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Three Essays in Economics of Ageing

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Alessio

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Introduction

This thesis is a collection of three essays in economics of ageing.

The research question of the first two chapters was motivated by the willingness to investigate about the effects of the recent financial crisis on saving behavior and the possible effects of pension reforms applied in several European countries on informal care provision. Instead the third chapter employs a statistical approach to treat the problem of non-classical measurement error with recall data affected by heaping and rounding. While this chapter is not strictly related to economics of ageing, applications of this method can be useful to treat problems of non-classical measurement error also with health variables such as the recall number of hospital days or the expenditures for health care which can be affected by this type of rounding mechanism.

The first chapter is titled “How the Experience in Financial Stock Markets Affect Stockholding and Portfolio Choice” and investigates about the long-lasting effects of the financial crisis on stock market participation. In the last decade financial stock markets have been affected by several downturns, but in the long run it is supposed that equities give a premium with respect to other less risky financial assets. An analysis on the past performance of the German stock market (DAX) confirms this idea. Investing in stocks markets could have been a great opportunity but many Europeans have not participated. Moreover if the experience of negative returns has long-lasting effects, we may expect even lower participation in the market than we saw before the crisis. Within a behavioral finance approach I allow for the presence of some impressionable financial years and I consider two types of experience in financial stock markets: a potential and actual experience. The potential experience is the observed performance of the stock market when individuals start saving for retirement as predicted by the standard life-cycle model (after age 40), the actual experience is the observed performance of the stock market after the first investment in stocks or shares. Using European data from SHARE and SHARELIFE, I find evidence for the presence of financial impressionable years. Myopic loss aversion and disappointment aversion are found when potential experience is considered: individuals who experienced periods of downturn in the market when they are expected to start saving for retirement are more willing to stay out of the market. Myopic behavior is also found for actual experience: investors who had a good (bad) actual experience with stocks within three years after their first investment are more (less) willing to participate in the financial stock market later in life. Findings also suggest that many Europeans may have invested in stocks to hedge against inflation.

The second chapter titled “Occupational Choices and Informal Caregiving Among Young Old Europeans” wants to analyze the effect of occupational choices on informal caregiving. In the recent years many European countries have adopted pension reforms to postpone retirement age. This could lower the informal long-term caregiving potential provided by young old. Using European data from SHARE I investigate about the effect of occupational choices on informal caregiving, both in probability and time, taking into account household formation between a care giver and a care recipient. Four different types of care recipients are considered: parents, grandchildren, adult children and other people who live outside the family. The occupational choices are considered as binary: participating or not in the labour market. Women who never participated in the labour market are distinguished from those who worked in the past, because the choice of never entering in the labour market was made in a distant past and it is more related to family preferences. Endogeneity of the occupational choices are also checked using the potential eligibility to pension benefits based on pension reforms. Results show that there is a positive effect of being not employed on coresiding with a parent or an adult child and on the informal care provision, especially for women and for care given to look after grandchildren. The endogeneity problem is relevant for women as it is considering coresiding as an alternative choice of providing informal care outside the household. Households with a woman who never worked provide more care inside the family and the woman is usually the one who specializes on care provision. A simulation of a pension reform with an increase of one year in the eligibility age to receive a public pension benefit, based on the estimated parameters, suggests that demand for formal care may increase a lot, but less for countries which adopt flexible time working arrangements policies for young old.

The third chapter is titled “Estimating the Intertemporal Elasticity of Substitution on error-ridden micro data” and it is based on a joint work with Gugliemo Weber. We estimate the Intertemporal Elasticity of Substitution (IES) using Italian data from SHIW (Bank of Italy). The consumption data from SHIW are based on recall questions and are affected by severe heaping and rounding. The measurement is non-classical. To treat the heaping and rounding we apply a multiple imputation technique proposed by Heitjan and Rubin (1990), following Battistin et al. (2003), to model the coarsening process and to impute true consumption expenditures. We also propose an extension to consider the panel feature of the data. We estimate the Euler equation using four different estimators: the log-linearized version, the standard GMM estimator (EGMM), and two GMM estimators proposed by Alan et al. (2009) which both assume a classical measurement error, the first one is more efficient (GMM-K) and the second one is more robust (GMM-D). We show that EGMM and GMM-K estimators produce implausible estimates of the IES when recall data are used. Instead when multiple imputations of non-durable consumption are used the GMM-K estimator produces plausible estimates in line with the recent micro-based literature (in the 0.5-0.8 range), and the overidentifying restrictions are not rejected at least if I focus on a sample of couples. Parameter estimates using the log-linearized version and GMM-D estimator turn out to be similar to the ones based on the previous method, but less precise and do not change much when we use reported or imputed consumption.

Introduzione

Questa tesi è una raccolta di tre saggi sull'economia dell'invecchiamento.

L'argomento di ricerca dei primi due capitoli è motivato dalla volontà di studiare gli effetti della recente crisi finanziaria sul comportamento di risparmio delle famiglie e il possibile effetto delle recenti riforme pensionistiche, applicate in varie nazioni europee, sull'assistenza informale. Invece il terzo capitolo utilizza un approccio statistico per trattare il problema dell'errore di misura non classico riscontrato nei dati interessati da problemi di arrotondamento e concentrazione. Nonostante il capitolo non sia strettamente legato al tema dell'economia dell'invecchiamento, l'applicazione di questa tecnica può essere utile per risolvere problemi di errore di misura non classico che si possono riscontrare anche in variabili sulla salute, per esempio il numero riportato di giorni trascorsi in ospedale o le spese sanitarie, valori che possono essere influenzati da questo tipo di arrotondamento.

Il primo capitolo titolato "How the Experience in Financial Stock Markets Affect Stockholding and Portfolio Choice" vuole analizzare gli effetti nel lungo periodo delle crisi finanziarie sulla partecipazione nel mercato azionario da parte delle famiglie. Nell'ultima decade i mercati finanziari sono stati interessati da diversi movimenti negativi, ma nel lungo periodo si suppone che i titoli azionari diano un premio rispetto ad altri strumenti finanziari meno rischiosi. Un'analisi sui passati rendimenti dell'indice borsistico tedesco (DAX) conferma quest'idea. Investire nei mercati azionari avrebbe potuto essere una grande opportunità ma molte famiglie europee non partecipano e non hanno mai investito nel mercato. Inoltre se l'aver sperimentato un rendimento negativo del mercato ha effetti nel lungo periodo, possiamo aspettarci una ancor più bassa partecipazione nel mercato di quella che già c'era prima della crisi. Con un approccio di finanza comportamentale, assumo che ci possano essere degli anni finanziari "impressionabili" e considero due tipi di esperienza con i mercati finanziari: un'esperienza potenziale e una attuale. L'esperienza potenziale è definita come il rendimento del mercato finanziario nel periodo in cui si inizia a risparmiare per la pensione come viene predetto dal modello standard sul ciclo vitale (dopo i 40 anni), l'esperienza attuale è definita come il rendimento del mercato finanziario osservato dopo il primo investimento in titoli azionari. Utilizzando dati europei SHARE e SHARELIFE, trovo evidenza riguardo alla presenza di anni finanziari impressionabili. Quando l'esperienza potenziale viene considerata, si trova evidenza empirica anche per la presenza di avversione miope ad una perdita o alla perdita rispetto ad un guadagno certo: gli individui che sono stati interessati da periodi negativi del mercato quando ci si aspetta che avessero iniziato a risparmiare per la pensione hanno maggior probabilità di restare fuori dal mercato. Un comportamento miope viene riscontrato anche per l'esperienza attuale: gli investitori che hanno avuto una buona (cattiva) esperienza con il mercato azionario entro i tre anni successivi al primo investimento hanno una maggiore (minore) probabilità di partecipare nei mercati finanziari più tardi nel corso della vita, mantenendo una quota azionaria nel loro portafoglio. I risultati inoltre suggeriscono che molte famiglie europee potrebbero aver investito in azioni per proteggersi dall'inflazione.

Il secondo capitolo titolato "Occupational Choices and Informal Caregiving Among Young Old Europeans" vuole analizzare gli effetti delle scelte occupazionali sull'assistenza informale. Negli ultimi anni molte nazioni europee hanno adottato riforme pensionistiche per posticipare l'età pensionabile. Questo può abbassare il potenziale di assistenza informale fornito dai giovani anziani. Usando dati europei SHARE studio l'effetto delle scelte occupazionali sull'assistenza informale, sia in termini probabilistici che di tempo, tenendo in considerazione la possibilità della formazione di un nucleo familiare tra fornitore di assistenza e potenziale ricevente. Quattro diversi tipi di destinatari di assistenza sono individuati: i genitori, i nipoti, i figli adulti e altre persone che vivono al di fuori del nucleo familiare. Le scelte occupazionali sono considerate come binarie: partecipazione o non nel mercato del lavoro. Le donne che non hanno mai lavorato sono distinte da quelle che hanno lavorato in passato, perché la scelta di non entrare mai nel mercato del lavoro è una decisione fatta in un lontano passato per donne con più di 50 anni e la scelta è più legata a preferenze familiari. L'endogeneità delle scelte occupazionali è controllata usando la potenziale idoneità a ricevere una pensione pubblica basandosi sulle riforme pensionistiche. I risultati mostrano che c'è un effetto positivo dell'essere non occupato nel risiedere con un genitore o con i figli maggiorenni, nel fornire assistenza informale, specialmente da parte delle donne e per badare ai nipoti. Il problema dell'endogeneità è particolarmente rilevante per le donne, come è importante considerare la possibilità di risiedere con il potenziale assistito come una scelta alternativa rispetto al fornire assistenza informale al di fuori del proprio nucleo familiare. Inoltre, le famiglie con una donna che non ha mai lavorato forniscono più assistenza all'interno della famiglia e le donne sono solitamente coloro che si specializzano in questo tipo di compito. Una simulazione di una riforma pensionistica che considera l'incremento di un anno dell'età pensionabile, basata sui parametri stimati, suggerisce che la domanda di assistenza formale potrebbe aumentare parecchio, ma in misura inferiore in quegli stati europei che adottano e permettono maggiormente l'utilizzo di politiche d'orario flessibili per i giovani anziani.

Il terzo capitolo si intitola "Estimating the Intertemporal Elasticity of Substitution on error-ridden micro data" ed è basato su un lavoro congiunto con Guglielmo Weber. Nello studio stimiamo l'Elasticità di Sostituzione Intertemporale (ESI) utilizzando dati italiani SHIW (Banca d'Italia). I dati sul consumo nell'indagine SHIW sono raccolti con domande di richiamo che sono affette da problemi di arrotondamento e concentrazione. L'errore di misura non è classico. Per trattare il problema di arrotondamento e concentrazione applichiamo una tecnica di imputazione multipla proposta da Heitjan e Rubin (1990), seguendo Battistin et al. (2003), per modellare il processo di arrotondamento e imputare la vera spesa per il consumo. Riguardo alla tecnica, proponiamo anche un'estensione per considerare la caratteristica longitudinale dei dati. L'equazione di Eulero è poi stimata con quattro diversi stimatori: una versione log-linearizzata, il classico stimatore GMM, e due stimatori GMM proposti da Alan et al. (2009) che considerano entrambi un errore di misura classico, il primo più efficiente (GMM-K) e il secondo più robusto (GMM-D). Nei modelli stimati mostriamo che gli stimatori EGMM e GMM-K producono stime non plausibili dell'ESI quando vengono utilizzati i dati riportati. Invece quando vengono usate le imputazioni multiple sul consumo non durevole, lo stimatore GMM-K produce stime plausibili, in linea con la recente letteratura basata sui dati micro (nell'intervallo 0.5-0.8), e i vincoli di sovraidentificazione non vengono rifiutati, almeno se si considera solamente un campione di coppie. Le stime dei parametri utilizzando la versione log-linearizzata e lo stimatore GMM-D si rivelano simili rispetto a ciò che viene ottenuto utilizzando il metodo precedente, però in modo meno preciso, e a prescindere dall'utilizzo dei valori riportati o imputati sul consumo.

1 How the Experience in Financial Stock Markets Affect Stockholding and Portfolio Choice

ABSTRACT

In this chapter I investigate the long-lasting effects of financial crisis on stock market participation. If the experience of negative returns has long-lasting effects, we may expect even lower participation in the market than we saw before the crisis.

Within a behavioural finance approach I allow for presence of some "impressionable" financial years and I consider two types of experience in financial stock markets: a potential and actual experience. The potential experience is the observed stock market performance when individuals start saving for retirement as predicted by the standard life-cycle model (after age 40), the actual experience is the observed stock market performance after the first investment in stocks or shares. Using European data from SHARE and SHARELIFE, I find evidence for presence of financial impressionable years. Myopic loss aversion and disappointment aversion are found when potential experience is considered: individuals who experienced periods of downturn in the market when they are expected to start saving for retirement are more willing to stay out of the market. Myopic behaviour is found also for actual experience: investors who had a good (bad) actual experience with stocks within three years after their first investment are more (less) willing to participate in the financial stock market later in life. Findings also suggest that many Europeans may have invested in stocks to hedge against inflation.

1.1 Introduction

In the last decade financial stock markets have been affected by several downturns such as the Net economy bubble in 2001 and the sub-prime mortgage crisis in 2007, followed by the European debt crisis in 2009. The last one was defined as the worst financial crisis since the Great Depression of 1929. Actually it is not possible to study yet if the last downturns may leave a scar on households saving behaviours and portfolio choices. However these events are not new in the financial history (see for a full review Reinhart and Rogoff, 2009). After the Second World War several downturns and recessions occurred such as the first oil crisis (1972-1973), the second oil crisis (1979), the Black Monday (1987), the US savings and loan crisis, the Japanese asset price bubble and the Swedish financial crisis (1989-1992). Despite the poor performance of the stock market indexes during those periods, it is supposed that in the long run equities give a premium return with respect to other less risky financial assets as bonds. An analysis on the past performance of the German stock market (DAX) confirms this idea: in the long run investing in stocks or shares could have been a huge opportunity to increase savings.

However many European households do not participate in the financial stock market holding stocks directly or indirectly through mutual funds or individual retirement accounts. Many Europeans never invested at all (Cavapozzi et al., 2011). Households who do not hold stocks or shares are more willing to have financial distress (Angelini et al., 2009). Investing in stocks or shares is important also for old individuals because stock holding later in life has been associated with a bequest motive (Kim et al., 2012) or also with precautionary saving for possible future health problems (Ameriks and Zeldes, 2004).

Why many Europeans do not hold risky assets is an open question. It has been explained by financial illiteracy (van Rooij et al., 2007), information costs (Guiso et al., 2003), or non-standard preferences. I focus on the last explanation to investigate if there could be long-lasting effects of periods of downturns on households saving behaviour. In particular I would like to study the effect of macroeconomic variables related to financial markets on the past decision of investing at least once in the risky market and the decision of holding stocks or shares for those who invested in the past.

The idea of the paper is related to the permanent effect of macroeconomic shocks on individual decisions making (Giuliano and Spilimbergo, 2009) or risk taking (Malmendier and Nagel, 2011). Giuliano and Spilimbergo (2009) find a relationship between recessions and beliefs: individuals who experienced a recession during formative years believe that luck is the most important driver of individual success, support more government redistribution, and have less confidence in institutions.

Starting from this idea, I suggest that there are some "impressionable" years when macro events affect financial decisions. I consider two periods of life: when individuals are supposed to start precautionary saving for retirement (Carroll, 1994; Attanasio et al., 1999), after age 40, as predicted by the standard life cycle model, and after the first direct or indirect investment in the stock market. The stock market performance in the first period is defined as the potential experience. It is potential because it can potentially affect each individual, even those who have not invested in the risky market. The performance of the market after the first investment is defined as the actual experience and it can be thought also as a proxy for the investment outcome at different time horizons.

The standard theory does not provide support for impressionable financial year because it assumes that agents take into consideration all the past information to make their decisions. Thus, I consider a behavioural finance approach and in particular by the concepts of mental accounting (Thaler, 1985) and narrow framing decisions (Barberis et al., 2006).

Within this theoretical background, I test if there is evidence for some impressionable financial years and if individuals are myopic loss averse (Benartzi and Thaler, 1995) or disappointment-averse (Gul, 1991; Ang et al., 2005). If myopic loss aversion is found for the potential experience, there will be an empirical evidence for the presence of scarring effects of periods of downturn on stock market participation.

In the analysis I use data from SHARE, especially the retrospective data from SHARELIFE and macroeconomic German data such as: inflation rate, short-term bonds rate and measures of the Performance DAX index. Probit regressions are run for the potential experience on having ever invested in stock or shares checking for several controls and for childhood conditions. Probit regressions with a sample selection are estimated to analyze whether actual experience affect past investors decisions on continuing to hold stocks later in life. The sample is selected because only past investors had an actual experience. The potentially experienced macro variables are used as instruments for the sample selection.

Results suggest that there is myopia for both types of experience. There is evidence for myopic loss aversion and disappointment aversion for potentially experienced returns: cohorts of individuals who experienced a downturn in the market when they are supposed to start saving for retirement are more likely to stay out from the risky market. Even if myopic loss aversion and disappointment aversion are similar concepts, I provide evidence about the best reference point. Individuals are more disappoint averse if they potentially experienced lower returns than a certain equivalent like returns from short-term bonds. For actual experience, the experienced returns after the first investment are positively correlated with the propensity to continue holding stocks later in life, but this is significant only for the actually experienced returns within three years from the first investment.

The research question is linked to other topics as lack of trust in the financial market (Guiso et al., 2008) and the reinforcement learning theory (Kaustia and Knüpfer, 2008). Kaustia and Knüpfer (2008) analyze the IPO subscriptions in Finland and they find that positive past IPO returns increase the probability to participate in a subsequent offering. They underline the importance of studying the initial experience, because inexperienced investors are less likely to act strategically. In my case SHARELIFE provides data about the first year of investment in several type of assets. While individuals have the same experience, they could have different financial literacy and act differently according to it. A recent paper by Bucher-Koenen and Ziegelmeyer (2013) find that financially literate individuals are less likely to exit the market during financial crisis and they can participate at the recovery of the market while illiterate sell their participation in stocks or shares and their losses become permanent. However the financial literacy later in life can increase with past financial experiences and the lack of previous experience may be considered also as a proxy of financial illiteracy.

The remainder of the paper is structured as follows: Section 2 presents the theoretical background, Section 3 presents data and descriptive analysis, Section 4 presents the econometric model and results for potential experience, Section 5 presents the econometric model and results for the actual experience and Section 5 concludes with a short discussion.

1.2 Theoretical background

Within a behavioural finance approach, the existence of impressionable financial years is theoretically supported by myopia (Thaler, 1985) and narrow framing (Barberis et al., 2006). Thaler (1985) introduced for the first time the concept of mental accounting on decision making process (myopic behaviour). Mental accounting assumes that financial investors tend to evaluate decision at a time, keeping it separate from other evaluations in a broader context, such that they tend to make more short-term decisions rather than long-term ones. Barberis et al. (2006) extend the idea and introduce the concept of narrow framing. Starting from evidence that often people are averse to small and independent gambles, even if they are actuarially favorable, they argue that risk aversion is not enough to explain this behavior but it is considering a narrow framing where agents evaluate a gamble in isolation and separately from other risks.

During impressionable financial years, experience with stock markets is supposed to affect household saving behaviour. Giuliano and Spilimbergo (2009) find an association between beliefs and recessions during formative years with respect to other periods of life. I assume that if financial impressionable years exist, they should be related to saving decisions. Hence, I consider as the most important years the period when individuals start planning for retirement, after age 40, as predicted by the standard life cycle model, and the period when inexperienced investors enter for the first time in the market. As previously introduced, potential experience is the experienced performance of the financial stock market after age 40, when individuals start precautionary saving for retirement (Carroll, 1994; Attanasio et al., 1999). Between age 40 and 60 is the period when households save the most, because earnings are at a peak and at the same time expenses for children bearing are declining and home mortgages are paid off. Attanasio et al. (1999) in their simulations of consumption and income profiles with demographic effects find a consumption peak at around age 40 with a later peak at age 45 if they take into consideration also income uncertainty. Using this result, I consider as potential experience the experienced returns between age 41 and age 45. This assumption seems plausible if we have a look at the European data: the median enter age in the risky market is 43, with just small differences across countries (Cavapozzi et al., 2011).

A behavioural finance approach seems appropriate to test if periods of market downturn can leave a scar on households saving behaviour with household head who have narrow framing. Households who had a potentially bad experience could reduce their willingness to invest directly or indirectly in stocks or shares. In particular I consider the concept of myopic loss aversion and its extensions. Myopic loss aversion (Benartzi and Thaler, 1995) proposes a combination between two principles of the behavioral finance: loss aversion and mental accounting. Loss aversion is a concept from prospect theory (Kahneman and Tversky, 1979) and it describes a decision-making bias where investors tend to be more sensitive to decreases in wealth (loss) than increases (gains). With respect to the expected utility theory outcomes are evaluated as a gain or loss relative to a reference point. Within myopic loss aversion, individuals are too anxious and evaluate the performance of their portfolio on a short-term basis. Benartzi and Thaler (1995) show that the observed equity premium is consistent with a moderate degree of loss aversion at an investment horizon of approximately one year.

Ang et al. (2005) introduced a similar concept: the disappointment aversion. It differs from the myopic loss aversion, because the reference point identifies a loss which is determined endogenously. Basically it is the certainty equivalence of a lottery that is a source of elation or disappointment for the investor. The disappointment for outcomes below expectations is assumed to be stronger than the elation related to outcomes exceeding expectations.

The prediction of myopic loss aversion is based on deterministic decision theory proposed by Tversky and Kahneman (1992). According to their cumulative prospect theory, an individual derives utility from changes in wealth, which is captured by the value function

$$v_{LA}(x) = \begin{cases} x^{\alpha} & if\, x \geq 0 \\ -\lambda(-x)^{\beta} & if\, x < 0 \end{cases}$$

where x is the nominal or real return on stocks and the reference point is the last time wealth was measured because x is a change in measured wealth. Kahneman and Tversky (1979) estimate $\lambda = 2.25$ and $\alpha = \beta = 0.88$. Following Fielding and Stracca (2007), I consider the linear loss aversion with $\alpha = \beta = 1$, and I use also a convenient representation of disappointment aversion:

$$v_{DA}(x) = \begin{cases} x + e(x - E[x]) & if\, x \geq E[x] \\ x + d(x - E[x]) & if\, x < E[x] \end{cases}$$

where $d > e > 0$ which means that disappointment is more important than elation. For the disappointment aversion, the reference point of the investment in stock is its expected value.

In the empirical analysis I consider two cases of loss aversion: when experience is measured with nominal returns and real returns (nominal returns net to the inflation rate). And I consider one case of disappointment aversion where the reference point is the short-term bonds rate.

The literature about myopic loss aversion identifies three key variables: information horizon, evaluation frequency[1], and decision frequency (Hardin and Looney, 2012). Information horizon is defined as the period of time over the prospective payoffs are presented. Evaluation frequency is the time passed between reviews of past returns. Finally the decision frequency is the rate of adjustments made by investors on their portfolios.

For the potential experience I assume an information horizon of 5 years and an evaluation frequency of one year, while I do not make any assumption about the decision frequency.

Beside the potential experience, I consider also another type of experience: the actual one. The actual experience is a measure of the stock market performance

[1] Benartzi and Thaler (1995) argue that even if evaluation period and horizon of the investment are two completely different concepts, if an investor has an evaluation period of one year, he behaves similarly as having one year of investment horizon.

after the first investment in stocks and it is a total return measure of the market. The actually experienced returns are also a proxy for the investment outcome after a determined time horizon.

If individuals are supposed to invest in a diversified portfolio and with a long-run perspective, the investment outcome should relatively care to them and their later participation in the risky market should not be related to its performance. If a myopic behaviour is considered it is plausible to expect that households who actually experienced a good performance after their investments have a higher participation in stock market also later in life. Anyhow previous studies find that the financial decisions are affected by the state dependence (Alessie et al., 2004; Ameriks and Zeldes, 2004). Alessie et al. (2004) suggest that once households decide which asset classes to participate in, they are not likely to revisit their decision. They analyze the dynamics of ownership of different type of risky assets using data from the Dutch CentER Savings Survey 1993-1998 and they find that they are driven by state dependence, because adjusting portfolio arises costs from buying or selling assets, or from asset-type specific learning, such as the cost of acquiring new information. Same results have been found by Ameriks and Zeldes (2004) who analyze US data from the TIAA-CREF (Teachers Insurance and Annuity Association - College Retirement Equities Fund) and find that over a 10 year period (1987-1999), half of the sample did not any change in their portfolio allocation.

At the same time a disposition effect (Shefrin and Statman, 1985) can occur. The disposition effect has been defined as the tendency to hold loser stocks too long and sell winner stocks too early. If investors are reluctant to realize losses they are less likely to revise their decision on stock market participation. From a theoretical point of view, it is not clear which behaviour can be more relevant for inexperienced investors dealing with their first experience.

1.3 Data and descriptive analysis

The micro data source is the Survey of Health Ageing and Retirement in Europe[2] (SHARE), a multidisciplinary and cross-national panel database of micro data on

[2] This chapter uses data from SHARE wave 4 release 1, as of November 30th 2012 or SHARE wave 1 and 2 release 2.5.0, as of May 24th 2011 or SHARELIFE release 1, as of November 24th 2010. The SHARE data collection has been primarily funded by the European Commission through the 5th Framework Programme (project QLK6-CT-2001-00360 in the thematic programme Quality of Life), through the 6th Framework Programme (projects SHARE-I3, RII-CT-2006-062193, COMPARE, CIT5- CT-2005-028857, and SHARELIFE, CIT4-CT-2006-028812) and through the 7th Framework Programme (SHARE-PREP, N° 211909, SHARE-LEAP, N° 227822 and SHARE M4, N° 261982). Additional funding from the U.S. National

health, social-economic status and social and family networks of about 28,000 individuals aged 50 or over. The analysis is conducted using the first three waves: Wave 1 (2004-05), Wave 2 (2006-07) and Wave 3 - SHARELIFE (2008-09). SHARELIFE data is particular attractive because it collects detailed retrospective life histories. SHARE questionnaire provides useful data to analyze household portfolio and especially stock market participation in 2004-05 and 2006-07 checking for several current individual and household characteristics. Meanwhile SHARELIFE adds the possibility to consider childhood conditions and past investment decisions in a type of asset: first it is asked whether the respondent has ever invested in stocks or shares, mutual funds and individual retirement accounts and then it is asked to recall the year when he bought those assets.

The year of the first investment can be affected by recall bias. However the interview was organized to reduce this problem: the major life events are first fixed on a timeline like marriage, children birth, job episodes, and then the other events such as the first investment in stocks or shares. Havari and Mazzonna (2011) check for internal and external consistency of childhood conditions, between age 0 and 15 using SHARELIFE finding that overall respondents seem to remember well also the event in their early life. The first investments in stocks or share rarely happened during the war and before 1950 and the only cases in SHARELIFE are found for Sweden and Switzerland.

Households are selected from ten countries: Northern European countries like Denmark and Sweden, Central European like Austria, Belgium, France, Germany and the Netherlands, and Southern European countries like Italy and Spain. I do not consider Eastern European countries (Czech Republic and Poland) and Greece because stock markets are quite new and they are not much developed, then only few individuals participate in.

The main sample consists of 10,785 financial respondents who participated in SHARELIFE and in at least one of the previous waves. When they participated in both first two waves, the most recent interview is considered. The financial respondent is the person who is responsible for financial decisions within a household and who answer the financial section of SHARE questionnaire[3].

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[3]In Wave 1 it was possible to define more than one financial respondent within a household. I consider them as different households. When the financial respondent is homemaker, if the partner information is available, the partner is assumed to be the financial respondent. If she does not have a partner or the partner has not been interviewed, the household is excluded because I do not assume that homemakers can plan for retirement.

