

# WEALTH SHOCKS AND LABOUR SUPPLY IN EUROPE

THIS VERSION 4<sup>TH</sup> SEPTEMBER 2018

PRELIMINARY DRAFT

PLEASE DO NOT QUOTE WITHOUT AUTHORS' PERMISSION!

Miguel A. Malo

Universidad de Salamanca

[malo@usal.es](mailto:malo@usal.es)

Dario Sciulli

Università di Chieti-Pescara

[dario.sciulli@unich.it](mailto:dario.sciulli@unich.it)

## Abstract

This paper analyzes how the receipt of a wealth transfer (inheritance or gift) in the 2008-2013 period affects the probability of being in the labour force in 2014 in 16 European countries. The analysis is based on cross sectional data from the Household Finance and Consumption Survey and adopt a bivariate probit approach (and its extensions) to account for endogeneity when estimating the impact of a wealth transfer on labour supply. Our preliminary findings suggest that receiving an inheritance reduces the probability of being in the labour force in a not significant way. Receiving a gift, instead, increases labour market participation, possibly because of the increasing chances of staying or becoming self-employed. These impacts, however, are not homogenous among population groups. Receiving a relatively wealthy gift decreases labour market participation of highly educated, while receiving an inheritance up to 250000 euros, increases the labour market participation of females.

**Keywords:** wealth shock, labour supply, endogeneity

**JEL codes:** J22, C36

## **Introduction**

The model of labour-leisure choice suggests that if leisure is a normal good, a positive wealth shock induces individuals to revise their time allocation, by increasing leisure and reducing labour supply. In this context, the so-called “Carnegie conjecture” (Holtz-Eakin et al. 1993), asserts that receiving an inheritance lowers work effort and labour supply of heirs. Empirical evidence supporting theoretical predictions, however, is relatively scarce. First, because the availability of data accounting for wealth shocks is limited; second, because the identification of the impact of wealth shocks requires being cautious, since the relationship between work outcomes and wealth shocks is likely to be affected by endogeneity problems.

A recent stream of the empirical literature has tried to identify the wealth shock effect on labour supply, by evaluating the impact of winning a lottery prize, which is substantially exogenous with respect to labour choices. In this context, Imbens et al. (2001) found that mid- ‘80s lottery winners in Massachusetts reduced their labor income, because of increasing time devoted to leisure. Cesarini et al. (2017), found that winning a lottery prize in Sweden produced a modest impact on labour supply, and that the impact is stronger for winners than their spouse. Picchio et al. (2018), focusing on the Dutch case, found a small but significant effect of winning a lottery prize on labour earnings and, therefore, on working hours, while they do not find significant effect of lottery prizes on the probability of being employed.

A more structured literature has tried to empirically test the existence of the income effect by investigating the impact of receiving an inheritance on labour supply, both along the extensive and the intensive margins. In this context, the empirical evidence suggests that receiving an inheritance reduces labour supply, but the effect is small in magnitude and sometime non-statistically significant. Holtz-Eakin et al. (1993), for example, found that receiving an inheritance significantly reduces the labour market participation, and that the negative impact increases with the amount received. Joulfaian and Wilhelm (1994) found evidence of a small reduction in labour supply because of inheritances for both men and married women. The receipt of an inheritance is also found to affect the retirement behavior. Brown et al. (2010), have found that an inheritance receipt is associated with a significant increase in the probability of retirement, especially when the wealth shock is unexpected. Sila and Sousa (2014) find evidence of a small reduction of labour supply along the extensive margin in the case of large windfall gains (unexpected inheritance or lottery wins), while working hours are not significantly affected.

The issue of expectations plays a role when evaluating the impact of receiving an inheritance. The life-cycle model, in fact, suggests that if an inheritance is completely expected, its effect is incorporated into the labour supply profile along the life cycle. Thus, the receipt of an expected inheritance is likely to determine a quite negligible effect on labour supply at the moment in which it is received. Conversely, when inheritance is unexpected, the wealth shock is likely to determine a discontinuity drop in the marginal utility of wealth, and this possibly determines significant changes in the labour supply. Doorley and Pestel (2016), found that receiving an inheritance in Germany, whatever the amount, does not affect the hours of work of males, while it reduces that of females. In any case, however, they found that no differences arise because of expected and unexpected inheritance. Recently, Blau and Goodstein (2016), investigating older married couples, have emphasized that the impact on labour force participation of receiving an inheritance is significant for heirs, while it is negligible for their spouses, consistently with a model of limited commitment in the household. Finally, the literature has highlighted that receiving an inheritance is positively associated with stay or become self-employed, as a financial windfall gain may help to start-up or the extend a business (Holtz-Eakin et al. 1994a and 1994b, Blanchflower and Oswald 1998, Taylor 2001, Hurst and Lusardi, 2004), especially in presence of liquidity constraints.

This paper contributes to this stream of literature in various manners. First, we analyze the impact of a wealth transfer on employment outcomes focusing on sixteen European countries. Existing empirical analysis has more frequently investigated the American situation, while European countries have been less investigated (see Blanchflower and Oswald 1998 for UK, Taylor 2001 for UK, Elinder et al. 2012 for Sweden, Doorley and Pestel 2016 for Germany). Recently, Sila and Sousa (2014) have investigated the situation of European workers in the EU-15 community using data from the 1994-2001 ECHP.

Thus, this paper has the merit of enhancing the knowledge of the impact of wealth transfer on labour supply in the European context using recent data and including some eastern countries. Second, when analyzing the impact of wealth shocks, we account for both the receipt of inheritances and gifts. This would potentially important, as the causes of wealth transfer diverges when considering inheritances and gifts and, therefore, also the effects they produce on labour supply may diverge. Previous literature, however, may intrinsically assume that there are few differences between gifts and inheritances beyond their different fiscal treatment. In this vein, Poterba (2001) remarks that large gifts and bequest can serve as substitutes for richer individuals.

Wealthy individuals can transfer wealth either by making gifts while they are alive (inter vivos gifts) or by leaving bequests. For these individuals, the tax system may be crucial to decide how (and when) transfer income (Poterba 2001). Beyond this potential substitution for richer households, both wealth transfers have a key difference: while inheritance is a one-shot transfer (per donor), gifts may be multiple along time. On the other hand, a gift may respond to an explicit need of the donee expressed towards the potential donor –i.e. a son/daughter asking to his/her parents to meet ends, partially funding training, house renovation, starting a business, and so on. Therefore, a gift may be very similar to an in-kind transfer, as the donor may expect that the donee will spend the transfer in a very specific end. In addition, presumably inheritances are larger than gifts, which is confirmed on average by the descriptive statistics (see Table 1). Because of their lower average size and because of gifts may be close to in-kind transfers, we expect a lower impact of gifts on labour supply – if any. Only for richer individuals and when the gift is relatively large, we may expect an impact of gifts similar to an inheritance.

