects on the marriage market.

[20]Estimates for couples formed less than 5 years before the survey gives similar coefficients but with less precision.

[21]Schwartz and Mare (2005)

are robust to several specifications. More specifically, we run these regressions with observed inheritance only and then on couples for whom both spouses are inheritors (to compare our estimates with those of Charles et al., 2013). This test confirms that the estimate is not biased by our data corrections. Then we add extra control variables in order to consider potential differences between inheritors and income earners that could affect marital sorting (number of children, timing of inheritance, type of matrimonial property regime, duration of the couple to date and whether one spouse already experienced divorce). The last two controls provide an alternative way to test the issue of selection out of marriage. This second robustness test indicates that all these extra controls explain no more than 15% of the overall marital sorting by inheritance.

The comparison with existing studies on assortative mating is complex because samples and econometric specifications vary. Nevertheless, our estimates for labor income are rather close to those of Lise and Seitz (2011)[22]. Charles *et al.* (2013) estimate a correlation between spouses' parental wealth around 0.4, after controlling for race and age[23]. The transition from parental wealth to inheritance is not straightforward. Inheritance taxation and the number of siblings (and so the number of heirs) determine the final wealth people receive[24]. Even though the authors do not deal with these issues we suggest that our estimates are reasonably close to theirs. If we focus on France, these results are in keeping with empirical evidence provided by comparison of spouses' socioeconomic background. More specifically, Bozon (1991) estimates that the probability for the son of a unskilled worker to be in couple with the daughter of a high-skilled worker equals 7% while the same probability for the son of an high-skilled worker equals 35%. Section 5.1 provides economic interpretations to these results.

### 4.1.2 Risk ratios

Correlations are the most usual way to measure of the extent of marital sorting but we make the implicit hypothesis that the effect is linear. However, sorting at the tails of the distribution must also be considered to have a complete analysis, especially when the distribution is skewed

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[22]Their paper mainly focuses on consumption inequality but the authors provide correlations of spouses' labor income

[23]For this estimate, the authors only keep all married couples for whom at least one parent is still alive with explicit reports of parental wealth. This selection reduces the sample size and mechanically increases the estimate by suppressing couples with opposite socioeconomic backgrounds. If we restrict our sample to all the couples for which each spouse receives positive bequests then our estimates equals 0.28 for all couples and 0.30 for the recent couples (Table C.1 in appendix).

[24]A simple difference in the number of siblings of each spouse can lead to large inequality in terms of actual inheritance even though their initial parental wealth is equal.

and when almost half of our sample receives no inheritance. Therefore, correlations may be hard to interpret because we somehow neglect the importance of inherited wealth at the top of the distribution.

With risk ratios, we compare the probabilities of success of two categories of people depending on their positions in the distribution. For each source of wealth, we divide the population into two parts: first, people below and above the median, then the top 10% versus the bottom 90% and finally the top 5% versus the bottom 95%. Then for people below and above the threshold we compute the probability of success, which is "living with a partner who is above the threshold".[25] Finally we compute the ratio of the probabilities of success for the top and bottom groups.

Mathematically, we have:

$$RR = Prob(Y = 1|X = 1)/Prob(Y = 1|X = 0) \tag{2}$$

with Y a dummy equal to 1 if the female/male belongs to the top P% and X a dummy equal to 1 if the male/female belongs to the same top P%. A ratio equal to 1 implies a random sorting (i.e. the probabilities of success of each category are equal).

We consider men as a dependent variable and we compare the probabilities of success of women depending on their positions in the distribution. Like for the partial correlations we control for age first (columns 1 to 3) and then for age and spousal education.

Table 2 presents the results. We provide evidence of non linearity for all the dimensions. Specifically, if we compare people below and above the median (top 50% versus bottom 50%), the ratio is equal to 1.6 for inheritance, 1.3 for current labor income and close to 2 for permanent income. In other words, for inheritance this is more than 60% the incidence we would expect relative to random sorting. This first specification is more meaningful for inheritance than labor income because we are close to a comparison between non-inheritors and inheritors[26]. So, the absence of parental wealth is a handicap if one wants to be in couple with an inheritor. Furthermore, it is very unlikely for a non-inheritor to be with a top inheritor. As a woman,

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[25]The threshold changes with the cut-off. When we compare people below and above the median, success is to be in a couple with someone above the median. For the top 10/bottom 90 and the top 5/bottom 95 cut-offs, it is with someone above the $90^{th}$ and $95^{th}$ percentile, respectively.

[26]Actually, the computation with the categories "inheritors" and "non-inheritors" provides a ratio of 1.53 against 1.56 for the comparison below and above the median.

belonging to the top 10% of the inheritance distribution multiplies by almost 4 the chance of living with a man belonging to the top 10%. This ratio is similar for current labor income and is even larger for permanent income. Controlling for education only explains one tenth of marital sorting based on inherited wealth for the ratio "Top 10 / Bottom 90" while this share equals 47% for current income and 60% for permanent income. This estimate completes our analysis of marital sorting and indicates that the dependence between spouses grows with their ranks in the distribution. The further a spouse's inherited wealth is from their own, the more unlikely is the formation of the couple. Similar patterns exist for labor income but they are mostly explained by educational sorting.

## 4.2 The substitutability between inheritance and labor income

The first part of this paper has shown that marital sorting based on inheritance was substantial especially at the top of the distribution. We may wonder if labor income can compensate a lack of parental wealth. In order words, is there any substitutability between these two sources of wealth and so between human capital and inheritance? With this bi-dimensional analysis we can therefore estimate the likelihood for a Rastignac of today to marry an heiress. This question is complex but interesting. Indeed, in real life, matching is multidimensional since spouses consider several economic and non-economic traits during the matching process. Therefore, considering only one trait simplifies the analysis of matching but this advantage comes at a cost since we ignore the effects of other traits. This exchange of status (human capital vs. social background) also helps to reveal the mechanisms explaining marital sorting and it allows us to better understand people's preferences. Chiappori et al. (2012) provide such multidimensional analysis. They study the trade-off between beauty (measured by body mass index) and wages or education. In this paper, we compare the role of the inherited and acquired traits in the choice of spouse for the first time.

