European Commission

Assortative mating in Spain: who marries whom, and how does it influence income and wealth inequality?

JRC Working Papers on Taxation and Structural Reforms no. 12/2024

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2024

Joint Research Centre

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EU Science Hub
https://joint-research-centre.ec.europa.eu

JRC140026

Seville: European Commission, 2024

How to cite this report: European Commission: Joint Research Centre, De Poli, S., Onrubia, J. and Picos, F., *Assortative mating in Spain: who marries whom, and how does it influence income and wealth inequality,* European Commission, Seville, 2024, JRC140026.

Contents

Assortative mating in Spain: who marries whom, and how does it influence income and wealth inequality?

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Abstract

Assortative mating can exacerbate household income inequality within and between generations. While previous studies have shown that it raises income inequality, its effects on wealth inequality remain less explored due to data limitations. This study uses Spanish administrative microdata to assess how assortative mating influences income and wealth inequality, and to what extent taxes and benefits mitigate these disparities.

We find a strong tendency for assortative mating, especially among couples at the top of the income and wealth distribution, which amplifies income and wealth inequality. Our analysis shows that the entire Spanish tax-benefit system reduces inequality to the (pre-tax) level of a hypothetical scenario of random mating. Our findings highlight the need to consider wealth, taxes, and benefits in addition to income to understand the full impact of assortative mating on household well-being and inequality. While wealth accounts only for 18.5% of the joint income-wealth at the time of marriage, it explains about 25% of the pre-tax inequality and 34% of the post-tax inequality. This is driven both by the high concentration of wealth at the top of the distribution and the low level of progressivity of wealth taxes compared to labour income taxes.

*The content of this article does not reflect the official opinion of the European Commission. We want to thank Rafael Frutos, Sarah Kuypers, Hugo Cruces, Juan Gabriel Rodriguez, Francisco Javier Velazquez and Elena Huergo. Jorge Onrubia is grateful for the support received from the Universidad Complutense de Madrid (Programme GRFN32/23, Research Group UCM 940355, Politicas Publicas: Analisis Economico Aplicado).

Executive Summary

- An important challenge for our society is the persistence of high income inequality and low social mobility across generations. Assortative mating —the tendency of individuals to marry those with similar traits— can further intensify these disparities, contributing to greater household income inequality both within and across generations.

- While previous studies found that positive assortative mating contributes to increased income inequality, its effects on wealth inequality have been less explored, largely due to data limitations. Using Spanish administrative microdata, this study assesses how assortative mating affects both income and wealth inequality; and investigates the role of taxes and benefits in alleviating these disparities.

- Our analysis shows a strong tendency for assortative mating, especially among couples at the top of the income and wealth distribution, which leads to a rise in income and wealth inequality. Under a scenario where couples are randomly matched, income and wealth inequality would be 7% and 8% lower, respectively.

- By analyzing income and wealth together, we find that, at the time of marriage, the inequality generated by assortative mating is driven mainly by differences in earnings and the ownership of the main residence.

- To provide a more complete picture of household well-being and inequality, we also look at post-tax income and wealth. While taxes and benefits completely offset the increase in income inequality due to assortative mating, they are less effective in countering the inequality generated by wealth. Our results show that the reduction in inequality resulting from a random choice of partners could have nearly the same impact as the entire tax-benefit system, underscoring the limits of current fiscal policies in addressing disparities rooted in marriage patterns.

1. Introduction

An important challenge for our society is the high level of income inequality and low social intergenerational mobility. In this context, assortative mating - the tendency of individuals with similar traits to marry each other - can exacerbate household income inequality within and between generations.

In a pioneering study (Becker (1973), Becker (1974)), Becker proposed the theory of positive assortative mating for complementary traits, such as education, and negative assortative mating for substitute traits, like wages. While positive educational assortative mating has been widely supported in numerous studies (Hou and Myles (2008); Schwartz and Mare (2005); Greenwood et al. (2014)), the literature on income assortative mating is comparatively limited and often contradicts Becker's predictions (Nakosteen and Zimmer (2001), Frémeaux and Lefranc (2020), Fiorio and Verzillo (2018) and Chiappori et al. (2022)). Along the same line, two recent studies for Norway (Fagereng et al. (2022)) and the US (Lersch and Schunck (2023)) report positive wealth assortative mating.

Besides measuring the level of assortative mating (also named homogamy), researchers have been interested in evaluating the consequences it might have. A strand of literature (see, for example, Fernandez et al. (2005); Frémeaux and Lefranc (2020); Fiorio and Verzillo (2018); Greenwood et al. (2014); Eika et al. (2019)) analysed the impact of the tendency to marry individuals with similar income or education on income inequality. By comparing the observed assortative mating patterns with a scenario where partners mate randomly, these studies found that the actual partner choices contribute to an increase in income inequality.

The literature on assortative mating and wealth inequality is more limited because of constraints in data availability. In particular, when assessing the likelihood of marriage between individuals with similar wealth levels and its impact on wealth inequality, it is crucial to obtain this information at the time the partners met or married, before making joint decisions on labour market participation and wealth accumulation. However, information on wealth is rarely available for both partners before marriage and, for married couples, it is typically reported only at the household level, making it impossible to disentangle the wealth of each partner.

This paper analyses income and wealth assortative mating in Spain and its implications on household joint income and wealth inequality. We contribute to the literature along three lines. First, we provide new evidence on the impact of assortative mating on wealth inequality. Besides two recent studies on the US (Lersch and Schunck (2023)) and Norway (Fagereng et al. (2022)) on marriage and wealth inequality, most of the literature focuses only on income inequality, which offers a partial view of the total inequality, given that it is just a proxy of households' well-being (Kuypers (2018)).

Second, to the best of our knowledge, we are the first to investigate the impact of assortative mating on couples' well-being, considering income and wealth jointly. Since income and wealth are not perfectly correlated, analysing the two measures separately would give just a partial insight into the consequences of the actual choice of partners on inequality between couples. Following the approach of Weisbrod and Hansen (1968), recently used among others by Petrov and Romaguera-de-la Cruz (2024) and Kuypers et al. (2021), we estimate couples' well-being, transforming wealth from a stock into a flow of resources and adding it to income. By analysing income and wealth jointly, we can assess the role of each component (income, financial assets, main residence, other buildings, and debts) on overall inequality.

Third, we simulate taxes and benefits to obtain a measure of post-tax income and wealth, which can be considered as a proxy of couples' yearly possibilities to consume (after taxes). In this way, we examine the role of the government in smoothing the increase in inequality generated by the choice of the partner. Although this matter has not been considered in previous studies, it is of special importance for policymakers, as they can intervene only post-marriage to try to adjust income through taxes and benefits and avoid an increase in inequality over time.

For this purpose, we exploit the information available from a unique database containing detailed longitudinal information on income and wealth (both real and financial assets) from administrative data. The underlying sample is representative of Spanish individuals and households both at national and regional levels.

Similarly to previous analyses, we assess assortative mating by comparing the actual situation with a counterfactual situation where the spouses are randomly matched. Moreover, we consider two additional scenarios where there is perfect positive and perfect negative assortative mating. This means we rank the spouses based on their income and wealth and match the richest husband/wife with the richest wife/husband until the poorest husband/wife is matched with the poorest wife/husband (and vice-versa). The perfect positive and negative assortative mating scenarios offer a lower and upper bound of household inequality based on the income and wealth of newly married. By comparing the actual situation with these counterfactual scenarios, we first assess how far the actual situation is from a random allocation and whether it tends towards a perfect positive or negative assortative mating scenario. Then, we examine the impact of marriage on income and wealth inequality using the Gini coefficient and decomposing it by income and wealth components.

The rest of the paper is organized as follows. Section 2 presents the literature review on assortative mating and its consequences on income inequality. Section 3 describes the data and methodology. Section 4 shows results and some analysis of the sensitivity of our results to alternative scenarios. Section 5 presents some final considerations and concludes.

2. Literature Review

In a pioneering study (Becker (1973), Becker (1974)), Becker developed the theory that there is positive assortative mating (also named homogony, meaning that it is likely that a person marries someone with similar characteristics) for complementary traits, such as education, while there is a negative assortative mating for traits that are substitute, such as wages. This theory has been widely analysed in the literature, especially with respect to education.

A huge strand of literature assessed educational assortative mating (e.g. Hou and Myles (2008); Schwartz and Mare (2005); Greenwood et al. (2014)) and, in line with Becker's theory, they found positive assortative mating.

On the contrary, the literature on assortative mating based on income is more limited, and most studies do not support Becker's theory.[1] Some examples are the works of Nakosteen and Zimmer (2001) for the United States, Frémeaux and Lefranc (2020) for France, Fiorio and Verzillo (2018) for an Italian region, Nakosteen et al. (2004) for Sweden, who found positive earnings assortative mating. Along the same line, Lam (1988) extends and contrasts the predictions of Backer through theoretical results.

The relative scarcity of literature on income assortative mating can be primarily attributed to data constraints. An optimal dataset for assessing income assortative mating should encompass the income of both spouses at the time of marriage or, ideally, in the years leading up to their marriage (Nakosteen et al. (2004)). For instance, consider a scenario in which a high-income individual marries someone with a medium income. After marriage, the income of the lower-earner spouse could potentially increase due to the sharing of business opportunities and social networks facilitated by their partner (Fiorio and Verzillo (2018)). In such cases, examining income solely after marriage may result in an overestimation of assortative mating. Conversely, the partner with the medium income might choose to reduce his/her number of working hours as a result of joint labour market decisions (Frémeaux and Lefranc (2020)).[2] In that case, looking at post-marriage income might lead to underestimating assortative mating.

Nevertheless, most surveys typically do not gather data on the income of both spouses in the years before marriage. Cross-sectional data, for instance, provide a snapshot of a single point in time and generally do not track individuals' income and marital status retrospectively. Panel datasets follow individuals and households for

[1] Only a few studies support Becker's theory (see, for example, Zhang and Liu (2003) for Taiwan).

[2] Christl et al. (2023) shows that some EU tax-benefit systems incentivize second earner to reduce labour market participation after marriage.

several years. Hence, in principle, they could provide the information needed for this type of study. Nevertheless, they tend to capture couples only when they commence cohabiting and become part of the same surveyed cohort. Moreover, in survey data, typically the year of marriage is not reported and, more in general, the number of marriages taking place in a given year of the survey is too small to allow for robust analysis (Chiappori et al. (2022)).

Most of the studies overcoming these limitations make use of administrative data. Nakosteen et al. (2004) analyse assortative mating in Sweden, using longitudinal data from official registers for the entire population. Looking at the income before marriage, they find a positive income assortative mating in Sweden. Fiorio and Verzillo (2018), using administrative data from tax forms for Lombardia (the richest Italian region in terms of GDP), find positive income assortative mating, especially at the top of the income distribution, while in the rest of the income distribution, income assortative mating is not significant. Chiappori et al. (2022) using tax file data for the Netherlands show that most of the couples exhibit positive assortative mating. Still, they highlight a negative assortative mating for a small share of couples, following a more traditional approach with a husband breadwinner. Moreover, they test whether considering all married couples with current income, instead of only newly married, might affect their results. They found that labour supply does not change significantly in the years before marriage, while it changes in the years after marriage. This result suggests that using data at the time of marriage (instead of before marriage) does not lead to biased estimates, while using post-marriage data may lead to significantly biased results.

Other studies make use of survey data and try to overcome the data limitations using different approaches. Frémeaux and Lefranc (2020) estimate after-marriage earnings for France, taking into account joint labour market decisions and imputing earnings to people who were not participating in the labour market. Nakosteen and Zimmer (2001), using panel data, can observe pre-marriage earnings but only for one spouse. For his/her partner, they rely on earnings after marriage, assuming that they do not change significantly.

The literature looking at the relationship between wealth and assortative mating is even more limited as it faces similar data challenges. In addition, differently from income, most datasets report wealth at the household level, without allowing for the distinction of individual wealth within married couples. A few papers assessed the degree of assortative mating based on parental wealth (e.g. Charles et al. (2013) for the US; Wagner et al. (2020) for Denmark; Fremeaux (2014) for France). Moreover, two recent papers analyse the relation between assortative mating and wealth inequality in Norway (Fagereng et al. (2022)) and in the US (Lersch and Schunck (2023)).

Assortative mating can be explained from both the demand and supply side perspectives. The theory on the supply side argues that individuals have more opportunities to interact with those who share similar social and cultural backgrounds (Kalmijn and Flap (2001)). This can happen through various channels, such as educational institutions, which are often regarded as highly efficient marriage markets, as well as workplaces and residential neighbourhoods. On the other hand, the theory on the demand side suggests that people try to find partners with similar characteristics due to their preferences (see, for example, Hitsch et al. (2010), Ranzini et al. (2022), Belot and Francesconi (2013)).

Besides the causes of assortative mating, this topic has drawn the attention of researchers because of the consequences that it can have. Schwartz (2013) presents a comprehensive overview of the literature focusing on the effect of assortative mating on income inequality within and between generations. Moreover, she discusses the potential consequences of population changes and the relation between quality and dissolution. A society where a high earner marries another high earner person would be more unequal than a society where a high earner marries a low earner. This is the so-called inequality within generations. Several studies found that assortative mating increases household income inequality (e.g. Fernandez et al. (2005); Frémeaux and Lefranc (2020); Fiorio and Verzillo (2018); Greenwood et al. (2014); Eika et al. (2019)). These papers assess the impact of homogamy on income inequality by comparing the actual situation with a scenario where marriage is random. Their findings suggest that marriage increases income inequality, but the effect is different in size depending on the methodology, country, data and sample selection. For instance, depending on the study, the Gini coefficient on income is estimated to be between 5 and 20% higher than what would happen under random mating.

3. Methodology and data

In this section, we first present the data employed for this analysis and the sample selection (section 3.1). Then, we describe the scenarios evaluated (section 3.2) as well as the methodology applied (section 3.3).

3.1. Data and sample selection

Our analysis is based on a household panel dataset which combines different sources of information compiled by the Spanish National Statistics Institute (INE) and the Spanish State Tax Agency (AEAT).[3] The sample is withdrawn by the INE and it is representative of Spanish households at the national and regional levels, except for the Basque Country and Navarre, as they operate under distinct fiscal regimes ("foral regime"). To well capture the bottom and up tails of the income distribution, there is an oversampling of individuals with gross income equal to 0 or higher than 300,000 euro.[4] The sample includes information from the census on the relationship between members of each household, and socio-demographic characteristics such as sex, year of birth and city of residence.

Moreover, this dataset includes detailed administrative data on income and wealth. Information on income comes from individual tax records and contains data related to employment and self-employment income, pensions, cash benefits, property income and capital income. These data come from self-reported personal income tax (IRPF)

[3]The microdata from this Household Panel are disseminated by the Spanish Institute of Fiscal Studies (IEF). For a comprehensive overview of the sampling methodology and the variables available in the panel, please refer to López et al. (2022).

[4]70% of the individuals with income higher than 300,000 are included in the sample.

declarations and information from third parties such as employers and other administrations.