The sample does not consider the very old respondents, born before 1920, and very young, born after 1961, because of the availability of the potentially experienced returns. I also exclude individuals who lived abroad when they potentially or actually experienced the performance of the financial markets. The later in life participation in stocks or shares considers 9,895 households. The sample is slightly smaller because of the availability of the actually experienced returns: financial respondents who invested before 1960 or who does not remember the year of their first investment are indeed excluded.

For the stock participation, I consider both direct and indirect participation, and I assume that mutual funds and individual retirement accounts have a share of assets invested in stocks.

From a descriptive analysis it is possible to observe that many Europeans have never directly or indirectly invested in stocks or shares (see Figure 1.1). Overall only 53% have invested at least once in a risky asset. High participation is observed in Northern European countries (85% in Sweden and 74% in Denmark), and in Switzerland (64%), Belgium (63%) and France (63%). Lower possession is observed in Austria (26%), Spain (26%) and Italy (22%). Then, only 40% of Europeans hold stocks in 2006-07.

Many Europeans exit from the market: 32% of European households do not hold anymore stocks or shares in their portfolios later in life (see Table 1.1).

The later participation of past investors among the European countries is quite different: in Sweden only 7% of the past investors do not hold stocks in Wave2, while in Italy half of them do not hold stocks later in life.

Table 1.1 presents the set of variables used in the empirical analysis and some descriptive statistics. Individuals who decided to invest in stocks or shares are from the younger cohorts, they are richer, more educated and healthier later in life and have a better family background. It is interesting to note that 31% of financial respondents experienced a downturn in the market one year after their first investment, and 43% experienced a return from stocks lower than the short-term bond rate.

The main macrodata is the computed experienced returns and volatility rate from the DAX Performance index[4]. The DAX is the main German stock price index

[4]Daily data for the DAX Performance index are from Datastream International since 1st January 1965, and from the website boerse.de since 30th September 1959. Yearly data are available since 1950 from the website boerse.de, too. The DAX index was introduced in July 1988 and it has been normalized to 1,000 index points at 31 December 1987. Since 1988 the index has been reconstructed on a daily basis until 1959. In the analysis I consider stock market data after 1960.

and it is based on the 30 largest and most actively traded listed companies on the Frankfurt Stock Exchange. It includes dividends and it is not tax adjusted.

German stock market data are used for all the considered European countries because, the DAX index is one of the most important stock market in Europe, and it is a good proxy for financial market performance net from effects by national government policies on stock prices. After the currency reform in 1948 with a 90% devaluation of its value, Germany has been one of the country with the most stable and low inflation in the western Europe (see Figure 1.2 and 1.3), also during the Seventies. The reasons why West Germany and its central bank pursue these objectives can be found in an historical overview (Hetzel, 2002a and Hetzel, 2002b).

To measure the performance in a specified year of the financial stock market I compute annual mean returns (nominal, real and excess returns) and annual mean volatility rate in the last 12 months[5]. Annual real returns are the differences between nominal returns and annual inflation rates, instead excess returns are computed as differences between nominal returns and short-term bonds rates. The volatility rate is calculated as the standard deviation from the annual average variance of returns in one year.

Figure 1.4 and 1.5 show DAX returns with different reference points from 1950 to 2010. It can be observed that volatility increased over time. From the figure it is possible to identify all the major financial crisis or periods of recessions, especially for the excess DAX returns such as: the first oil crisis (1972-1973), the second oil crisis (1979), the Black Monday (1987), the US savings and loan crisis, the Japanese asset price bubble and the Swedish financial crisis (1989-1992), the Internet bubble (2001-2003) and finally the subprime mortgage crisis (2007-2009).

Investing in the financial stock market was a great opportunity[6] (see Figure 1.6 and 1.7). One Mark invested in the DAX index in 1950 would have resulted a nominal value of 206.00 Marks, and a real value of 44.00 Marks. Instead one Mark invested in short-term bonds with the same time horizon would have resulted in a nominal value of only 18.50 Marks and a real value of 4.00 Marks.

Figure 1.8 and 1.9 show the different measures of potential experienced macroeconomic variables over time: the 5 year annual average returns, inflation rates, short-term interest rates and volatility rate. Inflation rates from 1948 to 1955 are based on the consumer prices index provided by the German institute of Statistics[7],

[5] Volatility is computed from 1960.

[6] Table 1.11 reports data on the path of wealth (POW). The POW measures the growth of a mark invested in any given asset (stocks and short-term bonds), assuming that all proceeds are reinvested in the same asset and it has been obtained following the same procedure and considerations made by Cornell (1999).

[7] Statistisches Bundesamt. The series is an index of retail prices (Index der Einzelhandelspreise) and it is available from 1948 to 1990.

and from 1955 onwards by the OECD.

The short-term interest rates is the average of the observed rates during one year and it is based on German O.D.R.[8] (Official Discount Rate) from 1948 to 1959, and on the 3-months interests rate published by OECD from 1960. Inflation rates and short-term interest rates are shown in Figure 1.2, together with the volatility of the stock market. It is possible to note that short-term rates are usually higher than the inflation rates. Moreover the measures are correlated because short-term rates depends on the expected inflation. Only when the realized inflation (observed only months later) has been lower than the expected inflation rate, the two curves cross each other. In the last 60 years inflation rate has been quite low and stable in Germany. Higher inflation rates occurred during the Seventies because of the oil crisis, and periods of low inflation rates occurred after 1995. If we consider also the other European countries, inflation rates changed a lot during the considered periods and across country (Figure 1.9). Before 1960, Austria, France[9] and Spain had short periods of high inflation. Then during the Seventies and the Eighties many countries were not able to control inflation, in particular Italy and Spain but also France, and some Northern European countries such as Denmark and Sweden. In Sweden there was a financial crisis during the 1990 and inflation rate hit 10%.

Only after 1992, with the process of harmonization and later with the adoption of the Euro we can see low and stable inflation rates among all the considered European countries.

1.4 Potential experience

The empirical analysis on past participation in the risky market is run considering a probit regression model:

$$stocks_i = \begin{cases} 1 & y^*_{1i} > 0 \\ 0 & y^*_{1i} \leq 0 \end{cases} \tag{1.1}$$

$$\epsilon_i \sim N(0,1) \tag{1.2}$$

$$y^*_{1i} = \boldsymbol{\alpha} + EXP_i + \boldsymbol{x}'_{1i}\boldsymbol{\beta_1} + \boldsymbol{x}'_{2i}\boldsymbol{\beta_1} + \boldsymbol{c}'_i\boldsymbol{\delta_1} + \boldsymbol{ch}'_i\boldsymbol{\delta_2} + \epsilon_{1i} \qquad i = 1, ...n \tag{1.3}$$

[8]Data is collected from Sidney and Sylla (1996)

[9]In 1957 there was a change in the currency, between old and new Francs.

where y^*_{1i} is the number of stocks that the household i held at least once in the past, $stocks_i$ is the propensity of having ever invested in the financial stock markets, $\boldsymbol{x}_{1i}$ is as set of financial respondent's characteristics such as age, gender, years of education, marital status, numeracy skills, health status (self reported health, number of limitations - adl and iadl), $\boldsymbol{x}_{2i}$ is a set of household characteristics such as household size, number of children, household income, real asset value, urban area, and financial hardship, $\boldsymbol{ch}_i$ is a set of childhood conditions such as the urban area at birth, the number of books in the house at age 10, and the self-reported mathematical ability relatively to the class at age 10. Then, $\boldsymbol{c}_i$ includes country dummies and cohort dummies. A full set of cohort dummies cannot be used because of collinearity with age and time effects, but two dummies are added to the regression: one for the prewar cohorts (before 1935) and one for the after-war cohorts (after 1945). The measure of experienced performance EXP_i is an individual characteristic common for all individuals born in the same year. According to Moulton (1990) when macroeconomic variables are used on microdata models, standard errors should be adjusted using a cluster option. I define clusters as the interactions between year of birth and country dummies.

Table 1.2 reports the average marginal effects from probit regressions on past participation in the risky market. Column (i) and (ii) present results of the models which consider respectively nominal and real experienced returns when individuals start saving for retirement. Column (iii) reports results for the probit estimation which considers excess returns. To test whether individuals are more myopic loss averse or disappointment averse, the performance is allowed to have a different effect for positive and negative returns. I find evidence for both loss and disappointment aversion. All the three specifications show that negative experienced returns[10] when individuals are supposed to start saving for retirement affect negatively the propensity of having invested in the market: 1% of average nominal loss during age 41-45 decreases by 1.156% the propensity of having entered in the market, while a 1% average real loss of the market decreases participation by 0.649%, and 1% of negative excess return by 0.572%. A positive potential experience is not associated with a higher participation in the financial stock market. When positive returns occur between age 41 and 45 the decision to invest in risky assets may depend on other determinants, while negative returns leave a scar and keep individuals out of the market.

Myopia is assumed because only a 5-years period of experience is considered. To check if this assumption is plausible, I estimate the previous models considering the potentially experienced returns from other periods of life: between age 36 and 40, and between age 46 and 50 (see Table 1.3, columns (i) and (ii)). Results

[10]Negative experienced returns are in absolute value.

show that stock market performance in the previous and next 5-years period does not affect past stock holding. This confirms the assumption that there are some financial impressionable years.

In columns (iii), (iv) and (v) of Table 1.3 I report also results where a dummy variable for negative returns is added to the main model specifications. I test which one is the best reference point, so I analyze whether individuals are more loss or disappoint averse. As previously presented in Section 2, myopic loss aversion is a special case of disappointment aversion (Fielding and Stracca, 2007) where the reference point is not a gamble or another investment (i.e. short-term bonds) but zero. Results show that there is no drift for potentially experienced excess returns and it seems more likely that individuals are more disappointment averse. This is not surprising because investors decide to enter or not in the market looking for trends: investors try to extrapolate from the recent past to the near future. If stocks provide better returns than short-term bonds, they put their money into stocks. If short-term bonds provide better returns, they put their money into bonds and so they do not enter in the market. But this choice is myopic because also when conditions of the market change, behaviour of the investor is not likely to change.

In the previous estimations I consider only experienced returns as a measure of performance with the stock market. Furthermore, the sign of the potentially experienced returns is negative but not significant, though it can be expected to be positive. Indeed, there could be other macro economic variables which can reduce participation: for instance volatility and inflation rate. High volatility or inflation rates when the returns are higher can reduce the propensity to enter in the market also when the returns are positive.

The performance of the financial stock markets can be measured also by market risk, for instance the volatility rate. Market downturns are often associated not only with a decline in the value of the market prices but also with periods of greater idiosyncratic risk. Glosten et al. (1993) suggests, accordingly to other previous studies (i.e. Fama and Schwert, 1977), that it has been observed a negative correlation between volatility and returns, but this relationship is weak. A negative effect of periods of downturn in the market on stock market participation may depend on the high volatility rate and the riskiness of the market. In column (vii) of Table 1.3, I check whether individuals are more myopic loss averse or myopic variance averse. The myopia is still assumed because of the 5-year time horizon. Results do not change: the effect of the volatility rate is not significant, even if the sign suggest that higher experienced volatility rate when individuals are supposed to start saving for retirement reduce the willingness to enter in the financial stock market. Results suggest that individuals are more loss averse than variance averse as it has been found in an experimental analysis by Duxbury and Summers (2004).

They observe that when the probability of a loss is greater than 0.5, individuals perceive higher variance as less risky; instead when the probability of a loss is less than 0.5, high variance is perceived as higher risk. However, variance aversion is linked to the frequency of feedback about the stock market performance. Only individuals who receive or collect enough feedback can be variance averse. In the SHARE dataset less than 30% of the households spend time on managing savings at least once every month.

Another macro variable that could have affected stock market participation is inflation rate. Across European countries there have been periods of high inflation for many reasons, mainly caused by crisis and imported prices. Inflation can be thought as an externally controlled policy variable that affects the purchasing power of money. During the last 60 years, the German central bank has been very careful about keeping a low inflation, but during the Seventies, inflation rates were relatively higher than the previous period. This was mainly caused by the increase in oil prices and not by change in monetary policies.

A general and widespread belief considered common stocks and real estate as a good hedge against inflation, because stocks represent control over real assets, and it was supposed to offer a long-run hedge against dramatic changes in the inflationary environment. Fama and Schwert (1977) was the first of many other studies which suggested that this belief was not true: stocks are not a good hedge against inflation and a negative correlation between inflation and stock market performances occur. Indeed inflation is a great destroyer of financial assets value over time. It reduces the real dividend yield on stocks, it increases the volatility and investors' total return suffers (Fama and Schwert, 1977). Results show that the average German inflation experienced between age 41 and 45 is positively correlated with past stock holding (Table 1.3, column (vii)): individuals who potentially experienced higher inflation rate are more likely to have invested in stocks. This suggests that they could have entered in the market to hedge against inflation. However it is important to keep into account that household decisions about their portfolio are historic dependent and that after a period of high inflation there have been a long period of low inflation rates which could have increased the willingness to participate in the market later in life.

Finally as additional robustness check, I consider the partner potential experience because the financial decisions for a couple can be taken together. The results show that also the partner negative experience has a scarring effect on stock market participation (Table 1.3, column (viii)).

1.5 Actual experience

In the previous section I show that there are some impressionable financial years, at around age 40. In this section I investigate whether experienced returns after the first investment in stocks or shares can affect portfolio choices. In particular the effect of actually experienced returns on stock market participation later in life is checked. In SHARELIFE no information is asked about the first investment or about other decisions after the first one, so we do not know when and why individuals exit the market and whether they experienced a good or bad outcome.

A Heckprobit model is estimated because there could be a sample selection bias: the decision of entering in the risky market and staying inside the market can be correlated.

The econometric model is defined as following:

$$y_{2i}^{*} = \alpha + AfterEXP_i + \boldsymbol{x}_{1i}^{'}\boldsymbol{\beta_1} + \boldsymbol{x}_{2i}^{'}\boldsymbol{\beta_1} + \boldsymbol{c}_i^{'}\boldsymbol{\delta_1} + \boldsymbol{ch}_i^{'}\boldsymbol{\delta_2} + \epsilon_{2i} \qquad i = 1, ...n \tag{1.4}$$

$$y_{1i}^{*} = \boldsymbol{\alpha} + EXP_i + \boldsymbol{x}_{1i}^{'}\boldsymbol{\beta_1} + \boldsymbol{x}_{2i}^{'}\boldsymbol{\beta_1} + \boldsymbol{c}_i^{'}\boldsymbol{\delta_1} + \boldsymbol{ch}_i^{'}\boldsymbol{\delta_2} + \epsilon_{1i} \qquad i = 1, ...n \tag{1.5}$$

$$laterstocks_i = \begin{cases} 1 & y_{2i}^{*} > 0 \\ 0 & y_{2i}^{*} \leq 0 \end{cases} \quad if \;\; stocks = 1 \tag{1.6}$$

$$stocks_i = \begin{cases} 1 & y_{1i}^{*} > 0 \\ 0 & y_{1i}^{*} \leq 0 \end{cases} \tag{1.7}$$

$$\begin{pmatrix} \epsilon_{1i} \\ \epsilon_{2i} \end{pmatrix} \sim N\left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 & \rho \\ \rho & 1 \end{bmatrix} \right) \tag{1.8}$$

where y_{2i}^{*} is the propensity to continue holding stocks later in life, and $AfterEXP_i$ is the individual experienced performance based on the year of the first investment in stocks or shares. A set of instruments include the potentially experienced returns, volatility and inflation rate. Differently from the potential experience, the actual experience is common for financial respondents who entered in the risky market at the same year. Table 1.4, 1.5, 1.6 report average marginal effects for respectively nominal, real and excess actually experienced returns.

Myopia is checked using different time horizons of the investment outcome, starting from one year after the first investment to the maximum possible investment duration[11].

Similar effects are found considering the three measures of experienced returns and these effects are low and significant only within three years after the first investment: a 10% increase (decrease) in the value of the stock market after one year has a positive (negative) effect on holding stocks later life by 0.655%. The estimated models show that the experience in the close years after the first direct or indirect investment in stocks or shares affect stock market participation later in life. Evidence for a myopic behaviour is found, but the effect is low because there could be disposition effects, state dependence due to costs of adjusting portfolio choices. Then, there could be health or other shocks that can affect more financial decisions later in life, independently of market performance.

1.6 Conclusion

Using European data from SHARE and information about the German stock market, I investigate whether periods of financial crisis can have long-lasting effects on stock market participation. Investing in the stock market was a great opportunity to get good returns, but many Europeans stayed outside the market. Within a behavioural finance approach, I suggest that there are financial impressionable years. Findings support the idea of myopic behaviour and that there are periods during the life when beliefs about stock market are made: when individuals start saving for retirement between age 41 and 45 and after the first investment by an inexperienced investor. The results differentiates from what Malmendier and Nagel (2011) find using US data from the Survey of Consumer Finances from 1960 to 2007. They consider the total experienced returns from birth to present, where experienced returns are computed as weighted averages of yearly returns with an optimal weighting procedure that give more weight to recent years than the distant past. They show that experienced returns during the life affect beliefs on risk taking about financial stock markets. In the analysis I give weight only to some past periods of life which can be also in a distant past.

Myopic loss aversion and disappointment aversion is found for potentially experienced returns. Individuals who experienced a bad performance of the market when they started saving for retirement are less willing to enter in the market and they are probably not entering anymore. For actual experience a myopic behaviour

[11] Myopic loss aversion is not tested because the performance is a total return measure and after several years, the stock market usually recover completely.

is found. The first experience is particularly interesting to study because even if individuals can have different level of financial literacy, they are all inexperienced. The effects are significant but relatively small, probably because of dependence state and disposition effects.

Mean reversion is not considered for potential experience because we look at the past participation, while for actual experience I consider interview year dummies to capture differences on the later participation in the market because of the current market cycle. In the period from 2004 to 2007 financial stock markets passed from a bottom level to a top one which should include those investors who invested in the market when the value was low and exited when it was high. Moreover, periods of downturns in the market can be related to periods of economic recession or instability which could have increased the background risks and lowered the participation in the market. However it is not clear why periods of economic recessions before or after the impressionable financial years should not affect financial decisions. The plausible explanation is that individuals are myopic loss averse and when they make financial decisions they evaluate the opportunity to invest or continuing to hold stocks or shares in isolation with respect to other risks, making a narrow framing decision.

Further investigation about the scarring effects of recessions should be considered, taking into account other aspects like the diversification of portfolios, the possibility that individuals invested in less risky mutual funds and individual retirement accounts, the size and duration of their first investment, and the background risks.

Comparisons and predictions for possible effects of the last financial crisis are difficult because in the past there was more limited and less frequent availability of information about stock markets and the volatility was lower. If we assume that the behaviour is similar, we could expect that there will be an important scarring effect on stock market participation by cohorts who were planning for retirement. These cohorts could be less prepared for retirement in the next future. Other results of the paper show that Europeans were not variance averse and that many Europeans could have decided to invest to hedge against inflation.

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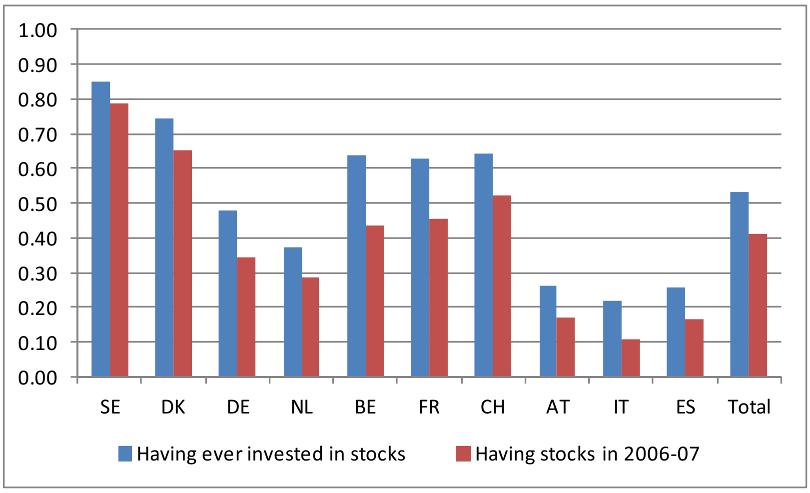

Figure 1.1: Weighted fraction of individuals who ever invested in stocks before 2006-07 and their later participation in the stock market in 2006-07

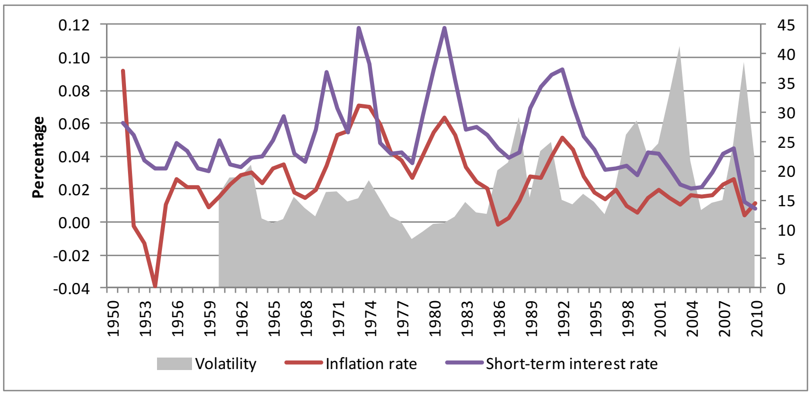

Figure 1.2: Comparison between inflation rate, short-term interest rate, and volatility rate in Germany from 1951 to 2010

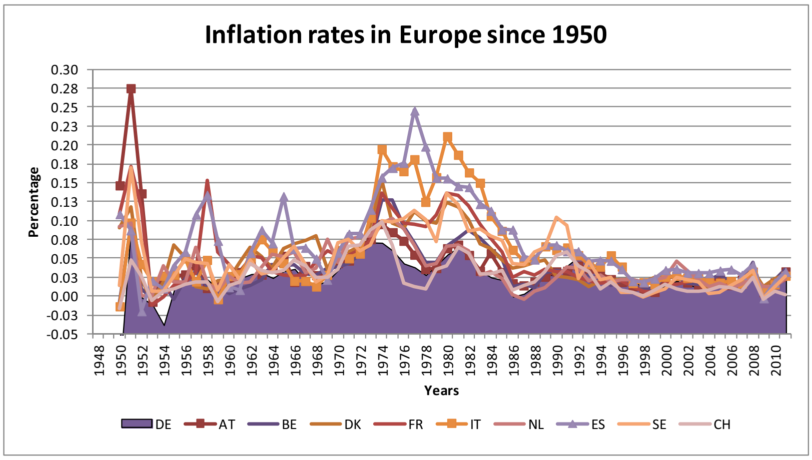

Figure 1.3: Inflation rates in several European countries since 1950. Data from national institutes of Statistics or from OECD.

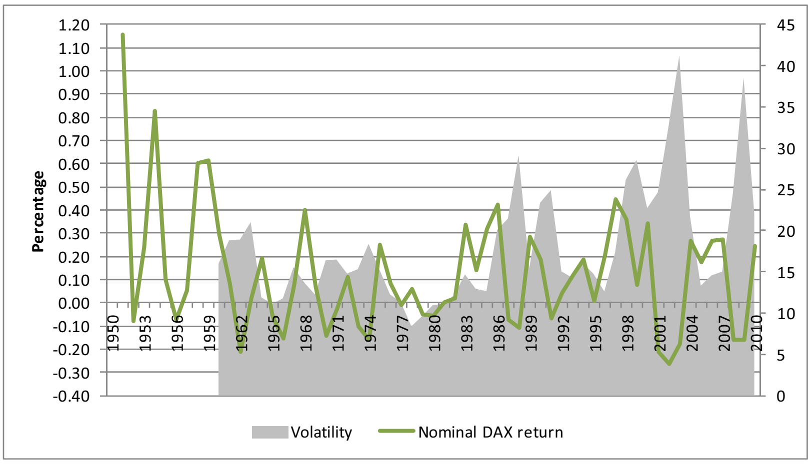

Figure 1.4: Nominal DAX returns since 1951 and volatility rates since 1960

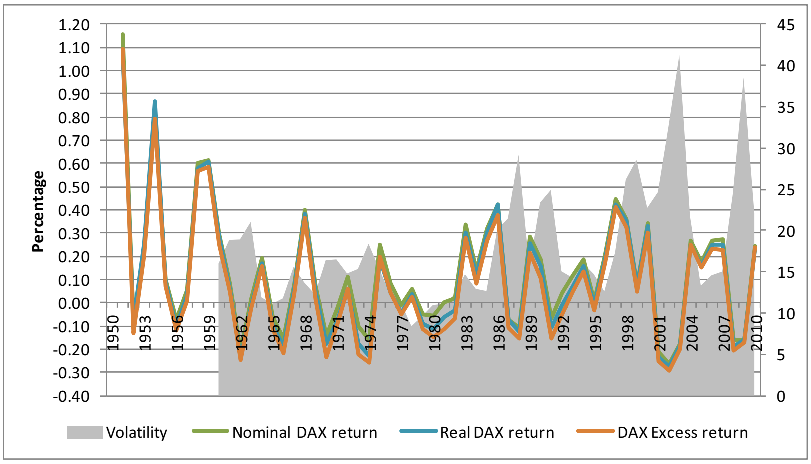

Figure 1.5: Nominal, real and excess DAX returns since 1951 and volatility rates since 1960

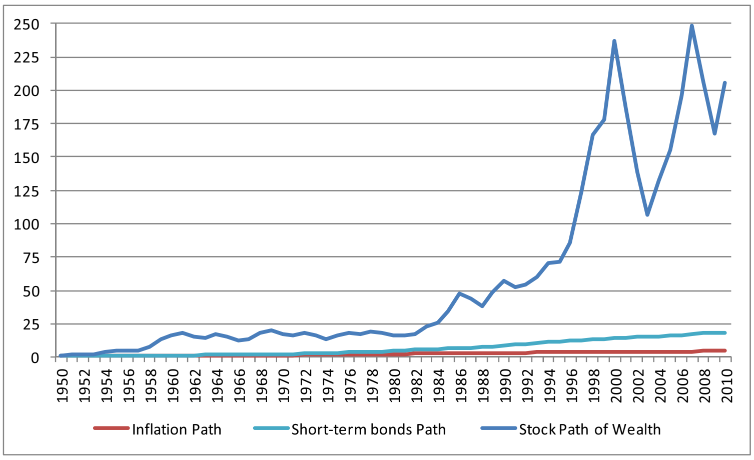

Figure 1.6: Path of nominal wealth for stocks, short-term bonds and inflation

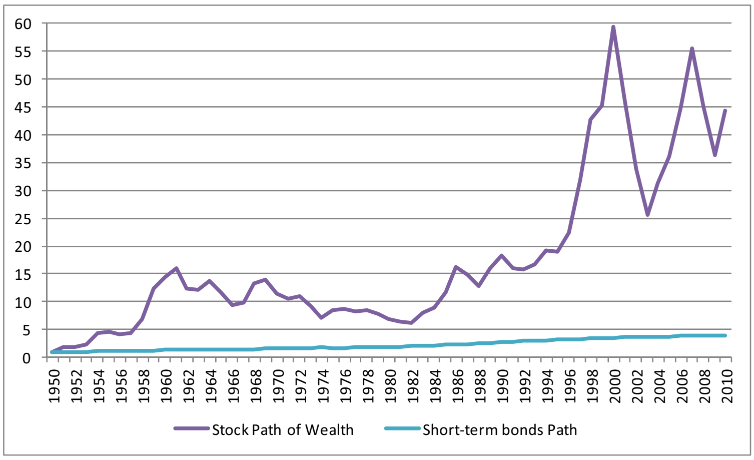

Figure 1.7: Path of real Wealth for stocks and short-term bonds

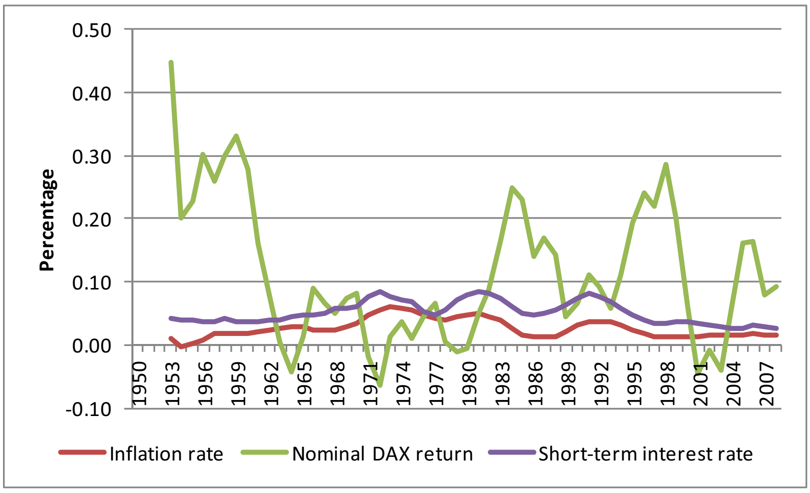

Figure 1.8: 5-year averages of nominal DAX returns, inflation rate and short-term interest rate between 1953 and 2008

