

THE GENDER WEALTH GAP ACROSS EUROPEAN COUNTRIES

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This paper studies the gap in wealth between male and female single households using 2010 Household Finance and Consumption Survey data for eight European countries. In the raw data, a large gap emerges at the upper end of the unconditional distribution. While OLS estimates show no difference in average net wealth levels, quantile regressions at the 95th percentile yield mixed evidence for the gender wealth gap in different specifications. Labour market characteristics and participation in asset and debt categories largely explain the differences between male and female single households. The gender gap in net wealth is driven by gaps in gross wealth and its components, but is attenuated in four countries by gender gaps in (collateralized) debt. In the full specification, the unexplained gap in gross wealth amounts to 27 percent in Slovakia, 33 percent in France, 44 percent in Austria, 45 percent in Germany, and 48 percent in Greece.

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1. INTRODUCTION

Research on the distribution of wealth has been fueled by a recent surge of interest, along with growing availability of high-quality micro-data. However, gender differences in wealth have thus far not been a prominent topic in this research, some notable exceptions notwithstanding (e.g. Deere and Doss, 2006; Schmidt and Sevak, 2006; Sierminska *et al.*, 2010). When contrasted to the gender

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pay gap, the gender wealth gap has received little attention. Reasons for this research shortage on gender differences in wealth have been the relative lack of wealth data compared to income data, and the difficulty in untangling ownership information within households. Despite the difficulties in studying wealth gaps by gender, the topic is highly relevant. Wealth is an important indicator of well-being, because it constitutes economic prosperity in its own right, provides the basis for future income generation via investments, brings social and political power, and provides economic security when income flows are interrupted. Investigating the gender gap in wealth is thus critical for understanding contemporary gender relations in the economy.

This paper contributes to the literature by presenting the first cross-national study of the gender wealth gap in eight European countries (Austria, Belgium, Germany, Spain, France, Greece, Portugal, and Slovakia). It makes use of the Household Finance and Consumption Survey (HFCS), a survey which is harmonized by the European Central Bank. The HFCS contains household-level information on net wealth and its components, real and financial assets, and debt, as well as detailed socioeconomic characteristics that allow us to control for a plethora of potential determinants of a household's wealth.

While the HFCS enables researchers to take large strides in studying the distribution of wealth by gender by providing harmonized data for many European countries, the fact that the data are aggregated at the household level presents a challenge. Having data on the wealth of households, not individuals, complicates the analysis of the distribution of wealth by gender because household members may not have equal access to wealth (Sierminska *et al.*, 2010; Grabka *et al.*, 2013) or decision-making power (Mader and Schneebaum, 2013). This paper circumvents that problem by restricting the analysis to households with only one adult, the female or male reference person ("female single households" and "male single households", respectively).

The findings are in line with the existing literature on gender differences in the wealth distribution, mostly for the U.S., the U.K., and Germany. A gender wealth gap exists at the upper end of the unconditional distribution of net wealth in the raw data in each of the eight countries. Across much of the distribution, however, there is little difference in wealth ownership between male and female single households. Consequently, multivariate analysis at the mean using OLS regressions fails to confirm a gender gap in net wealth. More surprisingly, however, quantile regressions on net wealth at the top of the distribution show mixed evidence of a gender "glass ceiling" in net wealth. In particular, we find that labor market characteristics and participation in asset and debt categories go a long way toward explaining the differences in net wealth between male and female single households. This leads us to look deeper, namely at the gender gap in gross wealth and debt, the two constituent parts of net wealth, and into their components. We uncover that the distribution of these wealth components often differs substantially by gender, a fact that was veiled in previous analyses that only looked at net wealth. Furthermore, throughout the paper differences in historical trajectories, institutions, and social norms that might play a role in shaping country differences in the gender wealth gap are discussed. Finally, we check the

robustness of our findings by looking at gender differences in occupational pension wealth, for which data are collected at the person level in the HFCS.

The remainder of the paper is structured as follows: Section 2 gives an overview of the theoretical and empirical background of gender differences in the accumulation and distribution of wealth; Section 3 presents the data; Section 4 contains the empirical results, first for net wealth (Section 4.1) and then for its components (Section 4.2); while Section 4.3 performs a robustness check of the gender wealth gap using individual-level data on pension wealth. Section 5 concludes.

2. GENDER DIFFERENCES IN WEALTH ACCUMULATION

It is a well-established stylized fact that the distribution of wealth in Europe is highly skewed, much more so than the distribution of income (Piketty, 2014; Rehm and Schnetzer, 2015). The distribution of wealth by gender, however, is not so clearly understood. As discussed below, most existing studies find a gender wealth gap, that is, male households have more wealth than female households. In order to assess potential determinants of this gender wealth gap, the following model can be posited (adapted from Schmidt and Sevak, 2006; see also Sierminska *et al.*, 2010):

$$(1) \quad A_{t+1} = (1+r_t)(A_t + Y_t - C_t + T_t).$$

That is, the household stock of assets A at time $t + 1$ is a function of the rate of return (r_t), the stock of assets (A_t), income earned (Y_t), consumption (C_t), and wealth transfers (T_t) such as inheritances, gifts, or asset division upon divorce, all at time t . Each of these components may vary by gender as well as institutional and cultural context, thus leading to differences in wealth accumulation.¹

Income (Y_t) differs by gender since women receive lower wages than men for the same work (OECD, 2015). Furthermore, women's income is lower than men's, since women are more likely to face interruptions in their work histories (Gangl and Ziefle, 2009) and to work in part-time jobs (Bardasi and Gornick, 2008; Matteazzi *et al.*, 2014) as a result of care and housework responsibilities. In addition, gendered sectoral and occupational segregation has been demonstrated to have an important impact on earnings differences between men and women. Finally, the wealth accumulation patterns of the self-employed differ from those of employees (Humer *et al.*, 2015), and the gendered selection into these two groups is thus likely to affect differences in wealth (Anna *et al.*, 2000; Burke *et al.*, 2002; Kim *et al.*, 2004). In general, women have less exposure to the structures that enable wealth accumulation via wage income and are more often subject to the economic penalties that result from child rearing (Denton and Boos, 2007; Chang, 2010; Ruel and Hauser, 2013).

Consumption (C_t) may vary with age, which is most commonly captured by the life-cycle hypothesis. The consumption smoothing assumed by the life-cycle

¹The initial level of wealth A_t is, of course, the sum of previous periods' A_{t+1} , and its gender difference is therefore dependent on the other components of equation (1).

hypothesis implies the accumulation of wealth during phases of labor market activity and dissaving in times of negative income shocks, but especially after retirement. Even though the high rate of dissaving in retirement suggested by the life-cycle hypothesis is not unambiguously observed in the empirical literature (Piketty *et al.*, 2014), wealth holdings over age nevertheless tend to have a broadly inverted U-shaped form. Since women typically have higher life expectancies than men, the life-cycle hypothesis would predict that women accumulate higher levels of wealth (i.e. save more) during their active years. In this study, we focus on the wealth of working-age (25–60 years) male and female single households; for this group, the life-cycle hypothesis predicts higher saving by women when controlling for age. At the same time, older and especially widowed women would be expected to have higher inheritances than men as a result of the combined asset accumulation within the couple.

Transfers of wealth (T_t) comprise inheritances and *inter-vivo* transfers, as well as asset separation upon divorce. Inheritances are a key factor in explaining wealth inequality (Bowles and Gintis, 2002; Piketty *et al.*, 2014), a fact which is also observed in the European HFCS data used in this analysis (Fessler and Schürz, 2013; Leitner, 2015). The distribution of inheritances has also become more unequal over time (Piketty, 2014). Edlund and Kopczuk (2009) suggest that the share of women within the wealthiest 0.4 percent of people in the U.S. may even serve as a proxy for the importance of inherited wealth. However, the hypothesis that “men make, but women inherit great fortunes” does not hold for the lower-wealth groups (Edlund and Kopczuk, 2009). The case of gifts among the living does not appear to be quite as clear-cut, since these tend to be given to liquidity-constrained children (Cox, 2003). Finally, upon divorce, only assets acquired during the partnership are considered jointly owned in many European countries and thus divided between partners; assets owned before marriage and inheritances are not split. Consequently, the effect of divorce on the gender wealth gap may be less pronounced than that of widowhood (Yamokoski and Keister, 2006; Sierminska *et al.*, 2010).

Finally, the economic literature on gender routinely discusses a number of factors affecting the rate of return (r_t). First, differences in risk preferences and investment strategy across genders have been thoroughly investigated in the literature, with most authors confirming their existence (Croson and Gneezy, 2009). Recent research, however, casts doubt on the widely held tenet that women are more risk averse than men (Nelson, 2014). The gender gap in wealth at retirement persists in the U.S. even after accounting for risk preferences (Neelakantan and Chang, 2010). Second, the literature typically finds a gender gap in financial literacy (Lusardi and Mitchell, 2008; Barasinska and Schäfer, 2013), which could affect the gender wealth gap. The gender implications of other factors impacting the rate of return, such as the distribution of capital income from wealth including imputed rents (Fessler *et al.*, 2015), differential returns which increase with the level of wealth (Piketty, 2014), and intergenerational persistence in educational attainment (Schneebaum *et al.*, 2015) are fruitful avenues for future research.

The empirical research typically finds evidence of a gender wealth gap, that is, women owning less wealth than men—see the overview by Deere and Doss

(2006) in the special issue of *Feminist Economics*, and in Chang (2010). Sierminska *et al.* (2010) and Ruel and Hauser (2013) show that a gender wealth gap between men and women exists in the German Socio-Economic Panel (SOEP) and in the Wisconsin Longitudinal Study, respectively, which is largely driven by differences in labor market characteristics but cannot be fully explained by covariates. Schmidt and Sevak (2006), in contrast, find no overall gap in the raw data of the U.S. Panel Study of Income Dynamics (PSID); a gender wealth gap only emerges once household characteristics are controlled for. The empirical studies of the gender wealth gap surveyed here focus on net wealth as their outcome variable of interest (Deere and Doss, 2006; Schmidt and Sevak, 2006; Yamokoski and Keister, 2006; Sierminska *et al.*, 2010; Ruel and Hauser, 2013; Sierminska *et al.*, 2015).

A fundamental issue in the empirical literature on the gender wealth gap is that wealth data often come from household surveys, without information on the ownership of assets across individual household members. Most papers discussed here therefore analyse wealth at the household, not person, level. Important exceptions are Sierminska *et al.* (2010) and Grabka *et al.* (2013), who use the 2007 German SOEP wealth module to analyse the gender gap in net wealth at the person level, and Sierminska *et al.* (2015), who employ the panel component of the SOEP to study the evolution of the determinants of the gender wealth gap over time. Many studies therefore focus on households with only one adult to compare male and female household wealth (e.g. Schmidt and Sevak, 2006; Yamokoski and Keister, 2006).

This approach of analysing only households with one adult may be liable to selection issues. Several aspects potentially affect the selection into single households by men and women differently. First, women live longer than men. The age composition of single households thus differs between men and women, and women are more likely to inherit and thus have higher wealth. Second, women tend to marry at an earlier age than men. As a consequence, for the entire population, the probability of being single at each age group differs between men and women. This situation may have an effect on wealth, because marriage has been found to increase wealth, independent of the other characteristics of the household and its members (Ruel and Hauser, 2013). Third, preferences and/or constraints regarding relationship status might differ between men and women. Whereas women might be more likely to be divorced or widowed, men might tend to be more likely to be “never married” or married (which includes having remarried after divorce). Again, the wealth effect of marriage could play out here. Fourth, career orientation might differ between female and male single households, which may be linked to the choice to have children. Women who are career-oriented might be more likely to choose to remain childless than career-oriented men. The presence of children is also found to have an effect on wealth accumulation (Yamokoski and Keister, 2006). Finally, social norms and customs regarding household formation might differ by gender across countries. For instance, living in a single-person household might be more common for young men than for young women in some countries compared to others, or women might tend to move in with family or friends at different rates than men following divorce or widowhood across countries.