Finally, we analyze the impact of wealth transfer on specific population sub-groups, defined according to gender, age and educational level characteristics. Therefore, we interact wealth transfer identifiers with mentioned characteristics with the aim of uncovering heterogenous effects across sub-groups. Previous literature has suggested that receiving an inheritance may increase the propensity to retire from the US labour market of older workers (Brown et al. 2010), while Doorley and Pestel (2016) found evidence that the receipt of an inheritance affects differently the hours of work of males and females. No specific evidence exists, however, about heterogenous effects of inheritance receipt because of different educational level. In the lottery winners research, Kaplan (1988) finds that the level of education associates with labour supply choices: generally, the lower the educational level of winners, the higher of quits and retires, and the greater the reduction in working hours. However, Kaplan (1998) also finds that some people used winnings to further their education. The literature on inheritances sometimes focused on previous earnings, as in Holtz-Eakin et al (1993). Usually, higher previous earnings increase the probability of remaining in labour force. As higher education is correlated with earnings, we can expect that a higher educational level will also increase the probability of remaining. When analysing the impact of the (instrumented) hourly wage on working hours per week, in the windfall gains literature, the hourly wage decreases working hours per week (Sila and Sousa 2014). Therefore, a mixed pattern emerges: higher previous earnings (higher education) increase the

probability of remaining in the labour force, but higher wages (higher education) decreases working hours – always in estimations analysing the impact of inheritances or windfall gains on labour supply.

Analyzing the wealth transfer effects would be important also for policy assessment purposes. The last decade, in fact, has been characterized by several fiscal reforms, which have been prevalently oriented to the reduction or the abolition of inheritance and/or gift taxes (European Commission, 2014). Favorable tax policy may increase the probability of receiving a gift, as the cost for the donors would be smaller; in addition, it may increase the net inheritance amount received by the heirs, with possible consequences for labour supply decisions. Thus, uncover the effect of a wealth transfer on labour supply, would be also important to evaluate the opportunity of setting some tax policy reforms.

When evaluating the impact of a wealth transfer on labour supply we have to consider the possibility of endogeneity problems. For example, the inheritance and the gift amount received by an individual and his/her employment prospects could be both affected by unobservable familiar background variables, resulting in an omitted variables problem. In addition, the employment status possibly guides the probability of receiving a gift, resulting in a reverse causality problem. To consider these endogeneity issues, we implement two-equation system models, where the benchmark is a bivariate probit model (see Altonji et al 2005, Neal 1997 for similar applications). We also considered some extensions (bivariate model with ordered and multinomial probit links) to account for the amount of wealth transfer and different employment outcomes.

Specifically, we investigate how the 2014 labour force participation of individuals aged 25-59 is affected by having received an inheritance or a gift in the 2008-2013 period. The analysis is based on the Household Finance and Consumption Survey (HFCS), that has been conducted by the Household Finance and Consumption Network, a survey of specialists, statisticians and economists from the European Central Bank, the national central banks of the Eurosystem and a number of national statistical institutes.

The paper proceeds as follows. Section 2 provides a description of the econometric analysis. describes the data and the variables used. Section 4 describes the estimation results. Section 5 concludes.

## 2. Econometric Analysis

This section presents the empirical strategy adopted to estimate the impact of having received a wealth transfer (inheritance or gift) in the 2008-2013 period on the 2014 employment outcome of individuals aged 25-59 living in sixteen European countries.

Intergenerational transfers could be potentially endogenous in the employment equations because of omitted variables problem. For example, the inheritance or the gift amount received by an individual and his/her employment prospects could be both affected by unobservable familiar background variables. In addition, the employment status possibly guides the probability of receiving a gift<sup>1</sup>, resulting in a reverse causality problem, even though this circumstance would be slightly mitigated as the work outcome is measured at least one year later the reception of the gift.

With the aim of considering the endogeneity issue, we estimate a two-equation system model (e.g. Altonji et al, 2005 and Neal 1997, for a similar approach), using a limited-information maximum likelihood (LIML) estimator. The first (reduced-form) equation models the intergenerational transfer outcome suspected of being endogenous and includes an instrument to be excluded from the main equation. The main (structural) equation models the employment outcome and includes the (endogenous) intergenerational transfer indicator on its right side<sup>2</sup>.

We consider different model specifications when estimating the impact of receiving an intergenerational transfer on employment outcomes, by combining alternative wealth transfer and employment outcomes' indicators. First, we consider two alternative indicators to model the wealth transfer: a) a binary indicator, indicating if a household has received an inheritance or a gift (separately) in the 2008-2013 period; b) a categorical indicator, indicating the amount of wealth transfer received according to the following ordinal scheme: 0, 1-30000, 30001-100000, 100001-250000, more than 250000. Second, we consider alternative employment outcomes: a) a binary indicator, indicating if an individual is in the labour force or not; b) a multinomial indicator, distinguishing if an individual is not employed, employed or self-employed.

---

<sup>1</sup> For example, a donor may operate a money transfer to support an existing business of his/her son/daughter and to help his/her to exit from a not employment status.

<sup>2</sup> Our model is estimated using the routine “*cmp*” written in STATA by Roodman (2011). Among others, it allows to adopt both the seemingly unrelated and instrumental variable approaches, and to consider equations with different kind of response variables in the spectrum of generalized linear models with Gaussian error distribution, including probit, ordered probit and multinomial probit, as well as continuous outcomes.

Therefore, the outcome of the wealth transfer equation is, in turn, a binary and an ordinal categorical variable. In the first case, it takes value one if the individual has received an inheritance (a gift) and zero otherwise and, in the second case, it ranges from 1 to 5 according to the wealth amount received. The wealth transfer equation is, therefore, estimated by using, in turn, a probit model and an ordered probit model.

The employment outcome equation is, in turn, a binary and a multinomial variable. In the first case, that variable takes value one if the individual is into the labour force and zero otherwise, while in the second case the employment has a multinomial outcome, that are not employed ( $j = 1$ ),<sup>3</sup> employed ( $j = 2$ ) and self-employed ( $j = 3$ ), respectively. The employment outcomes equation is, therefore, estimated by using, in turn, a probit model and a multinomial probit model, which allows individuals to choose among employment alternatives (employment and self-employment) that are not inherently ordered.