To tackle this issue we follow the empirical strategy we used to measure the extent of marital sorting. Table 3 presents the cross-correlations of spouses' labor income and inheritance. We use the same controls as in Table 1 and the same sub-sample of recent couples. Panel A describes the correlations between spouses' current labor income and inheritance. A complete absence of substitutability would imply point estimates equal to 0. Point estimates are positive and significant but low (around 0.05). The comparison between estimates of marital sorting

indicates that labor income only partially compensate inheritance. Moreover, while education explained only 20-25% of marital sorting, human capital accounts for no more than two thirds of the estimated substitutability (column 2). The focus on recent couples allows us to detect a stronger relationship between male labor income and female inheritance (around 0.11) but we still note the same effect of education. Again, it is not possible to distinguish between a cohort effect and a selection effect. Panel B indicates that permanent income and inheritance are more closely related with point estimates around 0.15. Once again, controlling for spouses' education explains all the effect. It bears noting that this higher degree of substitutability must be interpreted with caution because of the specificity of this sample. This table shows that the status exchange between acquired and inherited traits is low and is mainly explained by education.

In line with section 4.1.2 we pay attention to the top of the distribution to see if the poor substitutability we measure with correlations is confirmed for the upper tails of the distribution. Here we only focus on permanent income. The econometric test is more complex than for risk ratios. Indeed, we have to consider the monetary inputs of spouses in order to rule out any wealth effect. More specifically, if the average monetary inputs of income earners (Equation 1) are twice as large as the average monetary inputs of inheritors, assuming linearity, their probability of marrying a given spouse should be twice as large. As a consequence, in order to compare comparable individuals, it is necessary to take into account the relative magnitude of monetary inputs of top inheritors and top income earners. We implement the following specification:

$$TopSpouse_j = \alpha + r \times \beta_1 \times TopInheritor_i + \beta_2 \times TopIncome_i + \gamma X_{i,j} + u \qquad (3)$$

where the dependent and explanatory variables are dummies equal to 1 if the individual is in the top 10% of the inheritance distribution or in the top 10% of the income distribution (depending on the specification). So, $\beta_1$ (resp. $\beta_2$) represents the marginal probability of a top inheritor (resp. a top income earner) of living with a partner belonging to a top position. In other words, it measures by how much the probability increases according to a top position in a given dimension. $X$ is a set of control variables. Actually, given the effect of education on substitutability measured by correlations, we only consider spousal age as a control variable. All the specifications are estimated by probit with robust standard errors.

Coefficients are normalized so as to take into account the relative magnitude of monetary inputs brought by the two categories. Concretely, top income earners are about twice richer than top inheritors. In order to rule out a wealth effect, we multiply the coefficient by the ratio $r$ of inputs between the two categories. We can consequently measure the tastes of top inheritors and top income earners as if they were equally wealthy[27]. An equality between $\beta_1$ and $\beta_2$ would mean that inheritance and labor income are perfect substitutes.

Table 4 presents the results. Our estimates indicate that inheritance and labor income are poor substitutes in marital choices even at the upper tail of the distribution. Top heirs are more likely to be in couple with top heiresses than top income earners. Specifically, being in the top 10% of the female inheritance distribution increases your probability of living with a top heir by more than 40% while the marginal probability for a top income earner is only 6.5%. There is a clear separation between the sources of wealth because this result also holds for permanent income. The extent of substitutability for women (Panel B) does not suggest the existence of a gender bias. Robustness tests (presented in Appendix C.2) complete this conclusion. More specifically, we show that if people who are cumulating substantial endowments in both human capital and inherited wealth are excluded then the substitutability almost disappears. Specifically, the probability for top income earners to be in couple with top inheritors is not significantly different from 0 in this specification. Therefore, even more at the top of the distribution, our results suggest that human capital does not compensate a lack of inherited wealth.

However, the test of perfect substitutability requires several assumptions like a perfect capital market, a perfect marriage market and also assumptions about the time horizon of couples. This restrictive setting limits the information that can be derived from this test. In this paper we indicate that inheritance and labor income are poor substitutes but we must admit the difficulty to know whether perfect substitutability is not satisfied or one of the required assumptions is violated. However, this very new evidence is revelatory because it suggests a disparity of mechanisms behind marital sorting based on ascribed and acquired traits. Our conclusions open wide prospects for future research.

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[27]Appendix A.5 provide information about the construction of this ratio.

# 5 Interpretations

## 5.1 How can we explain these results?

Even if the comparison with the end of the nineteenth century is impossible, this paper demonstrates that inheritance still matters in marital choices and that people are sensitive to their spouses' source of wealth. The difficult question is of course "why?". Our estimates, like those of Charles et al. (2013), indicate that controlling for spousal education accounts for only one quarter of the overall marital sorting based on inherited wealth while it explains a larger part of sorting by labor income. In order to interpret these results we need to explore other channels that are less well observed. Economic theory has difficulty to fully understand all the motives of marital choices especially because non-economic determinants must be considered. Two complementary interpretations explain these results: the socialization process and the role of preferences.

First, the socialization process plays a decisive role by restricting the potential partners someone can meet to people with similar socioeconomic characteristics. The limited social diversity at school or in neighborhoods conditions the universe of potential partners either directly (through the spouse someone meets) or indirectly (through the peer group formed at this moment which influences future meetings). Several studies demonstrate that school is decisive to apprehend the role of social background in marital choices. More specifically, evidence from the US (Lauman et al., 1994) indicates that almost one-fourth of married couples met in school. Moreover, Holmlund (2008) studies the impact of an educational reform implemented in the 1950s and 1960s in Sweden, which increased the minimum school leaving age and abolished tracking. The author argues that this reform has significantly increased social diversity and so has affected assortative mating based on social background. There is no such direct evidence in France but the importance of socioeconomic background to access elite schools[28] suggests that this explanatory channel is likely to be decisive. However controlling for education does not capture all this socialization process because within a given level of human capital, peer group and preferences are strongly influenced by social background.