In terms of wealth, we have information on financial assets and real estate assets (distinguishing between the main residence and other buildings). Data on financial assets are reported by financial entities, while information on real estate assets is reported by the Ministry of Finance's Directorate General of the Cadastre, in cadastral values. Therefore, to obtain the total value of assets, we need to calibrate the cadastral values to align them with market values. To do so, we calculate the ratio between the total market value reported by the Bank of Spain[5] and the total cadastral values reported in our data. Then, we multiply our cadastral values by this ratio (3.79) and we obtain a proxy of market values. Although this approach is typical in the literature, a drawback of applying the same coefficient to all proprieties is that we are implicitly assuming a linear relationship between cadastral and market values. Yet, as also highlighted by Kuypers et al. (2020), the relationship between these two variables is not straightforward given the lack (or differential degree) of revision of cadastral values.[6]

Putting together all these sources of information, we compute net wealth (NW) as follows:

$$NW = FA + 3.79 * MR + 3.79 * OB - D \tag{1}$$

where FA stands for financial assets (in market values), MR and OB for, respectively, the main residence and other buildings (in cadastral values), and D denotes debts (in market values) which are mostly related to mortgages. Real assets are calculated as the sum of the main residence and other buildings, minus debts.

Currently, the panel is available for the period from 2016 to 2021.[7] The sample

[5] For more details on the methodology, please see https://www.bde.es/wbe/es/estadisticas/.

[6] Therefore, even if, at an aggregated level, the total value of real assets corresponds to external statistics, at the property level, we might introduce a bias with the underestimation and overestimation of some market values.

[7] For the years before 2016 (from 2008 to 2015), we can rely only on the data on income from IRPF, while we do not have access to information on wealth.

was initially established in 2016 and reflects the characteristics of the population at that time. The sample selected in that year consists of approximately 2.1 million observations each year. Subsequently, it retained all households from the 2016 selection and incorporated new family members each year. Additionally, new households are introduced into the sample annually to ensure cross-section representativeness of the Spanish population. In this paper, we focus on the most recent pre-COVID-19 year (2019), given that in 2020 and 2021, there was a reduction in the number of weddings due to the difficulties in celebrating this type of event during the pandemic. The sample size in 2019 is about 2.7 million observations (around 6% of the total population) living in about 950 thousand households.

For the purpose of this analysis, we restrict the sample to newly married couples in 2019. To identify them, we use two sources of information. First, we look at the variable on relationships within the household, and we select all married couples. Second, we compare the marital statuses declared in the tax declarations of 2018 and 2019, and we select those individuals who moved from single to married. Given that earnings are the main source of income by far, we restrict our sample to married couples of working age, while we drop couples where at least one partner is older than 59 or younger than 19. Moreover, since we are interested in highlighting gender differences within couples, we exclude same-sex weddings.[8] Our final sample is composed of 5.615 observations, which are representative of 88,997 weddings.

According to external statistics, in Spain, 161,389 weddings were held during 2019. Several factors can contribute to the potential underestimation of the overall wedding count. First, we are restricting our sample to the working-age population and opposite-sex couples. Second, we retrieve the information on the marriage status from the tax declaration; hence, we can identify a wedding in 2019 only when at least one partner

[8]A few studies for the Netherlands Verbakel and Kalmijn (2014) and US Jepsen and Jepsen (2002) assessed specifically the differences between same-sex and different-sex assortative mating. However, in our analysis, we cannot focus specifically on this because of the low rate (3%) of different-sex marriages.

submitted a tax declaration in 2018 and 2019.[9] Third, for couples entering the panel for the first time in 2019, lacking information on their marital status in 2018 prevents the inclusion of such marriages in our analysis.

Before moving to the next subsection, we present some statistics on our final sample (Table 1). At the time of marriage, women are typically younger than men. The majority of the sample gets married between 30 and 45 years old, while about 15% of the spouses are older than 45.

Table 1: Summary statistics (in %)

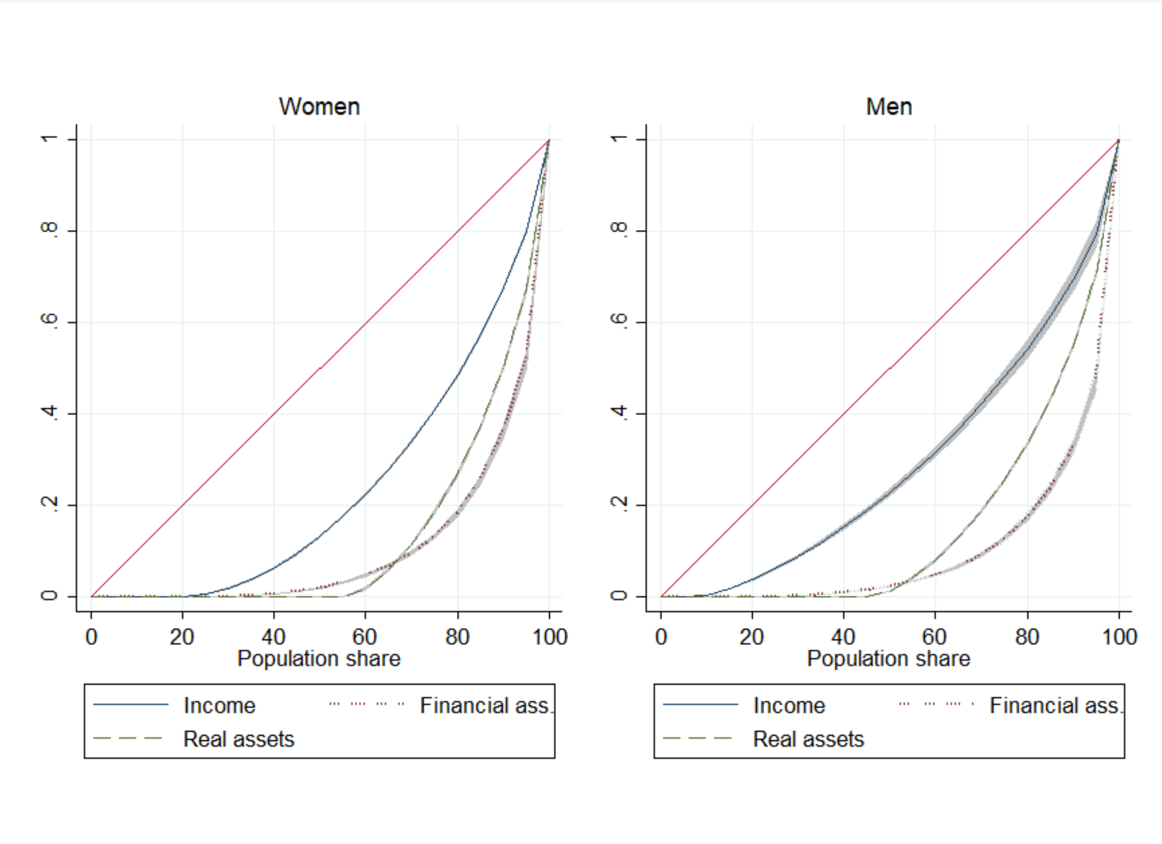
	Women	Men
Age:		
less than 30 years old	17	10
between 30 and 45 years old	70	72
older than 45	13	18
Share of individuals with income/wealth sources:		
Earnings	82.4	94.8
Income (including benefits)	90.0	97.5
Financial assets	83.9	89.9
Real assets	45.7	55.5
Debts	46.9	60.4

Then, we look at the share of individuals with positive income according to different definitions. In 2019, about 82% of newly married women reported positive earnings, a percentage roughly twelve points lower than the corresponding figure for men. When considering the overall income, including other sources of market income and benefits, we find that 90% of women have positive income, in contrast to 97% of men. Moreover, we look at wealth, decomposing it into financial assets, real assets and debts. Among newly married couples, the great majority of newly married partners have financial assets, while 45.7% of women and 55.5% of men have real assets. A similar share is observed for debts, suggesting that most individuals with real assets are still paying a mortgage.

[9] Tax declaration is not compulsory when the individual gets gross earnings below 22,000 EUR/year from a single employer and has no other relevant source of income.

To explore the distribution of income, financial assets and real assets[10], we examine the Lorenz curves, separately by gender (Figure 1). Although a large share of the sample owns financial assets, it is noteworthy that this component exhibits the highest level of inequality, as it is concentrated at the top of the distribution. Real assets also display an unequal distribution, with the bottom 50% of the population holding no assets. Conversely, income demonstrates a comparatively more equal distribution, particularly among men.

Figure 1: Lorenz curve of income, real assets and financial assets by gender.



Note: 45-degree reference line in red. The grey area reports confidence intervals at 95%.

3.2. Scenarios

The previous subsection showed how we select our sample of married couples, which, from now on, we define as ”actual” mating scenario. To assess the level of assortative

[10]In this graph, real assets are represented as the sum of main residence and other buildings, without accounting for debts.

mating and its impact on income inequality, we compare the actual mating scenario with alternative counterfactual scenarios. Most of the literature (among others, see, for example, Frémeaux and Lefranc (2020), Fiorio and Verzillo (2018), Nakosteen et al. (2004)) typically compares the actual mating scenario with a hypothetical scenario where partners are paired randomly (”random” mating scenario from now on).

Moreover, we consider two additional scenarios, named ”perfect positive” and ”perfect negative” mating scenarios, where partner pairing is determined by their respective position in the gender-specific income (or wealth) distribution (see, for example, Lersch and Schunck (2023)). To construct these scenarios, we first rank men and women based on their income. Let yw_i denote the income of woman i, with i=0, ...n, where yw_1 represents the income of the woman with the lowest amount and yw_n is the income of the richest woman. A similar notation applies to men, with income denoted as ym_i. In the perfect positive scenario, couples are formed by matching individuals who are in the same rank of the gender-specific distribution. Basically, the joint income of a couple (yc_i) is calculated as the sum of the incomes of the woman (yw_i) and man (ym_i), pairing the poorest woman with the poorest man and so forth. In other words, in the perfect positive scenario, couples' income is calculated as follows:

- $yc_1 = yw_1 + ym_1$ (couple formed by the poorest man and the poorest woman)
- $yc_2 = yw_2 + ym_2$ (couple formed by the second poorest man and the second poorest woman)
- .....
- $yc_n = yw_n + ym_n$ (couple formed by the richest man and the richest woman)

On the opposite, in the perfect negative scenario, couples are created by pairing individuals of opposite rank, such as the poorest man with the richest woman, and vice versa. The income of the couple (yc_i), in this scenario, is determined by combining the income of woman n-i (i.e. income = yw_{n-i}) with the man i (i.e. income = ym_i). In the negative assortative mating scenario, couples' income is calculated as follows:

- $yc_1 = ym_1 + yw_n$ (couple formed by the poorest man and the richest woman)
- $yc_2 = ym_2 + yw_{n-i}$ (couple formed by the second poorest man and the second richest woman)
- .....
- $yc_n = ym_n + yw_1$ (couple formed by the richest man and the poorest woman)

By comparing the actual situation with these counterfactual scenarios and with the random scenario, we can determine where the actual scenario is placed. The perfect positive and negative assortative mating scenarios are presented as extreme hypothetical scenarios. They can be considered, respectively, as an upper and lower bound of the impact of marriage on income and wealth inequality, based on the income and wealth of newly married. In turn, the random scenario lies between the extremes.

Subsequently, in Section 5, we repeat the analysis considering these three scenarios, but relaxing the assumption on gender in couple formation. More specifically, keeping our original sample of opposite-sex couples, we create the three counterfactual scenarios (i.e. random, perfect positive and perfect negative), allowing for same-sex pairing. For instance, if the two richest persons in the sample are two men, in the perfect positive assortative mating scenario, we will pair these two persons, obtaining a same-sex couple. These latter scenarios allow us to assess whether the impact of assortative mating on inequality is more pronounced if we also account for same-sex marriages, especially considering that, on average, women tend to earn less than men. Therefore, a scenario which includes marriages between two men (women) is expected to increase the number of high (low) income couples.

3.3. Methodology

3.3.1. Excessive mating ratio

First of all, we start by assessing the level of income and wealth assortative mating using the excessive mating ratio (EMR). This indicator is calculated following the approach of Fiorio and Verzillo (2018). First, we rank women and men by their respective income, and we construct gender-specific income deciles. Second, we build a table based on women (columns) and men deciles (rows), and in each cell, we identify the number of couples in each intersection. The excessive mating ratio in each cell (k, j) is defined as:

$$EMR_{kj} = \frac{\text{Actual relative frequency of couples in cell k, j}}{\text{Theoretical relative frequency under random mating}} \tag{2}$$

where the actual relative frequency in cell k, j, is the number of couples belonging to this cell, while the theoretical relative frequency is the same in each cell and it is calculated as the ratio between the total number of couples and the total number of cells (i.e. k*j = 100).[11] Intuitively, when looking at the EMR by income deciles, an EMR equal to 1 in all cells means that individuals are randomly mated (i.e. independent of their income), while an EMR equal to 10 in each cell of the main diagonal means that there is perfect assortative mating.

3.3.2. Income and wealth inequality

Then, we assess the impact of assortative mating on income and wealth inequality, considering these two components separately. For this purpose, we analyze the four scenarios presented above, and we look at the i) Lorenz curves, ii) Gini index, iii) income and wealth shares.[12] The Lorenz curve draws the cumulative proportion of couples' earnings, where couples are ranked in an ascending order based on their income. The closer the Lorenz curve is to the 45-degree line, the more equally distributed the income among couples. The Gini Index provides a quantitative measure of the Lorenz Curve in our alternative scenarios, making it possible to sort and compare them in terms of inequality.[13] Finally, the income and wealth shares allow us to investigate

[11]Since our sample is composed of 88,997 couples, the theoretical relative frequency under random mating in each cell is equal to about 890 couples.

[12]Most of these indicators are also presented for financial assets and real assets.

[13]The Gini index is calculated as twice the area between the 45-degree line and the Lorenz curve. The smaller the area, the smaller the Gini and therefore, the more equal is distributed income. If the Lorenz Curve lies on the 45-degree line, it means that there is no inequality and the Gini index is equal to 0.

what happens at the top of the distribution. To calculate them, we first build the percentiles based on couples' income. Then we calculate the ratio between the income earned by the bottom 50%, the middle 40%, the richest 10%, 5% and 1% of the couples, divided by the total income of all the couples. The same approach is used for wealth.

3.3.3. Joint income-wealth distribution

Since income and wealth are not perfectly correlated, it is important to analyse them jointly when assessing the overall inequality. Following the approach of Weisbrod and Hansen (1968), extended by Kuypers et al. (2021) to account also for wealth taxes, we calculate the joint distribution of income and wealth. The formula below shows the annuitized income, which is the sum of income and net wealth transformed into a flow of resources, such that:

$$AY = Y + \left[\frac{p}{1-(1+p)^{-T}}\right] * NW \tag{3}$$

where p is the interest rate, and T is life expectancy (i.e. time to death). Life expectancy by age and gender is obtained from the Spanish National Statistical Institute (Instituto Nacional de Estadistica, INE), while the interest rate considered is set at 4.5%.[14]

For a given value of wealth, a higher life expectancy corresponds to a lower annuitized income. The intuitive idea is that each year individuals could consume all income earned during the year plus a constant amount of their wealth, resulting in no remaining wealth (i.e. savings) at the time of death.[15] For instance, consider two individuals with identical wealth (100,000 euros) but different life expectancy (e.g., 10 and 20, respectively). Using the formula above and an interest rate of 0.045, the person with a life expectancy of 10 years could consume 12,637 euros of his/her wealth for each year of the rest of his/her life, while the person with a higher life expectancy (20

[14]For more details on the interest rate for Spain, see https://tradingeconomics.com/spain/interest-rate.