In sum, we estimate four different specifications of the two-equation system that we employ to uncover the impact of receiving a wealth transfer on employment outcome: a) a probit-probit specification (corresponding to a bivariate probit model), b) an ordered probit-probit specification, c) a probit-multinomial probit specification and, d) an ordered probit-multinomial probit specification. All equations derive from latent continuous variables and assume normally distributed errors.

The probit model we implement to estimate the wealth transfer equation is, therefore, derived from a latent continuous variable ( $y_{1i}^*$ ) related to a vector of explanatory variables  $z$  and an additional (instrumental) variable  $q$  introduced for identification purposes<sup>4</sup>, according to a standard linear model that can be represented as follows:

$$y_{1i}^* = \mathbf{z}_i' \alpha + \delta q_i + v_i \tag{1}$$

where,  $\alpha$  is a vector of associated parameters to  $z$ ,  $\delta$  is a parameter associated to the instrument and  $v$  is an error term drawn from a standardized normal distribution. While  $y_{1i}^*$  is unobserved,  $y_{1i}$  would be observed, and related to  $y_{1i}^*$  by the following relationship:

---

<sup>3</sup> The not employed category includes both inactive and unemployed.

<sup>4</sup> We consider two different instruments in our analysis. The inheritance variable is instrumented using a variable measuring the change in mortality rates in the 2008-2013 period, while the gift variable is instrumented using an indicator of the reduction or abolition of taxes on gifts and inheritance in the 2008-2013 period.

$$y_{1i} = \begin{cases} 1 & \text{if } y_{1i}^* > 0 \\ 0 & \text{otherwise} \end{cases} \quad (2)$$

The alternative specification that we consider when modeling the wealth transfer takes into account its amount through an observed ordinal categorical variable, which is related to the latent continuous variable  $y_{1i}^*$  as follows:

$$y_{1i} = \begin{cases} 1 & \text{if } y_{1i}^* \leq \mu_1 \\ 2 & \text{if } \mu_1 < y_{1i}^* \leq \mu_2 \\ 3 & \text{if } \mu_2 < y_{1i}^* \leq \mu_3 \\ 4 & \text{if } \mu_3 < y_{1i}^* \leq \mu_4 \\ 5 & \text{if } y_{1i}^* > \mu_4 \end{cases} \quad (3)$$

where  $\mu_1, \mu_2, \mu_3$  and  $\mu_4$  are a set of threshold parameters to be estimated. Under the normality assumption of the residual  $v$ , the corresponding model is a standard ordered probit specification.

The latent continuous variable representing the employment outcome propensity ( $y_{2i}^*$ ) is related to a set of explanatory variables  $x$  and the endogenous variable  $y_{1i}$  according to a standard linear model as follows:

$$y_{2i}^* = \gamma y_{1i} + x_i' \beta + u_i \quad (4)$$

where,  $\gamma$  is the coefficient associated with the endogenous variable  $y_{1i}$ ,  $\beta$  is a vector of associated parameters to  $x$ , including some  $x$ -variables, and  $u$  is an error term drawn from a standardized normal distribution.

As above, while  $y_2^*$  is unobserved,  $y_2$  would be observed, and related to  $y_2^*$  by the following general relationship:

$$y_{2i} = \begin{cases} 1 & \text{if } y_{2i}^* > 0 \\ 0 & \text{otherwise} \end{cases} \quad (5)$$

Finally, we also consider an alternative specification for the employment outcome, which allows as to distinguish employed and self-employed individuals by implementing a multinomial approach.

The multinomial probit model also derives from the latent continuous variable  $y_2^*$ , and the observable  $y_2$  outcome is represented by the following general relationship:



$$y_{2i} = \begin{cases} j & \text{if } y_{2ij}^* = \max(y_{2i1}^*, y_{2i2}^*, y_{2i3}^*) \\ 0 & \text{otherwise} \end{cases} \quad (6)$$

where the probability of choosing the category  $j$  corresponds to:

$$\Pr(y_{2i} = j | y_{1i}, x_i) = \Pr(y_{2ij}^* > y_{2i1}^*, \dots, y_{2ij}^* > y_{2i3}^*) \quad (7)$$

The two-equation system model allows the error terms of both equations to be correlated. The correlation terms  $\rho_{vu}$ , therefore, measures the correlation between residuals and returns a measure of the endogeneity of  $y_1$  in the  $y_2^*$  equation. In particular, we estimate a correlation term  $\rho_{vu}$  when implementing the probit-probit model and the ordered probit-probit model, and two correlation terms  $\rho_{vu2}$  and  $\rho_{vu3}$  (related to employment and self-employment outcomes in the multinomial specification), when estimating the probit-multinomial probit model and the ordered probit-multinomial probit model.

Finally, we complement the parameters' estimation with estimations of the average marginal effects (AMEs), which would be helpful when interpreting the impact of explanatory variables on outcomes of interest.

### 3. Data

The analysis is based on data from the Household Finance and Consumption Survey (HFCS), that has been conducted by the Household Finance and Consumption Network (HFCN), a survey of specialists, statisticians and economists from the European Central Bank, the national central banks of the Eurosystem and a number of national statistical institutes.

HFCS provides information on more than 62000 households across 18-euro area countries plus Hungary and Poland, constituting a representative micro dataset at the euro area and member state level. Among others, it provides data on employment outcomes, including employment status and working hours, as well as several individual, household and job-related characteristics. Importantly, it also provides information on intergenerational transfers, including the amount and the year in which the transfer has been received. In addition, it allows to distinguish the type of transfer received, i.e. inheritance or gift.

Because the 2012 wave provides less completed information on intergenerational transfers used in our analysis, we rely on the 2014 cross-sectional wave. In addition, because of relevant missing questions in the intergenerational transfer section of the survey for Finland and few intergenerational transfers observations for Cyprus, Malta and Greece, however, our analysis is based on the remaining 14 euro-area countries plus Hungary and Poland. HFCS data does not allow to distinguish between expected and unexpected wealth transfers, which is potentially relevant to determine significant impacts on labour supply according to the life-cycle model predictions. In addition, HFCS does not allow to identify the family member recipient of the wealth transfer in the household.

The study analyzes heads of household and relative partners aged between 25 and 59 years old. This selection leaves us about 65000 individuals, 29% of which are received an intergenerational transfer in their life course. Considering the 2008-2013 time-span, 7% of sample individuals have received an inheritance and 4.6% have received a gift. The related inheritance amount averaged across heirs is about 108000 euros expressed in purchasing power parities (PPP), while the average amount is about 88000 euros in PPP when focusing on gift (see Table 1)<sup>5</sup>. The median amount for both type of intergenerational transfers is about 30000 euros in PPP, while 8.3% of heirs and 7.1% of those receiving a gift collect more than 250000 euros in PPP.