Such passive or unconscious mechanisms can be reinforced by matrimonial strategies. Social sciences have studied the importance of social interactions in the choice of spouse. Several

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[28]Albouy and Wanecq (2003) estimate that the probability for a son of a high-skilled worker (entrepreneur or executive) to enter a *Grande École* is 19.8 times higher than that of a son of an unskilled worker or a farmer (for the cohort of students born between 1959 and 1968).

works[29] show that for good families the choice of the groom or of the bride owes nothing to chance. Strategies are implemented in order to preserve or increase the social rank of the dynasty. Pinçon and Pinçon-Charlot (1997) illustrate this idea: "The rally[30] almost always reaches its goal: to make sure that young people do not ruin a brilliant future, an exceptional destiny, by a bad marriage which would break up the dynasty. There is no free competition in the aristocratic marriage market". Inherited wealth is a first order condition to enter this specific marriage market. Even if these particular matrimonial strategies are probably limited to the very top of the distribution, some studies have shown that the importance given by people to their partner's socioeconomic background is widespread at all levels of society[31]. Bourdieu (1979) also explicates the attraction for inheritance by social prestige and by the symbolic power of inheritance. Therefore these active or passive mechanisms help to understand why we observe positive sorting for inherited wealth but also why there is a partition between these two sources of wealth.

Another way to interpret these results is to consider preferences. Socioeconomic background affects not only the likelihood of meeting someone similar but also people's preferences. Recent works[32] provide evidence of positive assortative mating based on attitudes to risk and time. Besides, if the composition of wealth reveals people's preferences then marital sorting partly comes from the similarity of spouses' preferences. Arrondel and Masson (2007) suggest that inheritors are more altruistic and have a greater probability of leaving themselves a bequest to their children. The importance of sharing similar dynastic preferences and a similar conception of family can hence partly explain our results.

Second, divorce laws distinguish the spouses' source of wealth. In case of divorce, wealth inequality between spouses matters because, under a community regime, common assets are shared equally among spouses independently on their individual contributions. Moreover, the French legal matrimonial regime[33] implies that each spouse remains the sole owner of his or her inherited assets and of assets acquired before the marriage. As a consequence, inheritance is

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[29]Arrondel and Grange (1993), Grange (2005)

[30]Social event organised by aristocratic families whose purpose is to initiate a meeting between young people from good families.

[31]Arrondel and Frémeaux (2013) note that when people are asked about on the factors that matters for a couple to endure, socioeconomic background and tastes are considered as decisive by a majority of respondents. According to this study, income is among the least important parameter.

[32]Dohmen et al. (2012); Arrondel and Frémeaux (2013)

[33]The community of acquisitions regime

protected in case of divorce while assets acquired during marriage with labor income are shared equally even if there is only one income earner in the household. So an equal level of wealth may lead to an unequal redistribution of assets among spouses because of the composition of their respective wealth. Therefore, the source of wealth affects the choice of the matrimonial regime[34]. Taken to its logical extreme and given the relative ignorance of the rules of matrimonial property regimes[35], this reasoning could imply an effect of preferences on the choice of a partner. Indeed, if people fear to lose some of their personal wealth in the event of divorce then people may prefer equality in terms of both total wealth and wealth composition.

Last, positive assortative mating based on inherited wealth may also be linked to a taste for equality in terms of commitment. Even if dowries almost disappeared in developed countries[36], the role of wealth at the time of marriage should not be ignored. Matoushek and Rasul (2008) consider marriage as a way for people to send a signal to his or her partner. We could enrich this theory by adding the idea of financial commitment. Inheritors may expect their spouse to financially contribute to the household wealth as much as them. Being unable to provide this monetary input (because of a lack of parental wealth) could be perceived by the partner as a bad signal and it may limit the possibility of heterogamy.

Divorce laws and preferences are certainly less important than the socialisation process but it would be a misjudgement to ignore their potential role when comparing the role of the spousal sources of wealth in marital choices.

## 5.2   Implications for the persistence of inequalities

The most important implication of this paper relates to intergenerational inequality[37]. Lefranc and Trannoy (2005) estimates that the elasticity of son's (respectively daughter's) long-run income with respect to father's long-run income is around 0.4 (respectively 0.3) in France. Arrondel (2013) repeats the exercise for wealth and evaluates that the elasticity equals 0.22. The Atkinson's illustration used in the introduction of this paper shows how marital sorting can affect intergenerational inequality. Our estimates are the first key parameter of models linking assortative mating to intergenerational inequality. To our knowledge, French data do not allow us to precisely estimate the role of assortative mating in the reproduction of inequalities. In

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[34]Wealth inequality or different wealth compositions increase the likelihood of opting for a separate property regime.

[35]Terre (1965)

[36]Anderson (2003)

[37]See Blake and Devereux (2011) for a survey

this section, we attempt to enrich the analysis of the relationship between marital sorting and intergenerational inequality by considering two issues: the impact of the source of wealth and the recent evolutions of family.

The existing studies about the role of marital sorting in inequality do not consider the source of wealth but only the household total wealth. In this paper we show that the extent of marital sorting is also higher for inherited wealth and that inheritance is more unequally distributed than labor income. A third parameter needs to be considered to have a complete view of this issue. Piketty (2011) makes clear that inheritance flows are back to its pre-World War I levels and also that the weight of inheritance in aggregate wealth is not likely to decrease in the coming decades. As a consequence, inherited wealth relative to labor income will become increasingly important in marital choices. Given the poor substitutability between these sources of wealth, the possibility to marry up without parental wealth and so the intergenerational mobility is likely to be limited. The direct impact of spousal inheritance on wealth inequality is yet to be determined but our results suggest that the effect of marital sorting by inheritance is likely to become increasingly substantial.

In order to fully understand the implications of our results we must also consider the evolutions of family since Balzac's period. At least two complementary recent changes are likely to make more complex the consequences of assortative mating on inequality. First, divorce and remarriage are more frequent nowadays. It implies that people can have several partners during their life and so that several wealth transfers between spouses can occur (alimonies, redistribution of common assets...). So the current wealth of someone that will be transmitted to his or her inheritors depends on his or her current spouse but also on past partners. Second, recent evidence indicates that French couples tend to separate more and more their assets either by not marrying (which is *de facto* equivalent to a separation of assets) or by choosing separate property contracts when they marry[38]. Even if *in fine* all parental wealth is transmitted to children, these changes considerably affect the timing of these transmissions. Timing matters because it affects non only the path of wealth accumulation but also more general economic decisions regarding labor supply for instance[39]. These issues are beyond the scope of this paper but the evolutions of family must be taken into account when one estimates the role of marital sorting on intergenerational inequality.

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[38]Frémeaux and Leturcq (2013) estimate that more than 15% of newly married couples chose this contract.