[15]For further details, refer to Weisbrod and Hansen (1968).

years) could consume a lower amount (7,687 euros) annually. Based on this formula, we obtain the pre-tax joint income-wealth distribution. Additionally, we decompose the joint income-wealth into income, financial assets, main residence, other buildings and debts. This allows us to identify the role of each subcomponent of income and wealth on the overall inequality. Distributional results are then presented using the Gini index and deciles, focusing only on our two main scenarios: the actual and random mating.

3.3.4. Simulation of taxes and benefits

For the last research question about the role of the government in reducing inequality, we need to estimate post-tax income and wealth. Table 2 provides a summary of how we move from pre-tax income and net wealth to post-tax values. It is important to note that we define pre-tax income as the sum of employment and self-employment income. In this concept, we do not include property and capital income, as they are already taken into account through the annuitization of pre-tax net wealth. Along the same line, in this paper we consider capital income tax and property income tax as taxes on net wealth.

Table 2: Components of post-tax income and net wealth

Pre-tax income:	**Pre-tax net wealth:**
+ employment [D]	+ financial assets [D]
+ self-employment income [D]	+ main residence [D]
	+ other buildings [D]
	- debts [D]
Post-tax income:	**Post-tax net wealth:**
+ earnings [D]	+ net wealth [D]
- earnings income tax (PIT) [S]	- wealth tax [D]
- social insurance contributions [D]	- property tax [S]
+ social benefits (minimum income) [S]	- property income tax [S]
	- capital income tax [S]

Note: D indicates that the value is taken from the data. S indicates that the variable is simulated by the authors.

The wealth tax (Impuesto sobre Patrimonio) and social insurance contributions (SICs) values are available in our dataset. As they remain constant across different scenarios, contingent only upon individual financial assets and market income, we can rely on their value without simulating them. Conversely, other taxes and benefits either are not available in our data, or depend on the household composition and partner's income. Thus, to accurately reflect these values across all scenarios, we simulate them in accordance with Spanish legislation. Specifically, to calculate personal income tax (PIT) (i.e. both earnings income tax and property income tax) as well as benefits like social assistance, we adapt our data to use the microsimulation model EUROMOD (see Sutherland and Figari (2013), Navas Román and Pellejero (2020) and De Poli et al. (2023)). It's worth noting that our calculations for PIT and benefits only account for the two partners and do not include other household members, such as children. Hence, the value of the PIT and social benefits in the actual scenario differs from that observed in the data. The property tax value is not directly available in our dataset. Therefore, we derive it using information on cadastral value, the percentage of ownership for each building, and the municipality's location, applying the respective flat tax rate for each municipality.[16]

To calculate the annuitized wealth tax,[17] we follow the approach of Kuypers et al. (2021). In a first step, we derive the net interest rate for annuitization as follows:

$$np = \frac{p * NW - WT}{NW} \tag{4}$$

where NW is net wealth, p is the interest rate (i.e. 4.5%), and WT indicates all the taxes on net wealth (see Table 2). The net interest rate is calculated at the individual level, as it depends on the taxes paid by each individual.

The annuitized wealth taxes (AWT) are captured by the difference between the gross (p) and net interest rate (np), as follows:

$$AWT = NW * \left[\frac{p}{1-(1+p)^{-T}} - \frac{np}{1-(1+np)^{-T}} \right] \tag{5}$$

[16] Information on municipal tax rates is sourced from the following website: https://serviciostelematicosext.hacienda.gob.es

[17] We cannot simply subtract the wealth tax paid on the assets owned at the time of marriage because, through the annuitization, we are assuming that each year individuals consume part of their assets. Therefore, in line with the reduction in wealth, the tax would decrease every year, .

4. Results

This section presents the main results of our analysis. We start presenting the excessive mating ratio (subsection 4.1) to assess the level of assortative mating. We then move to analyse the impact on income and wealth inequality, first considering these two measures separately (subsection 4.2) and then jointly (subsection 4.3). In the last subsection (4.4), we look at the role of the Spanish tax-benefit system in reducing the increase in inequality.

4.1. Excessive mating ratio

To assess the tendency of individuals with similar income and wealth to marry each other, we look at the excessive mating ratio. Table 3 shows the EMR by gender-specific income deciles. The first two deciles for women and men are grouped because of a large number of observations with 0 income (see also Table 1). In Table 3, we highlight in grey EMR larger than 1.1 and in red EMR exceeding 2.5.

Our analysis shows a significant excessive mating rate among women and men who belong to the same income decile (diagonal of the table). A high level of homogamy is observed especially in the top tail of the distribution (tenth decile), where the probability of marrying an individual with a similar income is 3.1 times higher than under a random mating scenario.

Table 3: Excessive mating ratio - income 2019. Deciles by income.

Deciles	Deciles Women								
Men	1 & 2	3	4	5	6	7	8	9	10
1 & 2	1.3	1.0	1.1	0.9	1.0	1.0	0.8	0.8	1.0
3	1.3	0.9	2.2	1.1	0.8	0.6	0.6	0.8	0.5
4	1.3	1.8	1.2	1.0	0.8	0.9	0.9	0.5	0.3
5	0.8	1.6	1.3	1.3	0.9	0.9	1.1	0.8	0.6
6	1.2	0.5	0.9	1.0	1.6	0.9	1.2	0.7	0.8
7	0.9	1.0	0.8	1.4	1.2	1.0	1.2	0.8	0.9
8	0.6	0.8	0.6	1.3	1.2	1.6	1.1	1.4	0.8
9	0.7	0.7	0.7	0.9	1.0	1.3	1.2	1.7	1.3
10	0.8	0.5	0.2	0.2	0.5	0.8	1.0	1.8	3.1

Note: Cells highlighted in grey indicate an EMR larger than 1.1.
Cells highlighted in red indicate an EMR larger than 2.5.

Similar results are found when we look at net wealth (Table 4). Nevertheless, we find a high level of homogamy not only at the top tail (with an EMR of 2.8) but also along all the cells of the diagonal.[18] In about half of them, the EMR is larger than 2, meaning that the probability of a marriage between two individuals from the same wealth decile is more than double compared to the defined random scenario. This indicates that wealth-assortative mating is also concentrated in the other deciles of the distribution.

Table 4: Excessive mating ratio - net wealth (financial and real assets) 2019. Deciles by net wealth.

Deciles	Deciles Women								
Men	1 & 2	3	4	5	6	7	8	9	10
1 & 2	1.9	1.8	1.5	0.7	0.4	0.9	0.6	0.8	0.6
3	1.6	1.9	0.6	0.2	0.3	0.3	0.4	0.4	0.2
4	1.2	1.4	1.9	0.9	0.5	0.4	0.7	1.0	0.8
5	1.0	0.8	1.6	1.3	1.0	0.8	0.7	0.7	1.0
6	0.7	0.6	1.0	2.5	1.1	0.7	0.8	1.0	0.9
7	0.4	0.5	0.5	1.5	3.7	1.0	0.9	0.6	0.6
8	0.3	0.3	0.5	0.4	1.1	3.5	1.9	0.8	0.9
9	0.6	0.3	0.5	0.5	0.7	0.7	2.3	2.4	1.5
10	0.4	0.5	0.5	1.2	0.6	0.8	1.0	1.7	2.8

Note: Cells highlighted in grey indicate an EMR larger than 1.1.
Cells highlighted in red indicate an EMR larger than 2.5.

Since our data allow us to decompose net wealth into its components, we investigate whether our results change when focusing only on financial assets. Table A.9 in the Appendix, shows that assortative mating related to financial assets is even larger at the top of the distribution, where the EMR is equal to 3.5. Additionally, in the appendix, we test whether our results might be influenced by the presence of couples with a large age gap or, more in general, of young individuals who might still be in education. Therefore, we repeat our analysis, restricting the sample to couples with both partners between 30 and 45 years old. Tables A.10 and A.11 in the Appendix report the EMR, respectively, for income and net wealth. In line with the results presented above, we

[18]Since our data allow us to decompose net wealth into its components, we investigate whether our results change when focusing only on financial assets. Table A.9 in the Appendix shows that assortative mating related to financial assets is even larger at the top of the distribution, where the EMR is equal to 3.5.

find higher levels of EMR in the diagonal, especially at the top of the distribution.

Still, our results might be influenced by the presence of couples with a large age gap or, more in general, of young individuals who might still be in education. Therefore, we repeat our analysis, restricting the sample to couples where both partners are between 30 and 45 years old. Tables A.10 and A.11 in the Appendix report the EMR, respectively, for income and net wealth. Our findings hold also for this subsample. In line with the results presented above, we find higher levels of EMR in the diagonal, especially at the top of the distribution.

In summary, our results indicate a high homogamy level, particularly in terms of wealth, but also in income. This tendency to marry individuals with similar income and wealth is more pronounced at the top of the distribution (i.e. three times larger than in a scenario of random mating).

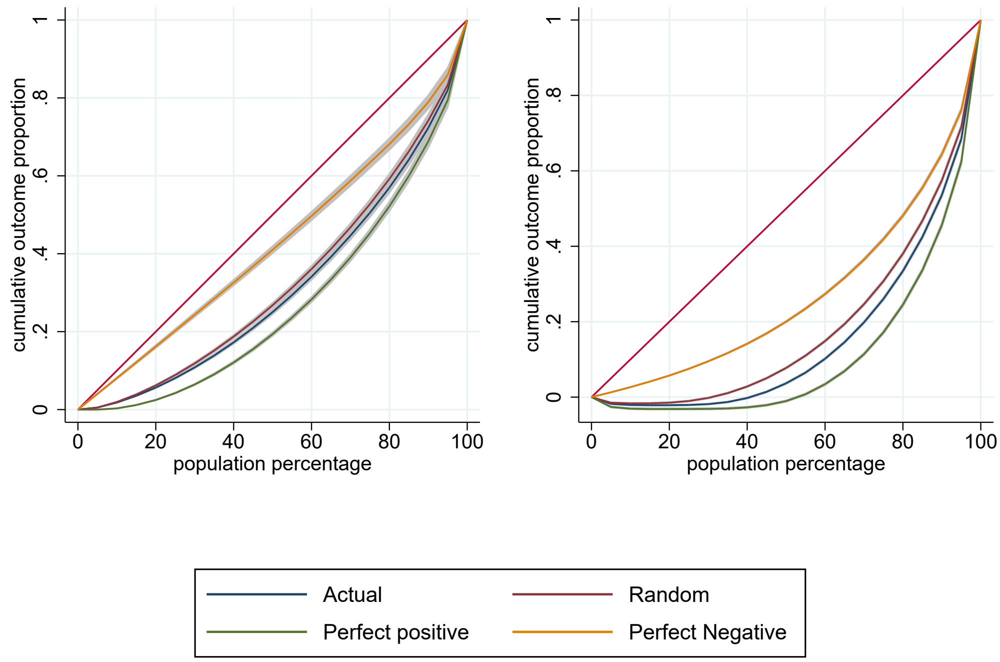
4.2. Effect of assortative mating on income and wealth inequality

A high level of assortative mating at the bottom and top tail suggests an unequal income distribution across couples. In this section, we examine the impact of assortative mating on income and wealth inequality, comparing our actual scenario with the three counterfactual scenarios: random mating, perfect positive and perfect negative assortative mating.

Figure 2 (left panel) shows the Lorenz curve for income in the four scenarios. The actual scenario (blue line) is in between the random and the perfect positive assortative mating scenarios. This means that assortative mating contributes to higher household income inequality than a random mating scenario. Still, the actual situation is slightly closer to the random mating than to the perfect positive assortative mating. On the other hand, in a scenario of perfect negative assortative mating, income inequality would reduce significantly, especially in the lower part of the income distribution. Results on wealth align with those for income (Figure 2, right panel), but the difference between inequality in the actual and random scenario, becomes larger.[19]

[19]Moreover, we further decompose net wealth into financial assets (Figure A.16) and real assets

Figure 2: Lorenz curve - income (left panel) and wealth (right panel) 2019: actual and counterfactual scenarios



Note: 45-degree reference line in red. The grey area reports confidence intervals at 95%.

To consolidate the findings of the Lorenz curve analysis into a single metric, we turn to the Gini Index. The first column of Table 5 presents the Gini of income and wealth in the actual scenario. In line with the Lorenz curves depicted in Figure 1, we find that the most unequal component is financial assets, followed by real assets and income. Although we are focusing on a specific subsample of married couples in working age, this result is in line with Balestra and Tonkin (2018), who shows that in the OECD countries, wealth inequality is twice income inequality.

The following three columns show the Gini index in the three counterfactual scenarios, while the last three represent the relative change with respect to the actual scenario. Similarly to the Lorenz curves, we can appreciate that the actual scenario is always in between the random (negative difference) and the perfect positive assortative

(Figure A.15). As we can appreciate in Figure A.16, the Lorenz curve of financial assets for the actual scenario is exactly in between the random and perfect mating, while the Lorenz curve of real assets is closer to the random scenario.

Table 5: Gini index in the actual scenario and counterfactual scenarios

	Gini index				% Diff. w.r.t actual scenario		
	Actual	Random	Positive	Negative	Random	Positive	Negative
Income	37.3	34.6	45.3	15.1	-7%	22%	-59%
Net wealth	69.0	63.2	77.9	45.6	-8%	13%	-34%
Financial assets	74.6	69.9	79.8	61.5	-6%	7%	-17%
Real assets	62.0	56.5	70.6	42.1	-9%	14%	-32%

Note: Net wealth is calculated as the sum of financial and real assets. Debts are subtracted. The value of the Gini index of the Random scenario depends on the seed of the random variable used to pair individuals. The value reported refers to the first replication. The standard deviation of the Gini index, based on 50 different seeds, is reported in Table A.12.

mating scenario (positive difference). This result indicates that inequality due to the actual choice of the partner is higher than what would happen under random mating. Depending on the income and wealth component, under the random mating scenario, inequality would decrease by 6-9%.[20] Still, while the variability in inequality across scenarios is larger with respect to earnings (i.e. +22% in the perfect positive scenario and -59% in the perfect negative scenario), it is much lower with respect to net wealth and especially to financial assets. For instance, if we look at the Gini index in income under the perfect negative assortative mating scenario (i.e. our lower bound), we find that it would reduce significantly to about 15.1. On the opposite, the Gini index on financial assets would decrease only to 61.5, highlighting the persistent impact of the unequal distribution of financial assets (shown in Figure 1), regardless of the marital decision.

As discussed by Fiorio and Verzillo (2018), assortative mating might be higher in specific parts of the income distribution and especially in the top part. Therefore, we also look at the income shares, following the literature of Atkinson et al. (2011) and Piketty and Saez (2006). Figures A.11 and A.12 in the Appendix report the income and wealth shares for these subgroups of the population. This analysis shows that the

[20]This result is in line with that of Lersch and Schunck (2023) for the United States, who find that under random assortative mating, wealth inequality, measured with the Gini index, would be 7% lower. Please note that the value of the Gini index in the Random scenario depends on the seed of the random variable used to pair individuals. In Table A.12 in the Appendix, we show that the standard deviation of the Gini index based on different seeds of the random variable is very minor. Therefore, our results are not affected by how we randomly pair individuals.

differences in income and wealth shares between the actual and random scenarios are concentrated mostly at the bottom and top of the distribution.