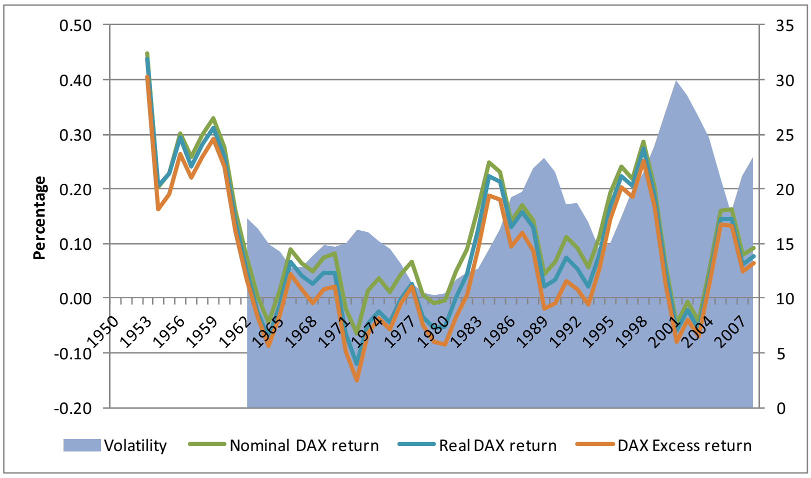

Figure 1.9: 5-years averages of the stock market performance between the period 1953 and 2008

Table 1.1: Descriptive statistics

Variables	Full sample		Investors	
	mean	std dev	mean	std dev
Having ever invested in stocks (1=Yes)	0.5766	(0.4941)		
Pot. Experienced excess returns	0.0455	(0.0932)		
Pot. neg. experienced excess returns	0.0167	(0.0299)		
Volatility since 1960	0.1610	(0.0372)		
Inflation rate	0.0319	(0.0146)		
Having stocks or shares in 2004-06	0.4100	(0.4919)		
Actual experienced nominal returns			0.1006	(0.1881)
- dummy for negative returns			0.3129	
Actual experienced real returns			0.0715	(0.1948)
- dummy for negative returns			0.4261	
Actual experienced excess returnss			0.0435	(0.1948)
- dummy for negative returns			0.4410	
Cohort dummy: year birth $\leq$ 1935	0.2490	(0.4325)	0.1776	(0.3822)
Cohort dummy: year birth $>$ 1946	0.4098	(0.4918)	0.4765	(0.4995)
Age	66.515	(8.791)	64.925	(8.175)
Years of education	10.268	(3.677)	11.063	(3.479)
Numeracy 2 (2/3 correct answers)	0.5666	(0.4956)	0.6711	(0.4699)
Numeracy 3 (3/3 correct answers)	0.2365	(0.4250)	0.3125	(0.4636)
Verbal fluency score			22.716	(6.879)
Ten words list learning score			5.611	(1.534)
Gender: (1=female)	0.4444	(0.4969)	0.3989	(0.4897)
Household size	2.1066	(0.9518)	2.1095	(0.8925)
Number of children	2.1507	(1.3608)	2.0793	(1.2458)
Marital status: having a partner	0.7288	(0.4446)	0.7627	(0.4255)
Make ends meet: difficult	0.2775	(0.4478)	0.1759	(0.3808)
Make ends meet: very easily	0.3546	(0.4784)	0.4604	(0.4985)
1+ limitations in ADLs	0.0592	(0.2361)	0.0465	(0.2105)
1+ limitations in iADLs	0.0919	(0.2889)	0.0634	(0.2438)
Self Reported Health: Excellent	0.1314	(0.3378)	0.1668	(0.3728)
Self Reported Health: Poor	0.0462	(0.2101)	0.0256	(0.1578)
1+ Chronic Diseases	0.3900	(0.4878)	0.3569	(0.4791)
Household Income (log)	10.173	(0.8021)	10.357	(0.7380)
Real Assets (inverse hyperbolic sine)	10.901	(3.7674)	11.336	(3.1188)
Urban area: Big city	0.1153	(0.3193)	0.1267	(0.3326)
Urban area: Rural area or village	0.2733	(0.4457)	0.2563	(0.4367)
IT	0.1161	(0.3203)	0.0534	(0.2248)
AT	0.0445	(0.2062)	0.0222	(0.1474)

Variables	Full sample		Investors	
SE	0.1152	(0.3192)	0.1767	(0.3814)
NL	0.1050	(0.3065)	0.0845	(0.2782)
ES	0.0647	(0.2460)	0.0338	(0.1807)
FR	0.1241	(0.3297)	0.1315	(0.3380)
DK	0.1132	(0.3169)	0.1511	(0.3582)
CH	0.0714	(0.2575)	0.0854	(0.2796)
BE	0.1478	(0.3549)	0.1718	(0.3773)
interview year=2007	0.6133	(0.4870)	0.5907	(0.4918)
interview=Wave2 (2006-07)	0.8519	(0.3551)	0.8582	(0.3489)
interview year=2005	0.0317	(0.1752)	0.0368	(0.1882)
Area birth: City	0.2398	(0.4270)	0.2616	(0.4395)
Area birth: Rural area or village	0.4220	(0.4939)	0.3965	(0.4892)
Math skills at age 10: Better	0.3981	(0.4895)	0.4562	(0.4981)
Math skills at age 10: Worse	0.1217	(0.3270)	0.0886	(0.2842)
Num. books at age 10: ≤ 10	0.3862	(0.4869)	0.2806	(0.4493)
Num. books at age 10: ≥ 100	0.1558	(0.3627)	0.2050	(0.4038)
N	10,785		5,360	

Table 1.2: Average marginal effects from a probit estimation for having ever invested in stocks or shares with different measures of potentially experienced returns

VARIABLES	(i) DAX Nominal	(ii) DAX Real	(iii) DAX excess returns
Pot. Experienced returns	-0.00663	-0.0770	-0.124
	(0.0722)	(0.0761)	(0.0843)
Pot. Neg. Experienced returns	-1.156**	-0.649**	-0.572***
	(0.488)	(0.261)	(0.217)
Cohort dummy:	-0.0276	-0.0211	-0.0185
year birth $\leq$ 1935	(0.0190)	(0.0194)	(0.0198)
Cohort dummy:	-0.00754	-0.0184	-0.0224
year birth $>$ 1946	(0.0198)	(0.0208)	(0.0211)
Age	-0.00345*	-0.00417**	-0.00459**
	(0.00176)	(0.00182)	(0.00187)
Years education	0.00741***	0.00743***	0.00745***
	(0.00137)	(0.00137)	(0.00137)
High numeracy score	0.0613***	0.0616***	0.0614***
	(0.00907)	(0.00908)	(0.00907)
Female	-0.0793***	-0.0794***	-0.0793***
	(0.00945)	(0.00945)	(0.00944)
Household size	-0.0113**	-0.0110**	-0.0108**
	(0.00513)	(0.00516)	(0.00517)
Number of children	-0.0143***	-0.0142***	-0.0142***
	(0.00307)	(0.00307)	(0.00306)
Has partner	-0.00728	-0.00765	-0.00789
	(0.0124)	(0.0124)	(0.0124)
Make ends meet: difficult	-0.0725***	-0.0725***	-0.0725***
	(0.0110)	(0.0110)	(0.0110)
Make ends meet: easily	0.0685***	0.0684***	0.0682***
	(0.00916)	(0.00915)	(0.00915)
1+ adl limitations	0.0141	0.0137	0.0134
	(0.0177)	(0.0177)	(0.0177)
1+ iadl limitations	-0.0146	-0.0135	-0.0134
	(0.0153)	(0.0153)	(0.0153)
Self-reported health: Excellent	0.00802	0.00799	0.00794
	(0.0122)	(0.0122)	(0.0122)
Self-reported health: Poor	-0.0803***	-0.0805***	-0.0806***
	(0.0216)	(0.0216)	(0.0216)
Household income (log)	0.0466***	0.0466***	0.0466***

	(0.00608)	(0.00609)	(0.00610)
Real Assets (asinh)	0.0170***	0.0169***	0.0169***
	(0.00130)	(0.00130)	(0.00130)
Urban area: Big city	0.0416***	0.0420***	0.0420***
	(0.0147)	(0.0147)	(0.0146)
Urban area: Rural area	-0.0279***	-0.0281***	-0.0279***
or village	(0.0106)	(0.0106)	(0.0106)
IT	-0.110***	-0.110***	-0.110***
	(0.0180)	(0.0179)	(0.0179)
AT	-0.135***	-0.135***	-0.135***
	(0.0232)	(0.0233)	(0.0234)
SE	0.377***	0.377***	0.377***
	(0.0184)	(0.0183)	(0.0181)
NL	-0.112***	-0.111***	-0.111***
	(0.0173)	(0.0173)	(0.0172)
ES	-0.100***	-0.100***	-0.100***
	(0.0230)	(0.0228)	(0.0226)
FR	0.162***	0.162***	0.162***
	(0.0184)	(0.0183)	(0.0181)
DK	0.241***	0.241***	0.242***
	(0.0200)	(0.0199)	(0.0197)
CH	0.129***	0.128***	0.128***
	(0.0232)	(0.0232)	(0.0232)
BE	0.163***	0.163***	0.163***
	(0.0169)	(0.0168)	(0.0167)
Area birth: City	-0.0101	-0.0101	-0.0102
	(0.0116)	(0.0116)	(0.0116)
Area birth: Rural area	-0.00154	-0.00155	-0.00168
or village	(0.0101)	(0.0101)	(0.0101)
Math skills at age 10: Better	0.0379***	0.0377***	0.0378***
	(0.00894)	(0.00896)	(0.00895)
Math skills at age 10: Worse	-0.0239*	-0.0241*	-0.0241*
	(0.0136)	(0.0136)	(0.0136)
Num. books at age 10:$\leq$ 10	-0.0426***	-0.0423***	-0.0424***
	(0.00970)	(0.00971)	(0.00970)
Num. books at age 10:$\geq$100	0.0414***	0.0412***	0.0411***
	(0.0120)	(0.0120)	(0.0120)
Observations	10,785	10,785	10,785
loglikelihood	-5532	-5531	-5531
N clusters	359	359	359

Pseudo R^2	0.247	0.247	0.247

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Dependent variable is the probability to have ever participated in the financial stock market. Average marginal effects are reported. The potential experience is defined as the average returns after age 40 (age 41-45). Standard errors are clusterized following Moulton (1990) where clusters are defined as the interaction between birth year and country.

Table 1.3: Average marginal effects for having ever invested in stocks or shares with different measures for potential experience

VARIABLES	(i) Excess returns Age 36-40	(ii) Excess returns Age 46-50	(iii) Nominal returns	(iv) Real returns	(v) Excess returns	(vi) Excess returns and Volatility rate	(vii) Excess returns and inflation rate	(viii) Excess returns and partner experience
Pot. experienced	-0.000790	0.0662	-0.0757	-0.102	-0.108	-0.137	-0.0315	-0.111
returns	(0.0995)	(0.0762)	(0.0790)	(0.0815)	(0.0870)	(0.0864)	(0.0934)	(0.0840)
Pot. neg. experienced	0.0701	0.113	-0.129	-0.473	-0.628**	-0.603***	-0.651***	-0.521**
returns	(0.211)	(0.223)	(0.566)	(0.356)	(0.252)	(0.223)	(0.221)	(0.216)
Dummy pot. experienced			- 0.0565***	-0.0176	0.00738			
returns (<0)			(0.0213)	(0.0220)	(0.0143)			
Volatility rate						-0.128		
						(0.160)		
Inflation rate							0.994**	
							(0.455)	
Partner pot.								-0.0971
experienced returns								(0.0676)
Partner pot. neg.								-0.453**
experienced returns								(0.228)
Observations	10,645	10,589	10,785	10,785	10,785	10,785	10,785	10,785
loglikelihood	-5453	-5430	-5528	-5531	-5531	-5531	-5529	-5529
N clusters	364	336	359	359	359	359	359	359
Pseudo R^2	0.247	0.248	0.248	0.247	0.247	0.247	0.248	0.248

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Dependent variable is the probability to have ever participated in the financial stock market. Average marginal effects are reported. Standard errors are clusterized following Moulton (1990) where clusters are defined as the interaction between birth year and country. Regressions include the same variables as in the previous estimation (financial respondent and household characteristics, country dummies and cohort dummies). The number of observations for (i) and (ii) depends on the availability of the potentially experienced returns.

Table 1.4: Heckman model estimation for holding stocks later in life conditional on having ever invested in stocks with actual experienced nominal returns and different time horizons

	(i) Actual experience after 1 year		(ii) Actual experience after 2 years		(iii) Actual experience after 3 years		(iv) Actual experience after 5 year		(v) Actual maximum experience	
Variables	stocks later in life	having ever invested	stocks later in life	having ever invested	stocks later in life	having ever invested	stocks later in life	having ever invested	stocks later in life	having ever invested
Actually exp. nominal	0.0655**		0.0732**		0.0745*		0.0672		0.0576	
returns	(0.0312)		(0.0354)		(0.0406)		(0.0428)		(0.0460)	
Potentially exp. returns		-0.0827		-0.0957		-0.0819		-0.0681		-0.0827
returns		(0.103)		(0.102)		(0.104)		(0.105)		(0.103)
Potentially. neg. exp.		0.662***		0.677***		0.661***		0.718***		0.663***
returns		(0.226)		(0.227)		(0.228)		(0.233)		(0.226)
Volatility rate		-0.0160		-0.0477		-0.0202		-0.0178		-0.0155
		(0.183)		(0.182)		(0.184)		(0.188)		(0.183)
Inflation rate		0.766		0.671		0.766		0.912*		0.767
		(0.521)		(0.520)		(0.521)		(0.525)		(0.521)
Cohort dummy:	-0.00719	-0.0229	-0.00747	-0.0240	-0.00634	-0.0271	-0.00252	-0.0292	-0.00619	-0.0229
year birth $\leq$ 1935	(0.0269)	(0.0215)	(0.0271)	(0.0217)	(0.0269)	(0.0219)	(0.0281)	(0.0222)	(0.0269)	(0.0215)
Cohort dummy:	0.0439*	-0.0298	0.0440*	-0.0290	0.0399	-0.0298	0.0422*	-0.0335	0.0444*	-0.0298
year birth > 1946	(0.0241)	(0.0214)	(0.0247)	(0.0217)	(0.0245)	(0.0218)	(0.0250)	(0.0221)	(0.0241)	(0.0214)
Age	-0.00222	- 0.00520***	-0.00232	- 0.00505***	-0.00257	-0.00486**	-0.00280	-0.00455**	-0.00243	- 0.00520***
	(0.00190)	(0.00192)	(0.00193)	(0.00194)	(0.00192)	(0.00196)	(0.00199)	(0.00199)	(0.00190)	(0.00192)
Years education	0.00328*	0.00575***	0.00325*	0.00589***	0.00342*	0.00591***	0.00343*	0.00655***	0.00336*	0.00575***
	(0.00191)	(0.00139)	(0.00192)	(0.00139)	(0.00194)	(0.00142)	(0.00198)	(0.00142)	(0.00189)	(0.00139)
Numeracy score (2/3)	0.00321	0.0436***	-0.00189	0.0438***	-0.00391	0.0454***	0.000261	0.0440***	0.00293	0.0436***
	(0.0143)	(0.0100)	(0.0141)	(0.0100)	(0.0141)	(0.00985)	(0.0147)	(0.00996)	(0.0143)	(0.01000)
Numeracy score (3/3)	0.00174	0.0211*	0.00284	0.0230**	0.00447	0.0234**	0.00469	0.0230*	0.000677	0.0211*
	(0.0150)	(0.0116)	(0.0149)	(0.0116)	(0.0148)	(0.0116)	(0.0150)	(0.0118)	(0.0150)	(0.0116)
Verbal fluency score	0.00292***	0.00270***	0.00276***	0.00272***	0.00289***	0.00261***	0.00281***	0.00259***	0.00290***	0.00270***

	(0.000974)	(0.000697)	(0.000981)	(0.000695)	(0.00103)	(0.000702)	(0.00106)	(0.000711)	(0.000979)	(0.000697)
Ten words list	0.00849**	0.0138***	0.00922**	0.0138***	0.00945**	0.0137***	0.0100**	0.0135***	0.00858**	0.0138***
learning score	(0.00397)	(0.00304)	(0.00398)	(0.00310)	(0.00416)	(0.00308)	(0.00424)	(0.00311)	(0.00398)	(0.00304)
Female	-0.0189	-0.0922***	-0.0191	-0.0933***	-0.0159	-0.0943***	-0.0137	-0.0971***	-0.0179	-0.0922***
	(0.0129)	(0.00983)	(0.0129)	(0.00995)	(0.0129)	(0.01000)	(0.0133)	(0.01000)	(0.0129)	(0.00983)
Household size	-8.91e-05	-0.0102*	0.00100	-0.0112**	0.00463	-0.0125**	0.00317	-0.0125**	0.000154	-0.0102*
	(0.00889)	(0.00540)	(0.00894)	(0.00555)	(0.00895)	(0.00569)	(0.00944)	(0.00564)	(0.00894)	(0.00540)
Number of children	-0.00772*	-0.0148***	-0.00677	-0.0147***	-0.00871*	-0.0145***	-0.00792*	-0.0139***	-0.00783*	-0.0148***
	(0.00449)	(0.00314)	(0.00446)	(0.00315)	(0.00447)	(0.00318)	(0.00463)	(0.00325)	(0.00449)	(0.00314)
Has partner	0.0310*	-0.00918	0.0262	-0.00733	0.0263	-0.00682	0.0252	-0.00639	0.0303*	-0.00918
	(0.0182)	(0.0126)	(0.0186)	(0.0128)	(0.0188)	(0.0129)	(0.0188)	(0.0133)	(0.0181)	(0.0126)
Make ends meet:	-0.0739***	-0.0635***	-0.0713***	-0.0639***	-0.0687***	-0.0633***	-0.0690***	-0.0630***	-0.0745***	-0.0635***
difficult	(0.0159)	(0.0116)	(0.0163)	(0.0117)	(0.0160)	(0.0117)	(0.0166)	(0.0119)	(0.0159)	(0.0116)
Make ends meet:	0.0527***	0.0637***	0.0535***	0.0643***	0.0561***	0.0660***	0.0567***	0.0671***	0.0521***	0.0636***
easily	(0.0131)	(0.00919)	(0.0131)	(0.00918)	(0.0129)	(0.00911)	(0.0132)	(0.00914)	(0.0132)	(0.00918)
1+ adl limitations	-0.0147	0.00860	-0.0208	0.00771	-0.0169	0.00661	-0.0162	0.0104	-0.0152	0.00859
	(0.0314)	(0.0192)	(0.0316)	(0.0194)	(0.0317)	(0.0195)	(0.0324)	(0.0201)	(0.0314)	(0.0192)
1+ iadl limitations	-0.0415	-0.0147	-0.0445	-0.0124	-0.0486*	-0.0130	-0.0473*	-0.0161	-0.0418	-0.0147
	(0.0283)	(0.0161)	(0.0283)	(0.0162)	(0.0282)	(0.0162)	(0.0284)	(0.0169)	(0.0284)	(0.0161)
Self-reported health:	0.0303*	0.00612	0.0316*	0.00469	0.0312*	0.00378	0.0277	0.00387	0.0302*	0.00612
Excellent	(0.0166)	(0.0128)	(0.0166)	(0.0129)	(0.0169)	(0.0129)	(0.0172)	(0.0132)	(0.0166)	(0.0128)
Self-reported health:	-0.0709*	-0.0876***	-0.0660*	-0.0908***	-0.0633	-0.0889***	-0.0736*	-0.0898***	-0.0710*	-0.0876***
Poor	(0.0383)	(0.0232)	(0.0391)	(0.0232)	(0.0392)	(0.0234)	(0.0392)	(0.0232)	(0.0384)	(0.0232)
1+ Chronic diseases	0.0157	0.00895	0.0174	0.00932	0.0177	0.0109	0.0153	0.0123	0.0146	0.00894
	(0.0129)	(0.00924)	(0.0129)	(0.00927)	(0.0129)	(0.00939)	(0.0130)	(0.00969)	(0.0130)	(0.00924)
Household income	0.0641***	0.0438***	0.0644***	0.0431***	0.0671***	0.0432***	0.0677***	0.0416***	0.0638***	0.0437***
(log)	(0.0105)	(0.00645)	(0.0106)	(0.00653)	(0.0105)	(0.00663)	(0.0103)	(0.00678)	(0.0106)	(0.00645)
Real Assets	0.0108***	0.0168***	0.0115***	0.0168***	0.0107***	0.0171***	0.0112***	0.0174***	0.0108***	0.0168***
(asinh)	(0.00224)	(0.00141)	(0.00224)	(0.00142)	(0.00223)	(0.00145)	(0.00229)	(0.00148)	(0.00223)	(0.00141)
Urban area: Big city	0.0117	0.0427***	0.0134	0.0418***	0.0116	0.0417***	0.0140	0.0411***	0.0116	0.0427***
	(0.0205)	(0.0151)	(0.0207)	(0.0151)	(0.0209)	(0.0153)	(0.0211)	(0.0153)	(0.0206)	(0.0151)
Urban area: Rural	-0.0278**	-0.0274**	-0.0283**	-0.0278**	-0.0309**	-0.0271**	-0.0345**	-0.0278**	-0.0282**	-0.0274**
area or village	(0.0130)	(0.0108)	(0.0134)	(0.0110)	(0.0134)	(0.0110)	(0.0138)	(0.0112)	(0.0130)	(0.0108)

IT	-0.126***	-0.0895***	-0.131***	-0.0847***	-0.139***	-0.0804***	-0.146***	-0.0727***	-0.127***	-0.0895***
	(0.0320)	(0.0189)	(0.0326)	(0.0187)	(0.0325)	(0.0186)	(0.0354)	(0.0192)	(0.0321)	(0.0189)
AT	-0.0262	-0.137***	-0.0278	-0.135***	-0.0396	-0.130***	-0.0461	-0.125***	-0.0280	-0.137***
	(0.0481)	(0.0244)	(0.0510)	(0.0246)	(0.0512)	(0.0249)	(0.0526)	(0.0259)	(0.0484)	(0.0244)
SE	0.428***	0.370***	0.427***	0.376***	0.420***	0.382***	0.410***	0.397***	0.426***	0.370***
	(0.0249)	(0.0186)	(0.0255)	(0.0185)	(0.0257)	(0.0185)	(0.0279)	(0.0186)	(0.0251)	(0.0186)
NL	0.0104	-0.0905***	0.00729	-0.0868***	0.00543	-0.0845***	-0.00115	-0.0809***	0.0115	-0.0905***
	(0.0276)	(0.0170)	(0.0284)	(0.0166)	(0.0282)	(0.0164)	(0.0308)	(0.0177)	(0.0277)	(0.0170)
ES	-0.0748*	-0.0754***	-0.0845**	-0.0715***	-0.0891**	-0.0721***	-0.102**	-0.0669***	-0.0782**	-0.0754***
	(0.0394)	(0.0235)	(0.0414)	(0.0230)	(0.0407)	(0.0227)	(0.0428)	(0.0227)	(0.0396)	(0.0235)
FR	0.0902***	0.136***	0.0902***	0.143***	0.0856***	0.145***	0.0755***	0.156***	0.0850***	0.136***
	(0.0230)	(0.0192)	(0.0236)	(0.0191)	(0.0235)	(0.0195)	(0.0257)	(0.0198)	(0.0234)	(0.0192)
DK	0.291***	0.229***	0.288***	0.232***	0.275***	0.235***	0.265***	0.248***	0.287***	0.229***
	(0.0238)	(0.0188)	(0.0246)	(0.0186)	(0.0250)	(0.0187)	(0.0272)	(0.0189)	(0.0241)	(0.0188)
CH	0.140***	0.133***	0.138***	0.135***	0.134***	0.137***	0.126***	0.146***	0.137***	0.133***
	(0.0286)	(0.0224)	(0.0295)	(0.0224)	(0.0297)	(0.0225)	(0.0323)	(0.0233)	(0.0290)	(0.0224)
BE	0.124***	0.158***	0.121***	0.162***	0.112***	0.167***	0.107***	0.178***	0.121***	0.158***
	(0.0249)	(0.0176)	(0.0253)	(0.0175)	(0.0253)	(0.0176)	(0.0276)	(0.0179)	(0.0250)	(0.0175)
Interview year: 2007	-0.0373**	-0.0184	-0.0328**	-0.0140	-0.0293*	-0.0146	-0.0273*	-0.0145	-0.0399**	-0.0184
	(0.0158)	(0.0124)	(0.0159)	(0.0125)	(0.0160)	(0.0126)	(0.0159)	(0.0128)	(0.0159)	(0.0124)
Interview year: 2006-07	0.0422*	0.0486***	0.0393	0.0460***	0.0384	0.0461***	0.0283	0.0604***	0.0391	0.0486***
	(0.0243)	(0.0159)	(0.0245)	(0.0160)	(0.0245)	(0.0160)	(0.0249)	(0.0164)	(0.0247)	(0.0159)
Interview year: 2005	-0.00728	0.0304	-0.00709	0.0314	-0.00418	0.0319	-0.0155	0.0400	-0.00872	0.0304
	(0.0374)	(0.0238)	(0.0371)	(0.0238)	(0.0372)	(0.0242)	(0.0391)	(0.0243)	(0.0376)	(0.0238)
Area birth: City	-0.00859	-0.00828	-0.00933	-0.00931	-0.00743	-0.00820	-0.0149	-0.00769	-0.00789	-0.00828
	(0.0159)	(0.0120)	(0.0160)	(0.0121)	(0.0161)	(0.0121)	(0.0162)	(0.0122)	(0.0160)	(0.0120)
Area birth: Rural area	0.00459	1.73e-06	0.00639	0.000178	0.0107	-8.01e-05	0.00398	0.000839	0.00529	-5.31e-06
or village	(0.0142)	(0.0102)	(0.0143)	(0.0103)	(0.0142)	(0.0103)	(0.0141)	(0.0106)	(0.0142)	(0.0102)
Math skills at age 10:	0.0249**	0.0312***	0.0273**	0.0304***	0.0247**	0.0310***	0.0212*	0.0280***	0.0250**	0.0312***
Better	(0.0120)	(0.00923)	(0.0121)	(0.00934)	(0.0122)	(0.00938)	(0.0124)	(0.00961)	(0.0120)	(0.00923)
Math skills at age 10:	-0.0143	-0.0268*	-0.0162	-0.0257*	-0.0246	-0.0268*	-0.0255	-0.0289**	-0.0152	-0.0268*
Worse	(0.0207)	(0.0142)	(0.0208)	(0.0142)	(0.0210)	(0.0143)	(0.0215)	(0.0144)	(0.0207)	(0.0142)
Num. books at age 10:	-0.0213	-0.0357***	-0.0251*	-0.0358***	-0.0220	-0.0375***	-0.0156	-0.0391***	-0.0206	-0.0357***