The distribution of intergenerational transfers does not diverge by gender, while age and education contribute to explain heterogenous distribution of intergenerational transfers (Table 1, columns 3, 5, 7 and 9). About 2/3 of heirs are aged 45-59, while the related proportion decreases to 1/3 when focusing on gifts. The percentage of high educated heirs is about 45%, while among individuals not receiving any inheritance highly educated represent 36%. In addition, almost 60% of those having received a gift are highly educated, while highly educated individuals represent 35% among those not having received any gift. Highly educated individuals, therefore, are more likely to receive an intergenerational transfer (especially gifts); inheritances are more likely to concern older individuals while gifts are more likely to be pointed at younger ones.

Preliminary information on the association between international transfers and employment outcomes may be drawn from Tables 1 and 2. Looking at the Table 1, it emerges that labour force participation is slightly lower for individuals having received an inheritance in the previous 6-years' time-span (86.7% versus 87.1%), while

---

<sup>5</sup> Table 1 also reports descriptive statistics on control variables used in the empirical analysis, including instruments for exclusion restriction, i.e. the variable measuring the change in mortality rates in the 2008-2013 period, and the dummy variable indicating the abolition or a reduction in inheritance and gift taxes in the 2008-2013 period.

the proportion of employed individuals is higher among those having received an inheritance than among their counterpart (79.3% versus 77.4%). Among individuals having received a gift in the 2008-2013 period, both the labour market participation and the proportion in employment is consistently higher when compared to individuals not having received any gift in the same period (92.4% versus 86.8% and 87% versus 77.1%, respectively).

Table 1. Descriptive statistics

	Mean	Std dev.	Inheritance				Gift			
			Yes		No		Yes		No	
			Mean	Std dev.	Mean	Std dev.	Mean	Std dev.	Mean	Std dev.
Labour force participation	0.870	0.336	0.867	0.339	0.871	0.336	0.924	0.264	0.868	0.339
Employment	0.775	0.417	0.793	0.405	0.774	0.418	0.870	0.337	0.771	0.420
Inheritance 2008-2013	0.070	0.255	-	-	-	-	-	-	-	-
Inheritance amount 2008-2013 in 1000 euros ppp	-	-	108.112	363.808	-	-	-	-	-	-
Gift 2008-2013	0.046	0.210	-	-	-	-	-	-	-	-
Gift amount 2008-2013 in 1000 euros ppp	-	-	-	-	-	-	88.634	249.320	-	-
Female	0.533	0.499	0.538	0.499	0.532	0.499	0.512	0.500	0.534	0.499
Age 25-34	0.171	0.376	0.114	0.318	0.175	0.380	0.270	0.444	0.166	0.372
Age 35-44	0.294	0.456	0.232	0.422	0.299	0.458	0.379	0.485	0.290	0.454
Age 45-54	0.354	0.478	0.384	0.486	0.352	0.478	0.261	0.439	0.359	0.480
Age 55-59	0.181	0.385	0.270	0.444	0.175	0.380	0.090	0.286	0.186	0.389
Low education	0.214	0.410	0.172	0.377	0.217	0.412	0.077	0.267	0.220	0.414
Medium education	0.423	0.494	0.382	0.486	0.426	0.495	0.336	0.472	0.427	0.495
High education	0.363	0.481	0.446	0.497	0.357	0.479	0.587	0.493	0.353	0.478
Partner at work	0.623	0.485	0.667	0.471	0.620	0.485	0.751	0.433	0.617	0.486
Married	0.721	0.449	0.760	0.427	0.718	0.450	0.762	0.426	0.719	0.450
Number of children aged 0-6	0.306	0.616	0.231	0.549	0.312	0.621	0.463	0.717	0.298	0.610
Born in foreign country	0.199	0.400	0.142	0.349	0.204	0.403	0.083	0.276	0.205	0.404
Unemployment rate 2014	9.729	4.377	9.396	3.791	9.754	4.417	8.361	2.362	9.795	4.440
Change in mortality rates	-0.634	7.051	0.489	6.741	-0.719	7.066	2.179	5.417	-0.770	7.092
Reduction/abolition inheritance/gift taxes	0.197	0.398	0.146	0.353	0.201	0.401	0.157	0.364	0.199	0.399

Source: own elaborations based on HFCS data

Table 2 informs about labour market participation and the proportion of individuals in employment by accounting for intergenerational transfers amount. The amount is coded in four different groups, according to the following limits: 1 to 30000 euros expressed in PPP, 30001 to 100000 euros in PPP, 100001 to 250000 euros in PPP and more than 250000 euros in PPP. When focusing on the receipt of an inheritance the impact on labour force participation and employment is non-linear: the highest level of labour force participation is found for those receiving an inheritance up to 30000 euros, while the lowest one is found for individuals having received an inheritance higher than 250000 euros, suggesting the existence of standard income effect on labour supply in presence of relevant wealth transfers. The highest proportion in employment is found for those individuals having received an inheritance which amount included between 100001 and 250000 euros. When focusing on gifts, having received one increase both labour force participation and employment, but the impact

is non-linear. The highest level of labour force participation and employment is found for individuals having received a gift which amount is included between 30001 and 100000 euros.

Table 2. Employment outcomes by amount of wealth transfer

Amount	Inheritance		Gift	
	Labour force participation	Employment	Labour force participation	Employment
No transfer	0.870	0.772	0.867	0.769
1-30000 euros in PPP	0.877	0.789	0.929	0.869
30001-100000 euros in PPP	0.849	0.798	0.937	0.885
100001 -250000 euros in PPP	0.870	0.816	0.912	0.862
more than 250000 euros in PPP	0.840	0.785	0.883	0.858

Source: own elaborations based on HFCS data

#### 4. Estimation results

Table 3 and Table 4 report the estimated average marginal effects (AME) measuring the impact of receiving an inheritance and a gift, respectively, in the 2008-2013 period on the 2014 labour market participation. Specifically, the first column of each table reports the average marginal effects for the wealth transfer binary indicator (inheritance and gift, respectively), while the fourth column reports the average marginal effects for the wealth transfer ordinal indicator (inheritance and gift, respectively), accounting for the amount of money transfer according to a categorical variable taking values: 0, 1-30000 euros, 30001-100000 euros, 100001-250000 euros and more than 250000 euros. The remaining columns illustrate standard errors and P-values.