4.3. Joint distribution of income and wealth

The previous subsection highlighted the high level of income and wealth inequality in the actual scenario. However, as discussed in previous studies, these two variables are not perfectly correlated (Kuypers et al. (2021). In our sample, the Spearman correlation between income and net wealth is equal to 0.348.[21]

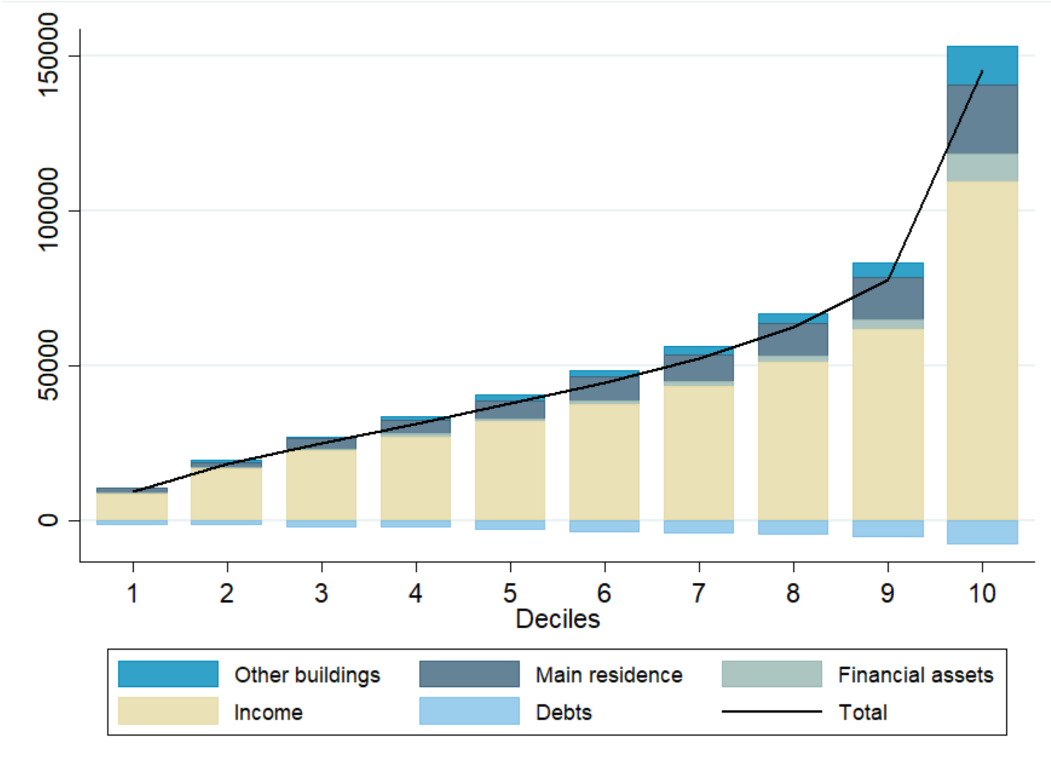
Since these variables are not perfectly correlated, we analyse them jointly. In this way, we provide a better overview of couples well-being and the impact of assortative mating on the overall inequality. From now on, we focus only on our two main scenarios (actual and random) but provide more detailed analyses on the income and wealth distribution (i.e., using deciles instead of Lorenz curves) and on all the subcomponents of net wealth (i.e., splitting real assets into the main residence, other buildings, and debts). Figure 3 shows the average income and wealth across deciles of the couples' joint income-wealth distribution, based on the annuitized income and wealth (see section 3.3). The net wealth is here decomposed into its subcomponents.

As we can appreciate from Figure 3, income and (annuitized) wealth are concentrated in the top decile. On average, the joint income-wealth of couples in the last decile is almost twice the value of the ninth decile and 15 times that of the first decile. More specifically, couples in the last deciles have 12 times the income of couples in the first decile and 42 times the net wealth of couples in the first decile.

In table A.13 in the Appendix, we can appreciate the relevance of each component of income and wealth by deciles. Income is the main component in all deciles, but

[21] To shed more light on this, we examine the distribution of wealth across income and wealth deciles. Figure A.13 in the Appendix shows the average financial and real assets across income (left panel) and wealth (right panel) deciles. The average wealth based on income deciles (left panel) increases over the distribution, especially in the top decile. However, when considering it by wealth deciles, we find that it is much more concentrated at the top of the distribution, with low deciles displaying low (or negative) values. A perfect correlation between income and wealth would have led to the same outcome in the left and right panels. The same figure for income (Figure A.14) leads to very similar conclusions.

Figure 3: Joint distribution of income and wealth by deciles, for the actual scenario.

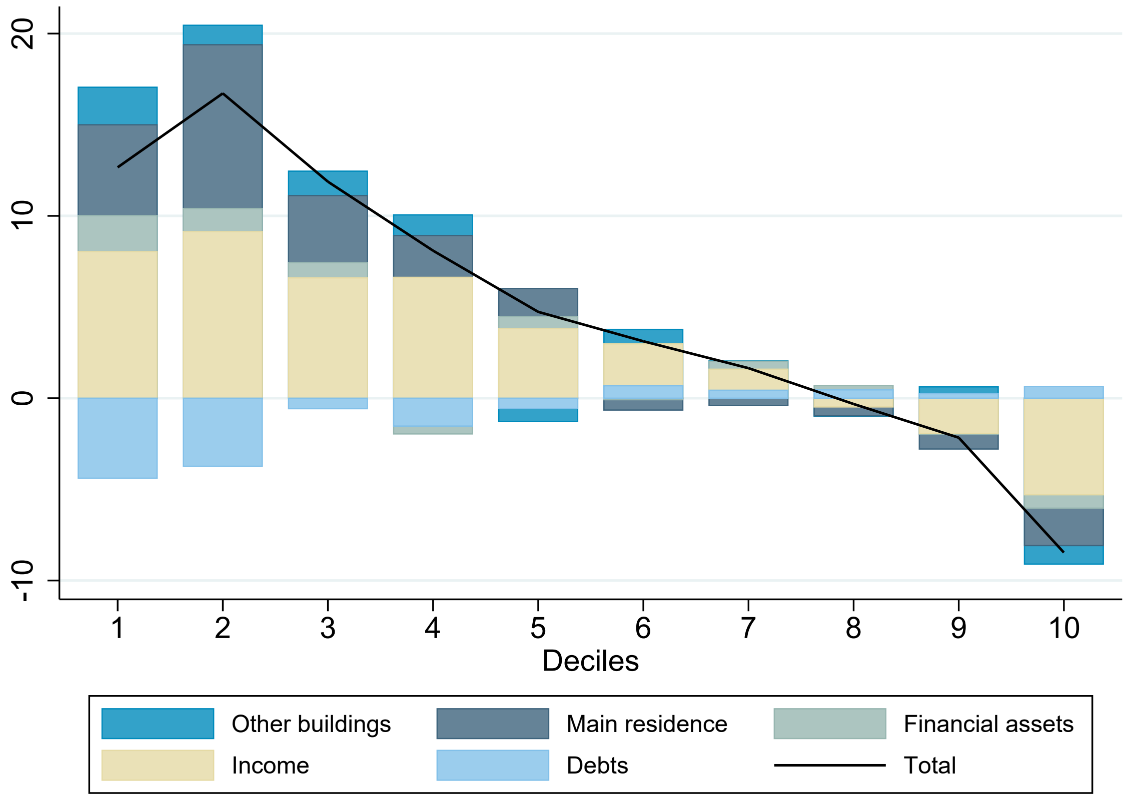


their relative contribution diminishes across the distribution. While in the first decile, it accounts for 95% of the total income and wealth, this proportion diminishes to 72% in the last decile. At the same time, in the upper part of the distribution, there is an increase in the proportion of wealth, especially in financial assets and other buildings, as well as a reduction in debts. On average, financial and real assets in the top decile account for about 30% of the joint income-wealth.

To assess the impact of assortative mating on the joint income-wealth distribution, we examine the percentage difference in income and (annuitized) wealth between the random and the actual scenario (see Figure 4).

Under random mating, couples in the first eight deciles of the distribution would be better off compared to the actual situation. This effect is higher in the first deciles, and it decreases over the distribution until turning negative in the last two deciles. Considering income and (annuitized) wealth together, we find that income explains a large part of the difference between the two scenarios. On the other hand, differences in wealth are mostly explained by real assets and especially by the main residence in the

Figure 4: Percentage difference in income and wealth between the random and the actual scenario, by deciles of income and wealth.



first deciles. Under the random mating scenario, financial assets would also be more concentrated at the bottom of the distribution. However, as shown in table A.13, they account for only a small part of couples' total income and wealth. Hence, they do not play a major role in the overall income-wealth inequality at the time of marriage. In this regard, we must take into account that in Spain, unlike other countries with similar per capita income levels, the weight of real assets, primarily housing, in the household asset portfolio structure is considerably higher (Blanco et al. (2021)). This comes at the expense of financial assets, except for households in the top 1%.

To analyse the role played by each source of income and wealth on the overall inequality, we decompose the Gini coefficient using the approach presented by Lerman and Yitzhaki (1985) and Stark et al. (1986). As explained by Stark et al. (1986) and Lopez-Feldman (2008), the influence of each component of income and wealth on the overall inequality depends on i) the share (S_k) of each component on total income-wealth, ii) how equally distributed is each income and wealth source (i.e. measured with the Gini Coefficient, G_k) and iii) the correlation (R_k) between the distribution of each income and wealth source with the distribution of the joint income-wealth distribution. Therefore, we decompose the Gini coefficient by income and wealth components, calculating the inequality effect of each component k, as follows:

$$I_k = S_k * G_k * R_k \tag{6}$$

Table 6 shows the Gini coefficient of the joint income-wealth is about 0.385 in the actual scenario. Column I_k represents the Gini coefficient of total income and wealth decomposed by components,[22] while the last column presents the share of each component on the overall Gini.

About 75% of the inequality is explained by income because this is the main component of the total income and wealth (81%) and highly correlated with the joint distribution of income and wealth. On the other hand, net wealth accounts only for 19% of the total income and wealth but explains about 25% of the overall inequality. Looking at the subcomponents of wealth, we see that real assets - the sum of the main residence and other buildings subtracting debts (i.e. typically mortgages) - explain about 20% of the total inequality, mostly because of their unequal distribution (see Gini index, in the second column, higher than 0.6). Yet, even if financial assets are the most unequal distributed component, they explain just 6% of the inequality, as they represent a low share of the total income and wealth.

Under a random mating scenario, inequality would be reduced by 0.036, which is about 9.2% of the joint income-wealth Gini. The reduction in inequality would be driven mostly by income (64%), main residence (31%), other buildings (10%) and financial assets (7%). Debts present a negative sign because they are concentrated

[22]Please note that the sum of all I_k components is equal to the overall Gini (0.385). Gini of earnings is the same as the Gini reported in Table 5, while the Gini on wealth are slightly different because they refer to the annuitized variable.

Table 6: Decomposition of the Gini coefficient by income and wealth components, in the actual and random scenario.

	S_k	G_k	R_k	I_k=S_k*G_k*R_k	Share (I_k/G)
Actual scenario					
Income	0.81	0.373	0.948	0.288	74.7%
Net wealth	0.19	0.696	0.755	0.097	25.3%
Financial assets	0.04	0.752	0.751	0.022	5.7%
Main residence	0.16	0.629	0.650	0.065	16.8%
Other buildings	0.06	0.861	0.646	0.032	8.3%
Debts	-0.07	-0.636	-0.479	-0.021	-5.5%
Total		0.385			
Random scenario					
Income	0.81	0.346	0.941	0.265	75.8%
Net wealth	0.19	0.639	0.716	0.085	24.2%
Financial assets	0.04	0.705	0.707	0.019	5.6%
Main residence	0.16	0.571	0.592	0.053	15.3%
Other buildings	0.06	0.840	0.589	0.028	8.1%
Debts	-0.07	-0.561	-0.427	-0.017	-4.7%
Total		0.350			
Difference					
Income	0	-0.027	-0.007	-0.023	64.3%
Net wealth	0	-0.057	-0.040	-0.013	35.8%
Financial assets	0	-0.046	-0.043	-0.003	7.1%
Main residence	0	-0.058	-0.058	-0.011	31.3%
Other buildings	0	-0.021	-0.058	-0.004	9.9%
Debts	0	0.075	0.052	0.004	-12.6%
Total		-0.036			

mostly among people with real assets.

While interpreting these results, it is important to note that even if income is still the main component of our definition of couples' well-being (i.e. the joint value of income and wealth), this also depends on how wealth is transformed into a flow of resources. In particular, it is calculated splitting wealth over the years such that couples could consume their entire wealth over the life cycle without any savings. However, households with higher income and wealth have typically a higher propensity to save (Lieberknecht and Vermeulen (2018)). Hence, if we calculate the same indicator some years after marriage, we could expect an increase in the share of wealth, especially in the upper part of the income-wealth distribution.

4.4. The role of taxes and benefits

The last research question considered in this paper is to what extent taxes and benefits smooth the inequality generated by the unequal concentration of income and wealth among newly married couples.

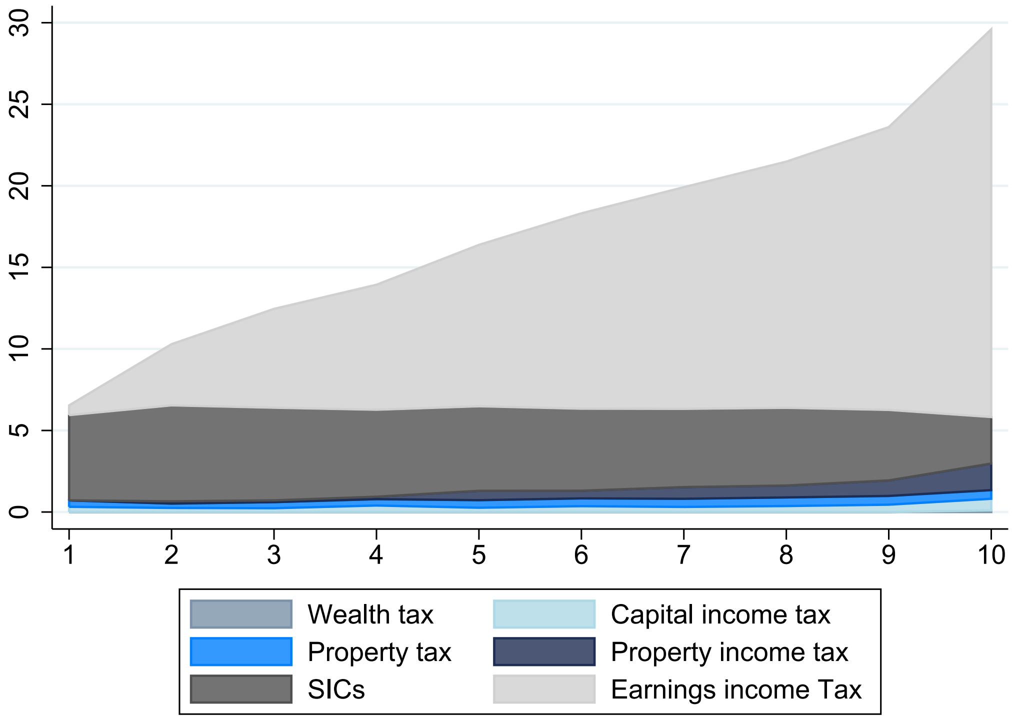
Figure 5 reports the share of taxes on the pre-tax joint income-wealth. The amount paid by each decile depends on i) the average tax rate of each component (see table A.14), ii) the annuitization[23] and iii) the share of each component on total joint income-wealth (see Table A.13). The average taxes paid on gross income and wealth increase over the distribution from 6 in the first decile to 30 in the last decile. As expected, the progressivity is explained by the taxation of earnings in the personal income tax. On the other hand, given the lower share of real and financial assets compared to income, we find that taxes on wealth and property have only a minor impact.