The selection mechanisms into single households for men and women therefore need to be taken into account. The existing literature on the gender wealth gap addresses this issue explicitly or implicitly by truncating the sample according to the age of households (Schmidt and Sevak, 2006; Warren, 2006), cohorts (Ruel and Hauser, 2013), or family status (Sierminska *et al.*, 2010). A second method of tackling selection bias is by using Heckman selection models (Heckman, 1979). Such an approach consists of a two-stage procedure of first estimating the probability of selecting into a group (here, single adult households, as described below) and then using the results of that estimation as a predictor of wealth. A third approach circumvents the selection issue of household-level data by studying wealth components for which person-level data are available, typically pension-related wealth. Warren (2006), for instance, shows that there is a gender gap in pension wealth in the Family Resources Survey (FRS) of the U.K. both before and after controls are included.

The data used in this paper contain information on wealth at the household level. We limit our analysis to households with just one adult (“single households”) and focus on eight European countries: Austria, Belgium, Germany, Spain, France, Greece, Portugal, and Slovakia. We apply all the aforementioned strategies to minimize any selection bias resulting from our household-level data: we restrict our sample to working-age (25–60) households, and we apply a Heckman selection model in estimating all our results. Furthermore, we perform a robustness check using a wealth component, pensions, that is available at the person level.

Since we are investigating eight European countries with different historical, legal, and social backgrounds, norms and institutions (that cannot be captured with the available data) might influence the results (Issac, 2007; European Central Bank, 2013b). In fact, a key finding from the HFCS data is that households’ wealth is very heterogeneous across countries (Andreasch *et al.*, 2013). We address this issue by presenting the results for each country separately and by briefly discussing the social norms and institutional background that might explain the gender wealth gap in each country. For instance, social norms might influence the decision to live alone. In countries in which independence is valued, individual traits such as risk preference might play out more strongly to generate different wealth outcomes between men and women than in countries in which family closeness is appreciated and extended families live together. Regarding institutional backgrounds, several potential avenues of influence are touched upon in this paper. First, labor market outcomes might be influenced by the availability and affordability of childcare facilities. Second, the legal framework surrounding divorce might lead to different gender wealth gaps across countries. Third, taxation of wealth and inheritances varies across countries. Fourth, since the main residence is often the main asset of private households, housing policy has a large effect on wealth and thus potentially on the gender wealth gap. Fifth, policies regarding pensions might lead to unequal incentives to accumulate across countries and between genders. Finally, banking practices and thus the potential for different treatment of men and women seeking credit might vary across countries. We discuss each of these issues below in the context of our empirical results. However, it should be noted that the main focus of this paper is to investigate the

gender wealth gap in eight European countries. A detailed analysis of institutional factors influencing this gender wealth gap thus needs to be relegated to future research.

3. DATA DESCRIPTION

The 2010 Household Finance and Consumption Survey (HFCS) data used here to test for differences in wealth between male and female single households contain detailed household balance sheets as well as flow variables and a plethora of socioeconomic and demographic variables. The HFCS data provide multiply imputed values for item non-response, which we take into account in this paper by using Rubin's Rule. All estimates reported are calculated using survey and replicate weights provided in the HFCS. For a detailed description of the survey, see the report by the European Central Bank (2013a).

The HFCS is *ex ante* harmonized, yet important differences in cross-country comparability remain. Possible issues in national comparisons may arise from variation in the timing of fieldwork, which was conducted in 2009–11 in most countries; the treatment of imputations; and data editing. Most notably for this paper, Cyprus, Finland, Malta, and the Netherlands performed a substantial share of their survey through methods other than computer-assisted personal interviews (European Central Bank, 2013a). These differences in interviewing technique may affect observed inequality. In addition, some countries surveyed key variables differently. Italy only collected data on net income, from which gross income was computed. Finland's data do not contain any inheritances, and the incidence of inheritances is implausibly low in Italy and the Netherlands (6.7 percent and 2.1 percent, respectively). Finally, Luxembourg and Slovenia have a small sample size, especially for single households. For these reasons, we focus on 8 out of 15 surveyed countries in this analysis: Austria, Belgium, Germany, Spain, France, Greece, Portugal, and Slovakia.

Like most wealth surveys, the HFCS collects net wealth data on the household level,² and the data do not contain information on the intra-household distribution of wealth ownership. Empirical research has shown, however, that access to resources cannot be assumed to be equally distributed between persons within the household; women own less of the household wealth (see, e.g., Sierminska *et al.*, 2010; Grabka *et al.*, 2013). Simply allocating household assets across household members is therefore likely to bias results toward an underestimation of the gender wealth gap.

This paper thus investigates the wealth of what we call single male and single female households, that is, households which have only one adult member.³ While they have only one adult in the household, the single households in our sample may contain minors, that is, children under 16 years of age.

²Certain wealth components, most notably occupational pension wealth, are available at the person level in the HFCS. We study gender differences in this particular asset in Section 4.3.

³This limitation is to eliminate the cases in which a person lives in a household with wealth but is not the owner of the wealth. Consider, for example, an adult living with his or her parents. The parents may own wealth that the adult cannot access; we do not want to attribute that wealth to the individual. We therefore focus our analysis on one adult ("single") households.

For comparison and to check for selection issues, we include all other (“non-single”) households in our summary tables. In these households, the socioeconomic characteristics of the survey respondent, which is the (self-selected) financially most knowledgeable person in the household, are used where person-level characteristics are required.

Furthermore, this paper focuses on working-age adults, which also reduces selection problems stemming from the differential life expectancies of men and women. We restrict our sample to adults aged 25–60. In the case of non-single households, this age restriction refers to the age of the reference person. Our full sample then comprises 36,362 households, of which 5,188 are single households (2,808 female and 2,380 male).

For this paper, at the household level, net wealth and its components as well as gross income and inheritances are of particular interest. In the HFCS, net wealth is generated as the sum of the household’s assets valued at market prices, which comprise real and financial assets, deducting the household’s liabilities, which are split into collateralized (i.e. mortgaged) and unsecured debt. Real assets include vehicles, the main residence, further real estate property, valuables, and self-employment businesses; financial assets include deposits, mutual funds, bonds, shares, managed accounts, non-self-employment businesses, money owed to the household, and private pension plans; collateralized debt consists of mortgages on the main residence or on other real estate property, and unsecured debt of overdrafts, credit card debt, and other unsecured loans.⁴ The distribution of wealth is highly right-skewed and contains zero and (in the case of net wealth) negative values. We therefore smooth all continuous wealth, debt, and income variables using an inverse hyperbolic sine (IHS) transformation.⁵

Regarding the present value of inheritances, we follow Fessler *et al.* (2012) and Leitner (2015) in conservatively assuming real value retention; our consumer price index (CPI) data come from the AMECO database (European Commission, 2016). We use dummy variables to distinguish between large and small inheritances, using the median level of wealth of the respective country as the cut-off between the two. The reference category is households which received no inheritance. The ownership of business assets (in the form of publicly traded or non-traded business assets, with or without self-employment), owner-occupied housing, collateralized debt (i.e. mortgages), and unsecured liabilities (credit card debt, overdrafts, and other unsecured debt) are included in our analysis as dummy variables.

At the person level, we make use of age, education, the number of children present, relationship status, employment status, the hours worked per week, and the work/age ratio of the respondent. We group age into three categories, namely 25–34, 35–44, and 45–60 years. The HFCS provides four education categories—primary, lower secondary, upper secondary, and tertiary education—and we have dummy variables for each. The number of children is categorized into zero, one,

⁴For a detailed discussion of asset valuation in the HFCS, see the European Central Bank (2013a) report; and for an in-depth analysis of issues in cross-country comparability, see Tiefensee and Grabka (2014).

⁵The transformation applied is $W = \text{asinh}(w) = \ln(w) + \sqrt{w^2 + 1}$.

two, and three or more. Relationship status includes never married, married (or living in a civil union), divorced, and widowed. Employment status comprises seven mutually exclusive categories: 1, employees with and 2, employees without a permanent contract; 3, self-employed without employees; 4, employers—that is, self-employed with employees; 5, unemployed; 6, out of labor force; and 7, retired. In our estimates, we use a person's work/age ratio to capture the share of his or her potential working life actually spent working, which can thus be interpreted as historical labor market attachment. It is calculated as the ratio of years during which a person worked (for all or most of the year, as an employee or self-employed) since age 16, over the years in which this person could have potentially worked, that is, age minus 15. The work/age ratio is thus bounded between 0 and 100 percent. The number of hours usually worked per week on average over a year indicates the current labor market attachment.⁶

Finally, the data on earnings give the sum of annual income in the previous 12 months from gross employee, self-employment, and unemployment benefit income, including gross income from public, occupational, and private pension plans. This variable is also IHS transformed and used as an instrument in the selection model.

Table A.1 in Appendix A.1 (in the Online Supporting Information) gives an overview of the distribution of the control variables for male and female single households, and for all other households (whose reference person is also 25–60 years old) in the eight European countries studied here. Across all countries, men and women in single households are younger than the reference person in non-single (“other”) households: if all countries are combined, 47 percent of women and 46 percent of men in single households are 45–60 years of age, which compares to 56 percent of the other households. However, there are differences in age by gender between countries. Whereas women living in single households are somewhat older than men in most countries, men in single households are older than women in Germany (51 percent aged 45–60 versus 45 percent) and the age structure is very similar for women and men in single households in Spain, Portugal, and France. It is conceivable that there is cultural pressure for younger, older, and also perhaps divorced individuals to live with their extended family rather than by themselves in some countries such as Spain and Portugal, and that this social norm contributes to age differences by gender across countries.

The differences in educational systems are evident in the cross-country data on single households. The share of men and women who completed only primary or lower secondary education is comparatively high in Spain and especially Portugal, and in both countries a larger share of males in single households has only finished those education levels. Austria and Germany, with their well-developed systems of vocational training, as well as Slovakia, have high shares of secondary education. Especially in Germany and Slovakia, there are notable differences between female and male single households (61 percent and 53 percent in Germany, and 72 percent and 83 percent in Slovakia, respectively, have secondary education). Austria and Germany are also the only countries where a larger share of male rather than female single households holds a tertiary degree. Belgium has by far the highest shares of tertiary education for both women and men in single

⁶Weekly hours worked are not available for France.

households, which amount to roughly 50 percent. It is conceivable that the international community in Brussels influences this result.

Women living in single households are more likely than men in single households to have children present. In all countries combined, 30 percent of female versus only 6 percent of male single households have children. These stark differences hold for every country; only in Belgium they are somewhat attenuated (around 25 percent of female versus 13 percent of male single households have children). Other (non-single) household types are more likely to have children present than single female and male households; 45 percent of these other household types have a minor in their home.