[39]Holtz-Eakin et al. (1993) or Joulfaian and Wilhem (1994)

# 6   Concluding comments

What have we learned from this paper? The main contribution of this paper is to analyse the extent of marital sorting based on inherited wealth for the first time. Our use of the French wealth surveys allows us to overcome the usual drawbacks of the existing literature about the choice of spouse. Our estimates of expected inheritance and permanent income greatly improve the analysis of marital sorting and provide new results. We use a variety of strategies to analyse the choice of spouse. In France there is clear positive of positive assortative mating by inherited wealth. Our preferred estimate indicates that the correlation of inheritance between spouses equals 0.25. Marital sorting is significantly stronger for inherited wealth than for labor income especially at the top of the distribution. Neither the timing of inheritance nor the selection into or out of marriage affect our results. The second, and very new, research question addressed in this paper relates to people's sensitivity to their spouse's source of wealth. There is clear proof that labor income and inheritance are poor substitutes. Specifically, there is a partition between the two dimensions: heirs marry heiresses and income earners marry income earners, even more at the top of the distribution.

Spousal education explains a limited part of marital sorting by inheritance but a larger share of the estimate for labor income. We suggest two complementary ideas to rationalize the unexplained part. First, the socialization process may explain why there is not only a greater opportunity for interaction but also common tastes for people from the same socioeconomic background. Moreover, matrimonial strategies and social prestige attached to inheritance are likely to reinforce the attraction towards inheritance. Second, inherited wealth and labor income differs because of their timing and their degree of uncertainty but also because divorce laws distinguish the sources of wealth.

Our findings open wide prospects for future research. First, our results are decisive to deeply understand the dynamics of inequalities especially because of the growing weight of inheritance as a fraction of aggregate wealth. An interesting area for future research would be to properly estimate the effect of marital sorting based on inherited wealth on intergenerational inequality. The lack of available data prevents us from providing such estimate for France. Second, existing papers on assortative mating generally pay too little attention to the interpretation of the results. In this paper we dedicate a long section to this issue and we attempt to consider

original explanations. However, we face difficulty in properly assessing the respective roles of the factors we identify especially regarding the issue of substitutability between inheritance and labor income. Even if it is, by definition, difficult to assess the role of unobservables, social sciences should put more efforts in understanding the mechanisms behind marital choices.

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Table 1: Partial correlation estimates of marital sorting

|  | All couples | | Couples formed less than 10 years before the survey | |
| --- | --- | --- | --- | --- |
|  | [1] | [2] | [3] | [4] |
| **Panel A:** | | | | |
| **Inheritance** | 0.245*** | 0.196*** | 0.222*** | 0.163*** |
| **Current income** | 0.120*** | 0.103*** | 0.144*** | 0.126*** |
| N | 27,723 | 27,723 | 4,882 | 4,882 |
| **Panel B:** | | | | |
| **Inheritance** | 0.207*** | 0.166*** | 0.196*** | 0.150*** |
| **Permanent income** | 0.459*** | 0.128*** | 0.374*** | 0.072*** |
| N | 17,384 | 17,384 | 3,556 | 3,556 |
| Controls: | | | | |
| Age | Yes | Yes | Yes | Yes |
| Education | No | Yes | No | Yes |
| Time fixed effect | Yes | Yes | Yes | Yes |

Note: Panel A includes all couples in the 1992-2010 waves of the *Patrimoine* surveys. Panel B includes all couples for whom we can estimate permanent income. Columns 3 and 4 include all couples who met less than 10 years before the survey. * $p<0.1$, ** $p<0.05$, *** $p<0.01$

Table 2: Risk Ratios

| | Inheritance [1] | Current income [2] | Permanent income [3] | Inheritance [4] | Current income [5] | Permanent income [6] |
|---|---|---|---|---|---|---|
| Top 50/Bottom 50 | 1.56*** (0.02) | 1.33*** (0.02) | 1.94*** (0.03) | 1.44*** (0.02) | 1.16*** (0.02) | 1.12*** (0.02) |
| Top 10/Bottom 90 | 3.68*** (0.13) | 2.97*** (0.11) | 5.27*** (0.21) | 3.29*** (0.12) | 1.56*** (0.02) | 2.14*** (0.04) |
| Top 5/Bottom 95 | 4.29*** (0.27) | 4.25*** (0.29) | 7.29*** (0.45) | 3.58*** (0.13) | 2.00*** (0.03) | 2.86*** (0.10) |
| Controls: | | | | | | |
| Age | Yes | Yes | Yes | Yes | Yes | Yes |
| Education | No | No | No | Yes | Yes | Yes |
| Time fixed effect | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 27,723 | 27,723 | 17,384 | 27,723 | 27,723 | 17,384 |

Note: Columns 1, 2, 4 and 5 include all couples in the 1992-2010 waves of the *Patrimoine* surveys. Columns 3 and 6 include all couples for whom we can estimate permanent income. The coefficients are ratios of marginal effects estimated by probit analysis. Robust standard errors in parentheses; * $p<0.1$, ** $p<0.05$, *** $p<0.01$

Interpretation: the coefficient 4.29 (at the bottom of the first column) means that women belonging to the top 5% of the inheritance distribution have a probability of success (being in a couple with a man in the top 5% of the inheritance distribution) 4.29 times higher than women belonging to the bottom 95% of the inheritance distribution.

Table 3: Partial correlation estimates of substitutability between sources of wealth

| | All couples | | Couples formed less than 10 years before the survey | |
|---|---|---|---|---|
| | [1] | [2] | [3] | [4] |
| **Panel A:** | | | | |
| Male inheritance and female current income | 0.053*** | 0.019*** | 0.056*** | 0.026* |
| Male current income and female inheritance | 0.051*** | 0.016*** | 0.111*** | 0.058*** |
| N | 27,723 | 27,723 | 4,882 | 4,882 |
| **Panel B:** | | | | |
| Male inheritance and female permanent income | 0.139*** | 0.003 | 0.151*** | 0.038** |
| Male permanent income and female inheritance | 0.142*** | -0.025*** | 0.166*** | 0.015 |
| N | 17,384 | 17,384 | 3,556 | 3,556 |
| Controls: | | | | |
| Age | Yes | Yes | Yes | Yes |
| Education | No | Yes | No | Yes |
| Time fixed effect | Yes | Yes | Yes | Yes |

Note: Panel A includes all couples in the 1992-2010 waves of the *Patrimoine* surveys. Panel B includes all couples for whom we can estimate permanent income. Columns 3 and 4 include all couples who met less than 10 years before the survey. * p<0.1, ** p<0.05, *** p<0.01