Taking into account taxes paid by each household and potential benefits received (e.g. minimum income for low-income households), we can move from gross to net income and wealth. Using the Gini coefficient, we can assess the change in inequality resulting from the tax-benefit system. First, we examine each component of income and (annuitized) wealth: income, financial assets and real assets. Figure 6 shows the Gini index pre and post-taxes in the actual and random scenario, calculated separately for each component.

From this figure, we can appreciate that the taxes and benefits on income completely offset the increase in inequality due to the actual choice of the partner. The reduction in income inequality due to government intervention is about twice (14%, see red dot, compared to blue dot) the change in pre-tax inequality (7%, see green dot) under random mating. A different result is observed for wealth. Taxes on financial and real assets lead to a minor change in inequality. Figure 6 shows that post-tax inequality

[23]Wealth and property taxes are assessed annually on the entire stock of assets. Table A.14 shows the tax rate applied to the entire stock (about 0.16 for the property tax and a maximum of 0.14 for the wealth tax). Since the tax rates represented in Figure 5 depend on the annuitized wealth - i.e. the transformation of wealth from a stock of resources into a flow - they appear higher than what reported in Table A.14.

Figure 5: Average tax by component of income and wealth on the total joint income and wealth



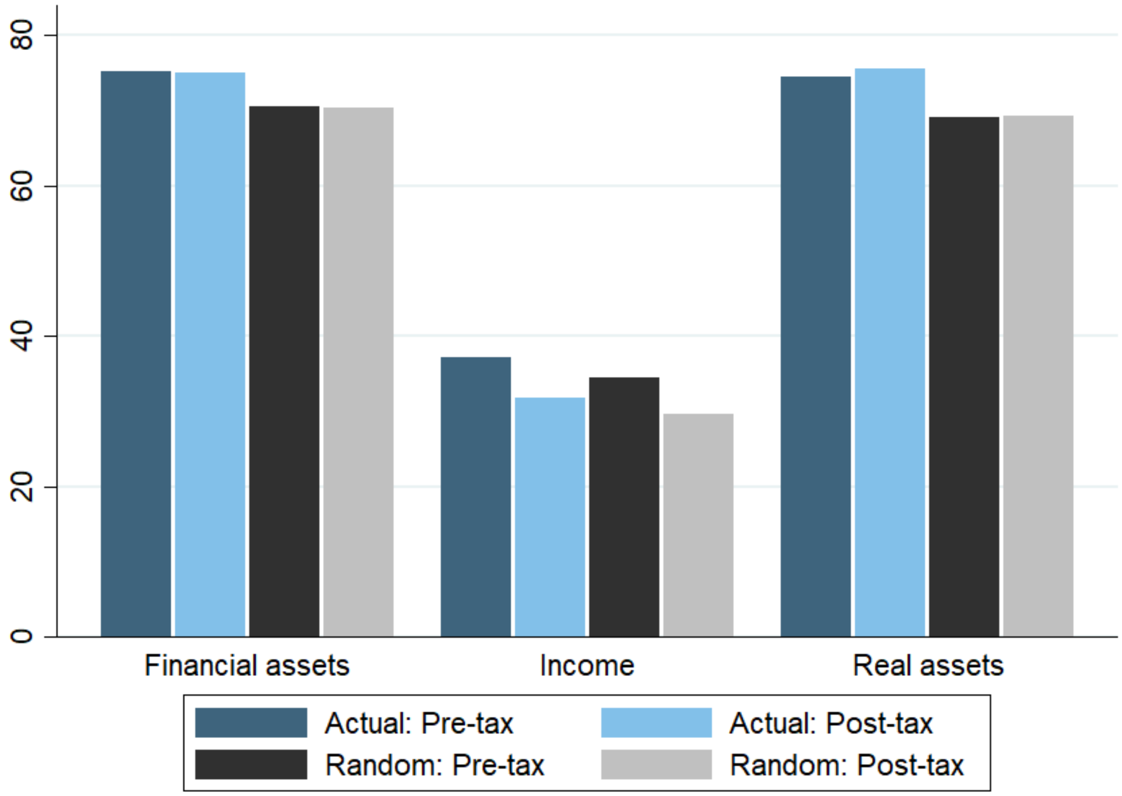
under the actual scenario remains much higher than pre and post-tax inequality under a random mating scenario.

Then, to have a better overview of couples' well-being, we focus on the joint income-wealth measure. Following the methodology explained in the previous section, we can decompose the Gini coefficient of joint income and wealth into each component of pre-tax (or post-tax) income, real and financial assets. As we can see in Figure 7, the government intervention in the actual scenario reduces inequality from 0.385 to 0.342 (i.e. by 11%). On the other hand, pre-tax inequality in the random scenario is about 9.2%. Hence, the overall reduction in inequality in the random scenario is almost as big as the effect of the whole tax-benefit system.

Looking at the decomposition of inequality by income and wealth components, we find that the weight of net wealth (i.e. the sum of blue and green bar, divided by the total inequality) increases from 25% to 34%.[24] This can be explained by the taxation on

[24]These shares can be better appreciated in Figure A.20 in the appendix.

Figure 6: Gini index pre- and post-taxes in the actual and random scenarios.



Note: The value of the Gini index of the Random scenario depends on the seed of the random variable used to pair individuals. The value reported refers to the first replication. The standard deviation of the Gini index, based on 50 different seeds, is reported in Table A.12

income, which is more progressive than taxation on financial and real assets. Similarly, in the random scenario, due to government intervention, inequality would decrease by 10%, reaching a Gini coefficient of 0.314.

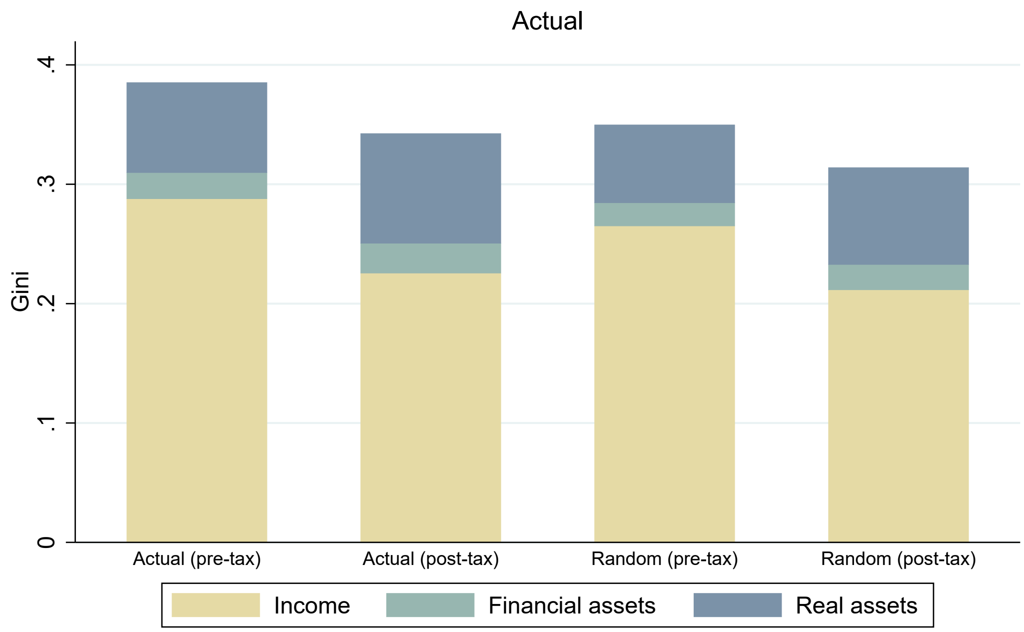
To sum up, even if income accounts for about 80% of total gross income and wealth, it explains only 66% of inequality on the net measure.

5. Sensitivity analysis

5.1. Income and wealth in the years before marriage

As discussed among others by Chiappori et al. (2022), ideally, we should assess assortative mating based on income and wealth in the years before marriage. However, due to data constraints, our previous section presented results based on the year of marriage. In this subsection, we aim to explore to what extent our results could change

Figure 7: Gini coefficient decomposed by income and wealth components in the actual and random scenarios



Note: Real assets are calculated as the sum of the main residence and other buildings, subtracting debts. The value of the Gini index of the random scenario depends on the seed of the random variable used to pair individuals. The value reported refers to the first replication. The standard deviation of the Gini index, based on 50 different seeds, is reported in Table

when analysing the years before marriage. More specifically, in subsection 5.1.1, we exploit the longitudinal dimension of income in our dataset to replicate the same analysis as in subsections 4.1 and 4.2. This allows us to investigate whether our conclusions remain consistent when analysing assortative mating four years before marriage (i.e. in 2015). On the other hand, we cannot replicate the same analysis for wealth since, for most couples, in the years preceding marriage, we observe wealth data for only one partner of each couple. Yet, subsection 5.1.2 provides some insights into the evolution of wealth in the years leading up to marriage.

5.1.1. Assortative mating and its impact on income inequality in 2015

Our data provide us with information on the income of newly married couples, both in 2015 and 2019. Yet, this comes with limitations. In particular, we have to restrict the sample to 76% of couples, because of some missing values.[25]

We start by presenting the EMR in 2015 for the new subsample of married couples. As shown in Table 7, the EMR is higher in the diagonal of the table, especially in the last cell (i.e. tenth decile of the income distributions of men and women). This result indicates a high level of homogamy, especially at the top of the distribution, and is consistent with our findings for 2019.

Table 7: Difference between excessive mating ratio - income 2019 vs 2015.

Deciles	Deciles Women								
Men	1&2	3	4	5	6	7	8	9	10
1&2	1.4	1.0	0.9	1.1	1.0	0.6	0.7	0.8	1.0
3	1.6	1.3	1.0	1.2	0.8	1.1	0.6	0.5	0.3
4	1.4	1.3	1.1	0.8	0.7	1.5	1.0	0.3	0.5
5	1.0	0.9	1.2	1.8	1.0	0.9	0.8	1.0	0.4
6	1.1	1.5	0.9	1.1	0.9	0.7	1.0	0.7	0.8
7	0.6	1.1	1.1	1.1	1.1	1.1	1.1	1.4	0.7
8	0.4	0.7	1.1	0.7	1.6	1.3	1.6	1.1	1.0
9	0.5	0.9	1.0	0.8	1.1	1.1	1.2	1.2	1.6
10	0.5	0.3	0.7	0.2	0.7	1.1	1.2	2.2	2.6

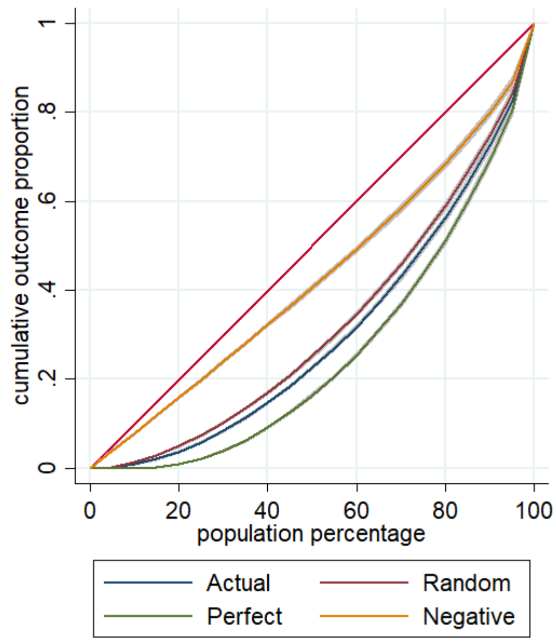
Note: Cells highlighted in grey indicate an EMR larger than 1.1. Cells highlighted in red indicate an EMR larger than 2.5. Number of observations: 4,279 couples.

Furthermore, we repeat the analysis of the impact of assortative mating on income inequality by analysing the Lorenz curves. As shown in Figure 8, the actual scenario falls between the random assortative mating and perfect positive assortative mating, highlighting again the consistency of results between 2015 and the time of marriage.

To compare properly our results for 2015 with those for 2019, we examine the difference in the Lorenz curves between these two years, keeping only the observations available on both years (i.e., the new subsample described in this subsection). Figure A.19 in the Appendix shows on the left panel the Lorenz curves of income, based on

[25] To retrieve information on income in 2015, we merge our panel dataset with data from 2015. From this merge, we find that for 19.6% individuals in our sample, we have no info on income in 2015, which means that these people either were not receiving any income (real 0) or were not living in Spain and therefore were not part of the dataset of the AEAT. Most of the individuals with no info on income (84%) were born abroad, especially in Morocco (19%) and Venezuela (15%). Therefore, we drop couples where at least one person was born abroad and had no info on income in 2015, assuming that they did not submit a tax declaration in 2015 because they moved to Spain after this year. The sample used for the sensitivity analysis is composed of 4,279 couples, which is representative of 75,333 couples.

Figure 8: Lorenz Curve of couples income between 2019 and 2015 (on the left) and difference between the two curves



Note: 45-degree reference line in red. The grey area reports confidence intervals at 95%.

the actual scenario in 2019 and 2015. On the right, we can appreciate the difference between the two curves. A value larger than 0 means that the Lorenz curve is closer to the 45-degree line (perfect equality), resulting in lower income inequality. In this graph, we see that the difference between 2019 and 2015 is always larger than 0 and, therefore, income inequality slightly decreased over the years. However, it is important to note that the maximum difference is lower than 0.025 percentage points, which highlights that the difference is very minor.

Thus, in accordance with the findings of Chiappori et al. (2022), we can conclude that the patterns observed four years before marriage remain largely consistent with those observed at the time of marriage.

5.1.2. Change in wealth in the years before marriage

As mentioned in the methodology section, our dataset lacks information on the wealth of both spouses prior to marriage. Still, for a substantial portion of the sample (92%), we can track the evolution of wealth from 2016 to 2019 for at least one spouse. Consequently, we examine whether the evolution of wealth in the years before marriage differs between our sample of newly married couples and single individuals. This analysis sheds light on the extent to which marriage may influence wealth accumulation in the years leading up to marriage. To investigate this result, we run a regression where the dependent variable is the change in wealth between two subsequent years. The independent variables include a dummy for newly married couples, age, gender, nationality (i.e., Spanish or not Spanish), and region of residence.

Table 8: Regression on the yearly difference in wealth between 2019 and 2016, controlling for marriage, age, gender, geographical area and nationality.