Estimation results reported in Table 3 reveals that having received an inheritance in the 2008-2013 period does not affect the probability of being in the labor market in 2014 in the 16 European countries here analyzed. The estimated AME is negative (-1.6%) but not statistically significant, given the p-value is 0.668. When accounting for the amount of the inheritance, our estimates confirms that it does not produce statistically significant effects along the extensive margin of labor supply. This finding countervails evidence from Holtz-Eakin et al (2017), which suggested that receiving an inheritance reduces the labor market participation, and that the negative impact increases with the amount of money received, but it is line with Picchio et al. (2018) which focused on the impact of winning a lottery in the Netherlands.

Table 3. The impact of receiving an inheritance on labour market participation

Outcome: Labour force participation	Probit-Probit model			Probit-Ordered probit model		
	AME	s.e.	P-value	AME	s.e.	P-value
Inheritance 2008-2013	-0.016	0.038	0.668	-	-	-
Inheritance amount 2008-2013:						
0 euro	-	-	-	base-category		
1-30000 euros (1)	-	-	-	0.013	0.028	0.645
30001-100000 euros (2)	-	-	-	-0.003	0.037	0.930
100001-250000 euros (3)	-	-	-	0.018	0.039	0.644
more than 250000 euros (4)	-	-	-	-0.013	0.056	0.814

Source: own elaborations based on HFCS data

Estimation results reported in Table 4 refer to the impact of receiving a gift in the 2008-2013 period on the probability of being in the labor market in the 2014. We find that individuals living in households which receipt a gift by the previous six-years period, see their probability of being in the labor market in 2014 increased by 5.5%, but the estimated AME is not statistically significant. When disentangling the money transfer by its amount, however, we find some evidence that receiving a gift significantly increases the probability of being in the labour market. Specifically, having received a gift which amount is less than 30000 euros, increases by 4.6% (p-value 0.085) the probability of being in the labour market with respect to individuals not having received any gift (our base-category). Having received a gift which amount is included between 30000 and 100000 euros increases by 6% (p-value 0.032) the probability of being in the labour market with respect to individuals not having received any gift.

Table 4. The impact of receiving a gift on labour market participation

Outcome: Labour force participation	Probit-Probit model			Probit-Ordered probit model		
	AME	s.e.	P-value	AME	s.e.	P-value
Gift 2008-2013	0.055	0.046	0.231	-	-	-
Gift amount 2008-2013:						
0 euro	-	-	-	base-category		
1-30000 (1)	-	-	-	<b>0.046</b>	<b>0.027</b>	<b>0.085</b>
30001-100000 (2)	-	-	-	<b>0.060</b>	<b>0.028</b>	<b>0.032</b>
100001-250000 (3)	-	-	-	0.031	0.041	0.452
more than 250000 (4)	-	-	-	0.019	0.056	0.733

Source: own elaborations based on HFCS data

In sum, our preliminary results indicate that the direct effect of inheritance is not statistically significant and occasionally positive for gifts. This is against the theoretical prediction of the static labour supply model, which provide for a reduction of labour supply in presence of a positive wealth shock, even along the extensive margin in presence of considerable transfer amount, but it is compatible with the predictions of life-cycle analysis in presence of expected wealth transfers.

While a specific interpretation is difficult, we may deduce that the systematic difference in signs for inheritances and gifts may say that for individuals these types of wealth transfers are markedly different. This possibly suggests that estimation results must be interpreted in the sphere of a 'behavioural' approach: it does not matter the level of the transfer, but the relative amount of the transfer. For the same amount, indeed, a gift will be considered larger than an inheritance and, therefore, the impact would be much more in line with the Carnegie conjecture for gifts than in the case of inheritances. Finally, it would be noted that composition effects are at work. Transfers' receivers, in fact, diverge for relevant characteristics, such as age and education, accordingly to the type of wealth transfer: inheritances' donees are older and less educated than gifts' donees. This may also contribute to explain different effects from receiving inheritance or gift.

We provide a more detailed analysis by interacting the wealth transfer variables with some relevant individual characteristics: gender, age and educational level. This would be relevant to identify diverging effects by population sub-groups and, therefore, to establish if the whole sample estimates hold when disentangling the sub-groups contributions. Estimation results are reported in the tables below Table 5, Table 6 and Table 7, which refer to gender, age and education, respectively.

Focusing on gender (Table 5), we find that the probability of being in the labour market for females increases by 1.5% when receiving an inheritance and decreases by 2% when receiving a gift; in both cases the estimates are not statistically significant. When accounting for the amount of wealth transfer, however, we find that receiving an inheritance ranging from 30000 to 100000 euros and from 100000 to 250000 significantly increases the probability of being in the labour force of females by 3.5% and 4.5%, respectively. The receipt of a gift (amount 30000-100000) increases by 6.6% the probability a male is in the labour market, while it decreases (amount 100000-250000) the probability a female is in the labour force. This confirms that receiving an inheritance or a gift differently affects the probability of being in the labour market and introduces some elements suggesting the existence of gender duality.

When focusing on age (Table 6) the only statistically significant estimate we find reveals that the receipt of a gift reduces by 3.8% the probability of being in the labour force of individuals aged 45-54. When accounting for the amount of the wealth transfer, estimation results are even more mixed. A small amount (up to 30000 euros) of inheritance and gift, increases the probability of being in the labour market for individuals aged 45-54 and 55-59, respectively. Conversely, a greater amount of gift (from 30000 to 100000) would decrease by 10.9% the probability of being in the labour force of individuals aged 55-59, possibly because of early retirement, in accordance with the finding from Brown et al. (2010).

Finally, we focus on estimation results accounting for the role of educational level and displayed in Table 7. When looking at the impact of receiving an inheritance, we find a significant positive impact for middle educated individuals, which probability of being in the labour market increases by 2.3% with respect to middle aged individuals not having received an inheritance in the 2008-2013 period. When accounting for the amount of inheritance, our estimations confirm the positive impact (+ 4%) for middle educated individuals, but only for those receiving a small amount of wealth transfer (up to 30000 euros). When focusing on gifts we find some unexpected results. Receiving a gift reduces the probability of being in the labour force of highly educated individuals by 4.1%. This countervails the results emerged from the descriptive analysis of Kaplan (1988), which pointed in the direction of a positive association between wealth transfer and labour supply for highly educated individuals. When accounting for the amount of gift, this finding is substantially confirmed. Receiving a gift ranging from 30000 to 100000 euros, reduced by 10.2% the probability of being in the labour force for both middle and highly educated individuals, while receiving a gift ranging from 100000 to 250000 euros reduces by 12.2% the probability of being in the labour force for highly educated individuals. As mentioned above, no specific evidence exists in the previous literature about the impact of wealth transfer across different educational levels. However, Holtz-Eakin et al. (1993) when investigating the impact of receiving an inheritance noted that those with higher earnings are more prone to persist in the labour market, suggesting a positive relationship also between higher educational level and labour force participation. In addition, when analysing the impact of the (instrumented) hourly wage on working hours per week, in the windfall gains literature, the hourly wage decreases working hours per week (Sila and Sousa 2014). Therefore, we may have a mixed pattern: higher previous earnings (higher education) increase the probability of remaining in the labour force, but higher wages (higher education) decrease working hours – always in

estimations analysing the impact of inheritances or windfall gains on labour supply. Anyway, our results in Table 7 concerning gifts is against this pattern but note that also the results for inheritances show negative coefficients for high education although they are not statistically significant.