Combining all countries, men in single households are more likely to have never been married (65 percent compared to women's 52 percent), whereas 32 percent of women but only 26 percent of men are divorced, and 10 percent of women are widowed compared to 3 percent of men. Of other, non-single households, 72 percent have a married reference person. Although magnitudes vary, this pattern holds across all countries except for Belgium, where men and women in single households are equally likely to have never been married (49 percent) and more men than women are divorced. Furthermore, about 13 percent of both men and women in single households are married in Belgium, which suggests again that either cultural factors or the multinational community in Brussels might influence the sample.

Regarding labor market status in all countries, women are more likely than men in single households to be employees with a permanent contract (55 percent versus 50 percent for all countries combined). Only in Germany and Portugal is this pattern reversed. In the combined sample of all countries, men in single households are more likely to be self-employed (12 percent, compared to 6 percent of women), to employ others (5 percent of men versus 2 percent of women), or to be unemployed (by a small margin, 13 percent of men versus 12 percent of women). Women in single households, on the other hand, are slightly more likely to have a temporary contract (9 percent versus 8 percent of men) or to be out of the labor force (16 percent versus 11 percent of men). This general picture is the same in all countries except for Germany, where more men than women in single households are employed temporarily or are out of the labor force, and in Portugal, where more women than men in single households are unemployed. Combining all countries, non-single households also have high rates of dependent employment (61 percent), but they have lower rates of unemployment (7 percent) than single households. The exceptions here are Greece (44 percent) for dependent employment and France, Greece, and Portugal for unemployment.

More male single households have received an inheritance (31 percent versus women's 28 percent) in all countries combined.⁷ However, this pattern is reversed in Austria, Belgium, and Greece. Men are also a little more likely to have received a large inheritance in all countries except for Belgium and Greece. On the other

⁷Note that inheritances do not always sum to one because a small share of households had inheritances whose value we could not measure, because either the date or value of the inheritance was missing, or there are no inflation data for the year in which the inheritance was received.

hand, a slightly larger share of women received a low inheritance in five countries; the exceptions are Spain, Greece, and Portugal.

In terms of asset holdings, we see that male heads of single households are more likely to own a business (24 percent versus female's 13 percent) in all countries combined. This relation—and even its rough magnitude—holds true for all countries. Non-single households have higher ownership rates for businesses and main residences, as well as higher debt rates than single households in all countries.

For owner-occupied housing, in contrast, very heterogeneous national ownership rates are obscured by the equal prevalence (43 percent) for male and female households in the sample of all countries. In the two countries with low ownership rates, Austria and Germany, more males than females in single households own their main residence (27 percent and 21 percent, respectively). In the other countries, ownership rates are higher among women (Greece 40 percent, Belgium 55 percent, France and Slovakia 63 percent) or roughly equal between genders (Portugal about 50 percent, Spain 66 percent). Since Austria and Germany have large rental sectors and comparatively strong social housing policies, this finding provides some indication that such institutions might have gendered effects.

The incidence of debt again varies a lot between countries despite similar aggregate numbers for male and female single households (43 percent). In Austria, Germany, and France, the incidence of total debt is similar between men and women; however, men have higher rates of mortgages (at a low level in Austria and Germany), and women of unsecured debt such as credit card debt and overdrafts. In Belgium, Spain, and Portugal, women have a higher incidence of debt than men in single households; in Slovakia and in Greece (except for mortgages), the situation is reversed. In all countries except for Greece and Slovakia, more women than men in single households have unsecured debt such as credit card debt and overdrafts. In Germany, with its large low-wage sector, and in Greece, which has experienced a stark economic crisis, these rates of unsecured debt are comparatively high (43 percent for German women and 37 percent for Greek men in single households).

Men have stronger historical labor market attachment than women, as measured by the mean and median work/age ratio if all countries are combined. At the mean, men in single households spent 75 percent of their potential working lives actually working, whereas this value is 67 percent for women. However, this finding does not extend to Belgium, France, and Slovakia, where male and female heads of single households have virtually equal labor market attachment at the mean (60 percent in Belgium, 67 percent in France and Slovakia). One possible explanation is that national (historical) differences in norms and institutions around childcare play a role in this finding. In Belgium and France, the level of childcare provision is relatively high, with policy focusing on full coverage. Furthermore, in those two countries childcare services, including for very young children, are widely accepted. Slovakia, on the other hand, had high childcare coverage historically, but following the transition to a market economy, Slovakia's childcare facilities experienced a clear downward tendency the 1990s (Plantenga and Remery, 2009; Janta, 2014).

Current labor market attachment is also stronger for men than for women, as captured by weekly working hours (31 for men versus 27 for women in single households at the mean). This relation holds true for all countries, although both levels and the gap in hours differ: on average, heads of female single households work between 20 hours in Belgium and 31 hours in Greece. The difference in working hours at the mean between male and female single households is 3 hours in Austria, and 8 hours in Greece and Portugal. Hours worked are higher in non-single households at the mean and at the median compared to single households.

Men living in single households have higher average earnings of about €26,000 per year, compared to women's €19,000 if all countries are combined. The HFCS data thus show a raw gender gap in earnings of roughly 26 percent for our sample of male and female single households. This gap varies from 8 percent in France to 33 percent in Germany. In addition, the level of annual earnings differs vastly across the European countries studied here. On average, female single households earn between roughly €7,000 in Slovakia and €25,000 in Belgium. Average earnings levels of non-single households are lower than male but higher than female single households' earnings levels in all countries except for Germany and Belgium, where the reference person in non-single households earns more.

All in all, we thus observe some systematic differences in our male and female samples and in comparison to the non-single households, even after restricting the age of our sample to the working-age population. In particular, age, the presence of children, marital status, home ownership, and earnings are of some concern to varying degrees in different countries. It is therefore possible that there are differences in selection into single households between women and men. As discussed in Section 4, we take this concern into account by applying a Heckman selection model in our multivariate analyses.

Table 1 gives an overview of the distribution of net wealth across household types and countries. The share of male and female single households in the total population varies substantially. In Spain, Greece, Portugal, and Slovakia, the shares of both male and female single households are between 6 percent and 9 percent of the countries' sample; in Austria, Belgium, Germany, and France, their shares lie between 15 percent and 21 percent.

On average, female single households have lower net wealth than male single households (€89,000 for females versus €130,000 males) if all countries are combined. That is, the raw data show a gender wealth gap of roughly 32 percent at the mean. On the country level, a positive raw gender wealth gap exists at the mean in each country except for Belgium, where female-headed single households have 6 percent more wealth than male-headed ones. The magnitude of this gap is far from uniform; it amounts to 8 percent in Slovakia, 14 percent in Portugal and 16 percent in Greece, 24 percent in France and 26 percent in Spain, and 48 percent in Austria and 49 percent in Germany. Non-single households have higher net wealth than single households in all countries and in the aggregate.

At the median, there is a positive raw gender wealth gap (i.e. the wealth of male single households exceeding that of female single households) of 19 percent if all countries are combined, but at the country level the situation is much more mixed. Austria, Belgium, Spain, Greece, and Slovakia report higher net wealth of female compared to male single households at the median. The size of the gap

TABLE 1
NET WEALTH BY COUNTRY AND HOUSEHOLD TYPE

	N	Share	Mean	p1	p5	p10	Median	p90	p95	p99
<i>All countries</i>										
Female households	2,808	10.65	88,516	-23,342	-2,428	-200	19,241	253,829	373,830	708,234
Male households	2,380	11.25	129,523	-20,140	-4,359	-153	23,701	301,100	511,726	1,322,829
Other households	31,174	78.10	248,694	-35,963	-58	2,314	130,474	526,805	792,844	1,963,811
<i>Austria</i>										
Female households	293	19.67	93,125	-13,919	-1,296	508	19,098	228,898	353,709	874,555
Male households	227	16.51	179,896	-57,347	-8,491	-145	17,051	365,247	632,446	2,372,511
Other households	980	63.82	379,703	-67,786	-1,990	3,027	161,866	792,452	1,415,455	4,295,981
<i>Belgium</i>										
Female households	200	15.75	159,559	-3,800	88	930	63,105	401,197	542,977	1,073,444
Male households	167	15.21	150,031	-1,077	0	509	26,172	369,000	587,877	1,509,400
Other households	1,020	69.04	356,912	-4,206	1,033	6,700	237,013	694,917	1,009,481	2,795,145
<i>Germany</i>										
Female households	236	17.04	57,951	-33,000	-4,130	-1,460	10,880	156,379	329,490	522,460
Male households	253	21.17	112,620	-20,500	-8,290	-1,980	17,990	240,300	497,780	1,522,500
Other households	1,555	61.80	260,987	-33,250	-1,058	1,422	87,918	515,882	807,520	3,031,487
<i>Spain</i>										
Female households	247	7.19	166,837	-11,723	-271	202	125,529	359,832	414,483	797,266
Male households	198	5.97	225,833	-7,452	0	546	105,146	500,140	646,584	1,323,541
Other households	2,657	86.85	287,321	-35,928	323	6,720	184,721	587,396	874,630	1,879,599
<i>France</i>										
Female households	1,192	16.00	103,182	-12,477	-863	510	22,332	276,408	419,787	792,993
Male households	1,053	14.99	135,576	-8,130	-442	616	22,448	330,495	543,423	1,225,777
Other households	6,403	69.00	256,670	-19,199	51	2,067	147,869	565,925	816,416	1,873,162

Table 1 Continued

	N	Share	Mean	p1	p5	p10	Median	p90	p95	p99
<i>Greece</i>										
Female households	198	8.18	68,224	-11,100	-1,100	0	40,800	184,145	234,442	420,000
Male households	177	6.31	81,683	-23,200	-3,034	0	14,640	203,448	246,491	871,208
Other households	1,691	85.50	174,534	-9,399	108	5,000	125,401	388,800	541,354	961,735
<i>Portugal</i>										
Female households	221	6.28	74,970	-26,405	-3,531	0	24,866	159,282	232,160	858,000
Male households	167	5.89	87,436	-3,918	0	43	41,132	204,140	312,736	1,172,700
Other households	2,021	87.83	143,926	-12,768	184	1,944	78,407	292,312	464,455	1,168,653
<i>Slovakia</i>										
Female households	221	9.41	48,049	-414	151	824	42,368	105,320	123,473	172,000
Male households	138	7.27	52,420	-1,475	-260	639	38,748	118,315	158,533	376,716
Other households	1,266	83.32	89,116	-333	5,432	20,538	65,808	170,389	236,077	482,135

Notes: This table shows the unweighted sample size, as well as the weighted share in the population and wealth levels of male and female single households (only one adult aged 25-60 present), and all other, non-single households (reference person aged 25-60).

Source: HFCS 2010, authors' calculations.

varies substantially due to the lower absolute values of net wealth; this negative gap is 9 percent in Slovakia, 12 percent in Austria, and 19 percent in Spain, but 141 percent in Belgium and 179 percent in Greece. The (positive) gender gap is 40 percent in Germany and Portugal. Net wealth is virtually equal at the median in France between male and female single households.

Female single households have higher net wealth than male single households in several instances at the bottom half of the distribution. In particular, at the first percentile, women are more indebted than men in Belgium, Germany, Spain, France, and Portugal. However, the differences in net wealth are small in absolute terms. Only in Belgium, women have noticeably higher net wealth than men up to the 90th percentile.

The gender wealth gap becomes positive and large at the top of the distribution. At the 95th percentile, the raw gender net wealth gap is consistently positive, and its magnitude ranges from 5 percent in Greece to 44 percent in Austria. At the very top of the distribution, the 99th percentile, the gap widens even further, from 27 percent in Portugal to 66 percent in Germany. If the relative gap is not calculated as the direct relation between male and female net wealth, but rather as the difference in male and female single households' net wealth relative to the mean of male net wealth, then it amounts to roughly 150 percent in Austria and Germany, between 90 percent and 100 percent in Spain, France, and Portugal, about 67 percent in Slovakia, 30 percent in Belgium, and 15 percent in Greece at the 95th percentile. It thus appears that the higher net wealth of male single households at the top of the distribution is driving the gender wealth gap at the mean in the raw data.