Varibales	d2019-18		d2018-17		d2017-16	
newly married	-6,270		-4,127		3,926	
	(42,194)		(8,315)		(50,523)	
Age	655.9	*	373.6	***	1,018	***
	(343.0)		(64.90)		(376.7)	
Gender	1,675		1,425		16,464	
	(11,153)		(2,134)		(12,507)	
Spanish (nationality)	11,793		5,676		13,081	
	(17,493)		(3,645)		(23,345)	
Observations	449,378		401,415		363,904	
R-squared	0.001		0.001		0.000	
Regional dummies	(*yes*)		(*yes*)		(*yes*)	

Note: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Regions are included as dummy variables. The reference region is Andalucia. Only the Comunidad de Madrid has a (positive) significant impact on the change in each year. Between 2018 and 2017, we find a significant negative reduction in wealth in Galicia and a significant positive increase in Catalunya.

Our analysis shows that only a couple of variables - age and being resident in Madrid - have a significant positive effect on wealth, whereas the dummy variable representing newly married status does not have any significant impact. Hence, we can assume that marriage did not significantly affect the change in wealth in the years before marriage.[26]

It is worth noting that this sensitivity analysis does not allow for a comprehensive examination of whether wealth inequality among newly married couples differs prior to marriage. However, given that income results are stable over the years and that wealth did not change significantly in the years before marriage, we could expect that

[26] Additionally, we try alternative model specifications, such as interacting the variable "newly married" with gender, but both marriage, gender and the interaction remain not significant.

analysing wealth in 2019 instead of 2015 should not largely affect our conclusions.

5.2. The role of gender in couple formation: alternative scenarios

Assortative mating is calculated based on the assumption that the richest man is married to the richest woman. However, as the descriptive statistics show, men tend to earn more than women. This can be further investigated by looking at the gender income and wealth gap among newly married couples. In particular, we calculate the gender gap for three groups based on couples' income and on couples' wealth: bottom 50% of the distribution, middle 40% and top 10%.

Following the standard definition of the gender pay gap, we calculate the gender income gap (GIG) as follows:

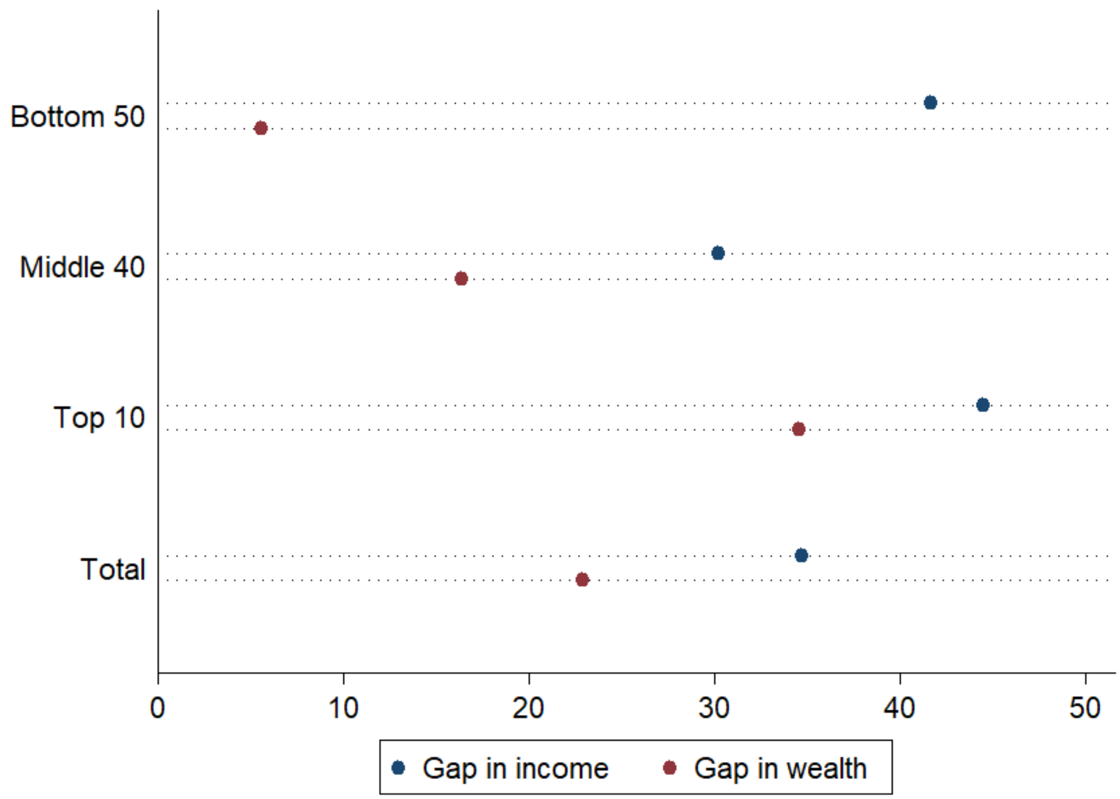
$$GIG_i = \frac{(Y\bar{m}_i - Y\bar{f}_i)}{Y\bar{m}_i} = 1 - \frac{Y\bar{f}_i}{Y\bar{m}_i} \tag{7}$$

where Yf_i represents the average income of women in group i, while Ym_i is the average income of men in the same group. A positive gender pay gap value indicates that, on average, men earn more than women. The same formula is used to calculate the gender wealth gap.

This indicator can be considered as a proxy of the inequality within couples. The larger the gap, the more unequal the income and wealth between women and men. Figure 9 presents the gender income gap by groups of income deciles and the gender wealth gap by groups of wealth deciles. In all groups, men have, on average, higher income and wealth than women. One reason explaining the wealth gap is that women are, on average, younger than men. Therefore, they have accumulated less wealth. Still, a larger gap is observed for income, especially at the bottom and top of the income distribution. On the contrary, the gap in wealth tends to increase along the distribution.

Given the gender pay gap in income and wealth, we can expect that constructing our counterfactual scenarios mating not only opposite-sex, but also same-sex individuals

Figure 9: Gender income and wealth gap by, respectively, income and wealth groups.



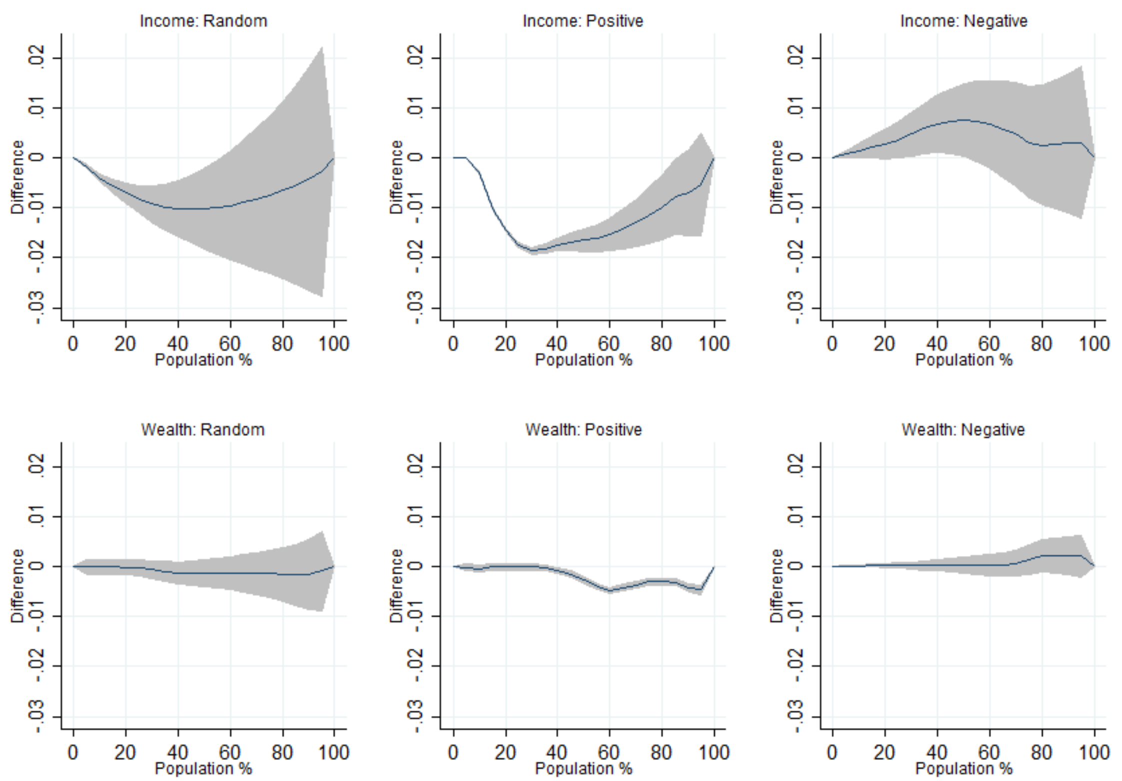
might affect the level of income and wealth inequality.[27] For instance, if the two richest individuals in the sample are men, in the perfect positive mating scenario, inequality will be higher when we mate also same-sex individuals than when we only allow for opposite-sex mating. These new scenarios allow us to assess to what extent the gender gap in income and wealth affects our counterfactual scenarios.

Figure 10 shows the difference in the Lorenz Curve of income (at the top) and wealth (at the bottom), between these new scenarios (i.e. which include also same-sex individuals) with the scenarios presented in section 4.2 (only opposite-sex marriages). A negative difference indicates that inequality would increase under the new scenarios.

Our results show that including same-sex couples would lead to a higher level of

[27]It is worth stressing that in this analysis, we are not adding the actual same-sex couples observed in the data. Our sample is still based on the selection described in Section 3.1, which includes only marriages between opposite-sex individuals. However, we are constructing our three counterfactual scenarios pairing individuals without a restriction on gender. For more details, see the methodological Section.

Figure 10: Difference in Lorenz Curve between a scenario with also same-sex couples and only opposite-sex couples.



Note: The grey area reports confidence intervals at 95%.

income inequality, especially in the perfect positive assortative mating scenario, but also in the lower part of the distribution of the random scenario. As expected, in the perfect negative scenario (last column), inequality would decrease, but the differences are minor.

On the other hand, wealth inequality wouldn't change much in the random scenario when also considering same-sex couples, while in the perfect positive assortative mating scenario, we find a small increase in the concentration of wealth in the upper part of the distribution.

6. Conclusions

This paper provides a comprehensive assessment of income and wealth assortative mating in Spain and its implications for inequality. To do this, we use administrative panel data combined with microsimulation techniques, which allow us to construct a unique dataset with detailed information on income, wealth as well as taxes and benefits. Contrary to Becker's theory, but in line with more recent studies, such as Fiorio and Verzillo (2018), Frémeaux and Lefranc (2020), Nakosteen et al. (2004) and Lersch and Schunck (2023), we find positive assortative mating on income and wealth. Similarly to other studies (e.g. Fiorio and Verzillo (2018)), our findings show that assortative mating is more pronounced at the top of the income and wealth distributions. In particular, couples, where both the wife and husband belong to the top decile of their gender-specific income distribution, have a three times higher probability of marrying compared to a scenario of random mating. A similar pattern is found for wealth, not only at the top but across all the wealth distribution.

High levels of homogamy, particularly at the top of the distribution, may exacerbate income and wealth inequality. We assess this by comparing the Gini index observed in actual couples with a counterfactual scenario based on random mating. Analysing income and wealth inequality separately, we find that under random mating, inequality would be 7% and 8% lower, respectively.

Analysing income and wealth jointly and looking at the impact of each subcomponent, we find that couples in the first eight deciles of the joint income-wealth distribution would be better off under a random mating up than in the actual scenario, especially because of higher earnings and main residence at the bottom of the distribution. In contrast, financial assets explain only a minor part of the differences in the joint income-wealth inequality between the actual and random scenarios. This result is consistent with the significant weight that housing holds in the asset portfolio of Spanish households, to the detriment of financial assets, with the exception of households located in the upper part of the distribution.

In the last step, we investigate the role of taxes and benefits in mitigating inequality. While government intervention significantly reduces income inequality, taxes on financial and real assets do not offset the increase in inequality due to the partner's actual choice. When considering income and wealth jointly, we find that the overall reduction in inequality due to a random choice of the partner is almost as big as the effect of the whole tax-benefit system.

Our results highlight the importance of accounting not only for gross income — as most previous studies did — but also for wealth, taxes, and benefits. Analysing the contribution of income and wealth to overall inequality, we find that while wealth accounts only for 18.5% of the total pre-tax income and wealth of married couples, it explains about 25% of the pre-tax inequality and 34% of the post-tax inequality. This can be explained both by the high concentration of wealth at the top of the distribution and the low level of progressivity of wealth taxes.

In this regard, two considerations have to be taken into account. First, financial assets are concentrated in very few individuals. Thus, independent of the choice of the partner, and even in a scenario where the richer individuals marry the poorest individuals, they would remain highly concentrated, contributing to persistent inequality. Second, this result also depends on our definition of couples' well-being. In particular, we are calculating the yearly capacity to consume, under the assumption that individuals could consume their entire wealth during life without any savings. However, if we calculate the same measure years after the wedding, we could expect that individuals at the top of the distribution would have accumulated more assets, since they have a higher propensity to save (Lieberknecht and Vermeulen (2018)). Therefore, the importance of wealth on the overall inequality would increase over time. Moreover, many newly married couples in our sample might not have yet received an inheritance from their parents, which could further exacerbate wealth inequality.

Our results point out the risk of increased inequality across generations and low social mobility due to the choice of partners. Policymakers can attempt to intervene on the supply side by implementing policies that reduce urban segregation and encourage greater interaction (e.g., in educational institutions) among individuals from different socioeconomic backgrounds. Although the effects of such measures may only be evident in the long term, fostering more inclusive environments can gradually reduce socioeconomic disparities across generations. At the same time, partner selection remains a personal choice beyond the scope of policymaking, and choosing a partner with similar characteristics might have positive effects on marriage stability and reduce the risk of marital dissolution (Jacob (2024)). Hence, from a fiscal policy perspective, the government should consider this risk of increasing inequality driven by partner choice and try to compensate for it through larger income and wealth redistribution. Such measures are essential to mitigate low social mobility and prevent a further rise in inequality over time.

Future studies could explore the specific channels that drive assortative mating. For example, analyzing the role of geographical factors and the place of birth, particularly in a country like Spain with its significant regional differences, could provide some insights into explaining the level of income and wealth homogamy. Considering the differences in unemployment rates by region (or between urban and rural areas) and in women's participation in the labour market could provide valuable insights to enrich our research.

References

Atkinson, A.B., Piketty, T., Saez, E., 2011. Top incomes in the long run of history. Journal of economic literature 49, 3–71.

Balestra, C., Tonkin, R., 2018. Inequalities in household wealth across oecd countries: Evidence from the oecd wealth distribution database .

Becker, G.S., 1973. A theory of marriage: Part i. Journal of Political economy 81, 813–846.

Becker, G.S., 1974. A theory of marriage: Part ii. Journal of political Economy 82, S11–S26.

Belot, M., Francesconi, M., 2013. Dating preferences and meeting opportunities in mate choice decisions. Journal of Human Resources 48, 474–508.

Blanco, M.A., Bauluz, L., Martínez-Toledano, C., 2021. Wealth in spain 1900–2017 a country of two lands. The Economic Journal 131, 129–155.

Charles, K.K., Hurst, E., Killewald, A., 2013. Marital sorting and parental wealth. Demography 50, 51–70.

Chiappori, P.A., Fiorio, C.V., Galichon, A., Verzillo, S., 2022. Assortative matching on income. Technical Report. JRC Working Papers in Economics and Finance.