## Gender

Table 5.

DV: Labour force participation	Probit-Probit model			DV: Labour force participation	Probit-Probit model		
	AME	s.e.	P-value		AME	s.e.	P-value
Inheritance 2008-2013	-0.028	0.041	0.491	Gift 2008-2013	0.046	0.046	0.314
Female	-0.133	0.003	0.000	Female	-0.131	0.003	0.000
Inheritance * Female	0.015	0.010	0.126	Gift * Female	-0.020	0.015	0.188

  

DV: Labour force participation	Probit-Ordered probit model			DV: Labour force participation	Probit-Ordered probit model		
	AME	s.e.	P-value		AME	s.e.	P-value
Inheritance amount 2008-2013 (base: no)				Gift amount 2008-2013 (base: no)			
1-30000 (1)	0.007	0.032	0.826	1-30000 (1)	0.039	0.031	0.208
30001-100000 (2)	-0.027	0.045	0.542	30001-100000 (2)	<b>0.066</b>	<b>0.031</b>	<b>0.032</b>
100001-250000 (3)	-0.011	0.051	0.827	100001-250000 (3)	0.053	0.041	0.194
more than 250000 (4)	0.006	0.059	0.919	more than 250000 (4)	0.026	0.061	0.674
Female	-0.134	0.003	0.000	Female	-0.132	0.003	0.000
Inheritance amount (1) * Female	0.010	0.015	0.515	Gift amount (1) * Female	-0.006	0.022	0.780
Inheritance amount (2) * Female	<b>0.035</b>	<b>0.018</b>	<b>0.052</b>	Gift amount (2) * Female	-0.034	0.034	0.320
Inheritance amount (3) * Female	<b>0.045</b>	<b>0.028</b>	<b>0.099</b>	Gift amount (3) * Female	<b>-0.065</b>	<b>0.039</b>	<b>0.099</b>
Inheritance amount (4) * Female	-0.025	0.036	0.480	Gift amount (4) * Female	-0.044	0.050	0.378

Source: own elaborations based on HFCS data

## Age

Table 6

DV: Labour force participation	Probit-Probit model			DV: Labour force participation	Probit-Probit model		
	AME	s.e.	P-value		AME	s.e.	P-value
Inheritance 2008-2013	-0.044	0.050	0.372	Gift 2008-2013	0.034	0.055	0.538
Age group (base: 25-34)				Age group (base: 25-34)			
35-44	0.019	0.004	0.000	35-44	0.020	0.004	0.000
45-54	-0.023	0.004	0.000	45-54	-0.020	0.004	0.000
55-59	-0.152	0.006	0.000	55-59	-0.152	0.006	0.000
Inheritance * Age 35-44	0.014	0.019	0.441	Gift * Age 35-44	-0.005	0.019	0.785
Inheritance * Age 45-54	0.020	0.017	0.239	Gift * Age 45-54	<b>-0.038</b>	<b>0.019</b>	<b>0.051</b>
Inheritance * Age 55-59	0.017	0.018	0.337	Gift * Age 55-59	0.016	0.024	0.500

  

DV: Labour force participation	Probit-Ordered probit model			DV: Labour force participation	Probit-Ordered probit model		
	AME	s.e.	P-value		AME	s.e.	P-value
Inheritance amount 2008-2013 (base: no)				Gift amount 2008-2013 (base: no)			
1-30000 (1)	-0.019	0.047	0.689	1-30000 (1)	0.033	0.033	0.314
30001-100000 (2)	-0.036	0.064	0.574	30001-100000 (2)	<b>0.085</b>	<b>0.026</b>	<b>0.001</b>
100001-250000 (3)	0.044	0.061	0.470	100001-250000 (3)	0.021	0.053	0.687
more than 250000 (4)	-0.043	0.103	0.677	more than 250000 (4)	0.026	0.072	0.720
Age group (base: 25-34)				Age group (base: 25-34)			
35-44	0.019	0.004	0.000	35-44	0.020	0.004	0.000
45-54	-0.023	0.004	0.000	45-54	-0.020	0.004	0.000
55-59	-0.152	0.006	0.000	55-59	-0.150	0.006	0.000
Inheritance amount (1) * Age 35-44	0.004	0.025	0.873	Gift amount (1) * Age 35-44	-0.005	0.025	0.835
Inheritance amount (1) * Age 45-54	<b>0.041</b>	<b>0.024</b>	<b>0.083</b>	Gift amount (1) * Age 45-54	0.004	0.027	0.887
Inheritance amount (1) * Age 55-59	0.022	0.024	0.353	Gift amount (1) * Age 55-59	<b>0.087</b>	<b>0.037</b>	<b>0.019</b>
Inheritance amount (2) * Age 35-44	0.022	0.039	0.571	Gift amount (2) * Age 35-44	-0.055	0.044	0.204
Inheritance amount (2) * Age 45-54	0.018	0.035	0.597	Gift amount (2) * Age 45-54	-0.046	0.045	0.310
Inheritance amount (2) * Age 55-59	0.021	0.035	0.548	Gift amount (2) * Age 55-59	<b>-0.109</b>	<b>0.048</b>	<b>0.023</b>
Inheritance amount (3) * Age 35-44	-0.003	0.076	0.970	Gift amount (3) * Age 35-44	0.029	0.046	0.524
Inheritance amount (3) * Age 45-54	-0.025	0.068	0.708	Gift amount (3) * Age 45-54	-0.025	0.043	0.554
Inheritance amount (3) * Age 55-59	-0.077	0.067	0.253	Gift amount (3) * Age 55-59	0.016	0.056	0.772
Inheritance amount (4) * Age 35-44	-0.014	0.070	0.842	Gift amount (4) * Age 35-44	0.018	0.069	0.798
Inheritance amount (4) * Age 45-54	-0.018	0.065	0.783	Gift amount (4) * Age 45-54	-0.086	0.066	0.194
Inheritance amount (4) * Age 55-59	0.057	0.066	0.388	Gift amount (4) * Age 55-59	0.046	0.084	0.582