Figure 1 investigates this point further by showing the gender wealth gap between male and female single households across the net wealth distribution for all eight countries. In most countries, there is very little difference in net wealth between male and female single households across much of the distribution; the gap increases steeply only at the top end of the distribution. Austria, Germany, Spain, France, Greece, and Slovakia conform to this pattern, with very minor (often negative) wealth gaps across the distribution. Belgium is the only country with a marked negative wealth gap in the upper half of the distribution. Portugal has a few observations of female single households with very high wealth, which impact the wealth gap at the top end. In part, this negative gap is driven by differences in the value of the main residence of male and female single households in Portugal (see Figure 3, which we discuss below).

The magnitude of the absolute gap at the 95th percentile varies substantially; it ranges from roughly €12,000 in Portugal to around €280,000 in Austria. The gap rises steeply until the 99th percentile in all countries (except for the few households in Portugal), where it lies between roughly €200,000 in Slovakia and €1,500,000 in Austria. The gender wealth gap is thus clearly right-skewed in our raw data; male single households have higher net wealth than female single households at the upper end of the wealth distribution.

This gap at the top of the unconditional distribution of net wealth is compounded by the household composition of the wealth distribution in the European countries studied here, as the lowest graph in Figure 2 shows. The share of female single households across the net wealth distribution shows an inverted U-shape, and in some cases a downright downward-sloping pattern. The share of female households

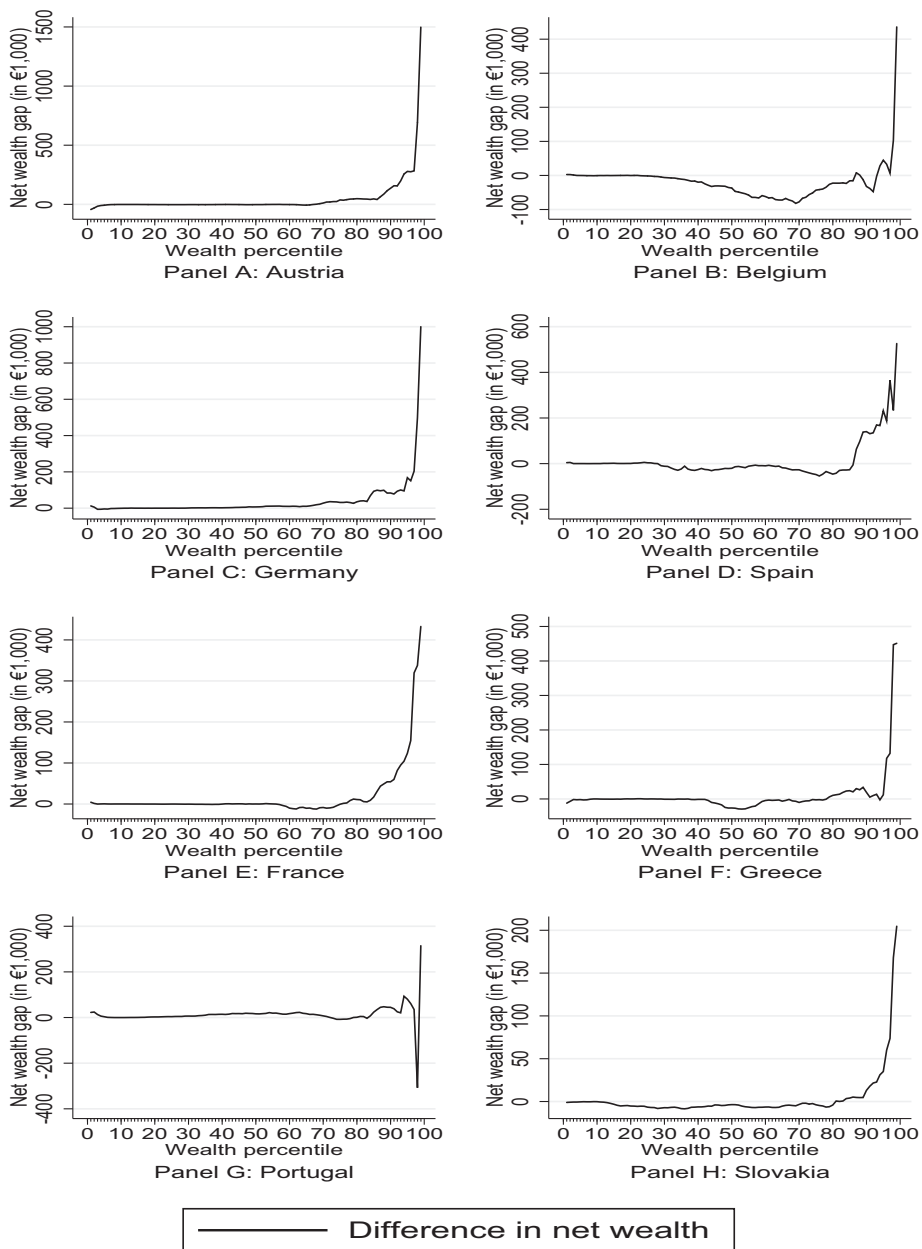


Figure 1. The Gender Wealth Gap (Male Minus Female Net Wealth) across European Countries

Notes: This graph shows the gender gap across the unconditional distribution of net wealth of single female households.

Source: HFCS 2010, authors' calculations.

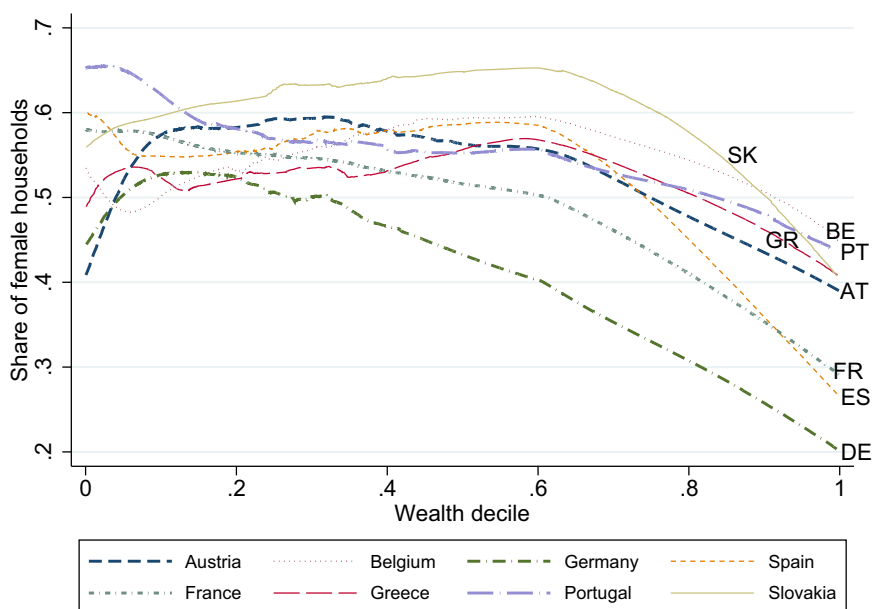


Figure 2. The Share of Female versus Male Households, across the Net Wealth Distribution [Color figure can be viewed at wileyonlinelibrary.com]

Notes: This graph shows the lowess-smoothed share of females in all single households across the unconditional distribution of net wealth of female single households.

Source: HFCS 2010, authors' calculations.

compared to male single households peaks at the first decile in Germany and at the third in Austria, the two distributions with the most pronounced inverted U-shape. Belgium, Greece, Spain, and Slovakia peak around the sixth decile. Portugal and especially France show a downward-sloping distribution of female households across the entire net wealth distribution. That is, in France, the relative incidence of female households strictly declines as net wealth rises. In all eight countries, the share of female single households falls below 50 percent in the top decile.

4. MULTIVARIATE ANALYSIS: THE GENDER WEALTH GAP

This section presents the multivariate empirical findings on the gender wealth gap in the eight European countries. Since the descriptive analysis showed that there is a fairly large gap at the upper end of the net wealth distribution of single female and male households despite very limited differences along most of the distribution, we attempt to explain this gap with various personal- and household-level characteristics. To do so, we first show the gender wealth gap in net wealth for the average single household by using an OLS regression, sequentially adding covariates to the model. Second, we employ a quantile regression at the 95th percentile of the net wealth distribution to examine the gender gap for wealthier households. Third, we extend this analysis by looking into disaggregated wealth categories as dependent variables; that is, we investigate the gender

wealth gap in gross wealth and its components (financial and real wealth), in debt and its constituent parts (collateralized and unsecured debt), and then in even more detail in main residences. Finally, we exploit the only data available on the individual level, namely occupational pension wealth, to show gender differences in this wealth category as a robustness check in Section 4.3.

As discussed in Section 3, the selection into single households is likely to be driven by different aspects for men and women. In particular, we observed differences in age between men and women in single adult households, their relationship status, career orientation as indicated by the presence of children, home ownership, and earnings. The degree of these differences varies by country, but at least one of these characteristics differs greatly by gender in each country (and in comparison to households with more than one adult, or “non-single” households in Table A.1 in Appendix A.1, in the Online Supporting Information). We thus attempt to control for the selection into a single household as a potential determinant of wealth by using these characteristics in the first step of a two-stage Heckman selection correction procedure, as shown in equation (2). The probability, Prob_i , of being single for each household i in country j is estimated, controlling for a household gender dummy variable, a vector X of age, relationship status, the presence of children,⁸ ownership of the main residence, and earnings—all of which are also interacted with the gender dummy—and including an error term ϵ_{ij} :

$$(2) \quad \text{Prob}_{ij} = \phi_{ij} \text{Female}_{ij} + \chi_{ij} X_{ij} + \psi_{ij} X_{ij} * \text{Female}_{ij} + \epsilon_{ij}.$$

Having obtained the probability of being a single household, Prob_i , for households in each country j , we calculate the Inverse Mills Ratio (IMR). This is the ratio of the probability density function to the cumulative distribution function of the distribution of the predicted values in the probability model:

$$(3) \quad \text{IMR}_{ij} = \frac{f(\text{Prob}_{ij})}{F(\text{Prob}_{ij})}.$$

Included in the selection model (equation (2)), but not in the models predicting wealth below, is our instrument of earnings. Earnings can affect the probability of being a single household, because living alone requires a certain regular income stream—in a sense, one needs to be able to “afford” to live in a single household. Furthermore, a well-established literature shows that having her own income often enables a woman to leave a bad relationship and live alone (e.g. Andress and Hummelsheim, 2009; Fernandez and Wong, 2014). Finally, given the literature indicating that other economic characteristics, such as inheritances, are more important in determining wealth than income (Fessler and Schürz, 2013; Leitner, 2015), we are comfortable leaving earnings out of the wealth equation.

