level characteristics which drive this gap. Third, we extend the analysis of net wealth to its constituent parts, and show the results of quantile regressions at the 95\textsuperscript{th} percentile predicting gross wealth and its components, financial and real wealth, and debt as well as its components, secured and unsecured debt. Finally, we check the robustness of our gender wealth gap at the household level by looking at gender differences in occupational pension wealth, for which data are collected at the person level in the HFCS.

The results are in line with the limited existing literature on gender differences in the wealth distribution in the U.S., 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. Quantile regressions on net wealth at the top of the distribution, however, show mixed evidence of a gender “glass ceiling” in wealth. On the whole, we find that labour market characteristics and participation in asset and debt categories go a long way towards explaining the differences in wealth between male and female single households. The heterogenous results in the gender net wealth gap across countries lead us to look deeper at the gender gap in gross wealth and debt, the two components of net wealth. This analysis sheds light onto the gendered distribution of wealth categories across countries which was previously veiled by looking at net wealth only. Further, differences in historical trajectories, institutions, and social norms in the eight countries that we analyse here also appear to play an important role. We provide a discussion of how various social and legal institutions across countries may explain some findings regarding the gender wealth gaps we find in the data.

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 for net wealth, section 4.2 covers the additional wealth categories, and section 4.3 contains the robustness check of the gender wealth gap. 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). An understanding of the distribution of wealth by gender, though, is not so clearly established. 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)):

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

That is, the household stock of assets \( A_t \) 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.\(^2\)

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 hypothesis implies the accumulation of wealth during phases of labour 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 tends 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). Some literature suggests that the share of women within the wealthiest 0.4% of people in the U.S. may even serve as a proxy for the importance of inherited wealth (Edlund and Kopczuk, 2009). However, Edlund and Kopczuk (2009) note that the hypothesis that “men make, but women inherit great fortunes” does not hold for the lower wealth groups. The case of gifts among the living does not appear to be quite as clear-cut, since these tend to be given

\(^2\)The initial level of wealth \(A_t\) is of course the sum of previous periods’ \(A_{t+1}\), and its gender difference is therefore dependant on the other components of equation 1.
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, 2015). Neelakantan and Chang (2010) show that the gender gap in wealth at retirement persists in the U.S. even after accounting for risk preferences. 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., 2015a), 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, i.e. 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 labour 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 vast majority of empirical studies of the gender wealth gap 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 use 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. Yamokoski and Keister, 2006; Schmidt and Sevak, 2006).

The approach of analysing only households with one adult may be plagued by potential
selection issues. Five main issues may 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 re-married 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, Germany, Belgium, France, Greece, Spain, 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 same HFCS data used here 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, as hinted above, 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, labour market outcomes might be influenced by the availability and affordability of child care facilities. Second, the legal framework surrounding divorce might lead to different gender wealth gaps across countries. Third, taxation of wealth and inheritance 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. 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 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 the survey weights provided by the HFCS. For a detailed description of the survey methodology, 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 methodologies other than computer assisted personal interviews (European Central Bank, 2013a).