Source: own elaborations based on HFCS data

## Education

Table 7

DV: Labour force participation	Probit-Probit model			DV: Labour force participation	Probit-Probit model		
	AME	s.e.	P-value		AME	s.e.	P-value
Inheritance 2008-2013	-0.013	0.042	0.752	Gift 2008-2013	<b>0.108</b>	<b>0.056</b>	<b>0.055</b>
Education (base: low)				Education (base: low)			
Medium	0.084	0.004	0.000	Medium	0.085	0.004	0.000
High	0.143	0.004	0.000	High	0.140	0.004	0.000
Inheritance*Medium education	<b>0.023</b>	<b>0.012</b>	<b>0.059</b>	Gift*Medium education	-0.021	0.023	0.359
Inheritance*High education	-0.004	0.013	0.732	Gift*High education	<b>-0.041</b>	<b>0.025</b>	<b>0.099</b>

  

DV: Labour force participation	Probit-Ordered probit model			DV: Labour force participation	Probit-Ordered probit model		
	AME	s.e.	P-value		AME	s.e.	P-value
Inheritance amount 2008-2013 (base: no)				Gift amount 2008-2013 (base: no)			
1-30000 (1)	-0.010	0.037	0.778	1-30000 (1)	<b>0.064</b>	<b>0.034</b>	<b>0.064</b>
30001-100000 (2)	-0.006	0.044	0.896	30001-100000 (2)	<b>0.112</b>	<b>0.021</b>	<b>0.000</b>
100001-250000 (3)	0.020	0.047	0.671	100001-250000 (3)	<b>0.099</b>	<b>0.033</b>	<b>0.003</b>
more than 250000 (4)	0.014	0.063	0.824	more than 250000 (4)	0.009	0.116	0.936
Education (base: low)				Education (base: low)			
Medium	0.085	0.004	0.000	Medium	0.086	0.004	0.000
High	0.144	0.004	0.000	High	0.142	0.004	0.000
Inheritance amount (1) * Medium education	<b>0.040</b>	<b>0.017</b>	<b>0.021</b>	Gift amount (1) * Medium education	-0.005	0.032	0.863
Inheritance amount (1) * High education	0.030	0.019	0.125	Gift amount (1) * High education	-0.005	0.034	0.884
Inheritance amount (2) * Medium education	0.020	0.024	0.388	Gift amount (2) * Medium education	<b>-0.102</b>	<b>0.061</b>	<b>0.096</b>
Inheritance amount (2) * High education	-0.007	0.024	0.775	Gift amount (2) * High education	<b>-0.102</b>	<b>0.062</b>	<b>0.100</b>
Inheritance amount (3) * Medium education	0.027	0.037	0.461	Gift amount (3) * Medium education	-0.044	0.068	0.524
Inheritance amount (3) * High education	-0.020	0.035	0.574	Gift amount (3) * High education	<b>-0.122</b>	<b>0.066</b>	<b>0.067</b>
Inheritance amount (4) * Medium education	-0.010	0.050	0.838	Gift amount (4) * Medium education	0.075	0.101	0.459
Inheritance amount (4) * High education	-0.038	0.048	0.425	Gift amount (4) * High education	0.029	0.099	0.766

Source: own elaborations based on HFCS data

We remark that in the Appendix, we report the average marginal effects related to the control variables included in the labour market participation equation (Table A1) and coefficients of the wealth shock equations (Table A2).

Finally, as anticipated above, with the aim of uncovering heterogeneous effects of wealth transfer on work outcomes, we split the labour market participation outcome into three separate outcomes, namely unemployment, employment and self-employment. This required us to extend our empirical and to consider a multinomial probit model when estimating the main equations in our two-system model. Preliminary estimation results are not presented for brevity and are available upon request.

### **Concluding remarks and future research**

This paper analyzes the impact of wealth shocks (both inheritance and gift) on labour market participation of individuals aged 25-59 and living in 16 European countries. The analysis is based on the 2014 wave of the HFCS dataset and adopted an empirical strategy accounting for endogeneity of wealth transfers in the labour market participation equation. Our preliminary results suggest that receiving an inheritance in the 2008-2013 had not significant effects on the 2014 labour market participation. This finding holds when considering the amount of the inheritance and indicates that the income effect does not work along the extensive margin of labour supply. Conversely, individuals receiving a gift (up to 100000 euros) increase their labour market participation, possibly because wealth transfer would be positively associated with stay or become self-employed. Therefore, the systematic difference in signs for inheritances and gifts may say that for individuals these types of wealth transfers are markedly different. For the same amount, a gift will be considered larger than an inheritance and, therefore, the impact would be much more in line with the Carnegie conjecture for gifts than in the case of inheritances. This possibly suggests that estimation results must be interpreted in the sphere of a 'behavioural' approach: it does not matter the level of the transfer, but the relative amount of the transfer. In addition, the impacts are only significant for low or intermediate levels of wealth transfers.

We also find some heterogeneities among specific population sub-groups. Receiving relatively high amount of inheritances (30000-250000 euros) increases the labour market participation of females, while when focusing on gifts, we find that they may lower the labour market participation of females, middle-aged workers and highly educated individuals.

From a tax-policy perspective our results suggest that while fiscal reforms oriented to the reduction or the abolition of inheritance and/or gift taxes may have consequences for economic inequality, they would not affect efficiency aspects.

While some interesting results have emerged from the current analysis, much remains to be done to better understanding the relationship between wealth transfers and labour supply. Our future research efforts will be mainly directed to analyzes three different issues. First, we will put more effort in disentangling the labour market participation outcome into three distinct outcomes, namely, unemployment, employment and self-employment. The distinction between employment and self-employment would be particularly relevant, since the related literature has suggested that wealth transfers help individuals to set up their own business and become self-employed. From an econometric point of view this requires to shift from a binary outcome to a multinomial outcome and, therefore, to apply a multinomial probit model rather than a probit one when estimating the main equation. Second, the model would be changed to include both wealth transfers (inheritance and gift) at the same time in the model specification. This means the main equation would include two endogenous regressors and, empirically, this would require the adoption of a trivariate probit approach and its extensions. Finally, we have to test the robustness of our results to a change of the time-span in which we consider an individual has benefited of the wealth transfer. In this vein, we may also consider empirical specifications accounting for different timing of the receipt of wealth transfers, with the aim of uncovering different short and long-term effects of wealth shocks.