The results of the selection model are reproduced in Table A.2, in online Appendix A.2. Two important findings should be mentioned here, one regarding

⁸We combine the variables “two” and “three or more children present” for this estimation due to a low number of observations in the latter, especially when split by gender.

variables and one concerning countries. With respect to variables, the selection model shows that being married, having one child in the household (except in Austria), and owning a home decreases the probability of living in a single household in all eight countries for men and women. These lower probabilities of living in a single household are attenuated for women in many cases. Regarding countries, we find almost all selection variables to be statistically significant in France, and to a lesser extent in Belgium and Slovakia. The selection process into single households thus appears to be captured particularly well in these countries by the quantifiable characteristics covered here. It is possible that individual attitudes such as independence and risk-taking might be more similar for men and women in these countries. In other countries, however, we conjecture that social norms and conventions, such as social pressure to live in larger households for elderly or young persons (Fokkema and Liefbroer, 2008), might play more of a role. Overall, these results suggest that there are indeed differences in selection into single households. We therefore report the selection parameter IMR for the Inverse Mills Ratio in the OLS results and in the quantile regressions below.

4.1. *The Gender Gap in Net Wealth*

In this section, we show the results of the OLS and quantile regression models for each of the eight countries. We regress the IHS-transformed level of net wealth NW for each household i in country j on a constant, a household gender dummy variable, a vector of k controls in X , the Heckman correction term IMR , and an error term ε :

$$(4) \quad NW_{ij} = \alpha_j + \beta_{1j} \text{Female}_{ij} + \beta_{jk} X_{jik} + \gamma_j \text{IMR}_{ij} + \varepsilon_{ij}.$$

Control variables are subsumed in four groups: personal characteristics (age and education), family structure (number of children present and relationship status), inheritances, and labor market attributes and asset ownership (employment characteristics, business and housing assets, and debt). The control group comprises male single households aged 35–44 with lower secondary education, who are married (or living in a civil union) with no children living in the household, who did not receive an inheritance, who work as an employee with a permanent contract, and who do not own their main residence, business assets, or debt.

Table 2 contains the results for the OLS model when the control variables are added sequentially. For readability, it includes only the coefficient for living in a female single household and the selection parameter.⁹ Since the gender gap in net wealth at the mean is not very pronounced, as Table 1 and Figure 1 illustrate, we do not expect a strong gap to emerge from the OLS. Table 2 shows that in most countries, there is indeed no statistically significant gender wealth gap in any specification, from the base model (1), which includes no controls beyond the Heckman correction term, to the full model (5). However, there are some exceptions. In Slovakia, there is a statistically significant gender wealth

⁹For detailed results, refer to Tables A.3–A.10 in Appendix A.3, in the Online Supporting Information.

TABLE 2
THE NET WEALTH GAP OF SINGLE HOUSEHOLDS AT THE MEAN (OLS)

	(1)	(2)	(3)	(4)	(5)
Independent Variable	Base	Age and Education	Family	Inheritances	Labor and Assets
<i>Austria</i>					
Female	0.672 (0.586)	0.899 (0.572)	-0.200 (0.706)	-0.047 (0.690)	0.630 (0.722)
IMR	1.806*** (0.488)	1.850*** (0.548)	9.856*** (2.775)	7.912*** (3.010)	3.677 (3.066)
R ²	0.022	0.094	0.145	0.173	0.387
<i>Belgium</i>					
Female	0.099 (0.490)	0.097 (0.419)	-0.122 (0.433)	-0.146 (0.436)	0.023 (0.422)
IMR	1.516** (0.677)	1.051 (0.667)	5.952*** (1.026)	5.766*** (1.012)	-0.328 (1.170)
R ²	0.029	0.184	0.251	0.256	0.428
<i>Germany</i>					
Female	-0.884 (0.904)	-0.602 (0.872)	-1.059 (0.825)	-0.909 (0.886)	-0.239 (0.913)
IMR	0.831 (1.082)	0.783 (1.004)	11.253*** (1.869)	9.296*** (1.838)	5.983*** (2.186)
R ²	0.005	0.093	0.251	0.256	0.468
<i>Spain</i>					
Female	-0.395 (0.642)	-0.651 (0.615)	-1.520** (0.679)	-1.213* (0.652)	-0.272 (0.591)
IMR	1.991* (1.032)	2.101* (1.144)	6.150*** (1.795)	5.147*** (1.649)	-2.592 (1.916)
R ²	0.014	0.111	0.186	0.214	0.473
<i>France</i>					
Female	-0.128 (0.359)	-0.343 (0.362)	0.212 (0.361)	0.199 (0.352)	-0.063 (0.318)
IMR	0.883 (0.570)	0.763 (0.533)	4.406*** (1.066)	4.021*** (1.034)	-0.721 (1.221)
R ²	0.005	0.074	0.110	0.136	0.329
<i>Greece</i>					
Female	0.026 (0.579)	0.073 (0.597)	-0.573 (0.745)	-0.437 (0.706)	0.296 (0.580)
IMR	4.845*** (0.942)	4.876*** (1.047)	8.167*** (1.007)	6.428*** (1.086)	-0.068 (2.149)
R ²	0.112	0.132	0.210	0.224	0.370
<i>Portugal</i>					
Female	-1.485** (0.703)	-1.600** (0.631)	-1.858*** (0.647)	-1.498** (0.604)	-1.050 (0.639)
IMR	1.474* (0.851)	0.922 (0.754)	3.216** (1.591)	2.061 (1.683)	-1.865 (1.739)
R ²	0.027	0.180	0.209	0.242	0.506

Table 2 *Continued*

Independent Variable	(1)	(2)	(3)	(4)	(5)
	Base	Age and Education	Family	Inheritances	Labor and Assets
<i>Slovakia</i>					
Female	0.309 (0.412)	0.012 (0.396)	-0.641* (0.389)	-0.490 (0.426)	0.383 (0.349)
IMR	1.889*** (0.374)	2.045*** (0.402)	5.985*** (1.011)	5.464*** (1.011)	-0.368 (0.737)
R ²	0.064	0.112	0.196	0.229	0.578

Notes: This table shows OLS estimates for the IHS-transformed net wealth of single male versus female households (only one adult aged 25–60 present). Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Source: HFCS 2010, authors' calculations.

gap if family controls are included (model 3), and in Spain, there is a statistically significant gap if we control for family structure and inheritances (models 3 and 4). Only Portugal shows a statistically significant gender wealth gap starting in the base model (1) and throughout all specifications, including inheritances (model 4). When the set of independent variables for labor market and assets is added for the full model, we do not find a gender gap in net wealth in any of the eight countries analysed here. The explanatory power of the full model (5) is comparatively high; it is between 33 percent in France and 58 percent in Slovakia.¹⁰

In all countries, the selection term IMR is statistically significant in at least one specification, confirming that selection into single households does appear to differ for males and females, and that the characteristics relevant to this selection are also related to wealth. In Austria, Spain, Greece, and Slovakia, it has an effect in specifications 1–4, that is, the base model, when age and education are included, when family structures are added, and when the model controls for inheritances. In the other countries, the selection parameter is not statistically significant when control set (2), age and education, is included, and significance is irregular otherwise. When the economic characteristics of labor market and assets are added for the full model (5), the selection parameter is not statistically significant in any country except Germany. We conjecture that controlling for home ownership explicitly in the full model might be driving this result. This would suggest that the decision to live alone is strongly influenced by housing, and in particular by owning one's main residence.

We thus do not find much evidence of a gap in average net wealth between male and female single households in the full OLS specification. This is not very surprising, since the raw data of Table 1 and Figure 1 did not give a strong

¹⁰The R^2 in the multiply imputed data is calculated as the average of the R^2 over the five imputates in the data set.

indication of a gender gap in average net wealth. It is therefore likely that these differences at the mean level of wealth miss important details about the gender wealth gap, given the fact that the distribution of net wealth is highly right-skewed in each of the eight countries, as is the raw gender gap in net wealth.

We therefore conduct a quantile regression at the 95th percentile of the net wealth distribution, in order to assess the gender gap at the top of the distribution.¹¹ Table 3 presents the coefficients on being a female single household and on the selection parameter.

The coefficient for being female is consistently negative at the top of the net wealth distribution; however, the statistical significance of the gender gap in net wealth varies substantially across countries and across our first four models. The gender wealth gap at the top of the distribution is statistically significant in the raw data of the base model (1) in three countries (Austria, Spain, and France). When personal characteristics of age and education are taken into account in model 2, only France retains a significant gender wealth gap. Three countries show a gender wealth gap with family controls in model 3 (Germany, Portugal, and Slovakia). Including inheritances in the controls yields five countries with a statistically significant gender wealth gap (Austria, Germany, Greece, Portugal, and Slovakia), suggesting that female single households receive larger inheritances: once comparing male and female single households with the same distribution of inheritances, female single households have lower wealth than male single households, that is, the net wealth gap becomes larger (except in Portugal) and statistically significant. This finding is in line with the literature on gender differences in inheritances among the rich (Edlund and Kopczuk, 2009).

The size of the gender wealth gap is economically significant; its smallest value is 25 percent in the raw data in France, which rises to 33 percent in model 2.¹² Austria and Germany have somewhat larger gender wealth gaps at the top of the distribution, which amount to almost 90 percent in Germany and over 100 percent in Austria in model 4. Slovakia's gender wealth gap in model 4, controlling for inheritances, is about 70 percent; Greece's about 63 percent. In general, the gender wealth gap increases as more control variables are included. Only Portugal's decreases from over 50 percent to less than 45 percent from model 3 to model 4.

The sporadic significance of the gender gap in net wealth with few immediately obvious commonalities in the first four models suggests that institutional differences and social norms might play a role in shaping these results. For instance, the three countries in which the gender wealth gap is significant when family controls are included in model 3, Germany, Portugal, and Slovakia, have rather weak childcare institutions. Full-time childcare services are scarce in Germany and Portugal, and high costs hamper uptake in Slovakia (Janta, 2014). Furthermore, of the five countries in which controlling for inheritance (model 4) yields a statistically significant gender wealth gap (Austria, Germany, Greece,

¹¹A limited number of observations and consequent sensitivity to variations prevent us from investigating the very top of the distribution, even though the raw data suggests that the gap widens toward the 99th percentile.

¹²Note that since the IHS transformation approximates the logarithmic function for all but very small values, coefficients can be interpreted analogously to logarithmic models (Pence, 2006).

TABLE 3
THE NET WEALTH GAP OF SINGLE HOUSEHOLDS AT THE TOP OF THE DISTRIBUTION
(QUANTILE REGRESSION)

Independent Variable	(1)	(2)	(3)	(4)	(5)
	Base	Age and Education	Family	Inheritances	Labor and Assets
<i>Austria</i>					
Female	-0.972** (0.384)	-0.107 (0.451)	-0.734 (0.560)	-1.067** (0.491)	-0.206 (0.354)
IMR	1.637** (0.689)	1.701* (0.887)	5.192** (2.276)	4.222** (1.642)	-1.012 (1.459)
<i>Belgium</i>					
Female	-0.188 (0.296)	-0.255 (0.252)	-0.094 (0.333)	-0.011 (0.377)	-0.043 (0.498)
IMR	0.970*** (0.265)	1.020*** (0.254)	4.041*** (0.948)	3.948*** (0.908)	2.982** (1.231)
<i>Germany</i>					
Female	-0.553 (0.549)	-0.342 (0.373)	-0.732* (0.414)	-0.895** (0.426)	-0.163 (0.365)
IMR	1.246 (0.966)	1.291* (0.668)	3.460*** (0.834)	3.339*** (0.903)	-0.159 (1.434)
<i>Spain</i>					
Female	-0.515** (0.236)	-0.075 (0.130)	-0.008 (0.179)	-0.089 (0.197)	-0.343 (0.242)
IMR	0.555 (0.489)	0.354 (0.603)	0.290 (0.700)	0.363 (0.636)	-0.524 (0.767)
<i>France</i>					
Female	-0.241* (0.136)	-0.332* (0.183)	-0.164 (0.224)	-0.199 (0.215)	-0.220 (0.157)
IMR	0.418 (0.319)	0.467 (0.306)	2.911*** (0.690)	2.674*** (0.642)	0.218 (0.346)
<i>Greece</i>					
Female	-0.435 (0.346)	-0.175 (0.247)	-0.348 (0.368)	-0.626* (0.343)	-0.447 (0.413)
IMR	1.617*** (0.460)	1.906*** (0.451)	2.078*** (0.590)	1.343* (0.717)	0.421 (1.205)
<i>Portugal</i>					
Female	-0.285 (0.433)	-0.326 (0.258)	-0.508* (0.262)	-0.446* (0.269)	-0.161 (0.345)
IMR	-0.291 (0.266)	-0.169 (0.391)	-0.202 (1.102)	-0.431 (1.175)	-0.550 (0.832)
<i>Slovakia</i>					
Female	-0.302 (0.275)	-0.262 (0.218)	-0.555* (0.310)	-0.702** (0.338)	-0.006 (0.225)
IMR	0.202 (0.191)	0.250 (0.234)	0.780 (0.563)	0.888 (0.611)	-0.438 (0.509)

Notes: This table shows a quantile regression at the 95th percentile of net wealth for single households (only one adult aged 25–60 present). Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Source: HFCS 2010, authors' calculations.