Table 4: Substitutability at the top of the distribution

| | Panel A: Men | | Panel B: Women | |
|---|---|---|---|---|
| | Inheritance | Permanent Inc. | Inheritance | Permanent Inc. |
| Top 10% inheritance [1] | 0.416*** | 0.090*** | 0.360*** | 0.109*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Top 10% permanent income [2] | 0.065*** | 0.286*** | 0.052*** | 0.281*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Difference [1-2] | **0.351*** | -0.196*** | 0.308*** | -0.172*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Controls: | | | | |
| Age | Yes | Yes | Yes | Yes |
| Time fixed effect | Yes | Yes | Yes | Yes |
| $R^2$ | 0.055 | 0.105 | 0.061 | 0.117 |
| N | 17,384 | 17,384 | 17,384 | 17,384 |

Note: Sample includes all couples for whom we can estimate permanent income. In panel A, men are dependent variables; in panel B, women are dependent variables. Coefficients are marginal effects from probit estimation (with robust standard errors). They are normalized so as to take into account the relative magnitude of monetary inputs of top inheritors and top income earners. P-values in parentheses; * p<0.1, ** p<0.05, *** p<0.01

Interpretation: The first column can be read as follows: 0.416 means that for a woman, belonging to the top 10% of inheritance distribution increases by 41.6% the probability of being in a couple with a top heir; 0.065 is the same probability for a woman belonging to the top 10% of permanent labor income distribution; the third coefficient is the difference.

# Appendices

## A   Data corrections

### A.1   Discounting of inheritance

The goal of this index is to take into account the changes in values of inherited wealth. To do so, we use the same index as in Piketty (2011)[40]. Most of the gifts/bequests contain real estates and moveable assets that experienced changes in their values especially over the recent decades. The index incorporates long-run evolutions of prices of consumption goods (CPI), real estate, equities and bonds. We compute a weighted average of these evolutions in order to build our index. Finally we use information about the year of transmission in order to discount each of them and to compare comparable bequests.

### A.2   Imputations: expected inheritance and missing values

To improve the quality of our analysis, we make two kinds of imputations: expected inheritance and missing values.

One of the main drawbacks of surveys about inheritance regards the expected inherited wealth. This aspect of inheritance is ignored while people consider their own (and their spousal) future wealth in their decisions. As a consequence, this necessary correction improves the quality of our analysis of marital sorting and provides new results. The method is divided into two steps: first we identify the potential inheritors and then we estimate an expected bequest based on observable characteristics.

In order to identify the potential inheritors we use information about respondents' parental characteristics. First, we only keep people who have at least one living parent. Then, we exclude orphans and people who experienced frequent periods of poverty when they were young (before 14). We also need to consider people who have already received wealth transmissions and whose parents are still alive. If people have received less than 15,000 Euros (Euros 2010) with two living parents or less than 7,500 Euros with only one living parents then they are considered as potential inheritors. Choosing higher thresholds leads to a modest increase in the share of inheritors but it also adds some imprecision in the estimation. Last, if respondents' parents do not hold any assets then people are not considered as potential inheritors.

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[40]See the online appendix for more technical details.

Then, to estimate the expected inheritance, we use a similar procedure than that of a standard missing values procedure. As explanatory variables we use: existence of financial help received from the respondent's parents (dummy), existence of *inter vivos* gift (dummy), type of assets held by the respondent's parents (real estate, lands, equities, bonds, life insurance contracts, professional assets), number of brothers/sisters and parents' socioeconomic status. Finally, we add this expected wealth to the observed wealth (if any) in order to consider the wealth already received by respondents.

The second type of imputation we implement is about missing values. The proportion of missing values in the declaration of labor income and bequests is around 2-3% of all reported values. The methodology we follow is standard. We use the observed self-declared values as well as observable characteristics to estimate these missing values. For labor income, we use age, education, parents' socioeconomic status, job sector and work experience in order to approximate the imputed labor income. For inheritance, we use the respondent's socioeconomic status, parents' socioeconomic status and the nature of the transmitted asset(s)[41].

## A.3   Estimation of permanent labor income

The respondent's current annual labor income may not be representative of his/her lifetime income because of life-cycle bias. We need to correct this potential issue by considering permanent income. Lollivier and Verger (1999) have developed a method to obtain a measure of permanent income from current income and other individual information. Basically, the methodology is the following. We decompose the individual permanent income as a function of two elements: the individual's age, $c(a)$[42] (reflecting the variations of income caused by age) and a structural part, $s(t)$ (reflecting general evolutions of standard of living).

$$log(y(t,a)) = s(t) + c(a) \tag{A.1}$$

This estimate of permanent income cannot be imputed on the whole sample. Specifically, self-employed are excluded because of the high volatility of their labor income. Second, we need to have a strictly positive current income to approximate the permanent income. Table B.1 indicates that current income equals 0 for approximately 15 to 30% of women in each

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[41]Several types of assets are listed : housing, building plot, business property, life insurance product, moveable assets, cash, jewelry and other assets.

[42]Actually, the age function is partly linear in order to consider the effect of retirement on income.

survey. As a consequence, we have a final sample of 17,384 couples instead of 27,723 in the initial sample. These corrections affect not only the size but also the composition of the sample. Taking couples for whom current labor income of both spouses is positive obliges us to focus only on two-earner couples. As a consequence, one must be cautious in not overinterpreting the results given the differences with respect to the initial sample. Nevertheless, estimate of marital sorting based on inherited wealth on this specific sample provide evidence that there is no substantial divergences between these samples.

In order to enrich the baseline model, we run it on 8 sub-populations defined according to the gender (2 categories) and the initial education (4 categories). The division by gender is based on the fact that men and women do not have the same careers. Women's careers are much more frequently interrupted. Then, the wage evolution is positively correlated with education. Focusing on education allows us to consider a permanent individual characteristic. Given that we have different generations in our sample, we do not consider diploma but rather the relative length of education (measured by the number of years of education) within each generation. Finally, we introduce permanent and exogenous characteristics such as the social position of parents and the job sector in order to improve the specification. The final specification we have is the following:

$$log(y_i(t, a)) = s(t) + c(a) + X_i b + v_{it} \tag{A.2}$$

with $y_i(t, a)$ the annual wage, X the permanent characteristics and $v_{it}$ an error term (capturing the unexplained variability within the 8 sub-populations).