Christl, M., De Poli, S., Ivaškaitė-Tamošiūnė, V., 2023. Does it pay to say 'I do'? Marriage bonuses and penalties across the EU. Journal of European Social Policy 33, 317–336.

De Poli, S., Gil-Bermejo Lazo, C., Leventi, C., Maier, S., Papini, A., Ricci, M., Serruys, H., Almeida, V., Christl, M., Cruces, H., et al., 2023. EUROMOD baseline report. Technical Report. JRC Working Papers on Taxation and Structural Reforms.

Eika, L., Mogstad, M., Zafar, B., 2019. Educational assortative mating and household income inequality. Journal of Political Economy 127, 2795–2835.

Fagereng, A., Guiso, L., Pistaferri, L., 2022. Assortative mating and wealth inequality. Technical Report. National Bureau of Economic Research.

Fernandez, R., Guner, N., Knowles, J., 2005. Love and money: A theoretical and empirical analysis of household sorting and inequality. The Quarterly Journal of Economics 120, 273–344.

Fiorio, C.V., Verzillo, S., 2018. Looking in your partner's pocket before saying "Yes!" Income assortative mating and inequality. Technical Report.

Fremeaux, N., 2014. The role of inheritance and labour income in marital choices. Population 69, 495–530.

Frémeaux, N., Lefranc, A., 2020. Assortative mating and earnings inequality in france. Review of Income and Wealth 66, 757–783.

Greenwood, J., Guner, N., Kocharkov, G., Santos, C., 2014. Marry your like: Assortative mating and income inequality. American Economic Review 104, 348–353.

Hitsch, G.J., Hortaçsu, A. Ariely, D., 2010. Matching and sorting in online dating. American Economic Review 100, 130–163.

Hou, F., Myles, J., 2008. The changing role of education in the marriage market: Assortative marriage in canada and the united states since the 1970s. Canadian Journal of Sociology/Cahiers canadiens de sociologie 33, 337–366.

Jacob, N., 2024. Assortative mating, marital stability and the role of business cycles in the united states from 1968 to 2011. Journal of Applied Economics 27, 2327909.

Jepsen, L.K., Jepsen, C.A., 2002. An empirical analysis of the matching patterns of same-sex and opposite-sex couples. Demography 39, 435–453.

Kalmijn, M., Flap, H., 2001. Assortative meeting and mating: Unintended consequences of organized settings for partner choices. Social forces 79, 1289–1312.

Kuypers, S., 2018. Two sides of the same coin? An investigation into the joint distribution of income and wealth and its applications to the analysis of poverty, inequality and redistribution. Ph.D. thesis. University of Antwerp.

Kuypers, S., Boone, J., Derboven, J., Figari, F., Verbist, G., 2020. Enhancing microsimulation analysis of wealth-related policies in euromod. International journal of microsimulation 13, 5–26.

Kuypers, S., Figari, F., Verbist, G., 2021. Redistribution in a joint income–wealth perspective: A cross-country comparison. Socio-Economic Review 19, 929–952.

Lam, D., 1988. Marriage markets and assortative mating with household public goods: Theoretical results and empirical implications. Journal of Human resources , 462–487.

Lerman, R.I., Yitzhaki, S., 1985. Income inequality effects by income source: A new approach and applications to the united states. The review of economics and statistics , 151–156.

Lersch, P.M., Schunck, R., 2023. Assortative mating and wealth inequalities between and within households. Social Forces , soad064.

Lieberknecht, P., Vermeulen, P., 2018. Inequality and relative saving rates at the top. Technical Report. European Central Bank.

López, C.P., García, J.V., Muñoz, I.M., Martínez, C.V., 2022. Panel de hogares: ejercicios 2016 a 2019. Documentos-Instituto de Estudios Fiscales , 1–153.

Lopez-Feldman, A., 2008. Descogini: Stata module to perform gini decomposition by income source .

Nakosteen, R.A., Westerlund, O., Zimmer, M.A., 2004. Marital matching and earnings: Evidence from the unmarried population in sweden. Journal of Human Resources 39, 1033–1044.

Nakosteen, R.A., Zimmer, M.A., 2001. Spouse selection and earnings: Evidence of marital sorting. Economic Inquiry 39, 201–213.

Navas Román, M., Pellejero, N.V., 2020. Euromod country report, spain 2017-2020.

Petrov, D., Romaguera-de-la Cruz, M., 2024. Measuring economic insecurity by combining income and wealth: an extended well-being approach. Review of Economics of the Household , 1–27.

Piketty, T., Saez, E., 2006. The evolution of top incomes: a historical and international perspective. American economic review 96, 200–205.

Ranzini, G., Rosenbaum, J.E., Tybur, J.M., 2022. Assortative (online) dating: Insights into partner choice from an experimental dating app. Computers in Human Behavior 127, 107039.

Schwartz, C.R., 2013. Trends and variation in assortative mating: Causes and consequences. Annual Review of Sociology 39, 451–470.

Schwartz, C.R., Mare, R.D., 2005. Trends in educational assortative marriage from 1940 to 2003. Demography 42, 621–646.

Stark, O., Taylor, J.E., Yitzhaki, S., 1986. Remittances and inequality. The economic journal 96, 722–740.

Sutherland, H., Figari, F., 2013. Euromod: the european union tax-benefit microsimulation model. International journal of microsimulation 6, 4–26.

Verbakel, E., Kalmijn, M., 2014. Assortative mating among dutch married and cohabiting same-sex and different-sex couples. Journal of Marriage and Family 76, 1–12.

Wagner, S., Boertien, D., Gørtz, M., 2020. The wealth of parents: Trends over time in assortative mating based on parental wealth. Demography 57, 1809–1831.

Weisbrod, B.A., Hansen, W.L., 1968. An income-net worth approach to measuring economic welfare. The American Economic Review 58, 1315–1329.

Zhang, J., Liu, P.W., 2003. Testing becker's prediction on assortative mating on spouses' wages. Journal of Human Resources 38, 99–110.

Appendix A. Additional results

Table A.9: Excessive mating ratio for positive financial assets 2019 by wealth deciles.

Deciles Men	Deciles Women 1 & 2	3	4	5	6	7	8	9	10
1 & 2	2.1	1.3	1.0	0.9	0.7	0.6	0.3	0.4	0.5
3	1.9	2.5	0.8	0.8	0.8	0.3	0.5	0.3	0.1
4	0.9	1.9	2.3	1.0	0.6	0.9	0.7	0.6	0.3
5	0.8	0.8	2.3	1.4	1.3	0.9	0.5	0.7	0.5
6	0.5	0.6	0.8	2.0	1.6	1.1	1.2	0.8	0.9
7	0.4	0.5	0.4	0.8	1.7	1.9	2.0	1.2	0.8
8	0.5	0.5	0.5	0.6	1.2	1.8	1.7	1.4	1.2
9	0.6	0.3	0.4	0.9	0.7	0.9	1.6	2.5	1.6
10	0.3	0.5	0.3	0.7	0.6	0.9	1.2	1.7	3.5

Note: Cells highlighted in grey indicate an EMR larger than 1.1.
Cells highlighted in red indicate an EMR larger than 2.5.

Table A.10: Excessive mating ratio - income 2019 by income deciles. Subsample of couples with both partners between 30 and 45 years old.

Deciles Men	Deciles Women 1 & 2	3	4	5	6	7	8	9	10
1 & 2	1.1	1.1	1.2	0.8	1.0	1.0	0.8	0.9	1.0
3	1.4	2.5	1.2	1.0	0.5	0.8	0.4	0.7	0.3
4	1.3	1.5	0.8	1.3	1.0	0.5	1.0	0.5	0.5
5	1.5	0.4	1.2	0.6	1.1	1.0	1.4	0.9	0.4
6	0.6	0.9	1.6	1.7	1.2	1.0	0.5	0.8	1.0
7	0.7	1.0	1.3	1.0	1.4	1.5	1.0	1.0	0.7
8	0.7	0.5	0.7	1.7	1.3	1.2	1.1	1.0	0.8
9	0.8	0.7	0.6	0.8	0.8	1.0	1.5	1.7	1.3
10	0.8	0.4	0.2	0.2	0.7	1.0	1.3	1.8	2.9

Note: Cells highlighted in grey indicate an EMR larger than 1.1.
Cells highlighted in red indicate an EMR larger than 2.5.

Table A.11: Excessive mating ratio for net wealth (financial and real assets) 2019 by net wealth deciles. Subsample of couples with both partners between 30 and 45 years old.

Deciles	Deciles Women								
Men	1 & 2	3	4	5	6	7	8	9	10
1 _ 2	1.8	1.6	1.0	0.6	0.4	0.7	0.3	0.9	0.7
3	2.1	2.3	1.2	0.1	0.3	0.3	0.3	0.4	1.0
4	1.0	1.2	1.8	0.8	1.1	0.6	0.8	0.9	0.8
5	1.0	1.1	1.6	1.6	0.7	0.5	0.8	0.7	0.9
6	0.5	0.7	0.8	2.8	1.8	0.6	1.1	0.6	0.6
7	0.2	0.4	1.1	0.9	3.2	1.8	0.8	0.7	0.6
8	0.5	0.2	0.3	0.7	0.8	3.2	2.6	0.5	0.8
9	0.7	0.4	0.5	0.8	0.5	0.5	2.1	2.8	1.1
10	0.5	0.5	0.6	0.9	0.7	1.1	0.7	1.7	2.8

Note: Cells highlighted in grey indicate an EMR larger than 1.1.
Cells highlighted in red indicate an EMR larger than 2.5.

Table A.12: Gini index and standard deviation in the random scenario

Component	Gini index	Std. Dev.
Pre-tax:		
Joint income-wealth	34.97	0.039
Income	34.57	0.041
Financial assets	69.86	0.035
Real assets	56.46	0.061
Post tax:		
Joint income-wealth	31.39	0.037
Income	29.65	0.038
Financial assets	70.47	0.035
Real assets	69.35	0.064

Note: The standard deviation is calculated based on 50 repetitions of the random scenario.

Table A.13: Share of income, financial assets, debts, main residence and other buildings by deciles

Decile	Income	Financial assets	Debts	Main residence	Other buildings
1	91	3	-13	17	2
2	93	2	-7	9	3
3	91	2	-9	13	3
4	86	3	-7	14	3
5	85	2	-7	15	5
6	84	3	-8	17	4
7	83	3	-8	17	5
8	82	3	-7	17	5
9	79	4	-7	18	6
10	75	6	-5	15	9
Total	81	4	-7	16	6

Figure A.11: Income shares in the actual and counterfactual scenarios for the bottom 50%, middle 40%, top 10%, top 5% and top 1%.

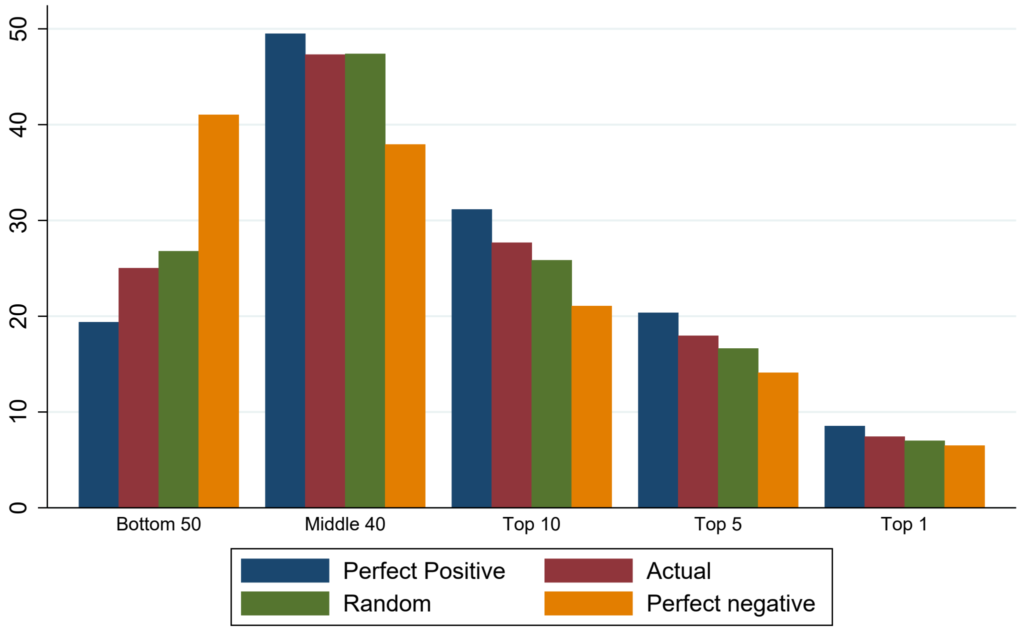


Figure A.12: Net wealth shares in the actual and counterfactual scenarios for the bottom 50%, middle 40%, top 10%, top 5% and top 1%.

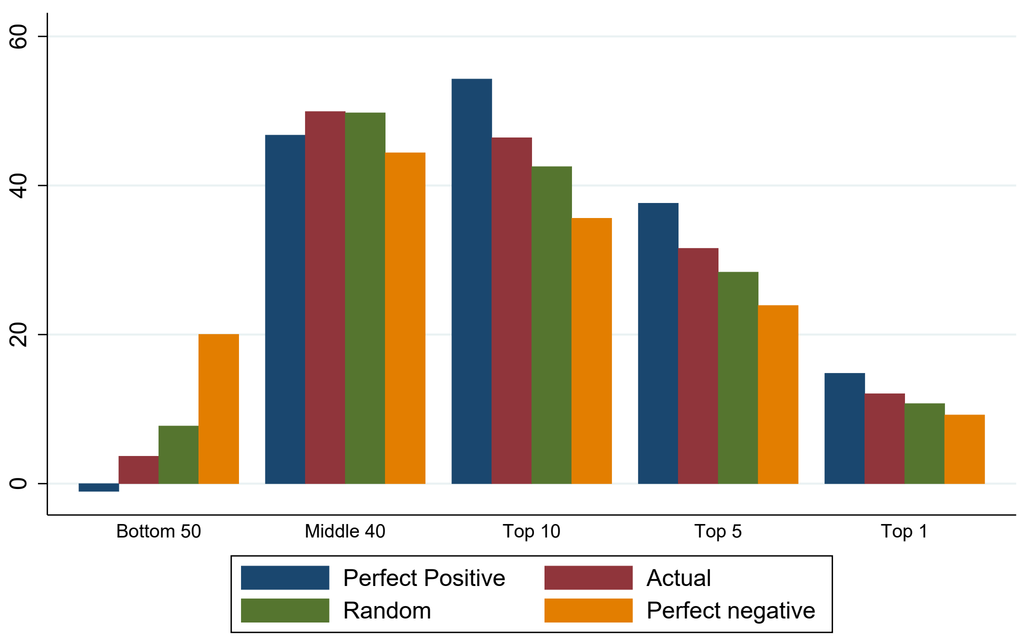
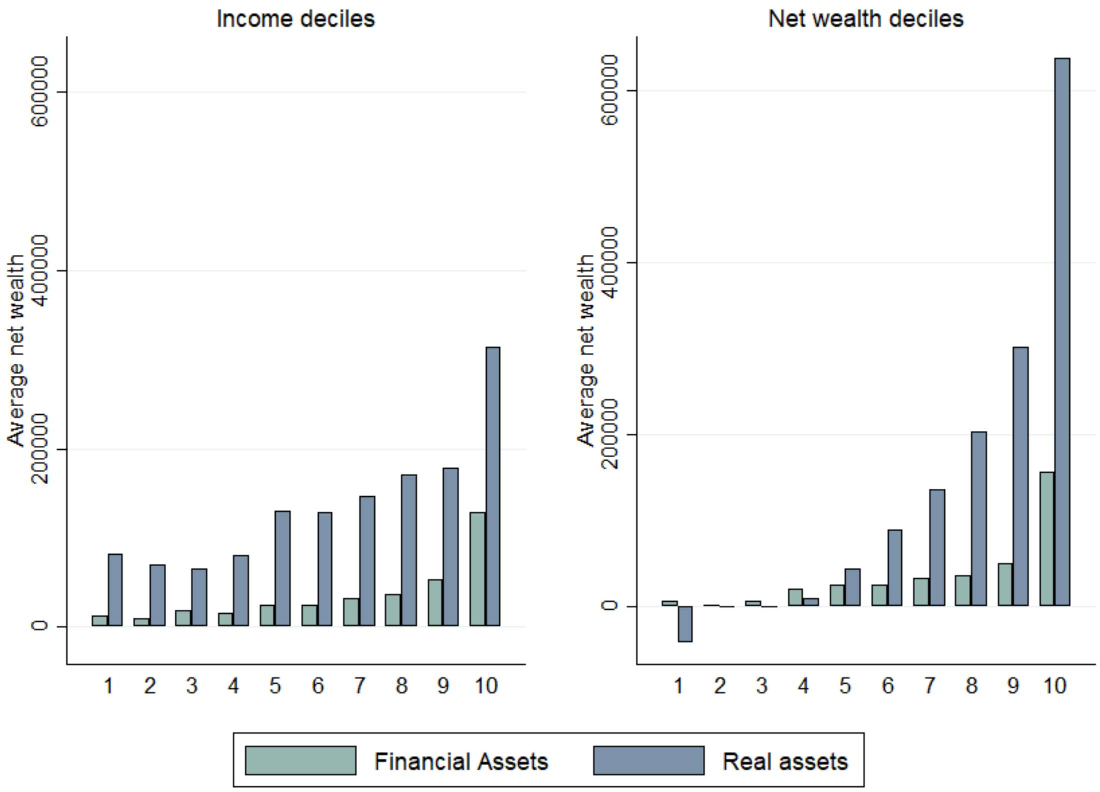