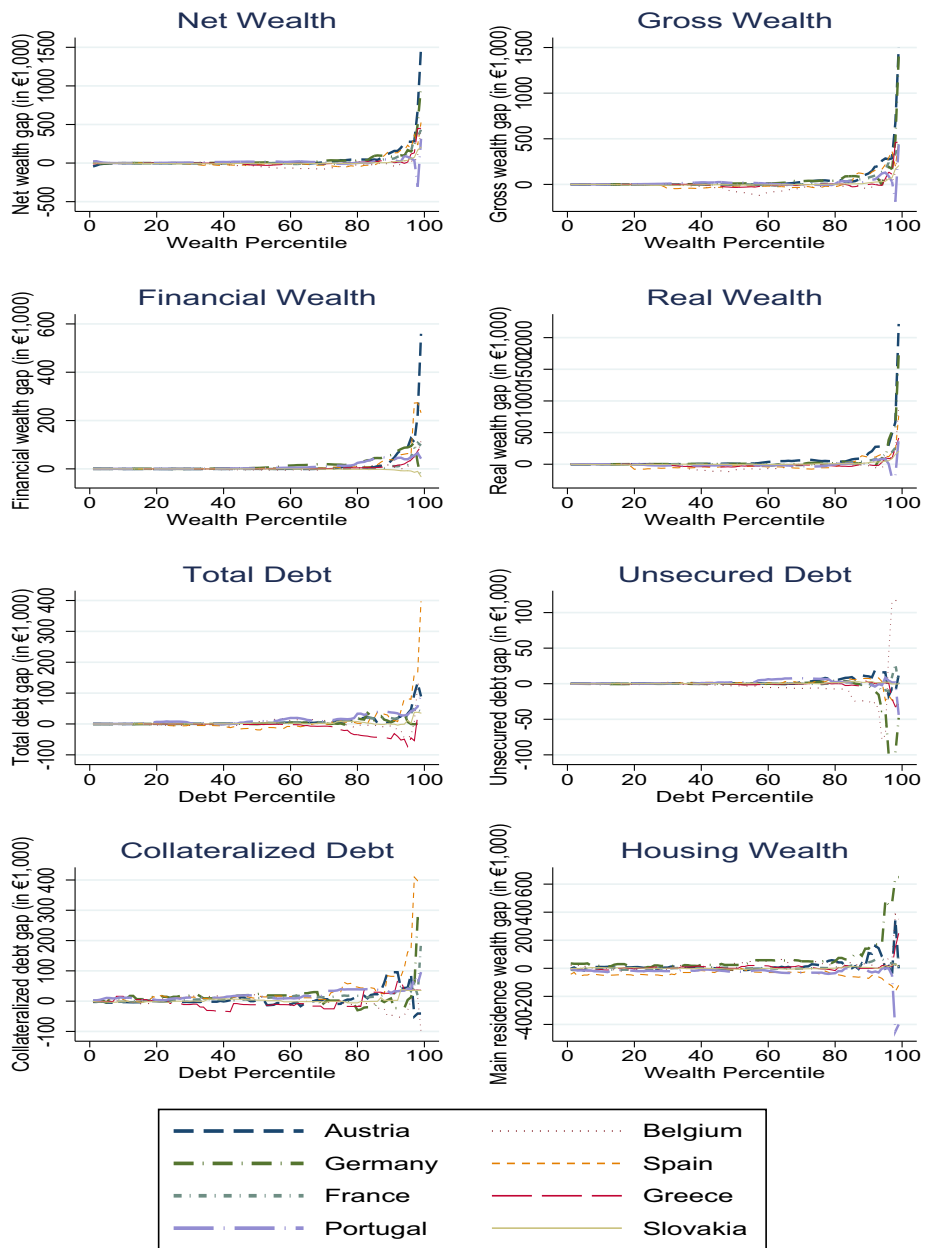


Figure 3. The Gender Gap in Components of Net Wealth (Male Minus Female Wealth/Debt) across European Countries (in €1,000) [Color figure can be viewed at wileyonlinelibrary.com]

Notes: This graph shows the gender gap in wealth and debt categories across the unconditional distribution of wealth and debt categories of single female households.

Source: HFCS 2010, authors' calculations.

Portugal, and Slovakia), three (Austria, Portugal and Slovakia) have no inheritance taxation, and the other two countries (Greece and Germany) have very low inheritance taxation (European Commission, 2014). Whereas a causal interpretation is not possible with these data, it is not implausible that norms and institutions affect the differences between female and male single households at the top of the distribution.

Finally, in the full model (5), female single households do not have statistically significant lower wealth than male single households in any of the eight Euro area countries. That is, even though we do find some evidence of a gender gap in net wealth in the raw data or with limited sets of controls at the top of the distribution in most countries, these differences are explained by labor market characteristics and participation in certain asset and debt categories.

The significance of the IMR shows that we are effectively capturing the difference in selection into single households in five countries: Austria, Belgium, Germany, France, and Greece. It thus does indeed appear to be the case that the factors included in the selection model are related to wealth as well as the choice to live alone in at least some countries. In particular, we conjecture that individual attitudes and social norms such as independence and risk-taking might affect both the decision to live alone and the wealth level of single households in those countries. This view might be supported by the fact that we detect no selection bias in model 5 when labor market effects and assets are controlled for in seven countries.¹³

Portugal, Spain, and Slovakia seem unaffected by selection issues. These three countries have the lowest share of single male and female households (together with Greece, see Table A.1 in Appendix A.1, in the Online Supporting Information). It is conceivable that there are social norms in these countries which induce the formation of larger households, such as early marriage, living with parents for longer at a young age, or living with adult children in older age. This possibility is in line with the literature which finds that living alone is much more common in Northern and Western Europe than in either Southern or Eastern Europe at all ages. Especially during young and middle adulthood, the percentage of men and women living alone is particularly low in Southern European countries (Fokkema and Liefbroer, 2008).

Regarding the effects of covariates, the control variables largely show the expected effects found in the literature (Schmidt and Sevak, 2006; Yamokoski and Keister, 2006; Sierminska *et al.*, 2010), conditional on statistical significance (for results and in-depth discussion, see online Appendix A.4). Youth, seniority, and education have the expected effects. So does marital status—never having been married, or being divorced or widowed go hand in hand with higher wealth in single households (with the exception of Slovakia in model 5). Single households at the top of the distribution in which there are children present have lower wealth. Large inheritances play an important role; they retain their statistical significance even in the full model in five countries. Temporary contracts, unemployment, work history (the work/age ratio), and employing others have the expected effects. Home and business ownership are positively correlated with wealth but, not

¹³The exception is Belgium.

surprisingly, at the top of the distribution debt (both collateralized and unsecured) has little correlation with wealth.

To sum up, as expected, we do not find a gender wealth gap at the mean for the eight European countries investigated here. Possibly more surprisingly, there is only a somewhat scattered incidence of a statistically significant gender gap in net wealth at the 95th percentile, and it is explained by gender differences in labor market characteristics and participation in asset and debt categories in all eight countries. Where it can be confirmed, the gap in net wealth is economically significant; it ranges from 25 percent in France to over 100 percent in Austria in different specifications of the controls. We effectively control for selection, especially in countries where it can be conjectured that individual attitudes and social norms such as independence and risk-taking play a more important role in the decision to live in a single-adult household. Furthermore, we are able to corroborate the existing literature regarding the influence of other covariates on net wealth. In particular, age, education, the presence of children, marital status, inheritances, home and business ownership, temporary contracts, unemployment, and employing others have the expected signs. The next section analyses components of net wealth to investigate the possible reasons for the far less than uniform statistical significance of the gender gap in net wealth at the top of the distribution.

4.2. *The Gender Gap in the Components of Net Wealth*

In the previous section, we established that even at the top of the distribution, the evidence for a gender gap in net wealth across countries and model specifications is mixed, even though the raw data shows a clear gap. This section thus presents an extension which investigates the gender gap in various components of net wealth. In particular, it starts with an analysis of gross wealth and its two components (real and financial wealth), continues with debt, where we delve deeper into collateralized and unsecured debt, and concludes with a brief look at main residences.

Figure 3 gives a first overview of these asset and debt categories. Important variations by country and category notwithstanding, which are discussed in detail below, it shows that the gap between male and female single households is situated at the top of the distribution in all cases. We therefore continue to focus on this segment in the multivariate analysis of this section.

Table A.19 in Appendix A.5 (in the Online Supporting Information) shows the results of a quantile regression predicting the value of gross wealth owned by female versus male single households at the 95th percentile of the gross wealth distribution. The coefficient on female single households is negative across the board; compared to the quantile regression of net wealth, however, the gender gap in gross wealth is statistically significant in many more specifications. In particular, we find a statistically significant gender gap in gross wealth that we did not detect for net wealth in the first four models in Spain (models 2 and 4), France (models 3 and 4), Greece (models 1, 2, and 3), and Slovakia (models 1 and 2). In the full model (5), five countries (Austria, Germany, France, Greece, and Slovakia) now show a statistically significant gender gap for gross wealth, where no country had done so for net wealth. Only in Germany does the gender gap

lose statistical significance in two instances (models 3 and 4) when predicting gross wealth compared to net wealth, and in Belgium the gender wealth gap remains statistically insignificant in all specifications.

The size of the gender gap in gross wealth varies significantly across countries, from less than 30 percent in Slovakia in model 5 to almost 80 percent in Austria in model 4. Although the non-universal statistical significance makes it difficult to discern patterns, in some cases the gender wealth gap follows an inverted U-shaped pattern across the five specifications. That is, the size of the unexplained gap increases as personal and family characteristics are controlled for, and then decreases when inheritances and especially labor market characteristics and asset/debt holdings are included. This is the case in Austria, France, and Portugal.

For all countries, the gender wealth gap shrinks when controls for labor market characteristics and asset/debt holdings are added. This finding reconfirms the importance of labor market outcomes and asset/debt holdings in explaining a part of the gender wealth gap. At the same time, the range of the gap size across countries is notably compressed. In the full model, the gap in gross wealth now takes values from the above-mentioned 27 percent in Slovakia to around 33 percent in France, 44 percent in Austria and 45 percent in Germany, and to 48 percent in Greece. Finally, we find that selection issues continue to be present while studying gross wealth. The country-specific patterns for the IMR found in Table 3 are broadly confirmed.