≤10	(0.0136)	(0.00982)	(0.0139)	(0.00988)	(0.0139)	(0.00992)	(0.0140)	(0.00999)	(0.0137)	(0.00982)
Num. books at age 10:	-0.0101	0.0321***	-0.0106	0.0343***	-0.00974	0.0340***	-0.0116	0.0360***	-0.0105	0.0321***
≥100	(0.0150)	(0.0123)	(0.0150)	(0.0124)	(0.0153)	(0.0125)	(0.0158)	(0.0126)	(0.0150)	(0.0122)
ρ		-0.215		-0.201		-0.194		-0.147		-0.215
		(0.212)		(0.207)		(0.203)		(0.224)		(0.209)
Observations		9,895		9,799		9,709		9,513		9,895
loglikelihood		-7958		-7844		-7733		-7493		-7960
N clusters		364		363		362		361		364
N uncensored obs.		5360		5264		5174		4978		5360
Wald test sel. instr.		10.52		10.35		10.31		12.25		10.53
p-value		0.0325		0.0350		0.0355		0.0156		0.0324

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 1.5: Heckman model estimation for holding stocks later in life conditional on having ever invested in stocks with actual experienced real returns and different time horizon

	(i) Actual experience after 1 year		(ii) Actual experience after 2 years		(iii) Actual experience after 3 years		(iv) Actual experience after 5 year		(v) Actual maximum experience	
Variables	stocks later in life	having ever invested	stocks later in life	having ever invested	stocks later in life	having ever invested	stocks later in life	having ever invested	stocks later in life	having ever invested
Actual exp. real	0.0620**		0.0674**		0.0730*		0.0676		0.110	
returns	(0.0303)		(0.0341)		(0.0403)		(0.0430)		(0.0828)	
Potentially exp.		-0.0827		-0.0958		-0.0819		-0.0681		-0.0828
returns		(0.103)		(0.102)		(0.104)		(0.105)		(0.103)
Potentially neg. exp.		0.663***		0.677***		0.661***		0.718***		0.663***
returns		(0.226)		(0.227)		(0.228)		(0.233)		(0.226)
Volatility rate		-0.0159		-0.0475		-0.0201		-0.0178		-0.0158
		(0.183)		(0.182)		(0.184)		(0.188)		(0.183)
Inflation rate		0.766		0.671		0.766		0.912*		0.766
		(0.521)		(0.520)		(0.521)		(0.525)		(0.521)
ρ		-0.215		-0.202		-0.194		-0.147		-0.214
		(0.212)		(0.208)		(0.203)		(0.224)		(0.209)
Observations		9,895		9,799		9,709		9,513		9,895
loglikelihood		-7958		-7844		-7733		-7493		-7960
N clusters		364		363		362		361		364
N uncensored obs.		5360		5264		5174		4978		5360
Wald test sel. instr.		10.53		10.35		10.31		12.25		10.53
p-value		0.0324		0.0349		0.0355		0.0156		0.0324

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 1.6: Heckman model estimation for holding stocks later in life conditional on having ever invested in stocks with actual experienced excess returns and different time horizon

	(i)		(ii)		(iii)		(iv)		(v)	
	Actual Experience after 1 year		Actual Experience after 2 years		Actual Experience after 3 years		Actual Experience after 5 year		Actual Maximum Experience	
Variables	stocks later in life	having ever invested	stocks later in life	having ever invested	stocks later in life	having ever invested	stocks later in life	having ever invested	stocks later in life	having ever invested
Actual exp. excess	0.0578*		0.0617*		0.0684*		0.0656		0.111	
returns	(0.0304)		(0.0343)		(0.0403)		(0.0425)		(0.133)	
Potentially exp.		-0.0827		-0.0958		-0.0819		-0.0681		-0.0828
returns		(0.103)		(0.102)		(0.104)		(0.105)		(0.103)
Potentially neg. exp.		0.663***		0.677***		0.662***		0.718***		0.663***
returns		(0.226)		(0.227)		(0.228)		(0.233)		(0.226)
Volatility rate		-0.0157		-0.0473		-0.0199		-0.0177		-0.0156
		(0.183)		(0.182)		(0.184)		(0.188)		(0.183)
Inflation rate		0.766		0.671		0.766		0.912*		0.766
		(0.521)		(0.520)		(0.521)		(0.525)		(0.521)
ρ		-0.217		-0.203		-0.196		-0.148		-0.214
		(0.212)		(0.207)		(0.203)		(0.224)		(0.210)
Observations		9,895		9,799		9,709		9,513		9,895
loglikelihood		-7959		-7844		-7733		-7493		-7960
N clusters		364		363		362		361		364
N uncensored obs.		5360		5264		5174		4978		5360
Wald test sel. instr.		15.14		14.65		13.61		14.49		11.25
p-value		0.0098		0.0120		0.0183		0.0128		0.0467

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 1.7: Data on Path of Wealth and Inflation

Year	Inflation path	Stock POW	Stock POW (real)	Short-term bond POW	Short-term bond POW (real)
1950	1.0000	1.0000	1.0000	1.0000	1.0000
1951	1.0919	2.1541	1.9727	1.0600	0.9708
1952	1.0891	1.9798	1.8178	1.1157	1.0243
1953	1.0752	2.4549	2.2832	1.1570	1.0761
1954	1.0334	4.4824	4.3375	1.1942	1.1556
1955	1.0446	4.9307	4.7204	1.2325	1.1799
1956	1.0719	4.5659	4.2596	1.2920	1.2054
1957	1.0944	4.8035	4.3892	1.3480	1.2317
1958	1.1177	7.6948	6.8847	1.3913	1.2448
1959	1.1277	13.8433	12.2758	1.4341	1.2717
1960	1.1450	16.4336	14.3523	1.5051	1.3144
1961	1.1713	18.6392	15.9135	1.5575	1.3297
1962	1.2046	15.0266	12.4746	1.6092	1.3359
1963	1.2403	14.9452	12.0494	1.6714	1.3476
1964	1.2693	17.5346	13.8145	1.7378	1.3691
1965	1.3104	15.1806	11.5842	1.8244	1.3922
1966	1.3567	12.8590	9.4778	1.9418	1.4312
1967	1.3811	13.5125	9.7838	2.0221	1.4641
1968	1.4014	18.6536	13.3105	2.0968	1.4962
1969	1.4282	19.9160	13.9446	2.2147	1.5506
1970	1.4775	17.0164	11.5170	2.4167	1.6356
1971	1.5549	16.4315	10.5673	2.5842	1.6619
1972	1.6402	18.2010	11.0966	2.7249	1.6613
1973	1.7556	16.2193	9.2388	3.0464	1.7353
1974	1.8782	13.4467	7.1593	3.3389	1.7777
1975	1.9892	16.7037	8.3971	3.4993	1.7591
1976	2.0737	17.9875	8.6741	3.6436	1.7570
1977	2.1511	17.7850	8.2677	3.7977	1.7654
1978	2.2096	18.8458	8.5290	3.9341	1.7804
1979	2.2990	17.8548	7.7664	4.1897	1.8224
1980	2.4241	16.7874	6.9253	4.5773	1.8883
1981	2.5778	16.8363	6.5311	5.1150	1.9842
1982	2.7130	17.1179	6.3097	5.5550	2.0476
1983	2.8023	22.8407	8.1507	5.8662	2.0933
1984	2.8697	25.7648	8.9781	6.2068ed	2.1628

Year	Inflation path	Stock POW	Stock POW (real)	Short-term bond POW	Short-term bond POW (real)
1985	2.9290	34.0576	11.6277	6.5344	2.2309
1986	2.9252	47.2960	16.1683	6.8282	2.3343
1987	2.9325	43.7734	14.9268	7.0953	2.4195
1988	2.9699	38.1676	12.8515	7.3937	2.4896
1989	3.0525	48.7984	15.9865	7.9044	2.5895
1990	3.1348	57.1069	18.2171	8.5552	2.7291
1991	3.2603	52.5285	16.1114	9.3225	2.8594
1992	3.4279	54.4444	15.8829	10.1830	2.9707
1993	3.5782	60.1432	16.8082	10.9027	3.0470
1994	3.6770	70.5052	19.1746	11.4695	3.1193
1995	3.7414	71.0945	19.0019	11.9733	3.2002
1996	3.7930	85.3930	22.5134	12.3571	3.2579
1997	3.8660	123.5866	31.9675	12.7556	3.2994
1998	3.9047	166.8465	42.7299	13.1941	3.3790
1999	3.9262	177.8028	45.2868	13.5732	3.4571
2000	3.9820	236.6133	59.4208	14.1517	3.5539
2001	4.0593	186.9433	46.0529	14.7362	3.6302
2002	4.1195	139.1107	33.7692	15.2104	3.6923
2003	4.1624	106.5065	25.5877	15.5543	3.7369
2004	4.2311	132.3923	31.2900	15.8721	3.7513
2005	4.2956	155.5166	36.2039	16.2084	3.7733
2006	4.3643	195.8561	44.8769	16.6929	3.8249
2007	4.4631	248.1476	55.5999	17.3858	3.8955
2008	4.5791	206.5086	45.0983	18.1673	3.9675
2009	4.5963	167.2289	36.3837	18.3830	3.9996
2010	4.6478	205.9346	44.3079	18.5278	3.9864

2 Occupational Choices and Informal Caregiving Among Young Old Europeans

ABSTRACT

In the recent years many European countries have adopted pension reforms to postpone retirement age. This could lower the informal long-term caregiving potential provided by young old. Using European data from SHARE I investigate about the effect of occupational choices on informal caregiving, both in probability and time, taking into account household formation between a care giver and a care recipient. Four different types of care recipients are considered: parents, grandchildren, adult children and other people who live outside the family. The occupational choices are considered as binary: participating or not in the labour market. Women who never participated in the labour market are distinguished from those who worked in the past, because the choice of never entering in the labour market was made in a distant past and it is more related to family preferences. Endogeneity of the occupational choices are also checked using the potential eligibility to pension benefits based on pension reforms.

Results show that there is a positive effect of being not employed on coresiding with a parent or an adult child and on the informal care provision, especially for women and for care given to look after grandchildren. The endogeneity problem is relevant for women as it is considering coresiding as an alternative choice of providing informal care outside the household. Households with a woman who never worked provide more care inside the family and the woman is usually the one who specializes on care provision. A simulation of a pension reform with an increase of one year in the eligibility age to receive a public pension benefit, based on the estimated parameters, suggests that demand for formal care may increase a lot, but less for countries which adopt flexible time working arrangements policies for young old.

2.1 Introduction

The recent European financial crisis has raised concerns about the sustainability of welfare and national pension systems. Austerity policies have been adopted to reduce public expenses for health care and long-term assistance. Many reforms have also been introduced across the European countries to decrease pension expenses: increasing the effective retirement age and decreasing current and future pension benefits, accordingly to the increased life expectancy.

The postponement of retirement age for many Europeans will induce many young old to work longer, reducing their available time for leisure or other activities like informal care provision. Informal care has been associated with an improved quality of life and a decrease in deterioration of mental and physical health for assisted people (i.e. Leung et al., 2007). Hence, a decrease in informal care provision could lead to an increase in demand for paid care and a reduction of quality of life for care receivers.

In this context I want to investigate if occupational choices of young old Europeans affect propensity and time allocated to informal caregiving. Young old are considered as the individuals aged between 50 and 69.

The association between labour supply and caregiving has been widely investigated especially with US data. The literature focused mainly on care provided by adult daughters to their parents (Ettner, 1995; 1996; Wolf and Soldo, 1994). These studies suggest that there is a weak negative correlation between work and propensity to provide informal care and the time allocated to it, but when one takes into account simultaneity of the choices, the effect is insignificant or very small, so that there is weak evidence for an effect of labour supply on informal care provision.

Other studies based on European data from SHARE find that there is a negative relation between informal caregiving and labor supply (Crespo, 2006; Bolin et al., 2008; Crespo and Mira, 2013). Bolin et al. (2008) find a negative correlation between informal caregiving to parents and labour supply for males and females but when they check for the endogeneity of informal care, they do not find a significant effect. Their results are probably affected by the weakness of their instruments. Crespo (2006) analyzes the differences between Northern and Southern European countries about provision of intensive informal care (on a daily or weekly basis) to elderly parents on labour market participation decisions of European women who are themselves approaching retirement. Finally, Crespo and Mira (2013) use a time allocation model and focus only on daily and coresidential personal care. The latter two studies suggest that there is a negative effect, especially for women from Southern European countries. However they do not consider that many women never participated in the labour market. This is a past choice which can depend on family preferences. Then it is not considered that especially in Southern Europe many young old individuals coreside with their parents, probably to provide informal care to them. Ciani (2012) studies the effect of providing coresidential unpaid adult care on the caregiver probability of being employed using ECHP data and separating the sample between Northern and Southern European countries. He finds that once he takes into account the time-invariant unobserved heterogeneity, informal caregiving is not endogenous and that the effect is negative but small for both groups of countries. But his study does not consider household formation and changes in household size.

The recent literature has focused also on informal care given to other recipients: caregiving to adult children also for looking after grandchildren[1] or caregiving to other people outside the family such as friends, neighbors, and other relatives. Using PSID data Wang and Marcotte (2007) find that grandparents are more willing to work if they coreside with grandchildren especially when parents do not live with them. Using preliminary data from SHARE Wave 1 Hank and Buber (2009) investigate about the country differences in characteristics of grandchildren and grandparents looking after to them. Albertini and Kohli (2009) and Kalwij et al. (2012) find using SHARE data that especially for childless individuals or families who relies less on children, individuals are more willing to give and receive care from friends, neighbors and other relatives. To my knowledge the literature on caregiving to grandchildren or to other people has not focused on the simultaneity of decisions of labour supply and informal caregiving.

As mentioned above, the economic literature which investigates the effect of labour supply on informal caregiving is based mainly on US data[2]. Some studies take into account that the caring decision is confounded with living arrangement (Stern, 1995; Pezzin and Schone, 1999). Labor supply is usually considered as one of the child decisions that can be jointly determined with informal caregiving or household formation with an older parent. Stern (1995) estimates the effect of various parent and child characteristics on the choice of care arrangement of the parent, considering the potential endogeneity of the employment status and the geographic distance of the child. She finds that child distance has a smaller and slightly significant effect, while work status is not significant. Instead, Pezzin and Schone (1999) analyze the problem of informal care decisions jointly with living arrangement, labor force participation and cash transfer decisions. They find that coresidence is an important alternative mode of assistance to elderly persons.

[1] I refer to this kind of help as caregiving to grandchildren.

[2] At least at my knowledge there are not other studies which focus on estimating the effect of occupational choices on informal caregiving considering household formation using European data.

As theoretical setting I consider a Nash bargaining game between a care giver and a care recipient, following the model proposed by Pezzin and Schone (1999) to discuss the interpretation of the parameters of interest: informal caregiving to each type of care recipient, inter-generational household formation, labor force participation and cash transfer decisions of young old individuals.

Simultaneity of decisions is taken into account by instrumenting the occupational choices with the potential eligibility to pension benefits computed using pension rules and reforms (as in Angelini et al. (2009)). The paper is related to the studies of the effect of informal care on labor supply. With respect to previous studies I am considering the care given to people who live outside the household and I am treating coresiding as a potential alternative choice for providing informal care outside the household. The analysis extends also to other types of informal caring distinguishing by care recipient. Care recipients are divided into four categories: parents or parents-in-law, grandchildren, adult children and other people (friends, neighbors, and other relatives). Then, women are distinguished between those who make an occupational choice (being employed or not) and those who never participated in the labor force. In the latter case I assume that the decision to never participate is more related to family choice or task allocation among family members than labor supply, because for women over 50 this is a past choice that is difficult to change.

The empirical estimation focuses on the effect of occupational choices on care arrangements decision (including coresiding decision) using European data from the first two waves of Survey of Health Ageing and Retirement in Europe (SHARE). To simultaneously estimate the propensity to coreside, provide care and the time allocated to informal care, I estimate a Heckman model with double sample selection: individuals first decide whether to co-reside with a care recipient, then if they do not, they decide whether to provide help and if they do, they decide how much time to allocate to informal care. At the beginning labor participation is considered independent of the decision of providing care or coresiding, then it is allowed to be a simultaneous decision. In the empirical estimation I check for several individual and household characteristics of the care giver and characteristics of care recipients when available. The multi equation system is estimated with a simulated maximum likelihood method as proposed by Roodman (2011).

Results suggest that women have a higher propensity and allocate more time than men to provide care to parents and look after grandchildren, while they are less likely to provide care to adult children and other people. Being not employed increases the probability to co-reside with parents and adult children, and to provide informal care both in probability and time to all the different types of care recipients. For men the exogeneity of the labour supply on informal caregiving is not rejected. For women I find evidence against the exogeneity of labour supply on informal care provision for all the different types of care, even for the care given to people outside the family. When the endogeneity of the occupational choices is taken into account, females who are retired or homemakers have around 20% more of probability to co-reside with their parents and their adult children; exiting the labour force has still a positive effect on caregiving, especially for the care propensity. The effect is strong for care given to grandchildren: not employed women who worked in the past provide 17.3% more care and allocate 120.5% more time than employed women. Little support is found for endogeneity bias of occupational choices and hours of provided care, except for the time given to look after grandchildren. There is also evidence that coresiding can be motivated by providing help to the care recipient. Finally families with a woman who never worked provide more care inside their own family, and less outside, but when they do, they provide more time. Among members of these family women are usually the ones who are requested to provide informal care.

After that for caregiving to parents and grandchildren and assuming the occupational choices as exogenous, I use the estimated parameters to simulate the effect of one year increase in the early and statutory eligibility age to receive a public pension benefit on the amount of provided informal care for the individuals potentially affected by this reform. I show that postponing retirement for many Europeans could lead to a reduction of informal provision or to an increase in demand for formal care, if we assume that informal and formal care can be substitutes. Countries where flexible working time arrangements are available are more likely to have a smaller increase in demand for formal care.

The remainder of the paper is structured as follows. Sections 2 presents data and descriptive analysis. Section 3 presents the theoretical model and Section 4 the econometric model. Section 5 presents estimation results, Section 6 presents simulation results, while Section 7 concludes with a short discussion.

2.2 Data and descriptive analysis

The Survey of Health Ageing and Retirement in Europe[3] (SHARE) is a European cross-national panel of individuals aged 50 or older. It collects several informa-

[3]This chapter uses data from SHARE wave 4 release 1, as of November 30th 2012 or SHARE wave 1 and 2 release 2.5.0, as of May 24th 2011 or SHARELIFE release 1, as of November 24th 2010. The SHARE data collection has been primarily funded by the European Commission through the 5th Framework Programme (project QLK6-CT-2001-00360 in the thematic programme Quality of Life), through the 6th Framework Programme (projects SHARE-I3, RII-CT-2006-062193, COMPARE, CIT5- CT-2005-028857, and SHARELIFE, CIT4-CT-2006-028812) and through the 7th Framework Programme (SHARE-PREP, N° 211909, SHARE-

tion about individual and family characteristics like care provision, social support, health conditions, occupational choices, income and financial assets. The sample consists of 22,464 individuals between age 50 and 69, 10,212 men and 12,252 women, who have been interviewed for the first time during Wave 1 (2004-2005) or Wave 2 (2006-2007)[4] from Northern European countries (Sweden, Denmark and the Netherlands), Central European countries (Austria, Germany, France, Belgium and Switzerland), Southern European countries (Italy and Spain), and Eastern European countries (Czech Republic and Poland)[5]. I exclude unemployed and disabled individuals, thus only employed and retired men, and women who are employed, retired or homemaker are selected.

SHARE is particularly interesting because it provides detailed information about labour market participation and informal caregiving. In its first two waves informal care provision is elicited with several questions: first survey respondents are asked if they have provided informal care outside the household[6]; then they are asked which kind of help they have provided among personal care, practical household help and help with paperwork. Hence, it is possible to distinguish informal care by type of task[7] and by care receiver. After that they are asked to whom the help has been provided and how often. Informal care is divided into four categories with respect to the care recipients: parents or parents-in-law, grandchildren, adult children and other people (friends, neighbors and other relatives). Then for each type of care one can compute a measure for the number of weekly hours of given informal care as it was done in Bolin et al. (2008): the reported reference period is multiplied or divided to get the weekly time spent to caregiving.

Many studies focused mainly on informal care given to parents, but a descriptive analysis shows that caring to parents is an activity done by less than 20% of the Europeans aged between 50 and 69, also because just half of them have at least one parent or parent-in-law still alive (Figure 2.1). At the same time while the

LEAP, N° 227822 and SHARE M4, N° 261982). Additional funding from the U.S. National Institute on Aging (U01 AG09740-13S2, P01 AG005842, P01 AG08291, P30 AG12815, R21 AG025169, Y1-AG-4553-01, IAG BSR06-11 and OGHA 04-064) and the German Ministry of Education and Research as well as from various national sources is gratefully acknowledged (see www.share-project.org for a full list of funding institutions).

[4]Longitudinal respondents are not considered because the reference period of the question about care provision change. The reference period is the last 12 months for non-longitudinal respondents, after the first interview.

[5]Czech Republic and Poland participated to the survey for the first time with Wave 2 (2006-07).

[6]For care given inside the household only the personal one is observed and there is no information about the time spent for that activity.

[7]In the analysis I do not consider the type of task provided by the care giver. Hassink and den Berg (2011) argue that it could be important to distinguish between shiftable and non shiftable task , so between personal care and other tasks. I prefer instead considering a broader definition of informal care.

proportion of Europeans with at least a grandchild is almost the same, young old people are more likely to look after grandchildren, supporting their adult children (at least 80% of young old Europeans have at least one adult child). Looking at the distribution of care provision outside the household to elderly parents across the European countries (Figure 2.2a) it is possible to notice that there are huge differences: northern European countries have around 40% of young old who report providing care to their parents, while in Spain and Poland only 15% of them do. However the differences across countries reduce a lot if we assume that young old who coreside with their parents or parents-in-law provide some informal care: around 30% of young old in Central and Southern Europe provide care to their parents or coreside with them.

For care given to adult children or grandchildren[8] coresiding plays an important role to reduce differences across countries (Figure 2.2b and 2.2c). Another important type of care, especially for childless individuals, recently studied in the literature is the care given to people outside the family such as friends, neighbors and other relatives (Albertini and Kohli, 2009; Kalwij et al., 2012): around 10% of young old Austrian, Spanish and Polish provide help to other people, while the proportion is higher for other Central European countries (around 20%) and even higher for Northern European countries (around 35%) (see Figure 2.3). About the informal care given to other people and to adult children, already from a descriptive point of view there is a higher proportion of men with respect to women who provide this type of help (see Table 2.1 and 2.2), whereas women help more parents and look more after grandchildren. These differences could depend on the kinds of tasks asked by the care recipients and on allocation preferences among family members.

Conditional on providing care outside the household, countries where less individuals provide care are the countries where caregiving is more intense. Table 2.3 reports first, second and third quartile of the distribution of hours of informal care to the different types of care receiver by country and gender. The table shows that when women provide help they often allocate much more time to informal care than men. Italy is the country where caregivers provide overall the most intensive informal care: the median time allocated by Italians is 7 hours per week for caring to parents, 14 hours to grandchildren, 10 hours to adult children and almost 2 hours per week to other people. Then there are countries where informal caregiving is overall intense like Spain, Austria, Czech Republic and Poland, while Denmark and Sweden are the countries where caregivers provide less intensive help: median time is one hour and half per week for caregiving to parents, 3

[8] The geographical distance from grandchildren (child of the adult child) is not available and it is assumed to be the same of the adult children, even if a grandchild could have moved out or could live with the separated or divorced child-in-law in another household.

hours to grandchildren, one hour to adult children and around 30 minutes to other people.

Besides differences in the proportion of individuals providing care, there are also huge differences in the labour force participation later in life, especially for women. Austria and Italy are the countries where most men are retired (almost 60%) while in Sweden and in Switzerland they are only 30% and 25%[9] (see Figure 2.4). The same applies for women (see Figure 2.5). The majority of them are outside the labor force: only 20% of women are employed in Italy, 23% in Poland and 25% in Austria. Around 30% and 40% in the other countries excluding the Northern European countries and Switzerland where participation is higher, respectively 51% for Swiss women, 56% for Danes and 62% for Swedes. However it is worth noting that many women in Europe never participated in the labour market: around 30% in Italy and Spain, and 10% in the Central European countries declared to have never worked in their life.

Table 2.1 and 2.2 do not provide clear evidence if being not employed can be associated positively with an increase in probability of informal caregiving. Overall not employed men and women provide less care to parents than the employed, while there is no great difference between employed and not employed who provide care to other care recipients.

From this brief descriptive overview, it seems already important to study the effect of occupational choices on different types of informal care, considering household formation with parents, and the postponement of forming a new household for adult children. About occupational choices, while the great majority of men worked in the past and they are still working or are retired, women present a more complicated situation: some of them never participated in the labour market, and among women who did, they are employed, retired or homemakers. Considering the simultaneity of labour supply and care arrangement decision for women who never worked is unnecessary because the decision for being homemaker is a choice made in a distant past, more related to family preferences and task allocation among family members where the husband is supposed to support the family working and earning an income, and the wife specializes on house keeping and looking after children.

[9] I am excluding disabled and unemployed so individuals who early retire through disability pension benefits are excluded.

2.3 Theoretical setting

As theoretical setting I consider the model by Pezzin and Schone (1999) to analyze the interpretation of the main parameters of interest and present a simple extension of the model to the case of two care recipients, discussing the necessary assumptions. Pezzin and Schone (1999) explicitly model intergenerational living and care arrangements within a Nash bargaining game when there is only one care giver, g, and one care recipient, r: one daughter and her parent. Each player is assumed to maximize a linear utility function U^i with $i = \{g, r\}$ defined over a vector of private goods X^i and a public good W^r which can be interpreted as the well-being of the care recipient. The public good W^r introduces altruism in the model, a choice variable which affects both players' utility. Additional choice variable for the care giver is leisure, L, while it is assumed that care recipient does not face a time allocation problem: when the recipient is of working age I am effectively assuming that she cannot change hours of work. Both utility functions also depend on a taste parameter θ^i reflecting giver and recipient preferences for privacy and independence, so we have

$$U^g \left(X^g, W^r, L; \theta^g\right) \tag{2.1}$$

$$U^r \left(X^r, W^r; \theta^r\right) \tag{2.2}$$

The production of W^r is conditional on the needs of the care recipients[10], N^r, assumed to be exogenous, and it requires the receipt of some form of care: formal, FC^r or informal, IC^r. The model allows for the possibility of a cash transfer, t, from the care giver to the recipient to purchase formal care ($t > 0$).

The care giver and recipient simultaneously determine the equilibrium values of X^g, X^r, L, t, and the combinations of care (IC and FC) necessary to produce the equilibrium level of W^r. The equilibrium level is found as the solution of a Cournot-Nash game. The equilibrium for the giver is found maximizing her utility, deciding individually IC and t and considering the strategy of the receiver (FC) as given, and is subject to budget and time constraints:

[10]For care given to parents, the needs are represented by their health conditions.

$$
\begin{aligned}
& U^{g}_{X^g,IC,t,L}\left(X^{g}, W^{r}\left(IC, FC\left(t\right); N^{r}\right), L; \theta^{g}\right) && (2.3)\\
s.t. \quad & V^{g} + \omega\left(T - L - IC\right) = X^{g} + t && (2.4)\\
& L + IC \leq T && (2.5)\\
& IC \geq 0 && (2.6)\\
& L \geq 0 && (2.7)
\end{aligned}
$$

where V^g is the non-labor income of the giver, ω is the wage rate, $T - L - IC$ is the working time.