The final step of this imputation consists in summing (from the date of entry in the labor market to the death) and discounting incomes. To do so we assume constant purchasing power *via* a discount rate equal to the real interest rate. This method allows us to consider career effects and also variations in purchasing power.

## A.4 Monetary inputs

The monetary inputs of a given household can be defined as:

$$I^s = \underbrace{\sum_{t=0}^{n} Y_t^s * (1+r)^{n-t}}_{Y^s} + \underbrace{\sum_{t=0}^{n} B_t^s * (1+r)^{n-t}}_{B^s} \tag{A.3}$$

with s = m (male) or f (female); $Y_t^s$ = labor income perceived at time $t$ by individual $s$; $B_t^s$ = *inter vivos* gifts and bequests received at time $t$ by individual $s$; $r$ = interest rate; $n$ = end of the period of observation and $t$ = time indicator.

We make some assumptions about the length of accumulation and the returns to compute the ratios of inputs between top income earners and top inheritors. Basically, we assume that spouses meet when they are 30 and that bequests are received at 45. We compute the ratio over a period of thirty years (from 30 to 60). Labor income is accumulated during 30 years and the inheritance during 15. Actually the initial difference between labor income and inheritance matters more than the length of accumulation *per se*. The returns to inheritance and labor income are similar: we simulate three scenarios depending on three different interest rates (1, 3 or 5%).

An illustrative example may help to understand this computation. Suppose that income earners receive on average a bequest of €50,000 and earn €65,000 per year. If inheritors receive €300,000 as bequests and earn €24,000 per year then the ratio is between 1.97 and 2.05 (depending on the interest rates). With the actual data the ratio is around 2. Actually, the normalisation we implement does not change the direction of preferences (and so the rejection of the substitutability) but only its extent. Without these ratios, we would observe similar results but we would overestimate the substitutability between sources of wealth because of wealth differences between top inheritors and top income earners.

## A.5   Measurement errors

The use of self-declared variables requires examining measurement errors and their potential effects on our estimations. Beyond of sampling errors (surveys do not capture the top of the distribution well), measurement errors consist in under or over reporting of labor income and inheritance compared with their real values. In this paper our concern is not more about the correlation of measurement errors between spouses than about the measurement errors *per se*. Indeed, in case of uncorrelated classical measurement errors, the estimate of marital sorting is likely to be biased towards zero. If so, we are measuring a lower bond of marital sorting. If measurement errors are correlated, estimates are likely to be biased upwards or downwards depending on the direction of the correlation. However, there is no clear evidence regarding how errors are correlated between spouses.

For labor income, the construction of the wealth survey allows us to test the presence of this potential bias. In 2004 and 2010, the survey is matched with fiscal data while incomes are self-declared in 1992 and 2004. Table B.1 indicates that real (fiscal) incomes are higher than self-declared incomes. However, estimates of marital sorting by labor income survey by survey do not present significant differences. When controlling only for spousal age, all estimates are between 0.11 and 0.14. This result suggests that measurements errors for labor income do not affect our estimates.

For inheritance, such comparison across surveys is not possible since values are self-declared for all waves. Nevertheless, it bears noting that differences between genders exist. Specifically, Table B.2 suggests than men seem to overestimate their inheritance compared with women. This result is surprising since the French inheritance taxation laws prevent parents from unequal wealth transmissions across their children and so between heirs and heiresses. However, this bias in terms of declaration is not likely to lead to a biased estimate of marital sorting since the whole male distribution seems to be affected. Again, the econometric tests implemented survey by survey do not present major differences. Therefore, the existence and the size of a potential bias is difficult to determine.

For the ratio of monetary inputs, this issue may affect our estimates only if there is a differential in measurement errors between labor income and inheritance. Again, the 2004 and 2010 waves provide an answer. Indeed, for these waves, labor income is matched with fiscal data so the measurement error is limited to a sampling error. The econometric tests implemented survey by survey only present marginal differences. Therefore, the existence and the size of a potential bias is likely to be limited.

# B    Descriptive Statistics

Tables B.1 and B.2 detail the distribution of labor income and inheritance from 1992 to 2010. We restrict the sample to men and women in couple. For both dimensions, we describe the sample mean, the thresholds by decile and the averages per fractile for the highest decile of the distribution and the top income shares. We divide the higher decile into three parts: P90-95, P95-99 and P99-100.

Table B.1 presents the labor income distribution for the three waves. Labor income is the sum of wages, mixed income, pensions and unemployment benefits. It is self-declared on a yearly basis by respondents, except in 2004 and in 2010 where survey data are matched with fiscal returns. The differences between the surveys reflect both changes in the labor income distribution in France (labor market feminization, evolution in top income shares) and the construction of the survey. Women have lower incomes compared to men, but women's average income grows over time. Surveys do not capture the top of the distribution very well (sampling error) and self-declared incomes in 1992 and 1998 suffer from downward bias compared with fiscal data (non-sampling error). The comparison with fiscal data is limited because we only consider couples while existing evidence about top income shares use the whole adult population. Nevertheless, for Piketty (2003) and Landais (2009), the top 10% of the total income distribution (measured at the household level) holds around 32-33% of total income and the top 1% between 7.5 and 9%. Godechot (2012) focuses on wages (at the individual level) only and finds that the wage share held by the top decile is around 26-27%.

Table B.2 demonstrates that the inheritance distribution is more skewed. Almost half of the sample receives no inheritance and the top 10% holds more than 60% of total inherited wealth. Fiscal data show that, among the strictly positive estates, the top 10% of the largest bequests represents more than 50% of total bequests in 2000 (Arrondel and Masson, 2008). Life insurance and *inter vivos* gifts that are, under certain circumstances, not taken into account in estate returns. The introduction of this type of assets in self-reported values we use as well as the difference in terms of samples (all population vs couples) explain the differences between these estimates and ours. An unexpected result needs to be considered. Since gender or the order of seniority among the children in their family do not matter, male and female inheritance should be similar. Most of this gap actually comes from self-declaration. The share of men who report positive bequests is higher (34% against 30% for women) and men declare higher values

than women (+ 20,000 Euros in average for the sub-sample of respondents with strictly positive bequests). Part of this gap can be explained by the age gap between men and women (Table B.3) but it also raises the question of the existence of a gender bias regarding the evaluation of inherited wealth.