Next, we look at the two components of gross wealth, real and financial wealth. Both show a gender gap that is strongly statistically significant. In particular, real wealth is very similar to gross wealth, both regarding statistical significance and the size of the gap between female and male single households (see Table A.20 in online Appendix A.6). The only difference to gross wealth is in a single instance of statistical significance in Belgium (model 4) with a gap of about 24 percent, and that the gender gap in real wealth is not statistically significant in any model in Germany. Since real wealth, and especially housing, is the most important asset category for most households, this close link to gross wealth is to some extent to be expected.

Financial wealth, on the other hand, shows some peculiarities, as shown in Table A.21 in online Appendix A.7. There is a gender gap in financial wealth at the top of the distribution of single households that is statistically significant in most model specifications in Germany and Austria, as well as in France, Greece, and Portugal, and to a lesser degree in Spain, whereas Belgium and Slovakia do not show evidence of a gender gap in financial wealth.

A possible explanation of the differences in the findings regarding the gender gap in net wealth versus gross wealth and its components is based on the fact that net wealth is gross wealth minus debt. As noted above, Spain, France, Greece, and Slovakia, as well as Germany, have notable differences in the statistical significance in the gender gaps of gross and net wealth. These are countries with a high incidence of debt in the full population (see Table A.1 in online Appendix A.1). In particular, single households in Spain, France, and Portugal have comparatively high levels of collateralized debt, while Greece and Germany have higher

levels of unsecured debt.¹⁴ It is therefore possible that the observed gender gap in gross wealth is diminished sufficiently to render it statistically insignificant for net wealth, because debt is taken into consideration implicitly. We therefore explicitly consider the gender gap in debt next.

Table A.22 in online Appendix A.8 shows that the coefficients on female households are indeed virtually uniformly negative in a quantile regression for debt at the 95th percentile, meaning that there is a gender gap in debt (i.e. men hold more debt) which might dampen the gap in net wealth. However, whether the gender gap in debt is statistically significant in multivariate analysis is highly country-specific; this is the case in Spain, France, and Portugal in all five specifications. These three are countries with a high share of home ownership (Pittini *et al.*, 2015), and especially in Spain there was a house price bubble (Fradique Lourenco and Rodrigues, 2014) which might have impacted the level at which mortgages were taken out at the top of the distribution. In fact, it is conceivable that in the run-up to the crisis, gendered lending practices (Hertz, 2011) interacted with gender stereotypes about risk aversion (Nelson, 2014) to magnify gender differences in indebtedness. In the other five countries, we do not detect statistically significant differences in indebtedness by gender at the top of the distribution.

To examine the gender gap in debt more closely, we look into gender differences in the ownership of different kinds of debt next. Gender differences in collateralized debt are shown in Table A.23 in online Appendix A.9, which reveals that male and female single households do in fact differ in this sub-category. As with total debt, near-universal negative coefficients on female single households are accompanied by statistical significance that is clustered in four of the eight countries—Spain, France, Portugal, and Slovakia. In three of these countries, we found significant differences in the gender gap in gross and net wealth. In the other two countries that showed differences in the gender gap between net and gross wealth, Greece and Germany, unsecured debt might play a role. It is indeed more prevalent in the entire population of single households in these two countries (see Table A.1 in online Appendix A.1) and at the top of the distribution in Germany (see Figure 3). This might be linked to Greece's severe economic crisis (e.g. Lane, 2012) and to Germany's large low-income sector (e.g. OECD, 2014). However, in multivariate analysis of the top of the distribution, gender differences in unsecured debt do not appear to play an important role; it is statistically significant only in Austria and in Slovakia in some specifications, as shown in Table A.24 in online Appendix A.10. Since unsecured debt comprises overdrafts, credit card debt, and similar unsecured forms of debt, it might not be too surprising that the multivariate analysis shows little evidence of gender differences at the upper end of the distribution. Taken together, these findings appear to indicate that in four countries (Spain, France, Portugal, and Slovakia), it is the difference in the likelihood of owning collateralized debt between male and female single households which drives our finding that female single households have less gross

¹⁴Belgium also has relatively high levels of debt incidence, in particular unsecured debt (see Figure 3), but does not have a statistically significant gender wealth gap in either net or gross wealth. Apart from potential data problems related to low numbers of observations at the top of the distribution, we conjecture that the international community in Brussels might have an impact here.

wealth, but not net wealth, than male single households when covariates are controlled for.

Since owner-occupied housing is typically the most important asset category for private households, and since we have established gender differences in collateralized debt (i.e. mortgages) which are directly linked to the ownership of real estate, we also investigate whether there are gender differences in the value of male and female single household's main residences. Table A.25 in online Appendix A.11 does indeed provide evidence for a gender gap in main residences. In particular, female single households hold between 17 percent (model 4 in Belgium) and 77 percent (model 3 in Germany) less wealth in the value of their main residences than male single households. Three countries—Belgium, Germany, and Slovakia—show broad statistical significance of the gender gap in main residences. In Belgium, the value of the main residence is the only wealth category in which we observe a gender wealth gap—here the value of men's single household homes is between 16 percent and 26 percent higher than women's at the top of the distribution. In Germany, there is a gender gap of 54–77 percent in the value of single household's main residences, and in Slovakia, it ranges from 40 percent to 51 percent. Both Germany and Slovakia were affected by historical policies following the transition to market economies regarding home ownership: in East Germany, most residents in formerly state-owned housing were moved to rental contracts, whereas in Slovakia, they were given the opportunity to purchase their homes on favourable terms (Andreasch *et al.*, 2013). Whereas home ownership rates differ substantially between those two countries as a consequence (see Table A.1 in online Appendix A.1), it is not unthinkable that both policies had unintended effects on relative home ownership between women and men.

Taken together, the results presented in this section suggest that the gender gap in net wealth at the top of the distribution of single households, which we identified in the raw data, is often driven by differences in gross wealth. In Spain, Portugal, France, and Slovakia, a gender gap in (collateralized) debt dampens the gender gap in net wealth sufficiently for it to become only sporadically statistically significant in multivariate analysis. As discussed, this may be related to gendered effects of housing policies in three of these countries.

Greece has a high incidence of both home ownership and unsecured debt over the entire population of single households, as well as a notable difference in the gender gap of gross and net wealth. The severe economic crisis might provide an explanation of why unsecured debt is prevalent in the general population while at the same time, female single households are more indebted than male single households at the top of the distribution.

In Austria and Germany, there is a gender wealth gap of 73 percent (Germany in model 3) to 107 percent (Austria in model 4) in net wealth in models which do not control for differences in labor and asset holdings, and a gross wealth gap of about 44 percent in both countries in the full model. In these countries, financial wealth and differences in the value of the household's main residence (as well as unsecured debt in Austria) appear to be behind the net and gross wealth gaps in single households at the top of the distribution. It is possible that exit rates (i.e. the probability of leaving owner-occupied housing following a divorce) in the context of a well-developed rental and social housing sector are a

factor contributing to these results. Among single female households, Austria has the highest share of divorcees (see Table A.1 in online Appendix A.1), and it also has the highest exit rate in comparison to 11 other European countries comprising all of our countries except Slovakia (Dewilde, 2009).

Belgium is the only country which did not show any gender gap in net or gross wealth at the 95th percentile. A closer analysis of particular types of wealth shows, however, that there is a gender wealth gap in the value of the household's main residence in Belgium. It is conceivable that the presence of a large international community in Brussels affects these results.

4.3. *Individual-Level Pension Wealth*

This section checks the robustness of the results obtained in Section 4.1. Like many other wealth surveys, the HFCS contains one wealth component at the individual level, occupational pension wealth.¹⁵ This variable is available in six countries (Austria, Belgium, Germany, Spain, France, and Slovakia) for all men and women in the sample, regardless of their household living arrangements. It thus allows us to present the gender wealth gap in occupational pension wealth for the entire population (similar to, e.g., Warren, 2006; Neelakantan and Chang, 2010).

Pension wealth is almost per definition strongly correlated with age. Table 4 thus shows the average level of occupational pension wealth of all women and men for three age groups for the sample as a whole, for all deciles, and the tails.

Occupational pension wealth is, of course, a very narrow aspect of wealth, which is likely to vary substantially across countries according to the organization of their pension system. Nonetheless, there is a gender gap in occupational pension wealth in the vast majority of cases. In general, the older and the higher up in the distribution, the more pervasive and the larger the gender gap becomes in occupational pension wealth in most countries. In Germany, and in some instances across the net wealth distribution in Spain and in France, women have higher occupational pension wealth than men in the youngest age group (25–34 years). However, as the level of pension wealth and age increases, the familiar structure of a gender gap in occupational pensions re-establishes itself.

There are some exceptions. In Germany and in Spain, women have higher occupational pension wealth than men in the top percentile of the net wealth distribution. In Spain, the sporadic reverse gap in the youngest age group extends to the middle age group (35–44 years) in the upper half of the distribution, a pattern which is mirrored by Austria.

The size of the wealth gap in pensions varies considerably across countries and may reflect idiosyncrasies in pension systems. For instance, in Slovakia, the short time period for accumulation in a market economy is reflected in generally low levels of occupational pensions, an inverse U-shaped pattern of occupational pension levels across age groups, and comparatively smaller gender gaps. This might also be related to a mandatory second pillar introduced in 2005

¹⁵Data on private pensions were collected only in Slovakia in the first wave of the HFCS.

TABLE 4
 OCCUPATIONAL PENSION WEALTH BY GENDER AND AGE GROUP (IN €)

	Mean	Decile																				
		0.01	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	0.99										
<i>Austria</i>																						
Age 25–34																						
Female	2,551	43	132	232	679	747	945	1,201	1,631	2,705	8,878	18,349										
Male	5,003	68	411	799	1,089	1,443	1,995	2,930	4,644	5,963	19,517	25,836										
Age 35–44																						
Female	6,753	20	260	517	1,015	1,328	2,709	3,644	5,934	7,822	17,664	55,950										
Male	7,483	86	348	739	1,226	1,870	2,328	3,447	4,587	6,900	20,965	67,023										
Age 45–60																						
Female	7,741	30	362	712	1,191	1,802	2,413	3,900	6,409	12,822	19,786	70,331										
Male	26,700	0	299	794	1,533	2,455	3,961	6,400	11,412	31,814	77,718	378,055										
<i>Belgium</i>																						
Age 25–34																						
Female	7,082	50	50	300	750	3,000	5,000	7,000	7,660	15,320	17,500	27,000										
Male	13,039	100	700	2,000	5,400	8,750	10,000	12,000	13,000	19,380	27,000	62,500										
Age 35–44																						
Female	22,921	1	1,200	1,750	3,750	5,500	7,000	10,000	17,500	46,000	62,500	157,000										
Male	33,489	50	700	2,880	4,000	7,800	10,480	17,500	32,000	37,500	89,000	200,000										
Age 45–60																						
Female	32,048	160	1,000	1,750	4,000	6,634	14,980	20,000	30,000	50,200	89,000	285,000										
Male	92,974	106	4,000	8,000	12,500	25,000	35,000	53,000	75,000	101,200	200,000	1,500,000										
<i>Germany</i>																						
Age 25–34																						
Female	13,991	182	652	1,120	2,110	3,476	5,220	6,540	8,580	12,040	22,360	180,000										
Male	6,731	47	246	668	1,020	1,360	1,800	2,740	5,140	8,352	17,100	100,000										
Age 35–44																						
Female	16,048	0	114	730	1,320	2,560	4,100	7,440	12,910	20,160	37,620	222,400										
Male	21,241	262	980	1,960	3,180	4,500	6,020	9,200	14,400	31,120	62,040	189,226										
Age 45–60																						
Female	21,146	0	462	1,260	2,240	3,080	5,000	8,000	13,060	23,800	49,500	220,000										
Male	27,202	32	580	2,020	4,440	6,780	10,780	15,800	24,000	41,216	77,000	183,780										