The care receiver maximizes his utility function in a similar way, deciding how much money to spend on formal care (FC) and considering as given IC and t:

$$
\begin{aligned}
& U^{r}_{X^r,FC}\left(X^{r}, W^{r}\left(IC, FC\left(t\right); N^{r}\right); \theta^{r}\right) && (2.8)\\
s.t. \quad & V^{r} + t = X^{r} + p_{FC}FC && (2.9)\\
& FC \geq 0 && (2.10)
\end{aligned}
$$

where V^r is the non-labor income of the receiver, p_{FC} is the price of formal care.

The Cournot-Nash equilibrium is determined as the intersection between the best response functions of the care giver and receiver based on the beliefs on the other player's strategy.

Household formation is determined when the utility from living separate for both care giver and recipient can increase if they decide to live together: a threat point is determined. The decision to coreside or to live separately is not related only to the provision of care but also to cash transfers and individual preferences to form a household.

With this specification one can derive implications that cover all possible cases: a care giver provides informal care if the marginal rate of substitution of informal care and cash transfers is greater than the opportunity cost of her time (working or leisure). The giver will provide more informal care if formal care has less of an impact on the public good and if her care recipient is less willing or able to purchase formal care. Corners solutions occur when an individual allocates all her time to informal care provision, or to work, or to leisure.

When the care giver can provide help to another care recipient, for instance supporting an adult child by looking after grandchildren, the game becomes complicated: competition between her adult child and her parent can arise to get informal care by the giver, as long as there is only one care giver[11].

It makes sense to assume a care recipient cannot observe the strategy of the other care recipient, so he decides how much formal care buying in the market based on his beliefs on IC and t that one giver provides to him. This implies that care recipients do not strategically compete to receive informal care by one care giver.

I extend the model to keep into consideration this case. Therefore, I consider that the care giver's utility function is conditional on two public goods (W^{R_1} and W^{R_2}) where W^{R_1} is the welfare of the first care recipient and W^{R_2} is the welfare of the other care recipient. With respect to the previous model, the care giver decides individually the time allocated to informal care (IC^{R_1} and IC^{R_2}) for both types of care recipients and cash transfers (t^{R_1} and t^{R_2}), given her beliefs for FC^{R_1} and FC^{R_2}:

$$U^g_{X^g,IC^{R_1},t^{R_1},IC^{R_2},t^{R_2},L}\left(X^g, W^{R_1}\left(IC^{R_1}, FC^{R_1}(t); N^{R_1}\right), W^{R_2}\left(IC^{R_2}, FC^{R_2}(t); N^{R_2}\right), L; \theta^g\right) \tag{2.11}$$

$$s.t.s.t.\ V^g + \omega\left(T - L - IC^{R_1} - IC^{R_2}\right) = X^g + t^{R_1} + t^{R_2} \tag{2.12}$$

$$L + IC^{R_1} + IC^{R_2} \leq T \tag{2.13}$$

$$IC^{R_1} \geq 0,\ IC^{R_2} \geq 0 \tag{2.14}$$

$$L \geq 0 \tag{2.15}$$

Implications are similar to the previous model. As internal solution a care giver allocates her time to work, leisure and informal care to her parent and to her adult child, when the marginal rate of substitution from leisure or from providing informal care and cash transfer to a care recipient is equal to the wage rate:

$$\frac{\frac{\partial U^g}{\partial W^{R_1}}\frac{\partial W^{R_1}}{\partial IC^{R_1}}}{\frac{\partial U^g}{\partial W^{R_1}}\frac{\partial W^{R_1}}{\partial FC^{R_1}}\frac{\partial FC^{R_1}}{\partial t^{R_1}}} = \omega \tag{2.16}$$

[11] The literature has focused on problems with more caregivers, usually two adult children, and one care receiver (one parent). Engers and Stern (2002) analyze the long-term care decisions in a family decision making problem finding that informal care is provided with a voluntary decision by each child and it is not likely to be a collective decision. In the model I do not consider competition on informal care provision by caregivers.

$$\frac{\frac{\partial U^g}{\partial W^{R_2}} \frac{\partial W^{R_2}}{\partial IC^{R_2}}}{\frac{\partial U^g}{\partial W^{R_2}} \frac{\partial W^{R_2}}{\partial FC^{R_2}} \frac{\partial FC^{R_2}}{\partial t^{R_2}}} = \omega \tag{2.17}$$

$$\frac{\partial U^g}{\partial L} = \omega \tag{2.18}$$

It is possible to derive the various corner solutions, identifying the cases where a daughter only allocates her time to work or to leisure or to informal caregiving.

Alternatively we could assume that necessity of help by care recipients arises at different times. When the need of a care recipient arises a care giver can decide whether to provide help or not: at low values of N^r the care giver always prefers to allocate her time to work or leisure. The game is between one care giver and one care receiver as in the original model proposed by Pezzin and Schone.

When the second care recipient asks for help we have two cases. If we assume that there is no form of commitment on informal care provision, care arrangement can be renegotiated. When the second care recipient asks for help, the care giver can simultaneously decide how much time and cash transfer allocate to both care recipients, as it was presented in the simple extension of the model. Instead, if there is a commitment on care arrangement, the second recipient becomes a residual claimant whose needs are met subject to the pre-existing care supply to the first recipient[12]. In this case a daughter can decide to provide less or no care to a needy parent, because she would like to be available to help her adult child looking after grandchildren in the future.

The idea that at least a weak commitment on care arrangement exists is suggested also by Stern (1995) and Pezzin and Schone. They argue that in problems of family arrangements, time and resource allocations are not binding or enforceable, but proximity can promote coordination of actions and enforce care arrangement. Before provision of informal care there is no possibility for an agreement between care giver and recipient. When informal care is provided there could be a commitment at least in the short-term. For instance a care giver who decides to coreside

[12]Guo and Iyer (2013) examine a multilateral bargaining game in vertical supply relationships and they show that a supplier prefers a sequential bargaining when the retail price is sufficiently different among retailers. So when the dispersion in retail prices is sufficiently large, it is optimal for the supplier bargain first with the higher priced retailer, ending up also not selling at all to the lower priced retailer. Their evidence can fit also in this context where there is a single care giver and different care receivers and there is a production of a public good W^r.

with a care recipient loses more bargaining power than a care giver who decides to provide care to someone outside the family, and this decision is more difficult to get revised by the care giver.

The presence of other care recipients can explain also why the importance of cash transfers is low especially when individuals do not coreside: care recipients have lower beliefs about the financial resources they can get by the giver and at the same time, a care giver will have lower beliefs about the amount of cash transfer which will be spent to buy formal care by a care recipient.

2.4 Econometric model

The economic model analyzes jointly occupational choices, informal care, household formation and financial transfers. From a descriptive overview of the sample from SHARE dataset some cases can be ruled out because they are infrequent: intervivos financial transfers do not happen frequently[13] and coresiding with people outside the family is very rare. Coresiding with grandchildren is also not that common and it is problematic deciding how to treat cases where a divorced or separated child has moved back to parents' house and his or her children are living with the ex-partner. For this reason coresiding with grandchildren is not considered and also this case is ruled out. This is also motivated by the fact that the majority of grandchildren are minors and that the decision to coreside with the grandparents is more related to the child characteristics and preferences[14]. The exclusion of these cases simplifies the empirical analysis. Basically I consider only informal care, occupational choices and household formation when it is relevant.

Differently from Pezzin and Schone I estimate explicitly the effect of occupational choices on propensity and time allocated to informal caregiving, considering also household formation. Occupational choices are treated as a binary choice for being employed or outside the labor force (retired for men, retired or homemaker

[13]In SHARE there are few questions about financial transfers above 250 euros (or equivalent sum in the local currency) received and given in the last year and their motivations. Financial help for illness or death of some relatives and payments to respect a legal duty happen in just few cases. If a broader definition is considered including also other situations such as help for unemployment period and for sustaining primary needs or other reasons which do not include presents and transfers for buying a house, furniture or other goods, the financial transfers from and to the parents happen only in 2.7% of the sample and from or to other people only in 2.4%, with not so many differences across countries.

[14]For robustness check I consider also grandparents coresiding with their grandchildren, as it was considered for parents and adult children. Results suggest that the choice of providing informal care and coresiding with a grandchild are not correlated.

for women). Women who never worked (nw) are considered separately from those who worked but exited the labour force. There are no cases in the SHARE sample of men who have never worked in the past, and almost nobody defines himself as homemaker. Having never worked is treated separately from being out of the labor force, because for women over 50 the decision to never participate in the labor market is related to the past, and I assume it is exogenous. The idea is that having never worked is a proxy for family importance and household allocation task among family members: a household with a woman who has never worked has probably decided in the past that the woman would have cared more about the family (house keeping and raising children), while the husband would have worked and sustained financially the needs of the family. I expect that women are more willing to provide care than men in these households.

First I consider being not employed ($nemp$) as exogenous, then I consider the possibility of simultaneous effects with coresiding and the caring decision.

From the theoretical model the decision to coreside with a parent or an adult child is not related only to provision of informal care: there could be cases where a child and a parent coreside but no informal care is provided. At the same time in SHARE there is no information about informal care given inside the household except for personal care, and time allocated is not asked. The only available information about time allocated to informal care provision is conditional on providing care outside the household.

I consider a Heckman model with double sample selection[15]: first an individual decides to coreside with a care recipient, then if she does not, she can decide whether to provide help and how much time caring to a care recipient. In the general case I have to estimate three equations. Let $ln\,(hcare)$ be the logarithm of the number of hours of weekly care given to the type of receiver r, $care^*$ be the propensity to provide care to them, nr^* be the propensity to live not in the same household, nw is a dummy equals to one when a woman has never worked, $nemp$ a dummy equal to one when an individual is not employed, but has at least a job episode in her career. The equation system is:

$$ln\,(hcare_{i,r}) = \gamma_1 nemp + \gamma_2 nw + X_1\beta_1 + \varepsilon_1 \; if \; care = 1 \tag{2.19}$$

$$care^*_{i,r} = \gamma_1 nemp + \gamma_2 nw + X_2\beta_2 + \varepsilon_2 \tag{2.20}$$

[15]The double selection problem is considered only for care given to parents or adult children. Care given to grandchildren or other people is considered as independent from coresiding.

$$nr^*_{i,r} = \gamma_1 nemp + \gamma_2 nw + X_3\beta_3 + \varepsilon_3 \tag{2.21}$$

$$care = \begin{cases} 1 & if\ care^* > 0 \\ 0 & if\ care^* \leq 0 \end{cases} \tag{2.22}$$

$$nr = \begin{cases} 1 & if\ nr^* > 0 \\ 0 & if\ nr* \leq 0 \end{cases} \tag{2.23}$$

where X_1, X_2, X_3 are a set of covariates and error terms are correlated and normally distributed:

$$\begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \end{pmatrix} \sim N\left(0, \begin{pmatrix} 1 & \rho_{12} & \rho_{13} \\ & 1 & \rho_{23} \\ & & 1 \end{pmatrix}\right) \tag{2.24}$$

For each individual i, we observe only nr_i and $w_i = care_i nr_i$, so caring propensity is observed only if the care recipient does not live in the same household of the giver ($nr = 1$). If $\rho_{23} = 0$ the double sample selection problem can be simplified and it is possible to consider only a single sample selection that is the classical Tobit II model or Heckman model[16].

As a set of covariates for the equations I include several controls: individual characteristics such as gender, years of education, health conditions (having limitations in ADLs or IADLs, having chronic diseases, physical inactivity), household and family characteristics such as having a partner, household size and non labor income[17], net real assets value, residence area and country dummies. Then for each type of care, I include care recipient characteristics, based on their availability.

In the extension of the economic model I consider that a care giver can allocate time to different care recipients. If we assume that there is no commitment in

[16]This model is appropriate if no assumption on informal care given to care receivers who live in the same household is made. If it is assumed that individuals who coreside provide help, then the problem can be treated differently. For instance if coresiding is linked to a higher propensity to provide care, an ordered probit could be used for the sample selection problem.

[17]Household size excludes care recipients if they coreside with the respondent, and non labor income is not included in X_3.

given informal care to each care recipient, the estimated model should consider the simultaneous decision of providing informal care to different care recipients. The estimation of the derived simultaneous equations is not an easy task. I prefer to assume that there is commitment when informal care is provided. Then, informal care to each type of care recipient can be analyzed separately and it will not be affect by informal care to other recipients, except for the reduction of available time to allocate to caregiving. At the same time, I consider that individuals have preferences about care provision to a type of care recipient and they are approximated by family characteristics: dummies for having parents, children or grandchildren and their numbers.

The models are estimated using a set of instruments for the sample selection equations. They identify only care provision and not the hours of given care and they consist of two proxies for being an altruistic person: a dummy for participating in religious organizations and the self-reported probability to leave a bequest; and two proxies for having the means to provide help: the number of cars per-capita and a dummy for being financial distress. Except for caring to parents, I also consider having ever had any siblings as an instrument for the sample selection. For the sample selection related to not coresiding with a care recipient I consider the number of rooms of the house that I suppose should affect only the propensity to live separately and should not have any effect on the propensity to provide care outside the household[18].

If the occupational choices are considered as endogenous, allowing for simultaneity in the decision, a fourth equation is added:

$$nemp^* = X_4\beta_4 + Z\delta + \nu \tag{2.25}$$

$$nemp = \begin{cases} 1 & if\ nemp^* > 0 \\ 0 & if\ nemp^* \leq 0 \end{cases} \tag{2.26}$$

where Z is a set of instruments for being not employed and X_4 is a set of covariates.

[18]This is based on the assumption that a care giver do not buy or move to a new bigger house when she decides to coreside with a care recipient. While coresiding is important especially in Southern European countries, moves are rare (Angelini et al., 2014).

The distribution of error terms becomes the following:

$$\begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \\ \nu \end{pmatrix} \sim N \left(0, \begin{pmatrix} 1 & \rho_{12} & \rho_{13} & \rho_{14} \\ & 1 & \rho_{23} & \rho_{24} \\ & & 1 & \rho_{34} \\ & & & 1 \end{pmatrix} \right) \tag{2.27}$$

As a test for the endogeneity of the occupational choices on care provision a t-test on the correlation coefficient can be performed following Knapp and Seaks (1998). It is important to note that in the considered sample, women who never worked do not face a simultaneous decision by assumption. The endogeneity bias of the occupational choices is addressed by using policy changes in eligibility rules for pension benefits[19]. As a set of instruments I consider the potential eligibility to pension benefits and its interactions with gender and number of children, to take into account interrupted careers due to maternity. I consider also the partner eligibility to pension benefits[20] and its interactions with gender and number of children, and then expectations for a worse standard of living in 5 years. For employed people, eligibility to pension benefits is computed using the current rules at the time of interview, while for retired is considered the eligibility at the retirement year. Figure 2.6 and 2.7 show the proportions of individuals eligible to a public pension benefit and individuals retired by age and country. Overall it seems that many Europeans retire as soon as they become eligible, especially women. In Austria and Belgium early retirement is wide spread among men, while in Sweden, Denmark, Switzerland and Czech Republic, men are more willing to wait for the statutory old age to get a full pension benefit.

The empirical estimation of the Heckman model with double sample selection is possible using different procedures: Tunali (1986) suggests a two-step procedure where two measures of Inverse Mills Ratio are computed to take into account the double sample selection problem; instead Roodman (2011) proposes to use a simulated maximum likelihood method which can be used to estimate multiple equations where the error terms have a Normal multivariate distribution. The sec-

[19] The instrument for eligibility to pension benefits is a dummy variable equal to one if the individual is eligible to a pension benefit. The potential eligibility to pension benefits is computed using information about the statutory old age, early retirement age and the minimum requirements to receive a pension benefit (see Appendix A). An individual is eligible as soon as she becomes eligible to a public pension. For employed people the rules and the potential work experience at the time of the interview are used, while for retired people the year of retirement is considered.

[20] The partner eligibility is computed also for non respondent partner, using the available information provided by the main respondent.

ond procedure is preferred because it is more efficient[21]. The use of the simulated maximum likelihood procedure is convenient especially when a fourth equation is added to the problem: it is possible to test for the endogeneity of the employment status simultaneously on all the three equations[22].

2.5 Results

First I present results from estimation of the multi equations system presented in the previous section about parents or parents-in-law, then about grandchildren and other people and finally about adult children, that I treat as residual with respect to other types of informal care. For each model I consider also separately men and women.

Caregiving to parents or parents-in-law

The sample has 10,918 individuals with at least a parent or parent-in-law alive, and only 3,046 young old provide care to them (1,300 men and 1,746 women). Table 2.4 presents results from the Heckman model with double sample selection for the number of hours of informal care provided to parents or parents-in-law. Column (1) reports the estimation of the equation for the logarithm of the number of hours of care, column (2) the average marginal effect for the propensity to provide informal care outside the household, and column (3) reports the average marginal effects for the first sample selection for not coresiding in the same household, columns 4-6 report estimation for the same equations only for males, and columns 7-9 only for females. When occupational choices are considered as exogenous, being outside of the labor force is associated with a 1.5% greater propensity to coreside with parents or parents-in-law especially for women. Men have a 4.61% higher propensity to provide care if they are retired and when they do, they provide almost 28% more time compared to employed males. If they have a partner who never worked, they are less likely to provide care, on average 12% less in probability, but when they do, they provide 53% more time. Employed women provide more care in probability (6.57%) and more time (56.4%) compared to employed men. There is no significant difference between employed or not employed women in the propensity to provide care while not employed women provide 38.6% more time compared to employed.

[21] In previous analysis both methods have been tested with similar results.

[22] Alternatively, Kim (2006) proposes a solution to estimate a sample selection model with an endogenous dummy as common regressor in the selection and censored equation. Anyway the method is applied only for a Heckman model with a single sample selection, which does not cover our general case.

Females who never worked provide less care, but when they do they provide 82% more time than employed women.

In all the three equations we have evidence that there is a double selection problem ($\rho_{2,3}$ is significantly different from zero), and that coresiding can be motivated by providing informal care to parents or parents-in-law ($\rho_{2,3} < 0$). Instruments used for the sample selections are informative and their signs are consistent with a priori expectations: number of cars per-capita, probability to leave a bequest, and participation in religious organization are positively correlated with providing care, while being in financial distress is negatively correlated; having a higher number of rooms correlates with the propensity to coreside. Other evidence suggests that coresiding with a parent is independent of gender, and it decreases with marriage and children as found by Pezzin and Schone. Having children or grandchildren decreases the propensity to provide care to parents or parents-in-law, supporting the idea that a care giver has preferences for providing care to a different care recipient if there is one. Recipient characteristics are consistent with a priori expectations as well: having an older parent or a parent with poor health increases the propensity to coreside, to provide care and also the time spent on caregiving, while parents-in-law characteristics seem not to affect the time spent on caregiving by men. Instead a woman who has a parent-in-law in poor health conditions provides almost the same amount of care as if he or she was her parent. The geographical distance from parents is negatively associated to providing care and time spent on caregiving. Finally if an individual has both parents alive, there is a strong reduction on care given, because probably parents are looking after each other in case of need, relying less on children and more on the partner's help. This result is consistent to what it has been found using HRS data by Pezzin et al. (2009).

When endogeneity bias of occupational choices is addressed using eligibility rules for pension benefits, women who never worked are excluded from the analysis because by assumption they are not potentially facing a simultaneous decision. Results from Table 2.5 show that there is endogeneity bias especially for coresiding in the same family, while there is weak or no evidence for endogeneity bias on provision of informal care outside the household. Women have a slightly higher propensity to coreside with parent (1.48%) and current not employed women have 20% higher propensity to coreside with their parents or parents-in-law than employed women. From the full sample estimation there is a much higher effect of being not employed on care provision outside the household (+10.4%), but the time spent even if with a positive sign is not statistically significant. Results also show that for men the endogeneity bias is less important.

Results can be affected by the validity of the considered instruments. The Hansen test does not reject the validity of over-identifying restrictions, then the instruments are exogenous and the relevance of the instruments is investigated running a first stage probit regression conditioned on the samples of the different equations. A Kleibergen-Paap Wald F statistic from the probit estimation is reported, showing that the instruments are unlikely to be weak[23]. There is no support for the endogeneity of the occupational choices on the time allocated to informal caregiving. If this result is given by the weakness of the instrument, the parameters estimated from the exogenous case should provide less biased results.

In Table 2.5 at column (4), (8) and (12) results from the estimation of the equation for being not employed are reported, showing that a dummy when an individual is eligible to a pension benefit is strongly and positively correlated with being not employed, both for men and women.

Caregiving to grandchildren

Table 2.6 reports estimation of the model for informal care given to adult children for looking after grandchildren. When occupational choices are assumed to be exogenous for caregiving, results are similar to the previous ones: women are more likely to provide care both in probability (+12.8%) and time (+40%), as not employed do (+5.86% in probability and 37.1% more time). Children and grandchildren characteristics are important for determining the needs of the adult children and the propensity and time to allocate to caregiving by their parents: having more employed children increases the amount of provided care, especially for women by 8.57% in probability and 47% more time. Men are more likely to look after grandchildren when they are overall older and there is a weak evidence that they spend more time with grandchildren if they have more male children. Having parents alive does not affect informal care to grandchildren, whereas having adult or minor children does. The caregiver's family type seems to have a different impact for each type of care. This suggests that the caregiver may have different preferences on care provision to a specific recipient. In particular the old parents are more likely to become residual claimants for the allocation time of their children.

Then, findings suggest that endogeneity bias of occupational choices is important, especially for women, both for the propensity to provide care and time spent for looking after grandchildren: not employed women have a higher propensity to

[23] In this case the statistics cannot be compared with the critical values proposed by Stock and Yogo (2005) because the endogenous variable and instruments variables are binary. The literature so far has not proposed some critical values to identify the relative bias and absolute bias of IV estimation in presence of a binary endogenous variable. While it is shown that to assure identification it is sufficient in a bivariate probit model to rest on exclusion restrictions, that is excluding at least one variable from the structural equation and including it in the reduced form equation.

provide care (17.3%) and allocate more time (120.5%) than employed women (see Table 2.7). Evidence is stronger in contrast to what it is found for caregiving to parents and the effect of being not employed is much higher.

Caregiving to other people

Caregiving to other people is not provided by most Europeans, but this type of caregiving is becoming more and more important especially for individuals who rely less on their own family (parents or children) as suggested by Albertini and Kohli (2009) and Kalwij et al. (2012). The sample here includes all the 22,464 observations. Table 2.8 reports results from the models estimated with the occupational choices considered as exogenous. Results support the idea that caregiving to people who live outside the family is important for childless and individuals without parents alive. With respect to the previous types of care, women provide 3% less care than men, but when they do, they provide almost 46% more time. Being not employed is positively associated with caregiving: the not employed provide 2.5% more care than employed. Retired men give 53.5% more time than employed men. Surprisingly also for care given to people outside the family, I find evidence for endogeneity bias of the employment status on care provision for women ($\rho_{2,3} = -0.193^{**}$) and the average marginal effect is higher: not employed women provide 9.90% more care than employed ones (see Table 2.9). The effect is found for all the individuals aged between 50 and 69, and for childless and individuals without parents alive, the effect might be stronger.

Caregiving to adult children

Caregiving to adult children is considered residual from the previous types of informal caregiving to give a complete overview on informal care by Europeans. It does not include looking after grandchildren, and it is mostly practical household help and help on paperwork. Table 2.10 reports estimation from the system of equations: column (1) reports the estimation from the logarithm of the number of weekly hours provided care to adult children who live outside the household, column (2) the propensity to provide care outside the household to at least one adult child, and column (3) the propensity to coreside with all the adult children. The subsample is conditioned on having at least one adult children (19,822 observations). Results suggest that women provide 3% less care to adult children than men but when they do, they allocate 30% more time. In this case occupational choices are not associated with a different propensity on providing care to adult children, but more time is provided by not employed women and most of all by women who never worked. When the endogeneity bias is not considered, a retired male is associated with the propensity that at least one adult child lives outside the household. When the endogeneity bias is considered (Table 2.11), the test rejects the assumption of exogeneity between occupational choices and coresiding with all adult children for both men and women. Conclusions are reversed: being not employed increases the propensity to coreside with all the adult children by 11.6% for men and 21% for women. Finally also for care given to adult children there is evidence for a double sample selection problem: a child coresides with a parent to receive some help.

2.6 Simulation

In the recent years many European countries have introduced pension reforms to postpone the effective retirement age. Usually these reforms have been applied gradually with a slow increase in the eligibility age. For instance German government adopted a pension reform in 2007 which started producing effects from 2012: the statutory retirement age was scheduled to increase by one month per year and birth cohort from age 65 to age 67 (Bonin, 2009). However there are few exceptions such as the 2011 pension reform in Italy: the statutory eligibility age for women is scheduled to increase from age 60 to age 66 by 2018 (OECD, 2013).

I use the prediction from the estimated model in the previous section to examine the effects of one year increase in both early and statutory eligibility age on the amount of informal care provided by young old Europeans. The computed amount of unprovided informal care by the individuals affected by the reforms is transformed in full-time equivalent job (FTE) assuming a full time position as caregiver[24]. If we assume that informal care can be perfectly substituted by formal care, FTE can be interpreted as the potentially demanded jobs to maintain the same level of offered care.

Simulations focus only on informal care given to parents or children for looking after grandchildren when the employment status is considered as exogenous. First I compute the difference in minutes per week of informal care between not employed and employed man or woman for each country. The considered individual has the same characteristics i[25]. The difference between the partial effects of non labour and labour participation on informal care provision is computed as following:

$$E_j\left(\triangle hcare_i\right) \cong \triangle Pr\left(care_i\right) E_j\left(hcare_i|care_i\right) + E_j\left(Pr\left(care_i\right)\right) \triangle E\left(hcare_i|care_i\right) \tag{2.28}$$

[24] A full time position is assume of 40 hours per week and 52 weeks per year minus 4 weeks of regulatory vacation. Contract rules can be different within each country. The same rules are applied to keep the differences comparable among countries.

[25] The individual is assumed to have 60 years old with average and median characteristics of the considered sample.

where $j = \{nemp, emp\}$ and it is reported in Table 2.12.

Results show that not employed allocate more time to look after grandchildren than employed: in the Northern European countries retired men provide around one hours and 20 minutes more care than employed, while in the other countries, retired men provide from 3 to 5 hours of more time to look after grandchildren. Similar results are found for women even if the difference in time is bigger for most of the country except for Czech Republic, Germany, Italy and Spain. The difference in minutes per week to caregiving to parents is much lower than the time spent to look after grandchildren, especially for men: retired men provide maximum 50 minutes more care in a week than employed ones. Not employed women provide more care than employed ones: from 47 minutes in a week by Danish to 2 hours by Belgian and 2 hours and 20 minutes by Italians.

Then using information from SHARE dataset and eligibility to pension benefits rules, I computed the number of men and women for each country that could be affected by the increase of one year in the eligibility age (see Table 2.13). These are the individuals who became eligible to a public pension benefits in the last 12 months and that with this simulated pension reform are not anymore entitled to receive a pension benefit. The simulation assumes that all the employed continue working for at least another year and that they are going to provide less care than what they could have provided if they were not employed, I assume that they do not reduce working time or leisure.

This simulation exercise shows that one year increase in pension eligibility age can decrease the received care or increase the demand for formal (paid) care. It can be both an opportunity to create new jobs positions as caregiver and a cost for welfare systems. The potential increase in demand for formal care can be avoid adopting job policy that allow individuals to reduce working time and allocate more time on care provision.