Table B.3 presents more general characteristics of our sample. The main information of this table is about the share of actual (i.e. observed) and future inheritors. There is an inversion of trends between 1992 and 2010 since the share of future inheritors becomes larger than the share of actual inheritors. The increase in life expectancy mechanically delays the transmission of wealth between parents and children and reduces the share of observed inheritors. Nevertheless, the imputation of expected bequests leads to a stability of the total share of inheritors.

Table B.1: Income Distribution

|  | 1992 | | 1998 | | 2004 | | 2010 | |
|---|---|---|---|---|---|---|---|---|
|  | **Men** | **Women** | **Men** | **Women** | **Men** | **Women** | **Men** | **Women** |
| **N** | 7,050 | 7,050 | 6,708 | 6,708 | 5,793 | 5,793 | 8,172 | 8,172 |
| **Mean (2010 Eur)** | 22,170 | 9,090 | 21,820 | 10,660 | 25,250 | 12,160 | 25,580 | 13,870 |
| **Thresholds:** | | | | | | | | |
| P10 | 5,760 | 0 | 8,940 | 0 | 9,160 | 0 | 8,969 | 0 |
| P20 | 10,900 | 0 | 12,290 | 0 | 13,700 | 50 | 13,800 | 1,930 |
| P30 | 14,060 | 0 | 14,520 | 3,580 | 16,000 | 4,020 | 16,370 | 6,180 |
| P40 | 16,170 | 1,630 | 16,090 | 6,450 | 17,990 | 7,140 | 18,550 | 9,500 |
| P50 | 18,170 | 5,840 | 17,880 | 8,940 | 20,260 | 10,400 | 20,740 | 12,820 |
| P60 | 20,770 | 10,390 | 20,110 | 11,620 | 22,960 | 13,580 | 23,490 | 15,640 |
| P70 | 23,800 | 13,500 | 23,460 | 14,300 | 26,410 | 16,730 | 27,150 | 18,410 |
| P80 | 28,590 | 17,160 | 27,930 | 17,880 | 31,570 | 20,440 | 32,030 | 21,540 |
| P90 | 39,380 | 22,070 | 35,910 | 22,350 | 44,050 | 25,780 | 43,140 | 27,330 |
| P95 | 54,090 | 27,110 | 46,920 | 28,830 | 59,450 | 31,450 | 56,960 | 33,490 |
| P99 | 103,850 | 43,270 | 84,480 | 46,920 | 120,310 | 48,900 | 114,390 | 58,330 |
| **Average income** | | | | | | | | |
| **per fractile:** | | | | | | | | |
| P90-100 | 66,750 | 34,790 | 62,720 | 35,930 | 70,080 | 35,020 | 71,080 | 36,630 |
| P90-95 | 47,090 | 27,110 | 46,240 | 27,670 | 47,060 | 27,290 | 46,640 | 27,420 |
| P95-99 | 73,160 | 36,710 | 69,530 | 36,660 | 71,010 | 36,710 | 72,100 | 37,000 |
| P99-100 | 144,740 | 71,300 | 147,760 | 71,450 | 157,790 | 75,500 | 183,830 | 72,730 |
| **Top income** | | | | | | | | |
| **shares:** | | | | | | | | |
| P90-100 | 30.1% | 38.3% | 28.7% | 33.7% | 27.8% | 28.8% | 27.8% | 26.2% |
| P90-95 | 10.6% | 14.9% | 10.6% | 13.0% | 9.3% | 11.2% | 9.1% | 9.9% |
| P95-99 | 13.2% | 16.2% | 12.7% | 13.8% | 11.2% | 12.1% | 11.3% | 10.7% |
| P99-100 | 6.5% | 7.8% | 6.8% | 7.0% | 6.2% | 6.2% | 7.2% | 5.2% |

Note: Sample includes all couples in the 1992-2010 waves of the *Patrimoine* surveys.
Income definition : earnings (wages and mixed income) + replacement income (pensions and unemployment benefits); self-declaration at the individual level for 1992 and 1998, matching with fiscal data in 2004 and 2010.

Table B.2: Inheritance Distribution

| | 1992 | | 1998 | | 2004 | | 2010 | |
|---|---|---|---|---|---|---|---|---|
| | **Men** | **Women** | **Men** | **Women** | **Men** | **Women** | **Men** | **Women** |
| **N** | 7,050 | 7,050 | 6,708 | 6,708 | 5,793 | 5,793 | 8,172 | 8,172 |
| **Mean (2010 Eur)** | 50,440 | 38,000 | 37,560 | 30,600 | 48,910 | 56,800 | 53,050 | 44,330 |
| | | | | | | | | |
| **Thresholds:** | | | | | | | | |
| P40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| P50 | 495 | 41 | 3,720 | 2,200 | 5,150 | 5,650 | 8,450 | 7,820 |
| P60 | 10,850 | 6,560 | 12,500 | 11,170 | 16,050 | 18,540 | 19,560 | 18,000 |
| P70 | 24,700 | 19,700 | 23,030 | 21,450 | 28,030 | 33,150 | 33,300 | 29,240 |
| P80 | 54,880 | 37,110 | 45,450 | 39,810 | 49,070 | 71,640 | 59,390 | 58,650 |
| P90 | 114,630 | 92,850 | 93,100 | 82,420 | 93,550 | 128,070 | 102,200 | 97,560 |
| P95 | 181,780 | 156,450 | 155,360 | 126,690 | 157,180 | 189,990 | 160,640 | 141,250 |
| P99 | 680,270 | 576,070 | 414,760 | 297,930 | 777,420 | 671,140 | 668,620 | 490,150 |
| | | | | | | | | |
| **Average inheritance per fractile:** | | | | | | | | |
| P90-100 | 321,580 | 289,190 | 272,140 | 233,730 | 381,380 | 304,020 | 353,310 | 299,300 |
| P90-95 | 128,310 | 126,110 | 128,070 | 124,430 | 125,120 | 124,530 | 126,310 | 123,880 |
| P95-99 | 263,370 | 236,170 | 277,530 | 236,430 | 301,900 | 233,400 | 294,190 | 239,530 |
| P99-100 | 1,618,750 | 1,038,890 | 1,531,810 | 1,172,550 | 1,456,050 | 1,506,020 | 1,672,170 | 1,393,550 |
| | | | | | | | | |
| **Top inheritance shares:** | | | | | | | | |
| P90-100 | 63.8% | 76.1% | 72.5% | 76.4% | 78.0% | 53.5% | 66.6% | 67.5% |
| P90-95 | 12.7% | 16.6% | 17.0% | 20.3% | 12.8% | 11.0% | 11.9% | 14.0% |
| P95-99 | 20.9% | 24.9% | 29.6% | 30.9% | 24.7% | 16.4% | 22.2% | 21.6% |
| P99-100 | 32.1% | 27.3% | 40.8% | 38.3% | 29.8% | 26.5% | 31.5% | 31.4% |

Note: Sample includes all couples in the 1992-2010 waves of the *Patrimoine* surveys.