Table 4 Continued

	Mean	Decile																					
		0.01	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	0.99											
<i>Spain</i>																							
Age 25–34																							
Female	4,347	600	1,562	1,562	1,800	2,417	2,517	3,858	5,098	5,498	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	
Male	3,729	400	1,200	2,200	3,000	3,627	3,982	3,982	3,982	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,800	
Age 35–44																							
Female	16,536	120	1,269	1,269	2,362	3,224	5,617	18,000	18,000	36,895	64,000	64,000	64,000	64,000	64,000	64,000	64,000	64,000	64,000	64,000	64,000	64,000	64,000
Male	8,416	60	1,350	1,676	2,376	3,181	4,080	5,388	9,764	15,400	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,800	
Age 45–60																							
Female	24,549	70	480	500	1,266	2,320	3,062	6,000	7,477	10,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	355,000	
Male	36,760	100	500	1,644	4,000	9,633	16,400	24,858	33,500	60,000	82,322	82,322	82,322	82,322	82,322	82,322	82,322	82,322	82,322	82,322	82,322	300,000	
<i>France</i>																							
Age 25–34																							
Female	5,860	45	179	482	605	897	1,661	4,059	4,705	6,242	12,986	12,986	12,986	12,986	12,986	12,986	12,986	12,986	12,986	12,986	12,986	80,401	
Male	4,354	1	673	1,012	1,596	2,061	2,896	3,650	4,207	5,559	9,235	9,235	9,235	9,235	9,235	9,235	9,235	9,235	9,235	9,235	9,235	23,726	
Age 35–44																							
Female	4,818	160	449	870	1,325	2,254	3,788	5,429	6,000	7,122	9,993	9,993	9,993	9,993	9,993	9,993	9,993	9,993	9,993	9,993	9,993	23,284	
Male	11,240	80	541	1,280	2,472	3,500	4,450	5,977	7,339	14,439	27,929	27,929	27,929	27,929	27,929	27,929	27,929	27,929	27,929	27,929	27,929	185,721	
Age 45–60																							
Female	12,378	289	888	1,098	1,928	3,158	5,370	8,879	11,783	15,514	26,200	26,200	26,200	26,200	26,200	26,200	26,200	26,200	26,200	26,200	26,200	90,000	
Male	20,486	195	835	1,771	3,393	5,200	8,842	12,748	17,823	25,537	47,877	47,877	47,877	47,877	47,877	47,877	47,877	47,877	47,877	47,877	47,877	179,602	
<i>Slovakia</i>																							
Age 25–34																							
Female	1,722	113	271	415	540	684	957	1,148	1,611	2,080	3,770	3,770	3,770	3,770	3,770	3,770	3,770	3,770	3,770	3,770	3,770	10,397	
Male	2,203	209	396	505	632	912	1,332	1,712	2,320	2,906	4,746	4,746	4,746	4,746	4,746	4,746	4,746	4,746	4,746	4,746	4,746	14,019	
Age 35–44																							
Female	2,409	124	371	561	676	1,060	1,483	1,869	2,389	3,189	5,045	5,045	5,045	5,045	5,045	5,045	5,045	5,045	5,045	5,045	5,045	20,000	
Male	3,923	126	406	746	1,138	1,594	2,065	2,777	3,787	6,738	10,159	10,159	10,159	10,159	10,159	10,159	10,159	10,159	10,159	10,159	10,159	20,644	
Age 45–60																							
Female	2,464	46	336	551	751	931	1,224	1,602	2,095	3,431	8,366	8,366	8,366	8,366	8,366	8,366	8,366	8,366	8,366	8,366	8,366	12,047	
Male	2,550	104	495	783	1,098	1,453	1,807	2,238	2,749	3,396	5,624	5,624	5,624	5,624	5,624	5,624	5,624	5,624	5,624	5,624	5,624	14,612	

Notes: This table shows the average level of occupational pension wealth owned by women and men in three age groups across the unconditional distribution of occupational pension wealth.

Source: HFCS 2010, authors' calculations.

(Wilmington, 2014). Belgian men, at the other end of the spectrum, own the highest occupational pensions across much of the net wealth distribution. Women in Belgium, however, are faced with a relative gender gap between around 20 percent and 80 percent, and thus in many deciles on average own less occupational pension wealth than, for instance, German women. Among the countries studied here, Belgium seems to be the only country with three effectively equal pillars of a pension system, since a scheme of sectoral complementary pensions was introduced in 2003 to further extend the occupational pillar (OECD, 2013). Furthermore, the workforce covered by occupational pension is relatively high in Belgium, with 75 percent of workers covered, compared to Austria, for example, with just 30 percent (PensionsEurope, 2012).

These data thus permit a—highly tentative—conclusion that the gender wealth gap for single households appears to broadly persist at the individual level for the entire population in the Euro area, at least for occupational pension wealth. However, a more detailed analysis of the pension systems in the countries studied here—in particular, the interplay of the other two pillars of the pension system (public and voluntary private pension plans)—would be required for more substantiated insights into the gender gap for this wealth component.

5. DISCUSSION AND CONCLUSION

It is well documented that wealth is unevenly distributed, but gender differences in wealth remain under-studied, especially in cross-country comparisons. This is the first paper to examine the gender wealth gap in multiple European countries (Austria, Belgium, Germany, Spain, France, Greece, Portugal, and Slovakia). It uses the Household Finance and Consumption Survey of the European Central Bank to test for gender differences in wealth in working-age (25–60 years) “single” households consisting of only one adult, male or female.

The raw data show little difference in the net wealth owned by single households across much of the distribution. Only at the top of the unconditional distribution of net wealth does a substantial difference between genders appear. Consequently, an OLS analysis does not show an unexplained gap in average net wealth between male and female single households in the full specification. Somewhat more surprisingly, quantile regressions at the upper end of the distribution (95th percentile) yield mixed evidence for a gender gap in net wealth.

Where it can be confirmed statistically, the gender gap in net wealth is economically significant; it ranges from 25 percent in France to 100 percent in Austria in different specifications of the control variables. Furthermore, covariates show the expected signs. Youth, seniority, education, and marital status have the expected effects. Children are correlated negatively and inheritances positively with wealth of single households. Wealth rises with the ownership of certain asset classes, but the holding of debt is statistically insignificant.

In order to investigate the gender wealth gap in more detail, this paper looked beyond differences in net wealth to the individual components of wealth. Differences in gross wealth appear to drive the gender gap in net wealth at the top of the distribution. The size of the gender gap in gross wealth is compressed

across countries, and at the full specification it amounts to 27 percent in Slovakia, 33 percent in France, 44 percent in Austria, 45 percent in Germany, and 48 percent in Greece. However, in four countries—Spain, France, Portugal, and Slovakia—a gender gap in (collateralized) debt dampens the gender gap in net wealth sufficiently to render its statistical significance patchy in multivariate analysis. Unsecured debt might play a role in Greece (negatively) and Germany (positively), although quantile regressions detect little statistical significance for this debt component at the top of the distribution.

Since data are available only at the household level, selection into single households may be a concern. The descriptive analysis suggests that there are systematic differences in the characteristics of female and male single households, and that the mechanisms affecting selection into being a single household (and thus in our sample) may be related to age, the presence of children, relationship status, home ownership, and earnings. We follow the literature in truncating our sample by age, and we apply a Heckman selection model in all our results. In addition, we perform a robustness check using occupational pension wealth, for which person-level data are available.

The country-level differences in the gender gap in net wealth are likely to be affected by historical trajectories, institutions, and social norms. For instance, selection into single households, as well as wealth, might be driven less strongly by individual traits such as risk preference in countries where large family systems are the norm. This paper has provided a brief discussion of country differences in availability and affordability of childcare facilities, the legal framework surrounding divorce, taxation of wealth and inheritances, housing policies, pension systems, and banking practices where they might explain differences in the gender wealth gap across countries.

The work presented here has answered some important questions regarding the gender wealth gap in eight European countries, but opened the door to several others. First, it is clear that the availability of data measuring wealth at the individual level, such as in the German Socio-Economic Panel (Wagner *et al.*, 2007), would be useful in measuring a gender wealth gap for the entire population. Second, a more in-depth analysis of the effect of institutional differences on the gender wealth gap would be a fruitful avenue for future research. Third, research on the mechanisms which determine wealth accumulation and how they differ for women and men would be useful, either by analysing panel data (as in the preliminary work of Sierminska *et al.*, 2015) or in a cross-cohort analysis. Just as studying pay gaps by gender tells us a great deal about the structure of our society and economy, a greater understanding of wealth gaps by gender will illuminate the ways in which wealth is intertwined with economic and social outcomes.

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SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this paper at the publisher's website:

Appendix A.1: Descriptives

Table A.1: Descriptive Statistics for Independent Variables by Country and Household Type

Appendix A.2: Selection Model

Table A.2: Results of Selection Model Predicting the Probability of Living in a Single Household

Appendix A.3: OLS Model

Table A.3: Net Wealth of Single Households at the Mean—Austria

Table A.4: Net Wealth of Single Households at the Mean—Belgium

Table A.5: Net Wealth of Single Households at the Mean—Germany

Table A.6: Net Wealth of Single Households at the Mean—Spain

Table A.7: Net Wealth of Single Households at the Mean—France

Table A.8: Net Wealth of Single Households at the Mean—Greece

Table A.9: Net Wealth of Single Households at the Mean—Portugal

Table A.10: Net Wealth of Single Households at the Mean—Slovakia

Appendix A.4: Net Wealth

Table A.11: Net Wealth of Single Households at the Top of the Distribution—Austria

Table A.12: Net Wealth of Single Households at the Top of the Distribution—Belgium

Table A.13: Net Wealth of Single Households at the Top of the Distribution—Germany

Table A.14: Net Wealth of Single Households at the Top of the Distribution—Spain

Table A.15: Net Wealth of Single Households at the Top of the Distribution—France

Table A.16: Net Wealth of Single Households at the Top of the Distribution—Greece

Table A.17: Net Wealth of Single Households at the Top of the Distribution—Portugal

Table A.18: Net Wealth of Single Households at the Top of the Distribution—Slovakia

Appendix A.5: Gross Wealth

Table A.19: Gross Wealth of Single Households at the Top of the Distribution

Appendix A.6: Real Wealth

Table A.20: Real Wealth of Single Households at the Top of the Distribution

Appendix A.7: Financial Wealth

Table A.21: Financial Wealth of Single Households at the Top of the Distribution

Appendix A.8: Debt

Table A.22: Debt of Single Households at the Top of the Distribution

Appendix A.9: Collateralized Debt

Table A.23: Collateralized Debt of Single Households at the Top of the Distribution

Appendix A.10: Unsecured Debt

Table A.24: Unsecured Debt of Single Households at the Top of the Distribution

Appendix A.11: Main Residence

Table A.25: Value of Main Residence of Single Households at the Top of the Distribution