If we graphically analyze the proportion of FTE over the individuals affected by the reform and the proportions of individuals who are voluntary part-time workers between age 55 to 64[26] (Figure 2.8-2.11), we find that countries with more voluntary part-time workers are the countries with lower difference in allocated time between employed and not employed. The negative correlation is particularly strong for men when they provide care to grandchildren. The correlation can partly depend on the model specification because I do not distinguish between part-time and full-time workers, but this does not affect the conclusions of the simulation exercise: a higher labour force participation among young old individ-

[26]Sources of the data are OECD and Eurostat for year 2004-2005, and 2006-2007 for Czech Republic and Poland. From the proportion of part-time workers I subtract the proportion of involuntary part-time workers.

uals can be achieved by a policy maker without increasing the demand for formal care or the unsatisfied demand of informal care, if there is enough flexibility in the working time arrangements. Indeed, an increase of one year in eligibility age could increase the proportion of part-time young old workers if the national job policies sustain this possibility.

2.7 Discussion and conclusions

In this chapter I have estimated the effect of occupational choices on informal caregiving to different types of care recipient in Europe, using a multi equation system with a simulated maximum likelihood method proposed by Roodman (2011). In contrast to the previous literature I show the importance of considering the problem of household formation and care arrangement for care given to parents and parents-in-law and to adult children. Separating the sample between men and women, I find support for endogeneity bias of occupational choices, not only for care given to parents by adult daughters but also for care given to people outside the family. Endogeneity bias is addressed using pension reforms as a source of exogeneity to compute a variable for the potential eligibility to public pension benefits.

Occupational choices are considered differently for men and women: men can be employed or retired, while women can be employed or outside the labour force (retired or homemaker) and having worked in the past, or having never worked. In the latter case I consider having never worked as a proxy for family importance and task allocation preferences among family members, because the non participation in the labour market for women over 50 is a choice made in a distant past, and their employment status is less likely to change later in life. Results suggest that the assumption about having never worked is correct: a woman allocates more time to caregiving, especially she cares more about their own family (parents and children). Whereas, a man with a partner who never worked is less likely to provide help but when he does he provides more, independently of his current occupational choice. I find evidence that being not employed increases the propensity to coreside with a care recipient, increases the propensity to provide care outside the household and the allocated time. Stronger support is found especially for women when the endogeneity bias is taken into account. However there is no clear evidence for endogeneity bias of labour supply and informal care given to parents when I check for several observables and coresiding. This may depend on the validity of the instruments or the definition of informal care. In particular, I do not focus on intensive caregiving or specific tasks. Using Dutch data from time use diaries Hassink and den Berg (2011) analyze the patterns of informal care during the day. They show that caregivers in the Netherlands usually provide informal care simultaneously with household activities and that it is important to distinguish between shiftable and non shiftable activities (usually personal care) especially when the association with labor supply is considered. But they show also that employed caregivers usually undertake shiftable activities.

In the analysis I do not consider explicitly the "north-south gradient". Many studies on informal caregiving and labour supply divide the sample between northern and southern European countries because it is argued that there are many differences across countries about institutions and family ties (Ciani, 2012; Crespo, 2006; Bolin et al., 2008). Individuals from Southern European countries are assumed to care more about the family, leave closer and provide more help. In the previous studies which focused only on caregiving to parents, Ciani (2012) finds almost the same effect for both northern and southern countries; Bolin et al. (2008) finds that for both men and women there is not statistical difference on the propensity to work between northern and southern countries. Crespo and Mira (2013) finds a north-south gradient, considering only intensive daily care, but it has to be noted that in Northern European countries there are not many intensive caregivers. With respect to previous studies I prefer to keep into account several controls[27], and decisions such as coresiding with a care recipient and for women never entering in the job market.

The north-south gradient should be further investigated taking into account the differences on preferences of household formation, and on how the burden of care is shared among family members or children. Looking at the SHARE data about caregiving to parents, it is possible to note that in Northern European countries there are more children who provide care but for less time. Informal care duty is shared more among children, while in Central and Southern European countries, less children provide more care or coreside more often with their parents (see Figure 2.12). If there is a presence of a main caregiver, she could be the one who specializes on providing care to parents, leaving the other siblings "free" from the duties of care provision.

Stern (1995) also suggests that the geographical distance of a care recipient can be an endogenous characteristic. In my empirical analysis I consider only household formation as endogenous. A care recipient can act strategically, moving closer to a care recipient, to increase the willingness to receive help, but there is no possibility for a binding contract between caregiver and receiver even if individuals are altruistic and care about each other (Pezzin and Schone, 1999), at least before informal care is provided. Hence, proximity is not considered correlated to care

[27]Further robustness check includes the estimation of the previous models dropping a single country with no different result.

arrangement decision.

In conclusion my estimates show that the effect of being not employed increases the propensity to provide care both in probability and in time. With the increase of the effective retirement age and postponement of eligibility age to receive a pension benefits, many Europeans will retire later and there could be a lower informal caregiving potential by young old, especially for women who are usually the main caregivers. This could increase mostly the demand for personal care and demand for formal care to institutions and nurseries.

A policy maker could achieve a higher labour participation rate of young old and a limited increase of demand for formal care introducing policies to allow and promote flexible working time arrangements for young old workers for informal care provision.

Appendix A - Statutory old age, early retirement age and minimum requirements for eligibility

Information about pension reforms are collected from several sources starting from the work made by Angelini et al. (2009). Other sources have been Committee (2007), Schludi (2005), Hirose (2011) and Gruber and Wise (2004).

Austria

Statutory old age: from 1961 to 2007, 65 for men and 60 for women.

Early retirement age: from 1961 to 2000, 60 for men and 55 for women with at least 35 years of contributions and for individuals receiving an unemployment pension; from October 2000 to October 2002 increase of the early retirement age of 2 months every 3 months (effectively adopted only from January 2001); from October 2002, 61.5 for men and 56.5 for women; women born before 1950 or with more than 40 years of contributions and men before 1945 or with more than 45 years of contributions are excluded from the reform. From January 2004, early retirement age increases of 1 month every 3 months for both women and men, until age 62 for both men and women.

Minimum requirement: At least 15 years of contribution.

Belgium

Statutory old age: from 1961 to 1998, 65 for men and 60 for women; from 1999 to 2003, 65 for men and 61 for women; from 2004 to 2005, 65 for men and 63 for women; from 2006 to 2007, 65 for men and 64 for women.

Early retirement age: from 1961 to 1966, no retirement age; from 1967 to 1986, 60 for men and 55 for women; from 1987 to 1997, 60 for men and 60 for women; from 1998 to 2007, 60 both for men and women with year of contributions (20 years in 1998, 24 years in 1999, 26 years in 2000, 28 years in 2001, 30 years in 2002, 32 years in 2003, 34 years in 2004, 35 years from 2005). Individuals with heavy or night jobs can early retire at age 58. Pre-pensions are possible at least at age 58 for individuals working in restructured sectors.

Minimum requirement: no minimum period of contribution is required.

Czech Republic

Statutory old age: from 1961 to 1995, 60 for men and 57 for women; from 1996 two months more every year for men and four months more every year for women, until age 65 is reached both for men and women (age 67 with the pension reform in 2011).

Early retirement age: women can early retire from 1 to 5 years earlier based on the number of they children they had (5 years if they had more than 4 children); from 1996 it is possible retire 3 years earlier than the statutory old age.

Minimum requirement: At least 15 years of contribution.

Denmark

Statutory old age: from 1961 to 2003, 67 for both men and women; from 2004 to 2007, 65 for both men and women, except for individuals born before 1939.

Early retirement age: from 1961 to 1975, no retirement age; from 1976 to 1978, 60 for both men and women; from 1979 to 2007, 60 with 30 years of contributions. Pre-early retirement is possible through unemployment periods of at least one year: from 1992, at age 55.

Minimum requirement: at least 3 years of residence.

France

Statutory old age: from 1961 to 1994, 65 both for men and women; from 1995 to 2007, 60 both for men and women.

Early retirement age: from 1961 to 1994, 60 both for men and women; from 1995 to 2007, no early retirement. From 1961 to 2007, 55 for public transport and electricity workers; from 2003 to 2007, 40 years of contributions for people who started working as early as ages 14, 15 or 16.

Minimum requirement: no minimum period of contribution is required.

Germany

Statutory old age: from 1961 to 2007, 65 both for men and women.

Early retirement age: in 1961, no early retirement; from 1962 to 1972, no early retirement for men and 60 with 15 years of contribution for women; from 1973 to 2007, 63 with 35 years of contributions for men and 60 with 35 years of contributions for women, long-term unemployed, disabled.

Minimum requirement: At least 5 years of contribution.

Italy

Statutory old age: from 1961 to 1993, 60 for men and 55 for women; in 1994, 61 for men and 56 for women; in 1995, 61.5 for men and 56.5 for women; in 1996, 62 for men and 57 for women; in 1997, 63 for men and 58 for women; in 1998, 63.5 for men and 58.5 for women; in 1999, 64 for men and 59 for women; from 2000 to 2007, 65 for men and 60 for women; from 1961 to 2007, 65 for men and 60 for women in the public sector.

Early retirement age: from 1961 to 1964, no early retirement; from 1965 to 1995, independently from the age with 35 years of contributions (25 in the public sector) both for men and women. Early retirement is possible with 35 years of contributions at the following age: from 1996 to 1997, 52 for both men and women, 56 for self-employed. in 1998, 53 for the public sector, 54 for the private sector and 57 for self-employed; in 1999, 55 for the private sector; in 2000, 54 for the public sector; in 2001, 55 for the public sector, 56 for the private sector, 58 for self-employed; in 2002, 57 for the private sector; in 2003, 56 for the public sector; from 2004 to 2007, 57 for both the private and public sector, 58 for self-employed. Early retirement is possible independently from the age with the following years of contributions: from 1996 to 2007, 40 years of contributions for self-employed; from 1996 to 1998, 36 years for the public and private sector; from 1999 to 2003, 37 years of contributions; from 2004 to 2005, 38 years of contributions; from 2006 to 2007, 39 years of contributions; in 2008, 40 years of contributions. From 1999 to 2007, individuals with 57 years old or less who become eligible of a pension, they can receive a pension only after a period from 6 to 9 months (i.e. if they turn 57 in January they can retire in October).

Minimum requirement: before 1996, at least 20 years of contributions; after 1996, at least 5 years of contributions.

Netherlands

Statutory old age: from 1961 to 2007, 65 for both men and women.

Early retirement age: from 1961 to 1974 no early retirement age; from 1975 to 1994, 60/61 with 10 years of work in a sector or firm both for men and women; from 1995 to 2007, 62 with 35 years of contributions both for men and women.

Minimum requirement: no minimum period of contribution is required.

Poland

Statutory old age: 65 for men and 60 for women

Early retirement age: before 1999, 60 with 25 years of contributions for men and 55 with 25 years of contributions for women; from 1999 to 2007, 60 with 35 years of contributions for men and 55 with 30 years of contributions for women, 60 with 25 years of contributions for men born before 1949 and 55 with 25 years of contributions for women born before 1949; miners can early retire at age 50 with 15 years of contributions; teachers, academic lectures and transport workers can early retire at age 60 with 25 years of contributions for men and 55 with 20 years of contributions for women; uniformed services (army, police, prison officers) can early retire with 15 years of contributions at any age.

Minimum requirement: no minimum period of contribution is required.

Spain

Statutory old age: from 1961 to 2007, 65 for both men and women.

Early retirement age: from 1961 to 1982, 64 for both men and women; from 1983 to 1993, 60 for both men and women; for 1994 to 2001, 61 for both men and women; from 2002 to 2007, 61 with 30 years of contributions for both men and women, 60 with 30 years of contributions for public employees; from 2002 to 2007, 60 with more than 35 years of contributions (2002) and one additional year every year after 2002, until 40 years of contributions in 2007.

Minimum requirements: At least 15 years of contributions, with at least 2 years in the last 15 years.

Sweden

Statutory old age: from 1961 to 1994, 67 both for men and women; from 1995 to 2007, 65 both for men and women.

Early retirement age: from 1961 to 1962 no early retirement; from 1963 to 1997, 60 both for men and women; from 1998 to 2007, 61 both for men and women.

Minimum requirements: at least 3 years of residence.

Switzerland

Statutory old age: from 1961 to 1974, 65 for men and 63 for women; from 1975 to 2003, 65 for men and 62 for women; in 2004, 65 for men and 63 for women; from 2005 to 2007, 65 for men and 64 for women.

Early retirement age: from 1961 to 1990 no retirement age; from 1991 to 1997, 62 for men and 59 for women; from 1998 to 2004, 62 for men and 60 for women; from 2005 to 2006, 62 for men and 61 for women; in 2007, 63 for men and 62 for women (it is possible to early retire two years earlier the statutory age).

Minimum requirement: no minimum period of contribution is required.

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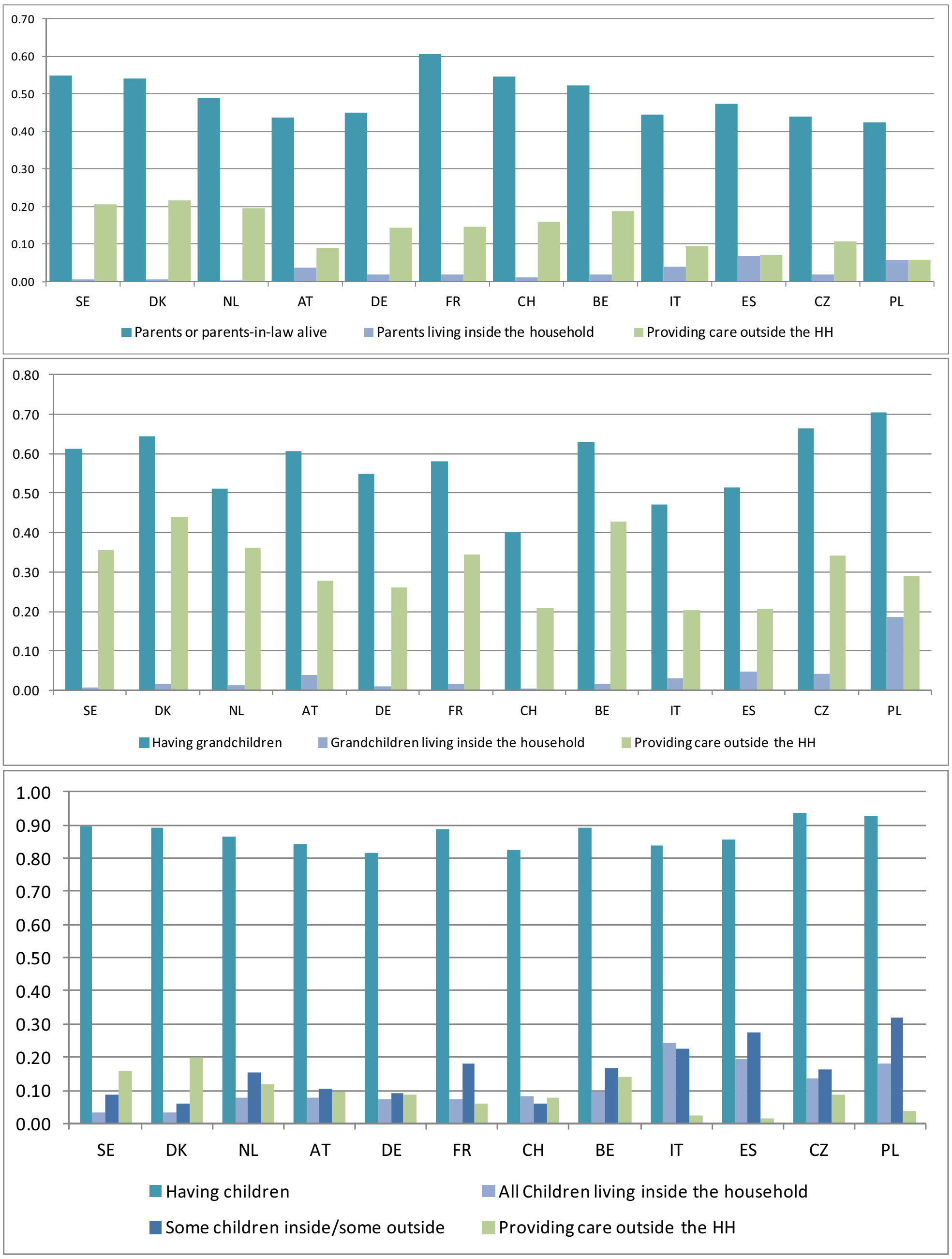

Figure 2.1: Weighted proportions of individuals having parents, grandchildren or adult children, coresiding or providing care to them, by country

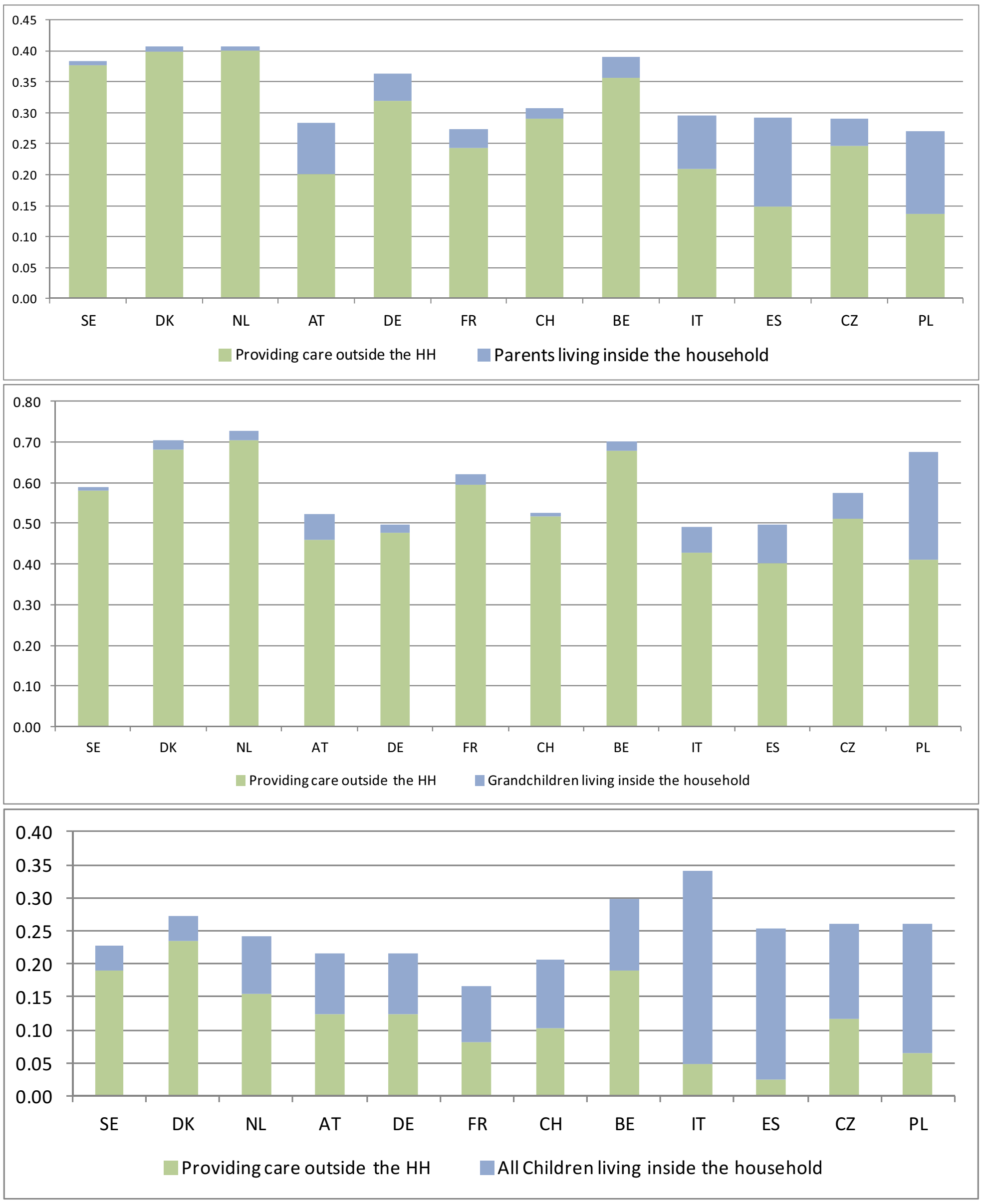

Figure 2.2: Weighted proportions of individuals providing care outside the household or co-residing with parents, grandchildren and adult children, by country

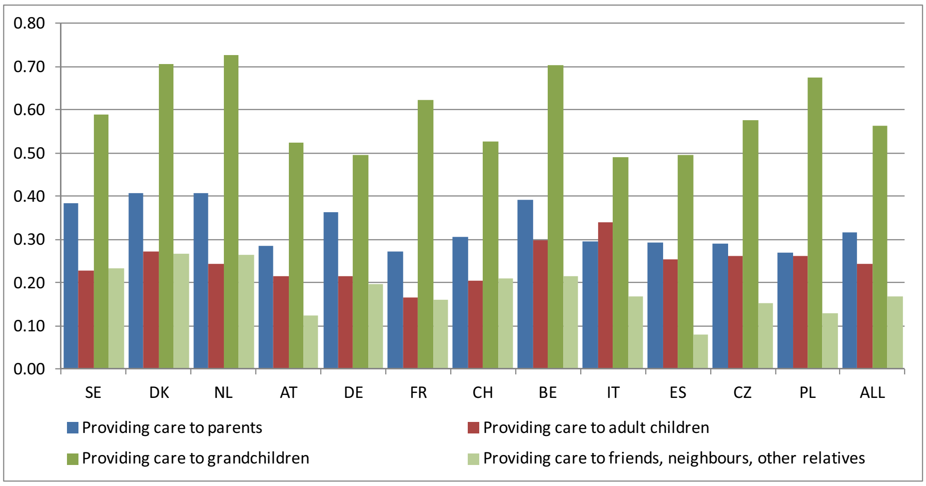

Figure 2.3: Informal caregiving by country and by care receiver

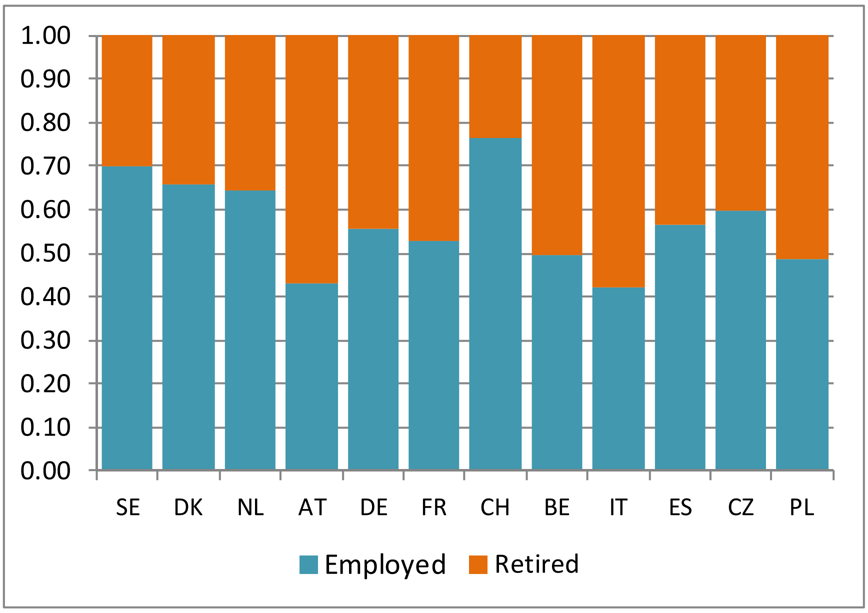

Figure 2.4: Occupational choices distribution for males, by country

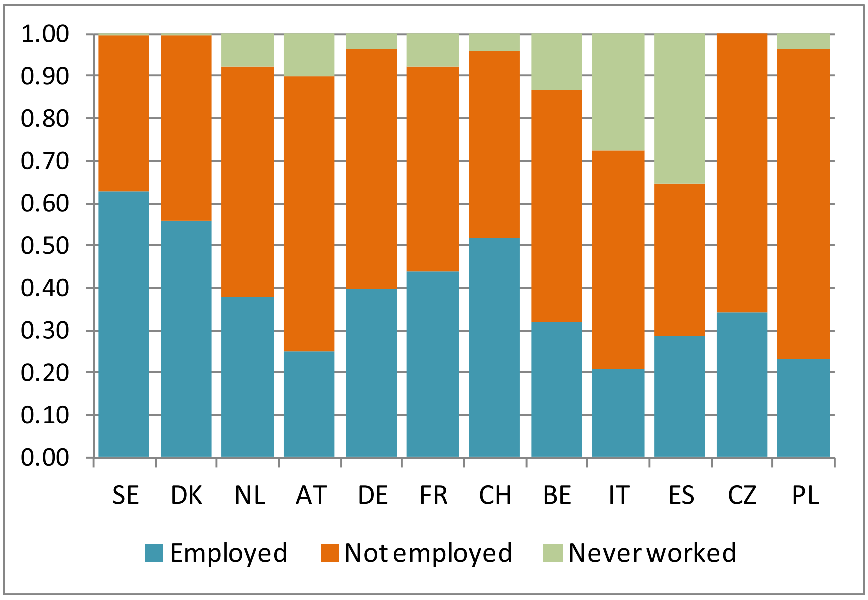

Figure 2.5: Occupational choices distribution for females, by country

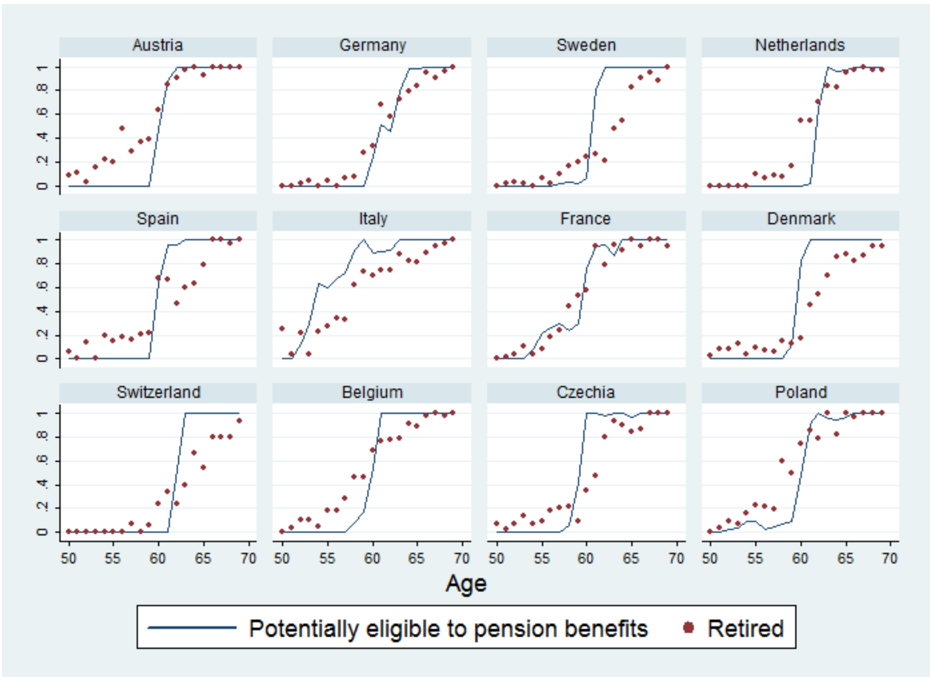

Figure 2.6: Proportion of men potentially eligible to pension benefits and proportion of retired men by age and country