Figure A.13: Average financial assets and real assets by income and wealth deciles.



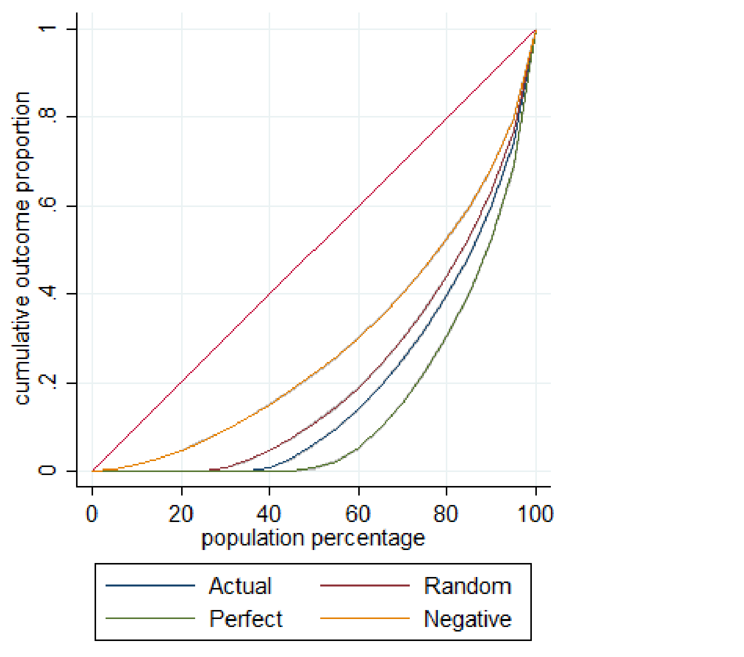
Note: Net wealth is calculated as the sum of financial and real assets. Debts are subtracted.

Table A.14: Average income and wealth tax of each component by joint deciles. Wealth is not annuitized.

Decile	PIT (on earnings)	SIC	Wealth tax	Property tax (market)	Property tax (cadastral)	Property income tax	Capital Income tax
1	0.74	6.49	0.00	0.15	0.58	0.27	19.00
2	4.28	6.71	0.00	0.17	0.63	8.69	19.00
3	7.22	6.77	0.00	0.17	0.64	6.59	19.00
4	9.49	6.60	0.00	0.16	0.62	8.39	19.00
5	12.52	6.56	0.00	0.16	0.61	17.12	19.00
6	15.46	6.49	0.00	0.16	0.60	18.69	19.00
7	17.58	6.20	0.00	0.16	0.61	24.47	19.00
8	19.77	6.24	0.00	0.16	0.62	22.63	19.00
9	23.30	5.81	0.00	0.16	0.62	26.86	19.00
10	33.26	3.98	0.14	0.16	0.62	33.20	19.00

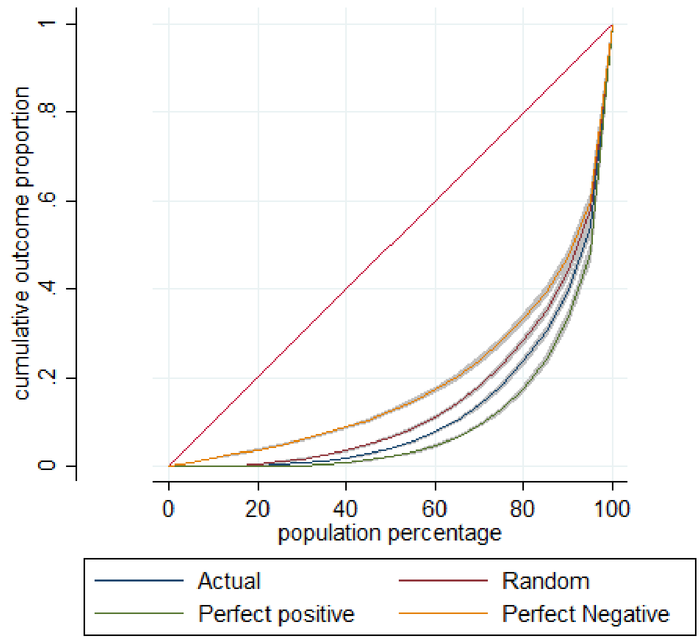
Figure A.14: Average income by income and wealth deciles.

Figure A.15: Lorenz curve market real assets: actual and counterfactual scenarios



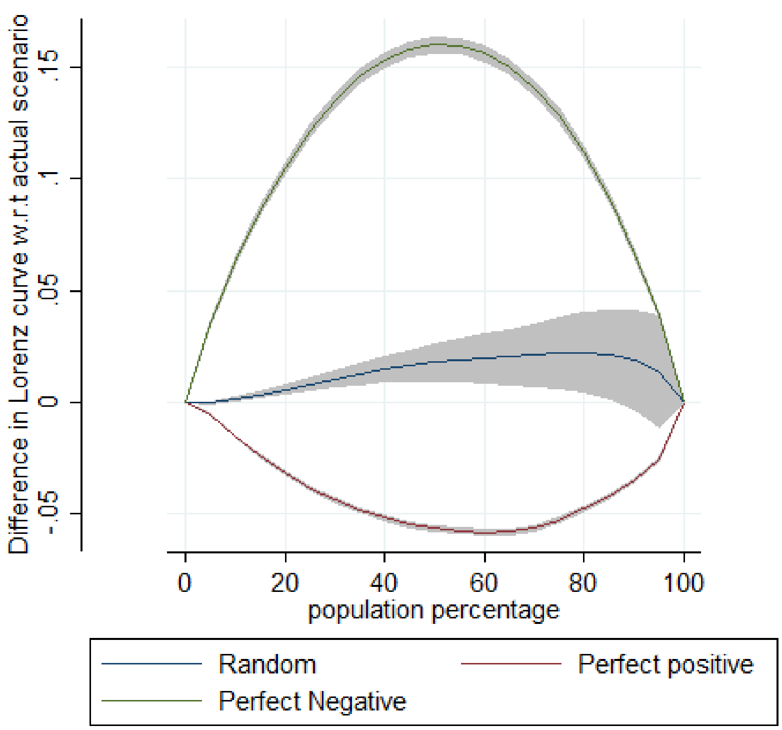
Note: 45-degree reference line in red.

Figure A.16: Lorenz curve financial assets: actual and counterfactual scenarios



Note: 45-degree reference line in red.

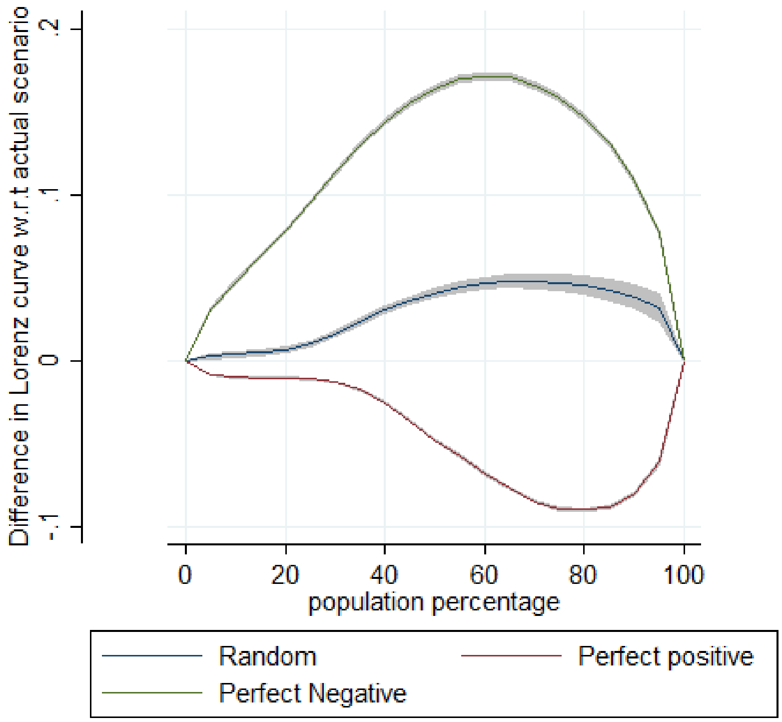
Figure A.17: Lorenz curve income 2019: Difference w.r.t actual scenario



Note:

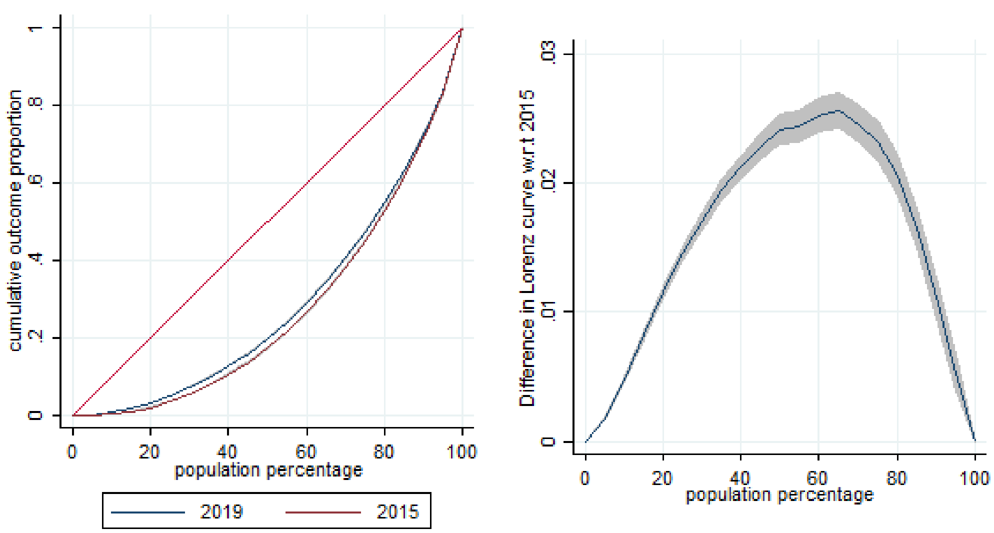
The grey area reports confidence intervals at 95%.

Figure A.18: Lorenz curve net wealth 2019: Difference w.r.t actual scenario



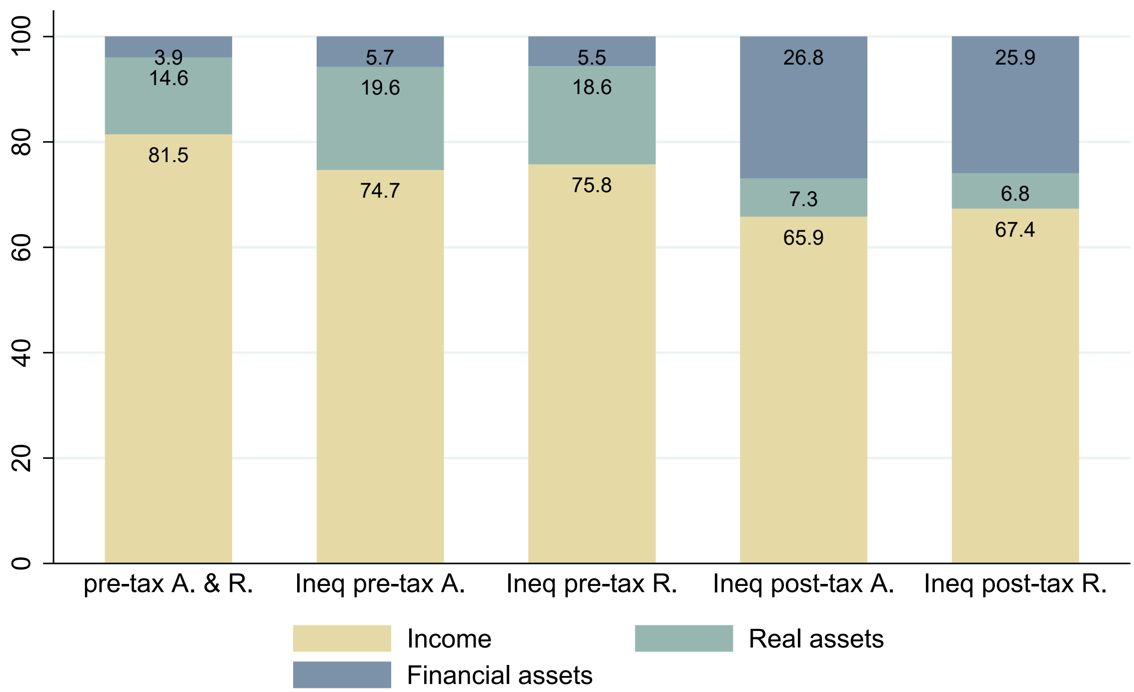
Note: The grey area reports confidence intervals at 95%.

Figure A.19: Lorenz Curve of couples income between 2019 and 2015 (on the left) and difference between the two curves.



Note: The grey area reports confidence intervals at 95%.

Figure A.20: Share of income, real assets, financial assets in explaining total income-wealth (first column) and inequality pre- and post-tax in the actual and random scenarios.



Note: Real assets are calculated as the sum of the main residence and other buildings, subtracting debts.

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