## References

Blanchflower D.G., Oswald A.J. 1998. What makes an entrepreneur? *Journal of Labor Economics*, Vol. 16: 26-60.

Blau D.M., Goodstein R.M. 2016. Commitment in the household: Evidence from the effect of inheritances on the labor supply of older married couples. *Labour Economics*, Vol. 42: 123-137.

Brown J.R, Coile, C.C., Weisbenner S.J. 2010. The effect of inheritance receipt on retirement. *The Review of Economics and Statistics*, Vol. 92(2): 425-434.

Cesarini D., Lindqvist E., Notowidigdo M.J., Ostling R. 2017. The effect of wealth on individual and household labor supply: Evidence from Swedish lotteries. *American Economic Review*, Vol. 107: 3917-3946.

Cox D. 2014. Inheritance, bequest, and labor supply. *IZA World of Labor*, Vol. 69: 1-10.

Doorley K., Pestel N. 2016. Labour supply after inheritances and the role of expectations. IZA discussion paper No. 9822.

Elinder M., Erixon O., Ohlsson H. 2012. The impact of inheritances on heirs' labor and capital income. *B.E. Journal of Economic Analysis & Policy*, Vol. 12(1): 1-35.

Holtz-Eakin D., Joulfaian D., Rosen H.S. 1993. The Carnegie conjecture: Some empirical evidence. *The Quarterly Journal of Economics*, Vol. 108(2): 413–435.

Holtz-Eakin D., Joulfaian D., Rosen H.S. 1994a. Entrepreneurial decisions and liquidity constraints. *The RAND Journal of Economics*, Vol. 25(2): 334–347.

Holtz-Eakin D., Joulfaian D., Rosen H.S. 1994b. Sticking it out: Entrepreneurial survival and liquidity constraints. *Journal of Political Economy*, Vol. 102(1): 53–75.

Hurst E., Lusardi A. 2004. Liquidity constraints, household wealth, and entrepreneurship. *Journal of Political Economy*, Vol. 112(2): 319–347.

Joulfaian, D., Wilhelm M.O. 1994. Inheritance and labor supply. *The Journal of Human Resources*, Vol. 29(4): 1205–1234.

Kaplan H.R. 1988. Gambling among lottery winners: before and after the big score. *Journal of Gambling Behavior*, Vol. 4: 171-182.

Imbens G.W., Rubin D.B., Sacerdote B. 2001. Estimating the effect of unearned income on labor earnings, savings and consumption. *American Economic Review*, Vol. 91(4): 778-794.

Neal D. 1997. The effects of catholic secondary schooling on educational achievement. *Journal of Labor Economics*, Vol. 15(1): 98-123.

Picchio M., Suetens S., van Ours J.C. 2018. Labour supply effects of winning a lottery. *The Economic Journal*, Vol. 128: 1700-1729.

Poterba J.M. 2001. Estate and gift taxes and incentives for inter vivos giving in the US. *Journal of Public Economics*, Vol. 79(1): 237-264.

Roodman D. 2011. Fitting fully observed recursive mixed-process models with cmp. *Stata Journal*, Vol. 11(2): 159-206.

Sila U., Sousa R.M. 2014. Windfall gains and labour supply: Evidence from the European household panel. *IZA Journal of Labor Economics*, Vol. 3(1): 1-27.

Taylor M.P. 2001. Self-employment and windfall gains in Britain: evidence from panel data. *Economica*, Vol. 68: 539-565.

## Appendix

Table A1. Labour market participation determinants: AME of control variables (Probit-probit model)

	AME	s.e.	P-value
Female	-0.132	0.003	0.000
Age group (base: 25-34)			
35-44	0.020	0.003	0.000
45-54	-0.022	0.004	0.000
55-59	-0.152	0.006	0.000
Education (base: low)			
Medium	0.086	0.004	0.000
High	0.143	0.004	0.000
Spouse at work	0.024	0.003	0.000
Married	-0.026	0.003	0.000
Number of children 0-6 (base: 0)			
1	-0.014	0.004	0.001
2	-0.048	0.007	0.000
3 or more	-0.112	0.018	0.000
Born in a foreign country	-0.030	0.004	0.000
Unemployment rate	-0.005	0.002	0.006
Country (base: AT)			
BE	-0.012	0.011	0.270
DE	-0.017	0.009	0.063
EE	-0.035	0.011	0.001
ES	0.071	0.024	0.003
FR	0.032	0.010	0.002
HU	-0.004	0.009	0.667
IE	-0.025	0.011	0.027
IT	-0.013	0.014	0.350
LU	-0.026	0.011	0.015
LV	0.032	0.014	0.022
NL	-0.044	0.013	0.001
PL	-0.037	0.011	0.001
PT	0.071	0.014	0.000
SI	0.027	0.012	0.027
SK	0.053	0.015	0.000

Source: own elaborations based on HFCS data

Table A2. Determinants of wealth shocks (Probit-probit model)

	DV: Inheritance 2008-2013			DV: Gift 2008-2013		
	Coeff.	s.e.	P-value	Coeff.	s.e.	P-value
Change in mortality rate 2008-2013	0.020	0.003	0.000	-	-	-
Tax abolition/reduction 2008-2013	-	-	-	-0.223	0.026	0.000
Female	-0.014	0.016	0.386	-0.069	0.019	0.000
Age group (base: 25-34)						
35-44	0.114	0.026	0.000	-0.082	0.025	0.001
45-54	0.278	0.024	0.000	-0.342	0.025	0.000
55-59	0.457	0.026	0.000	-0.500	0.033	0.000
Education (base: low)						
Medium	0.062	0.023	0.006	0.181	0.032	0.000
High	0.239	0.022	0.000	0.498	0.031	0.000
Born in foreign country	-0.174	0.023	0.000	-0.389	0.030	0.000
Number of children 0-6 2008(base: 0)						
1	-0.095	0.022	0.000	-0.004	0.024	0.862
2	-0.003	0.033	0.921	0.008	0.036	0.830
3 or more	0.043	0.083	0.604	-0.039	0.095	0.680
Unemployment rate 2008	0.037	0.005	0.000	0.017	0.007	0.012
Country area (base: Southern Europe)						
Baltic	-0.097	0.042	0.020	-0.033	0.051	0.520
Eastern	-0.070	0.027	0.009	0.166	0.033	0.000
Central	0.149	0.027	0.000	0.556	0.030	0.000
Anglo-Saxon	0.442	0.055	0.000	-0.056	0.045	0.219
Constant	-2.085	0.048	0.000	-2.037	0.059	0.000

Source: own elaborations based on HFCS data