Inheritance definition: observed bequests and *inter-vivos* gifts + imputed inheritance; all the observed transmissions are self-declared.

Table B.3: General Descriptive Statistics

|  | 1992 | 1998 | 2004 | 2010 |
|---|---|---|---|---|
| Number of couples | 7,050 | 6,708 | 5,793 | 8,172 |
| Proportion of married couples | 89.0% | 84.0% | 82.5% | 76.2% |
| **Age (average in years)** | | | | |
| Men | 48.3 | 49.2 | 50.4 | 50.0 |
| Women | 45.7 | 46.6 | 48.0 | 47.3 |
| **Inherited wealth** | | | | |
| *Men:* | | | | |
| Share of observed inheritors [1] | 30.8% | 27.3% | 29.5% | 25.9% |
| Share of future inheritors [2] | 27.0% | 27.4% | 27.8% | 33.5% |
| Total [1 + 2] | 57.8% | 54.7% | 57.3% | 59.4% |
| *Women:* | | | | |
| Share of observed inheritors [1] | 28.9% | 24.3% | 26.0% | 24.3% |
| Share of future inheritors [2] | 25.6% | 28.6% | 31.0% | 34.0% |
| Total [1 + 2] | 54.5% | 52.9% | 57.0% | 58.3% |
| **Share of inheritance as a % of household wealth*** | | | | |
| None | - | 23.6% | 19.3% | 23.4% |
| Less than 25% | - | 48.5% | 50.6% | 48.9% |
| Between 25% and 50% | - | 16.3% | 17.3% | 15.2% |
| More than 50% | - | 11.6% | 12.7% | 12.5% |
| **Comparison of wealth between spouses** | | | | |
| When they met, the man's wealth was: | | | | |
| Greater | 17.9% | 23.8% | 22.5% | 25.4% |
| Lesser | 10.2% | 14.4% | 12.4% | 15.3% |
| Similar | 30.2% | 28.6% | 29.5% | 26.5% |
| Neither of them had any wealth | 39.5% | 32.8% | 35.1% | 32.2% |

Note: Sample includes all couples in the 1992-2010 waves of the *Patrimoine* surveys.
* For this question only the observed inheritance is taken into consideration.

# C  Supplementary results

## C.1  Robustness tests: marital sorting

Table C.1: Robustness tests - Marital sorting

|  | **Observed inheritance** | **Positive inheritance** | **Full controls (1)** | **Full controls (2)** |
|---|---|---|---|---|
|  | [1] | [2] | [3] | [4] |
| **Inheritance** | 0.168*** | 0.285*** | 0.165*** | 0.159*** |
| **Current income** |  |  | 0.113*** | 0.109*** |
| **Permanent income** |  |  | 0.133*** | 0.129*** |
| N | 27,723 | 11,604 | 27,723/17,384 | 27,723/17,384 |
| Controls: |  |  |  |  |
| Age | Yes | Yes | Yes | Yes |
| Education | No | No | Yes | Yes |
| Marital status | No | No | Yes | Yes |
| Number of children | No | No | Yes | Yes |
| Timing inheritance | No | No | Yes | Yes |
| Duration of the couple to date | No | No | No | Yes |
| Experience of divorce | No | No | No | Yes |
| Time fixed effect | Yes | Yes | Yes | Yes |

Note: In column 1 we consider observed (i.e. non-imputed) inheritance only; in column 2 we only keep couples if both spouses are inheritors; in column 3 we add extra control variables: marital status (non-married, married with community regimes, married with separate regimes), number of children and timing inheritance (dummy equal to 1 in case of imputation of expected inheritance). In column 4, we add two controls: the duration of the couple to date (in years) and a dummy equal to one if (at least) one spouse already experienced divorce. In columns 3 and 4, the number of observations is equal to 27,723 for inheritance and current labor income and to 17,384 for permanent income. * $p<0.1$, ** $p<0.05$, *** $p<0.01$

## C.2  Sensitivity tests without cumulative top positions

One may worry about a bias in the results caused by people who are at the top 10% of the distribution for inheritance and labor income at the same time. In Table C.2 we exclude couples for whom at least one spouse is in this situation. Their weight is lower than 5% (3% for men and 2% for women).

The results suggest that most substitutability between inheritance and labor income is actually due to people who are cumulating top positions for both sources of wealth. Indeed, the marginal probabilities for people belonging to the opposite source of wealth are close to 0 when these people are excluded. This table confirms our conclusions and indicates that human capital is not sufficient to compensate a lack of parental wealth.

Table C.2: Robustness test - Bi-dimensional tests

| | Panel A: Men | | Panel B: Women | |
|---|---|---|---|---|
| | Inheritance | Permanent Inc. | Inheritance | Permanent Inc. |
| Top 10% inheritance [1] | 0.558*** | 0.050** | 0.437*** | 0.072*** |
| | (0.000) | (0.049) | (0.000) | (0.003) |
| Top 10% permanent income [2] | 0.019* | 0.260*** | 0.005 | 0.249*** |
| | (0.051) | (0.000) | (0.487) | (0.000) |
| Difference [1-2] | **0.539*** | -0.211*** | 0.432*** | -0.177** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Controls: | | | | |
| Age | Yes | Yes | Yes | Yes |
| Time fixed effect | Yes | Yes | Yes | Yes |
| $R^2$ | 0.047 | 0.107 | 0.055 | 0.099 |
| N | 16,557 | 16,557 | 16,557 | 16,557 |

Note: Sample includes all couples for whom we can estimate permanent income. In panel A, men are dependent variables; in panel B, women are dependent variables. Coefficients are marginal effects from probit estimation (with robust standard errors). They are normalized so as to take into account the relative magnitude of monetary inputs of top inheritors and top income earners. P-values in parentheses; * $p<0.1$, ** $p<0.05$, *** $p<0.01$