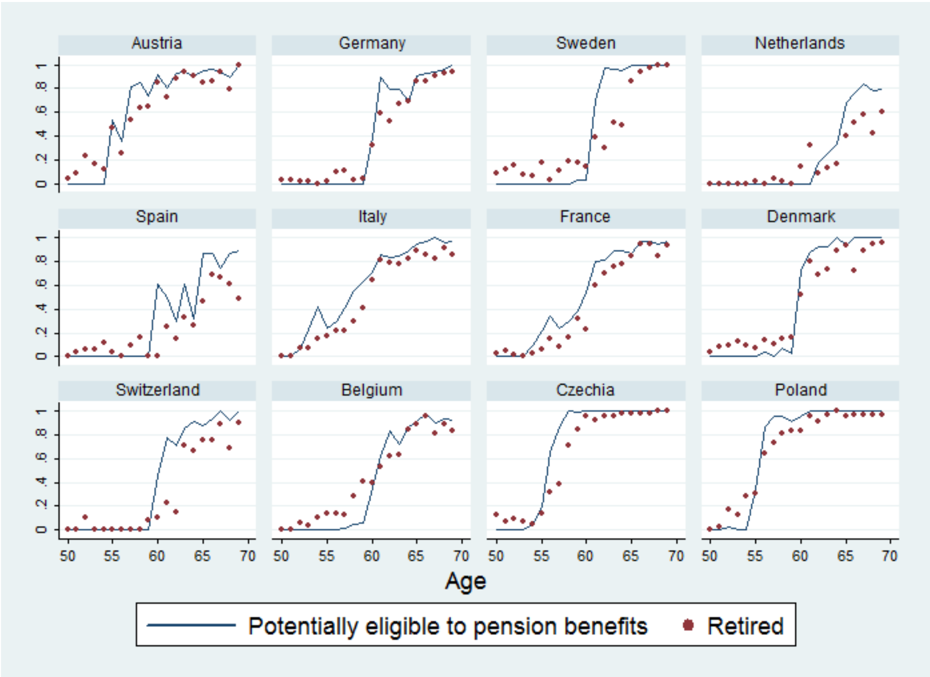

Figure 2.7: Proportion of women potentially eligible to pension benefits and proportion of retired women by age and country

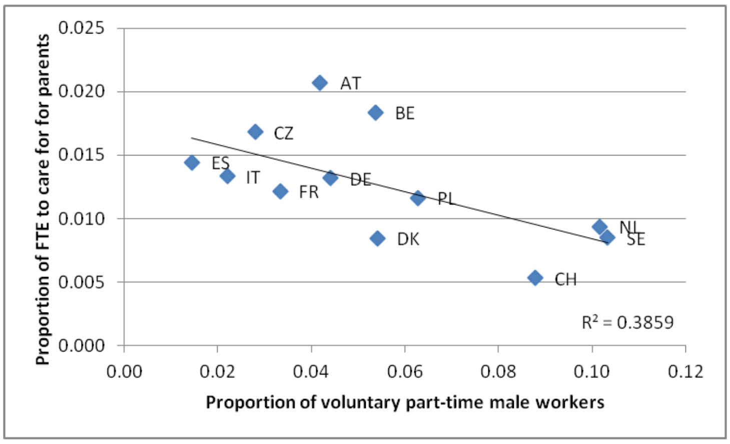

Figure 2.8: Proportion of FTE for caregiving to parents over proportion of voluntary part-time male workers (55-64)

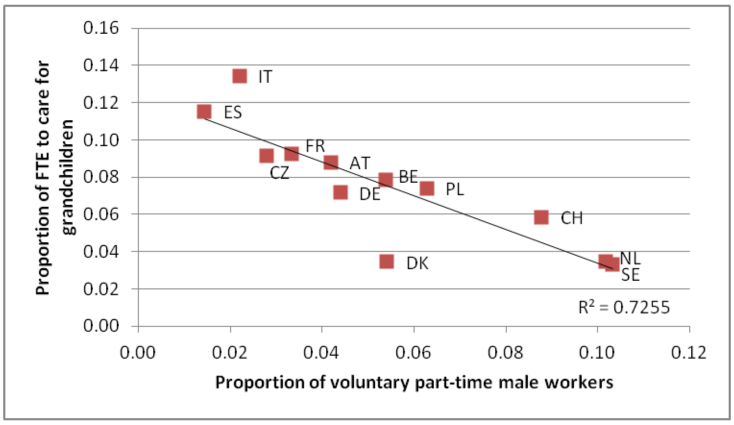

Figure 2.9: Proportion of FTE for caregiving to grandchildren over proportion of voluntary part-time male workers (55-64)

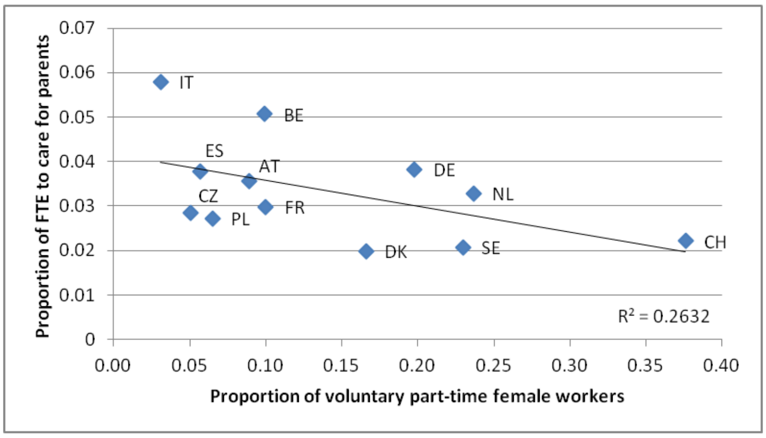

Figure 2.10: Proportion of FTE for caregiving to parents over proportion of voluntary part-time female workers (55-64)

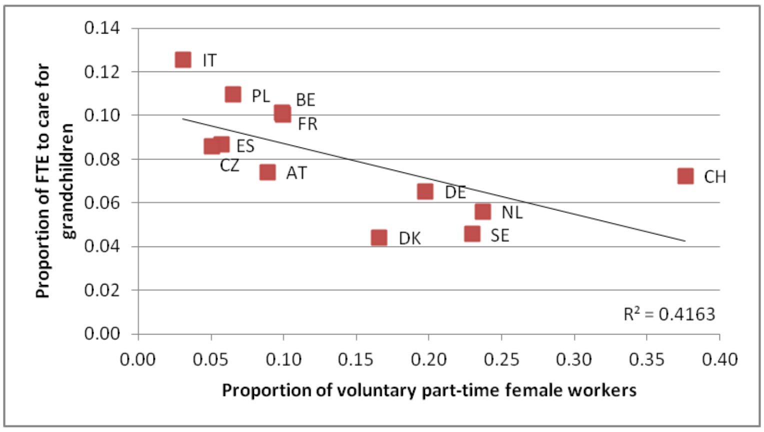

Figure 2.11: Proportion of FTE for caregiving to grandchildren over proportion of voluntary part-time female workers (55-64)

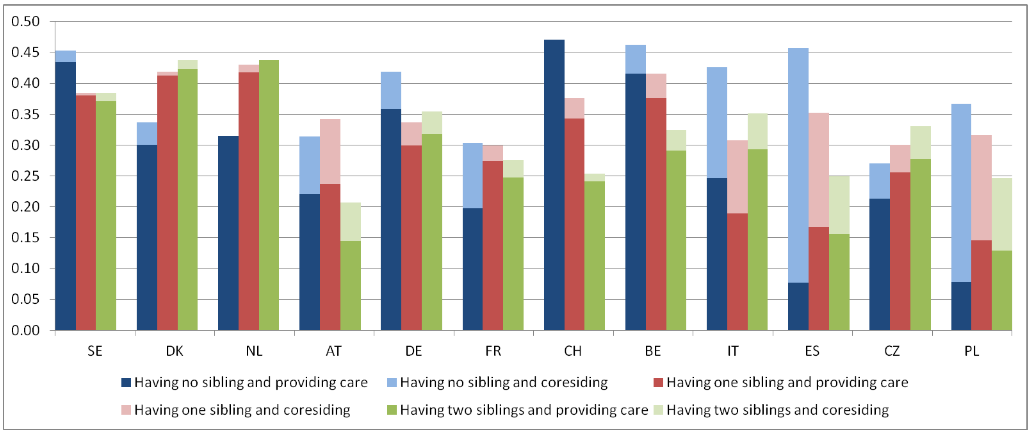

Figure 2.12: Proportions of individuals providing care to parents or parents-in-law by number of siblings (from 0 to 2) and by country.

Table 2.1: Proportion of individuals providing informal care outside the household to parents or grandchildren by gender, occupational choices and country

Country	Care to parents					Care to grandchildren				
	Male		Female			Male		Female		
	emp	nemp	emp	nemp	nw	emp	nemp	emp	nemp	nw
SE	0.3758	0.2140	0.4324	0.3588	-	0.4957	0.4701	0.6684	0.6821	-
DK	0.3720	0.3186	0.4732	0.3774	-	0.6358	0.5788	0.7739	0.7699	-
NL	0.3610	0.2890	0.4324	0.5093	0.4578	0.5794	0.6982	0.7664	0.7933	0.6993
AT	0.2151	0.1546	0.2428	0.2567	0.2204	0.5102	0.4850	0.5800	0.4727	0.4402
DE	0.2885	0.2833	0.4027	0.3806	0.0697	0.3951	0.4228	0.5802	0.5286	0.5066
FR	0.2301	0.2022	0.2923	0.2849	0.1247	0.4653	0.5971	0.6159	0.6849	0.6232
CH	0.2403	0.3139	0.3640	0.3103	0.2135	0.4156	0.4987	0.6320	0.5335	0.5668
BE	0.3634	0.3184	0.4153	0.3756	0.3500	0.6226	0.6767	0.7905	0.7062	0.7053
IT	0.2297	0.1505	0.2558	0.3075	0.2182	0.2094	0.4075	0.4858	0.5701	0.4542
ES	0.1418	0.1258	0.1829	0.2432	0.2277	0.3053	0.3789	0.4027	0.5037	0.5537
CZ	0.1773	0.1842	0.3669	0.3484	-	0.4197	0.4414	0.7274	0.6096	-
PL	0.1622	0.0331	0.2901	0.1236	0.2332	0.4943	0.4809	0.6753	0.5950	0.4481

Table 2.2: Proportion of individuals providing informal care outside the household to adult children or other people by gender, occupational choices and country

Country	Care to adult children					Care to other people				
	Male		Female			Male		Female		
	emp	nemp	emp	nemp	nw	emp	nemp	emp	nemp	nw
SE	0.2166	0.2175	0.2012	0.1703	-	0.2691	0.2337	0.2097	0.2109	-
DK	0.3046	0.2181	0.2369	0.2277	-	0.2849	0.3136	0.2313	0.2555	-
NL	0.1917	0.2202	0.1726	0.1590	0.1800	0.3053	0.2982	0.2025	0.2632	0.1298
AT	0.0752	0.1742	0.1031	0.1570	0.1360	0.1534	0.1128	0.1089	0.1282	0.0592
DE	0.1193	0.1520	0.1378	0.1230	0.1972	0.2235	0.2322	0.1529	0.1737	0.2379
FR	0.0926	0.1234	0.0778	0.0939	0.0446	0.1312	0.1717	0.1807	0.1759	0.0932
CH	0.0617	0.1721	0.1059	0.1443	0.2545	0.1969	0.2335	0.1923	0.2489	0.0854
BE	0.2760	0.2386	0.1922	0.1946	0.1877	0.1919	0.2622	0.2055	0.2066	0.1718
IT	0.0465	0.0598	0.0951	0.0885	0.0347	0.1865	0.1457	0.1557	0.2092	0.1164
ES	0.0278	0.0290	0.0630	0.0211	0.0608	0.0718	0.0488	0.1279	0.1111	0.0547
CZ	0.1148	0.1762	0.1124	0.1425	-	0.1738	0.0894	0.1823	0.1563	-
PL	0.0917	0.0416	0.0842	0.1182	0.0000	0.1896	0.1407	0.1098	0.1048	0.0312

Table 2.3: First, second and third quartiles of the weighted distribution of care hours to parents, grandchildren, adult children and other people, by country and gender

Country	Gender	Hours of care to parents			Hours of care to grandchildren			Hours of care to adult children			Hours of care to other people		
		Q1	Q2	Q3	Q1	Q2	Q3	Q1	Q2	Q3	Q1	Q2	Q3
SE	M	0.38	1.00	2.00	0.46	2.00	5.52	0.23	0.77	3.00	0.19	0.48	1.38
	F	0.46	1.92	4.00	1.30	3.30	6.90	0.38	1.15	3.26	0.12	0.46	2.00
DK	M	0.38	0.92	2.00	0.92	2.76	5.52	0.23	0.94	4.60	0.10	0.48	1.61
	F	0.46	1.84	3.68	1.15	3.00	6.44	0.29	0.92	2.76	0.19	1.00	3.00
NL	M	0.29	1.00	2.15	0.76	4.00	9.67	0.48	1.53	6.00	0.19	0.46	1.15
	F	1.00	3.00	6.90	1.38	5.37	11.05	0.76	2.00	7.00	0.29	1.15	3.68
AT	M	1.15	4.00	7.00	1.34	6.90	17.3	0.69	2.00	6.90	0.25	0.92	2.00
	F	3.00	5.00	14.0	2.30	7.98	19.9	1.00	3.00	10.0	0.46	3.00	10.1
DE	M	0.69	1.84	4.00	0.92	4.00	10.0	0.29	1.15	3.22	0.23	0.58	2.00
	F	1.00	3.45	7.98	1.92	5.52	14.0	0.75	2.49	8.00	0.29	1.15	4.00
FR	M	0.38	1.00	3.07	1.38	5.00	17.9	0.19	0.96	3.03	0.19	0.61	2.00
	F	0.69	2.50	7.00	2.03	6.90	20.52	0.19	0.96	4.00	0.23	1.00	3.00
CH	M	0.19	0.69	2.30	0.46	2.30	8.00	0.38	5.00	14.0	0.23	0.48	2.00
	F	0.61	1.15	3.07	2.11	6.00	12.0	0.46	3.00	7.98	0.12	1.00	4.00
BE	M	0.96	2.00	5.00	1.84	7.00	16.0	0.46	2.30	7.98	0.19	0.88	3.00
	F	1.15	4.00	10.0	2.92	8.00	17.2	4.00	4.00	8.98	0.69	2.00	7.00
IT	M	1.15	4.00	14.0	3.00	9.00	29.9	1.00	3.00	9.00	0.12	0.58	2.00
	F	3.00	10.3	21.0	5.00	19.9	42.0	7.00	14.0	35.0	0.46	3.00	10.0
ES	M	1.00	6.00	14.0	2.00	5.52	21.0	0.10	0.19	15.0	0.12	0.38	3.00
	F	1.84	7.00	21.0	1.84	9.00	35.9	0.38	6.98	15.0	0.38	2.00	7.92
CZ	M	0.58	2.30	7.00	0.96	4.00	10.0	0.58	2.88	6.90	0.19	0.69	2.30
	F	1.84	4.60	10.0	3.45	7.67	17.0	0.96	4.00	11.0	0.19	1.00	5.00
PL	M	0.46	1.34	4.60	1.15	4.00	21.0	0.46	3.84	14.0	0.19	0.69	3.45
	F	1.15	5.00	14.0	4.00	13.8	37.6	1.15	8.98	16.3	0.19	1.00	7.00

Table 2.4: Informal caregiving to parents and parents-in-law with employment status considered as exogenous

VARIABLES	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*
	Full sample			Male			Female		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Not employed	0.367***	0.0200*	-0.0103*	0.279**	0.0461**	-0.00354	0.386***	-0.00242	-0.0151*
	(0.0769)	(0.0121)	(0.00599)	(0.132)	(0.0187)	(0.00862)	(0.0929)	(0.0161)	(0.00789)
Partner never worked	0.294	-0.136***	0.00455	0.534*	-0.120***	0.00147			
	(0.280)	(0.0236)	(0.00987)	(0.284)	(0.0228)	(0.0102)			
Female never worked	0.905***	-0.0182	-0.00872				0.821***	-0.0465*	-0.0116
	(0.163)	(0.0246)	(0.0109)				(0.174)	(0.0268)	(0.0121)
Female	0.564***	0.0657***	0.00517						
	(0.0575)	(0.00848)	(0.00361)						
Age	0.0343***	-0.00167	8.55e-05	0.0221*	-0.00313*	0.000199	0.0496***	-0.00126	-0.000284
	(0.00801)	(0.00126)	(0.000615)	(0.0128)	(0.00173)	(0.000819)	(0.00988)	(0.00172)	(0.000761)
Years of education	-0.00643	0.00625***	0.00194***	-0.00797	0.00641***	0.00339***	-0.00265	0.00546***	3.43e-05
	(0.00943)	(0.00144)	(0.000717)	(0.0143)	(0.00191)	(0.000876)	(0.0126)	(0.00202)	(0.000946)
Having a partner	0.123	-0.0548***	0.107***	0.0581	-0.0812**	0.180***	0.217	-0.0505**	0.0723***
	(0.111)	(0.0202)	(0.0129)	(0.197)	(0.0327)	(0.0256)	(0.138)	(0.0254)	(0.0142)
limitations in	-0.109	-0.0322*	-0.00902	-0.151	-0.0209	-0.0233	-0.105	-0.0496**	0.000978
ADLs or IADLs= 1	(0.118)	(0.0172)	(0.00851)	(0.200)	(0.0274)	(0.0145)	(0.144)	(0.0214)	(0.0102)
limitations with	0.156**	-0.00529	-0.00679	0.200**	-0.0150	-0.00549	0.150*	0.00455	-0.0102
daily activities	(0.0638)	(0.0104)	(0.00513)	(0.102)	(0.0143)	(0.00723)	(0.0824)	(0.0147)	(0.00700)
Chronic diseases	-0.0139	0.0242**	0.00712	0.0117	0.00449	0.00430	-0.0197	0.0417***	0.0116*
	(0.0637)	(0.0105)	(0.00475)	(0.0998)	(0.0142)	(0.00672)	(0.0822)	(0.0151)	(0.00657)
Physical inactivity	-0.269	-0.153***	0.0108	0.205	-0.123***	0.00205	-0.408	-0.175***	0.0146
	(0.265)	(0.0200)	(0.00850)	(0.437)	(0.0307)	(0.0128)	(0.329)	(0.0275)	(0.0104)
Real assets	-0.0116	0.00328*	-0.000194	-0.00808	0.00315	-0.000668	-0.0137	0.00375*	0.000430
	(0.0118)	(0.00168)	(0.000789)	(0.0195)	(0.00251)	(0.00114)	(0.0134)	(0.00222)	(0.000901)
urban = Big city	0.00937	-0.0114	0.00714	-0.0822	-0.00373	0.00773	0.0727	-0.0197	0.00525

VARIABLES	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*
	(0.102)	(0.0155)	(0.00827)	(0.151)	(0.0204)	(0.0102)	(0.128)	(0.0202)	(0.00968)
urban = Village, rural area	0.0264	-0.00310	-0.0233***	-0.0249	0.00549	-0.0223***	0.0264	-0.00741	-0.0248***
	(0.0638)	(0.0109)	(0.00574)	(0.0948)	(0.0137)	(0.00650)	(0.0805)	(0.0145)	(0.00701)
HH size	-0.0284	0.0135**	-2.30e-05	-0.00768	0.00871	-0.00369	-0.0317	0.0196**	0.00144
	(0.0393)	(0.00598)	(0.00327)	(0.0570)	(0.00757)	(0.00376)	(0.0512)	(0.00842)	(0.00410)
Non labour income (asin)	-0.0180	0.00477***		-4.91e-05	0.00402*		-0.0407**	0.00543*	
	(0.0128)	(0.00184)		(0.0185)	(0.00232)		(0.0170)	(0.00277)	
Parent age	0.00728***	0.00353***	-0.000354***	0.00389	0.00305***	-0.000254**	0.00890***	0.00399***	-0.000512***
	(0.00148)	(0.000188)	(9.00e-05)	(0.00243)	(0.000234)	(0.000103)	(0.00202)	(0.000273)	(0.000132)
Parent health = Poor	0.468***	0.0816***	-0.0182***	0.436***	0.0472***	-0.00902	0.471***	0.110***	-0.0253***
	(0.0632)	(0.0111)	(0.00549)	(0.106)	(0.0156)	(0.00797)	(0.0819)	(0.0154)	(0.00747)
Parent distance	-0.129***	-0.0401***		-0.0871***	-0.0280***		-0.150***	-0.0500***	
	(0.0170)	(0.00215)		(0.0297)	(0.00312)		(0.0218)	(0.00299)	
Parent-in-law age	3.09e-05	0.00137***	-0.000529***	-0.000136	0.00195***	-0.000655***	-0.000296	0.000895***	-0.000518***
	(0.00125)	(0.000200)	(8.77e-05)	(0.00196)	(0.000246)	(0.000114)	(0.00175)	(0.000288)	(0.000108)
Parent-in-law health	0.257***	0.0568***	0.00213	0.0966	0.0381**	-0.00333	0.450***	0.0854***	0.0105
= Poor	(0.0906)	(0.0137)	(0.00618)	(0.127)	(0.0169)	(0.00814)	(0.135)	(0.0220)	(0.00944)
Parent-in-law distance	-0.0436**	-0.0239***		-0.0470	-0.0253***		-0.0379	-0.0226***	
	(0.0213)	(0.00289)		(0.0304)	(0.00351)		(0.0320)	(0.00461)	
Both parents alive	-0.253***	-0.0519***	0.0334***	-0.244**	-0.0481***	0.0329***	-0.256***	-0.0655***	0.0342***
	(0.0702)	(0.0112)	(0.00524)	(0.103)	(0.0137)	(0.00600)	(0.0906)	(0.0148)	(0.00612)
Has children	-0.0427	-0.0328	0.0417***	-0.0893	-0.0411	0.0338**	0.0297	-0.0274	0.0289*
	(0.126)	(0.0217)	(0.0125)	(0.187)	(0.0284)	(0.0147)	(0.163)	(0.0291)	(0.0147)
Number of children	-0.00690	-0.0118**	0.00870**	-0.0499	-0.0112	0.00956**	0.0228	-0.0130*	0.0103**
	(0.0329)	(0.00560)	(0.00345)	(0.0529)	(0.00720)	(0.00397)	(0.0396)	(0.00744)	(0.00405)
Has grandchildren	0.123	-0.0170	-0.0150**	0.150	-0.0102	-0.0132	0.111	-0.0198	-0.0158**
	(0.0866)	(0.0135)	(0.00702)	(0.129)	(0.0180)	(0.00847)	(0.109)	(0.0174)	(0.00799)
Number of grandchildren	-0.0467*	-0.00339	0.000891	-0.0285	-0.00838*	0.000832	-0.0556*	-0.000268	-7.46e-05

VARIABLES	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*
	(0.0240)	(0.00337)	(0.00181)	(0.0370)	(0.00481)	(0.00223)	(0.0301)	(0.00430)	(0.00216)
Number of siblings	-0.0266*	-0.00980***	0.00737***	-0.0207	-0.00675**	0.00457***	-0.0303	-0.0137***	0.0103***
	(0.0147)	(0.00243)	(0.00139)	(0.0223)	(0.00320)	(0.00175)	(0.0203)	(0.00351)	(0.00207)
Bequest	0.159**	0.112***	0.0231***	0.0296	0.111***	0.0172*	0.225**	0.116***	0.0287***
	(0.0779)	(0.0128)	(0.00751)	(0.130)	(0.0169)	(0.00972)	(0.0960)	(0.0177)	(0.00966)
SE	-1.096***	0.141***	0.0574***	-0.765***	0.142***	0.0577***	-1.323***	0.129***	0.0562***
	(0.155)	(0.0279)	(0.00502)	(0.265)	(0.0382)	(0.00563)	(0.187)	(0.0345)	(0.00681)
DK	-0.977***	0.132***	0.0584***	-0.622**	0.115***	0.0521***	-1.250***	0.139***	0.0662***
	(0.153)	(0.0282)	(0.00442)	(0.259)	(0.0369)	(0.00613)	(0.193)	(0.0367)	(0.00466)
NL	-0.762***	0.133***	0.0558***	-0.582**	0.0944***	0.0508***	-0.870***	0.162***	0.0616***
	(0.146)	(0.0271)	(0.00523)	(0.257)	(0.0354)	(0.00605)	(0.177)	(0.0336)	(0.00569)
BE	-0.201	0.0661***	0.0526***	0.0563	0.0742**	0.0503***	-0.339**	0.0480	0.0540***
	(0.137)	(0.0253)	(0.00560)	(0.239)	(0.0334)	(0.00672)	(0.166)	(0.0314)	(0.00686)
DE	-0.376***	0.0445*	0.0250***	-0.146	0.0441	0.0247***	-0.538***	0.0376	0.0254***
	(0.145)	(0.0243)	(0.00789)	(0.250)	(0.0320)	(0.00925)	(0.177)	(0.0307)	(0.00924)
FR	-0.555***	0.0366	0.0483***	-0.200	0.0275	0.0477***	-0.777***	0.0320	0.0494***
	(0.154)	(0.0250)	(0.00589)	(0.260)	(0.0323)	(0.00656)	(0.187)	(0.0312)	(0.00710)
CH	-0.988***	0.0530*	0.0523***	-0.918***	0.0346	0.0444***	-1.013***	0.0631*	0.0586***
	(0.183)	(0.0297)	(0.00543)	(0.299)	(0.0387)	(0.00755)	(0.227)	(0.0380)	(0.00563)
AT	-0.162	-0.0413	0.0247***	0.286	-0.0119	0.0202*	-0.483**	-0.0703**	0.0293***
	(0.197)	(0.0278)	(0.00931)	(0.313)	(0.0363)	(0.0109)	(0.235)	(0.0349)	(0.0100)
ES	-0.141	-0.0560*	-0.0812***	0.207	-0.0416	-0.0505***	-0.360	-0.0597	-0.109***
	(0.235)	(0.0296)	(0.0159)	(0.407)	(0.0361)	(0.0157)	(0.272)	(0.0400)	(0.0212)
CZ	-0.138	0.0572**	0.00669	0.404	0.0602	0.00178	-0.535**	0.0576	0.0118
	(0.187)	(0.0291)	(0.0120)	(0.302)	(0.0384)	(0.0144)	(0.231)	(0.0375)	(0.0135)
PL	-0.150	-0.0228	-0.0996***	0.130	0.0252	-0.0878***	-0.340	-0.0456	-0.102***
	(0.217)	(0.0331)	(0.0226)	(0.337)	(0.0469)	(0.0267)	(0.273)	(0.0425)	(0.0267)
Wave2	-0.335***	-0.0602***	0.0162**	-0.337***	-0.0509***	0.0130*	-0.314***	-0.0712***	0.0190**

VARIABLES	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*
	(0.0788)	(0.0118)	(0.00663)	(0.119)	(0.0152)	(0.00754)	(0.100)	(0.0160)	(0.00828)
Num. of cars per capita		0.0279*			0.0329			0.0272	
		(0.0156)			(0.0212)			(0.0214)	
Fin. distress =		-0.0371*	0.00510		-0.0757***	0.00688		-0.0183	0.000752
With great difficulty		(0.0195)	(0.00849)		(0.0277)	(0.0106)		(0.0260)	(0.0100)
Leave bequest		0.0393***	0.00544		0.0292*	0.00732		0.0493***	0.00503
		(0.0122)	(0.00618)		(0.0160)	(0.00768)		(0.0168)	(0.00779)
Religious organization		0.0632***	-0.0133		0.0634***	-0.0162		0.0664***	-0.0149
		(0.0168)	(0.00848)		(0.0244)	(0.0125)		(0.0225)	(0.0109)
hrooms			-0.0168***			-0.0150***			-0.0185***
			(0.00168)			(0.00201)			(0.00194)
Constant	-1.073***			-1.028**			-0.402		
	(0.310)			(0.510)			(0.390)		
		$\rho_{\bullet 2}$	$\rho_{\bullet 3}$		$\rho_{\bullet 2}$	$\rho_{\bullet 3}$		$\rho_{\bullet 2}$	$\rho_{\bullet 3}$
$\rho_{1\bullet}$		0.0814	0.0752		-0.0384	0.175		0.109*	0.0324
		(0.0508)	(0.0865)		(0.124)	(0.137)		(0.0628)	(0.139)
$\rho_{2\bullet}$			-0.607**			-0.945**			-0.604**
			(0.247)			(0.380)			(0.289)
Observations	3046	10258	10918	1300	5106	5422	1746	5152	5496
Ncluster			7836						
loglikelihood			-12787			-5796			-6906
Selection Inst. Wald test		33.44	442.7		19.19	174.3		20.23	377.3
p-value		0.000	0.000		0.001	0.000		0.000	0.000
Selection Instr. Wald test			134.0			71.48			108.3
p-value			0.000			0.000			0.000

Robust standard errors in parentheses

VARIABLES	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*

*** p<0.01, ** p<0.05, * p<0.1

Table 2.5: Informal care to parents and parents-in-law with employment status considered as endogenous

VARIABLES	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*
		All				Male				Female		
Not employed	0.182	0.104**	-0.0978*		0.0958	0.0816	0.00578		0.424	0.0738	-0.201***	
	(0.320)	(0.0507)	(0.0504)		(0.396)	(0.0645)	(0.0576)		(0.381)	(0.0891)	(0.0559)	
Partner never worked	0.289	-0.145***	0.00205	-0.0188	0.530*	-0.126***	0.00156	0.00140				
	(0.284)	(0.0268)	(0.0108)	(0.0192)	(0.284)	(0.0241)	(0.0103)	(0.0168)				
Female	0.589***	0.0568***	0.0148**	0.177***								
	(0.0740)	(0.0114)	(0.00590)	(0.00863)								
Age	0.0442**	-0.00623**	0.00423*	0.0353***	0.0316	-0.00510	-0.000358	0.0315***	0.0480**	-0.00536	0.00826***	0.0401***
	(0.0184)	(0.00286)	(0.00219)	(0.00115)	(0.0236)	(0.00378)	(0.00348)	(0.00153)	(0.0219)	(0.00472)	(0.00248)	(0.00171)
Years of education	-0.00738	0.00776***	0.00132	-0.00995***	-0.00922	0.00717***	0.00348***	-0.00644***	0.000299	0.00690***	-0.00249*	-0.0137***
	(0.0105)	(0.00166)	(0.000869)	(0.00114)	(0.0147)	(0.00211)	(0.00105)	(0.00136)	(0.0148)	(0.00254)	(0.00148)	(0.00181)
Living with partner	0.129	-0.0619***	0.115***	0.0458***	0.0573	-0.0839**	0.180***	0.0102	0.241*	-0.0492*	0.0836***	0.0541***
	(0.113)	(0.0214)	(0.0139)	(0.0137)	(0.198)	(0.0348)	(0.0256)	(0.0196)	(0.141)	(0.0270)	(0.0162)	(0.0204)
limitations in ADLs or IADLs= 1	-0.0948	-0.0383**	-0.00347	0.0736***	-0.143	-0.0250	-0.0243	0.0707***	-0.114	-0.0521**	0.0128	0.0826***
	(0.124)	(0.0194)	(0.00899)	(0.0148)	(0.200)	(0.0297)	(0.0156)	(0.0208)	(0.155)	(0.0234)	(0.0121)	(0.0217)
limitations with daily activities	0.166**	-0.0106	-0.000870	0.0538***	0.205**	-0.0175	-0.00617	0.0544***	0.150*	-0.000545	0.00188	0.0498***
	(0.0660)	(0.0116)	(0.00577)	(0.00844)	(0.102)	(0.0155)	(0.00824)	(0.0102)	(0.0866)	(0.0160)	(0.00902)	(0.0132)
Chronic diseases	-0.0166	0.0222*	0.00788	0.0294***	0.0156	0.00417	0.00411	0.0186*	-0.0328	0.0397**	0.0162*	0.0395***
	(0.0652)	(0.0116)	(0.00551)	(0.00819)	(0.0999)	(0.0152)	(0.00684)	(0.00956)	(0.0856)	(0.0164)	(0.00865)	(0.0132)
Physical inactivity	-0.289	-0.168***	0.0191**	0.0643***	0.221	-0.136***	0.000975	0.102***	-0.453	-0.171***	0.0296**	0.0280
	(0.279)	(0.0241)	(0.00933)	(0.0199)	(0.439)	(0.0342)	(0.0145)	(0.0276)	(0.361)	(0.0308)	(0.0145)	(0.0295)
Real assets	-0.00891	0.00413**	-0.000574	0.000230	-0.00895	0.00348	-0.000612	-0.00336**	-0.00976	0.00446*	0.000245	0.00296
	(0.0115)	(0.00182)	(0.000889)	(0.00124)	(0.0196)	(0.00270)	(0.00117)	(0.00155)	(0.0138)	(0.00234)	(0.00121)	(0.00198)

VARIABLES	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*
urban = Big city	-0.00446	-0.00878	0.00391	-0.0233*	-0.0841	-0.00337	0.00795	-0.0215	0.0691	-0.0136	-0.00412	-0.0235
	(0.104)	(0.0169)	(0.00935)	(0.0122)	(0.151)	(0.0218)	(0.0102)	(0.0150)	(0.132)	(0.0212)	(0.0136)	(0.0187)
urban = Village, rural area	0.0223	-0.00452	-0.0225***	0.0256***	-0.0226	0.00484	-0.0227***	0.0217**	0.00496	-0.00987	-0.0247***	0.0264**
	(0.0651)	(0.0119)	(0.00613)	(0.00786)	(0.0951)	(0.0148)	(0.00688)	(0.00929)	(0.0826)	(0.0152)	(0.00893)	(0.0125)
HH size	-0.0255	0.0156**	0.000715	-0.00264	-0.00621	0.00944	-0.00350	-0.0151**	-0.0349	0.0213**	0.00601	0.0130*
	(0.0403)	(0.00653)	(0.00350)	(0.00473)	(0.0572)	(0.00808)	(0.00388)	(0.00603)	(0.0536)	(0.00907)	(0.00552)	(0.00766)
Not labour income (asin)	-0.0176	0.00465**		-0.000371	-0.000711	0.00435*		-7.18e-05	-0.0404**	0.00444		-0.00137
	(0.0129)	(0.00200)		(0.00167)	(0.0186)	(0.00250)		(0.00194)	(0.0173)	(0.00290)		(0.00281)
Parent age	0.00768***	0.00387***	-0.000406***	0.000118	0.00384	0.00326***	-0.000253**	-0.000128	0.00970***	0.00420***	-0.000681***	0.000320
	(0.00152)	(0.000209)	(0.000100)	(0.000175)	(0.00243)	(0.000256)	(0.000103)	(0.000227)	(0.00210)	(0.000296)	(0.000164)	(0.000258)
Parent health = Poor	0.480***	0.0821***	-0.0154***	0.0236***	0.438***	0.0493***	-0.00916	0.0147	0.475***	0.105***	-0.0208**	0.0244*
	(0.0653)	(0.0120)	(0.00587)	(0.00876)	(0.106)	(0.0165)	(0.00807)	(0.0114)	(0.0851)	(0.0162)	(0.00901)	(0.0133)
Parent distance	-0.136***	-0.0426***		-0.00694**	-0.0876***	-0.0300***		-0.000244	-0.160***	-0.0507***		-0.0124***
	(0.0175)	(0.00248)		(0.00286)	(0.0298)	(0.00335)		(0.00428)	(0.0226)	(0.00350)		(0.00351)
Parent-in-law age	-5.66e-05	0.00152***	-0.000591***	2.63e-05	-0.000125	0.00207***	-0.000656***	-2.92e-05	-0.000724	0.000908***	-0.000683***	0.000139
	(0.00129)	(0.000219)	(0.000100)	(0.000178)	(0.00196)	(0.000262)	(0.000116)	(0.000233)	(0.00186)	(0.000304)	(0.000135)	(0.000254)
Parent-in-law health = Poor	0.249***	0.0564***	0.00313	0.0128	0.0990	0.0404**	-0.00346	0.0114	0.440***	0.0791***	0.0160	0.0168
	(0.0924)	(0.0149)	(0.00673)	(0.0101)	(0.127)	(0.0181)	(0.00816)	(0.0111)	(0.141)	(0.0230)	(0.0117)	(0.0179)
Parent-in-law distance	-0.0419*	-0.0255***		-0.00366	-0.0473	-0.0270***		0.000949	-0.0312	-0.0218***		-0.00929**
	(0.0216)	(0.00318)		(0.00327)	(0.0304)	(0.00378)		(0.00452)	(0.0334)	(0.00494)		(0.00460)
Both parents alive	-0.265***	-0.0571***	0.0361***	-0.00407	-0.244**	-0.0509***	0.0330***	-0.00373	-0.273***	-0.0666***	0.0432***	-0.00427
	(0.0719)	(0.0122)	(0.00620)	(0.00840)	(0.103)	(0.0149)	(0.00607)	(0.0100)	(0.0949)	(0.0153)	(0.00837)	(0.0134)
Has children	-0.0381	-0.0399*	0.0459***	0.0282*	-0.0719	-0.0451	0.0331**	0.0407**	0.0316	-0.0306	0.0357**	0.0156
	(0.129)	(0.0234)	(0.0138)	(0.0163)	(0.190)	(0.0307)	(0.0150)	(0.0198)	(0.168)	(0.0302)	(0.0180)	(0.0260)
Number of children	-0.0150	-0.0119*	0.00870**	0.00588	-0.0540	-0.0115	0.00974**	-0.00860	0.0149	-0.0127	0.0130**	0.0187**
	(0.0335)	(0.00615)	(0.00370)	(0.00481)	(0.0536)	(0.00774)	(0.00409)	(0.00607)	(0.0406)	(0.00785)	(0.00517)	(0.00780)
Has grandchildren	0.103	-0.0115	-0.0182**	-0.0256***	0.145	-0.0102	-0.0132	-0.0123	0.0857	-0.0102	-0.0244**	-0.0364**
	(0.0884)	(0.0149)	(0.00784)	(0.00978)	(0.129)	(0.0194)	(0.00848)	(0.0120)	(0.112)	(0.0187)	(0.0101)	(0.0149)

VARIABLES	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*
Number of grandchildren	-0.0406*	-0.00491	0.00178	0.00753***	-0.0252	-0.00937*	0.000745	0.00750**	-0.0495	-0.00136	0.000845	0.00754**
	(0.0247)	(0.00373)	(0.00199)	(0.00280)	(0.0373)	(0.00522)	(0.00230)	(0.00356)	(0.0311)	(0.00459)	(0.00274)	(0.00378)
Number of siblings	-0.0254*	-0.0102***	0.00698***	-0.00222	-0.0213	-0.00704**	0.00461***	-0.00319	-0.0255	-0.0131***	0.0110***	-0.000486
	(0.0151)	(0.00263)	(0.00152)	(0.00180)	(0.0223)	(0.00342)	(0.00178)	(0.00212)	(0.0213)	(0.00366)	(0.00254)	(0.00290)
Bequest	0.153*	0.120***	0.0267***	-0.00357	0.0319	0.119***	0.0173*	-0.00393	0.228**	0.115***	0.0435***	0.00308
	(0.0796)	(0.0141)	(0.00821)	(0.0102)	(0.131)	(0.0182)	(0.00978)	(0.0124)	(0.0998)	(0.0190)	(0.0120)	(0.0159)
SE	-1.139***	0.169***	0.0544***	-0.160***	-0.790***	0.157***	0.0585***	-0.124***	-1.326***	0.157***	0.0396**	-0.208***
	(0.176)	(0.0300)	(0.00682)	(0.0150)	(0.274)	(0.0414)	(0.00816)	(0.0198)	(0.223)	(0.0397)	(0.0160)	(0.0221)
DK	-1.016***	0.155***	0.0598***	-0.143***	-0.645**	0.128***	0.0529***	-0.121***	-1.268***	0.159***	0.0872***	-0.182***
	(0.168)	(0.0302)	(0.00717)	(0.0156)	(0.266)	(0.0400)	(0.00802)	(0.0191)	(0.216)	(0.0394)	(0.0145)	(0.0234)
NL	-0.800***	0.141***	0.0581***	-0.00657	-0.593**	0.104***	0.0514***	-0.0378*	-0.925***	0.161***	0.0733***	0.00484
	(0.154)	(0.0286)	(0.00795)	(0.0173)	(0.260)	(0.0381)	(0.00715)	(0.0201)	(0.189)	(0.0353)	(0.0125)	(0.0273)
BE	-0.205	0.0724***	0.0547***	0.0272	0.0546	0.0808**	0.0506***	0.0286	-0.345*	0.0513	0.0586***	0.0160
	(0.147)	(0.0277)	(0.00728)	(0.0171)	(0.239)	(0.0361)	(0.00712)	(0.0209)	(0.182)	(0.0338)	(0.0115)	(0.0261)
DE	-0.395***	0.0586**	0.0206**	-0.0171	-0.155	0.0507	0.0255**	-0.0450**	-0.564***	0.0493	0.0156	-0.00773
	(0.152)	(0.0268)	(0.00911)	(0.0169)	(0.250)	(0.0347)	(0.0107)	(0.0195)	(0.189)	(0.0328)	(0.0134)	(0.0268)
FR	-0.577***	0.0454*	0.0483***	-0.00861	-0.199	0.0309	0.0478***	0.0206	-0.802***	0.0455	0.0436***	-0.0510**
	(0.163)	(0.0273)	(0.00726)	(0.0172)	(0.261)	(0.0351)	(0.00674)	(0.0235)	(0.202)	(0.0333)	(0.0120)	(0.0249)
CH	-1.042***	0.0752**	0.0509***	-0.107***	-0.943***	0.0440	0.0454***	-0.129***	-1.058***	0.0876**	0.0636***	-0.103***
	(0.194)	(0.0326)	(0.00794)	(0.0180)	(0.305)	(0.0428)	(0.00984)	(0.0212)	(0.242)	(0.0408)	(0.0129)	(0.0283)
AT	-0.164	-0.0473	0.0258**	0.0802***	0.294	-0.0135	0.0202*	0.0673**	-0.539**	-0.0779**	0.0365**	0.0690**
	(0.208)	(0.0314)	(0.0107)	(0.0225)	(0.313)	(0.0392)	(0.0109)	(0.0263)	(0.256)	(0.0376)	(0.0152)	(0.0345)
ES	-0.119	-0.0602*	-0.0880***	-0.0323*	0.186	-0.0428	-0.0493***	-0.0307	-0.397	-0.0792*	-0.137***	-0.0540*
	(0.272)	(0.0354)	(0.0184)	(0.0190)	(0.410)	(0.0405)	(0.0174)	(0.0222)	(0.342)	(0.0475)	(0.0270)	(0.0315)
CZ	-0.159	0.0711**	0.00118	-0.0536***	0.381	0.0689*	0.00313	-0.0743***	-0.565**	0.0638	0.00834	-0.0504*
	(0.195)	(0.0317)	(0.0138)	(0.0182)	(0.307)	(0.0413)	(0.0163)	(0.0209)	(0.240)	(0.0395)	(0.0180)	(0.0288)
PL	-0.111	-0.0230	-0.0963***	0.0368*	0.114	0.0274	-0.0871***	0.0159	-0.351	-0.0611	-0.0880***	0.0280
	(0.226)	(0.0370)	(0.0226)	(0.0219)	(0.339)	(0.0509)	(0.0268)	(0.0270)	(0.286)	(0.0443)	(0.0273)	(0.0327)

VARIABLES	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*
Wave2	-0.332***	-0.0612***	0.0119*	-0.0243***	-0.339***	-0.0538***	0.0132*	-0.0187*	-0.291***	-0.0661***	0.00751	-0.0234
	(0.0804)	(0.0130)	(0.00714)	(0.00928)	(0.119)	(0.0163)	(0.00776)	(0.0112)	(0.104)	(0.0169)	(0.0107)	(0.0147)
Num. of cars per capita		0.0342**		-0.0637***		0.0357		-0.00616		0.0308		-0.116***
		(0.0172)		(0.0153)		(0.0226)		(0.0244)		(0.0240)		(0.0195)
Fin. distress =		-0.0495**	0.00646	0.0141		-0.0824***	0.00656	0.0274		-0.0293	0.00173	-0.00209
With great difficulty		(0.0220)	(0.00912)	(0.0148)		(0.0302)	(0.0108)	(0.0201)		(0.0282)	(0.0132)	(0.0221)
Leave bequest		0.0421***	0.00233	-0.0219**		0.0315*	0.00722	-0.0144		0.0487***	-0.00610	-0.0321**
		(0.0134)	(0.00679)	(0.00928)		(0.0171)	(0.00769)	(0.0107)		(0.0178)	(0.0102)	(0.0148)
Religious organization		0.0735***	-0.0145	-0.00138		0.0675***	-0.0159	-0.00915		0.0765***	-0.0145	0.000555
		(0.0182)	(0.00939)	(0.0131)		(0.0258)	(0.0126)	(0.0165)		(0.0240)	(0.0134)	(0.0203)
hrooms			-0.0175***	-0.00421			-0.0150***	-0.00365			-0.0212***	-0.00399
			(0.00215)	(0.00261)			(0.00201)	(0.00310)			(0.00255)	(0.00412)
Eligibility				0.229***				0.137***				0.160***
				(0.0307)				(0.0301)				(0.0352)
Eligibility x female				-0.0835***								
				(0.0223)								
Eligibility x number of children				-0.0163**				-0.00750				-0.0447***
				(0.00748)				(0.00762)				(0.0114)
Eligibility x female				-0.0163								
x number of children				(0.0103)								
Partner Eligibility				0.0362*				0.0249				0.0674**
				(0.0215)				(0.0290)				(0.0292)
Partner eligibility x female				0.0219								
				(0.0187)								
Partner eligibility x				-0.00665				0.00145				-0.0161
number of children				(0.00708)				(0.0109)				(0.0101)
Worse standard of living				-0.0490***				-0.0597***				-0.0370**
				(0.0111)				(0.0132)				(0.0168)

VARIABLES	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*
Constant	-1.000***				-0.924				-0.519			
	(0.378)				(0.573)				(0.504)			
		$\rho_{\bullet 2}$	$\rho_{\bullet 3}$	$\rho_{\bullet 4}$		$\rho_{\bullet 2}$	$\rho_{\bullet 3}$	$\rho_{\bullet 4}$		$\rho_{\bullet 2}$	$\rho_{\bullet 3}$	$\rho_{\bullet 4}$
$\rho_{1\bullet}$		0.0875	0.0378	0.0780		-0.0367	0.180	0.0769		0.121*	0.0162	-0.0169
		(0.0548)	(0.0967)	(0.126)		(0.123)	(0.139)	(0.149)		(0.0666)	(0.157)	(0.152)
$\rho_{2\bullet}$			-0.677***	-0.148			-0.914**	-0.0655			-0.546*	-0.138
			(0.248)	(0.0917)			(0.424)	(0.120)			(0.296)	(0.163)
$\rho_{3\bullet}$				0.489**				-0.0621				1.001***
				(0.221)				(0.382)				(0.250)
Observations	2952	9846	10453	10453	1300	5106	5422	5422	1652	4740	5031	5031
Ncluster				7658								
loglikelihood				-16250				-7417				-8667
Selection Instrument Wald test		37.03	441.1			19.39	176.7			21.38	399.2	
p-value		0.000	0.000			0.000658	0			0.000	0.000	
Hansen test				26.26				12.81				14.19
p-value				0.197				0.383				0.289
Emp Instr. Informativity test	71.51	184.9	200.6		26.53	75.07	85.44		12.20	35.83	36.92	
p-value	0.000	0.000	0.000		0.000	0.000	0.000		0.0321	0.000	0.000	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2.6: Care to grandchildren with employment status considered as exogenous

VARIABLES	*hcare*	*care*	*hcare*	*care*	*hcare*	*care*
	All		Male		Female	
Not employed	0.371***	0.0586***	0.216*	0.0514***	0.307***	0.0468***
	(0.0535)	(0.0123)	(0.112)	(0.0191)	(0.0616)	(0.0153)
Partner never worked	0.0631	-0.0610**	0.285*	-0.0724***		

VARIABLES	*hcare*	*care*	*hcare*	*care*	*hcare*	*care*
	(0.124)	(0.0239)	(0.153)	(0.0251)		
Female never worked	0.198**	-0.0293			0.132	-0.0404*
	(0.101)	(0.0216)			(0.104)	(0.0232)
Female	0.399***	0.128***				
	(0.0425)	(0.00835)				
Age	-0.00789	-0.00143	-0.00894	0.000356	-0.00807	-0.00239
	(0.00577)	(0.00128)	(0.0121)	(0.00201)	(0.00635)	(0.00151)
Years of education	0.000567	0.00523***	-0.0374***	0.00716***	0.00820	0.00295
	(0.00657)	(0.00143)	(0.0123)	(0.00205)	(0.00760)	(0.00180)
Living with partner	-0.00890	0.0277	0.168	0.180***	-0.247**	-0.0262
	(0.116)	(0.0240)	(0.277)	(0.0376)	(0.125)	(0.0273)
limitations in ADLs or IADLs= 1	-0.129**	-0.0140	-0.243	0.00158	-0.0370	-0.0103
	(0.0653)	(0.0139)	(0.156)	(0.0247)	(0.0726)	(0.0161)
limitations with daily activities	-0.0399	-0.0183*	0.0399	-0.00997	-0.0721	-0.0248**
	(0.0438)	(0.00979)	(0.0888)	(0.0153)	(0.0526)	(0.0123)
Chronic diseases	0.0344	0.0310***	-0.0656	0.0522***	-0.00163	0.0177
	(0.0422)	(0.00943)	(0.0861)	(0.0145)	(0.0502)	(0.0119)
Physical inactivity	-0.0149	-0.180***	0.608***	-0.219***	-0.0318	-0.169***
	(0.107)	(0.0192)	(0.221)	(0.0302)	(0.128)	(0.0240)
Real assets	-0.00544	0.00248	-0.0235*	0.00521**	-0.00487	0.00153
	(0.00649)	(0.00166)	(0.0142)	(0.00255)	(0.00683)	(0.00181)
urban = Big city	0.104	0.0170	0.296**	-0.0198	0.0237	0.0385**
	(0.0753)	(0.0168)	(0.141)	(0.0246)	(0.0826)	(0.0186)
urban = Village, rural area	-0.0246	-0.0329***	0.171**	-0.0450***	-0.0428	-0.0187
	(0.0482)	(0.0108)	(0.0867)	(0.0148)	(0.0522)	(0.0122)
HH size	0.213**	0.0210	-0.0344	0.0301	0.303***	0.0117
	(0.0961)	(0.0197)	(0.179)	(0.0267)	(0.105)	(0.0232)
Not labour income (asin)	-0.00391	0.000891	-0.00785	-0.00302	0.00487	0.00391

VARIABLES	*hcare*	*care*	*hcare*	*care*	*hcare*	*care*
	(0.00897)	(0.00183)	(0.0154)	(0.00253)	(0.0117)	(0.00248)
Employed children	0.470***	0.0820***	0.167	0.0551**	0.471***	0.0857***
	(0.0863)	(0.0175)	(0.156)	(0.0250)	(0.0919)	(0.0199)
Number of grandchildren	0.0407***	0.00815***	0.0101	0.00693*	0.0375***	0.00679**
	(0.0127)	(0.00262)	(0.0242)	(0.00393)	(0.0132)	(0.00293)
Granchildren age	-0.0263***	-0.0225***	0.0442***	-0.0183***	-0.0264***	-0.0236***
	(0.00736)	(0.00111)	(0.0127)	(0.00171)	(0.00744)	(0.00121)
Grandchildren distance	-0.156***	-0.0442***	5.63e-06	-0.0366***	-0.169***	-0.0458***
	(0.0122)	(0.00200)	(0.0217)	(0.00294)	(0.0121)	(0.00224)
Ratio male children	-0.184***	-0.0627***	0.156	-0.0606***	-0.283***	-0.0643***
	(0.0656)	(0.0147)	(0.117)	(0.0201)	(0.0696)	(0.0164)
Parents alive	-0.0266	-0.00458	0.0255	-0.0118	-0.0195	0.00381
	(0.0485)	(0.0109)	(0.0863)	(0.0147)	(0.0526)	(0.0126)
Number of adult children	-0.101***	-0.00891*	-0.0366	-0.0148*	-0.0847***	0.000497
	(0.0274)	(0.00515)	(0.0479)	(0.00762)	(0.0305)	(0.00587)
Number of minor children	-0.0785	-0.0989***	0.443**	-0.107***	-0.139	-0.0860***
	(0.129)	(0.0249)	(0.226)	(0.0344)	(0.137)	(0.0309)
SE	-0.995***	0.0899***	-1.471***	0.140***	-1.061***	0.0617**
	(0.114)	(0.0226)	(0.227)	(0.0325)	(0.119)	(0.0261)
DK	-0.936***	0.139***	-1.469***	0.191***	-1.116***	0.101***
	(0.118)	(0.0230)	(0.229)	(0.0321)	(0.122)	(0.0267)
NL	-0.833***	0.153***	-1.456***	0.201***	-0.900***	0.121***
	(0.112)	(0.0215)	(0.218)	(0.0307)	(0.113)	(0.0246)
BE	-0.158	0.113***	-0.681***	0.179***	-0.263**	0.0680***
	(0.108)	(0.0211)	(0.215)	(0.0298)	(0.109)	(0.0245)
DE	-0.521***	0.0144	-0.690***	0.0624*	-0.639***	-0.0258
	(0.116)	(0.0243)	(0.227)	(0.0352)	(0.124)	(0.0285)
FR	-0.139	0.0565**	-0.470**	0.109***	-0.238**	0.0130

VARIABLES	*hcare*	*care*	*hcare*	*care*	*hcare*	*care*
	(0.114)	(0.0224)	(0.228)	(0.0329)	(0.115)	(0.0257)
CH	-0.470***	0.0674**	-0.925***	0.137***	-0.561***	0.0174
	(0.150)	(0.0305)	(0.293)	(0.0437)	(0.156)	(0.0351)
AT	-0.342***	0.0257	-0.502**	0.0962***	-0.531***	-0.0294
	(0.130)	(0.0266)	(0.251)	(0.0373)	(0.137)	(0.0314)
ES	-0.240	-0.103***	-0.105	-0.0467	-0.246	-0.134***
	(0.146)	(0.0262)	(0.270)	(0.0395)	(0.162)	(0.0307)
CZ	-0.378***	-0.0122	-0.314	0.00236	-0.422***	-0.00504
	(0.129)	(0.0271)	(0.254)	(0.0399)	(0.134)	(0.0307)
PL	-0.222	0.0356	-0.664**	0.103**	-0.195	0.00735
	(0.142)	(0.0272)	(0.274)	(0.0401)	(0.148)	(0.0316)
w2	-0.000798	0.00625	-0.0484	-0.000374	0.00881	0.00637
	(0.0589)	(0.0131)	(0.108)	(0.0182)	(0.0635)	(0.0149)
Num. of cars per capita		0.0282*		0.0338		0.0463**
		(0.0169)		(0.0213)		(0.0190)
Leave bequest		0.0312**		0.00710		0.0356**
		(0.0122)		(0.0142)		(0.0145)
Fin. distress = With great difficulty		-0.0360**		-0.00183		-0.0417**
		(0.0183)		(0.0233)		(0.0202)
Religious organization		0.0476***		0.0350*		0.0359**
		(0.0156)		(0.0192)		(0.0179)
Ever had siblings		0.0400***		0.0289		0.0440**
		(0.0148)		(0.0181)		(0.0195)
Constant	0.280		1.507***		0.813***	
	(0.184)		(0.383)		(0.196)	
		$\rho_{\bullet 2}$		$\rho_{\bullet 2}$		$\rho_{\bullet 2}$
$\rho_{1\bullet}$		-0.0529		-1.477***		-0.0146
		(0.0593)		(0.0948)		(0.0482)

VARIABLES	*hcare*	*care*	*hcare*	*care*	*hcare*	*care*
Observations	6820	11538	2533	4755	4287	6783
Ncluster		8301				
loglikelihood		-19503		-7726		-11639
Instrument Wald test - SEL I eq		30.37		7.919		26.46
p-value		0.000		0.161		0.000

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2.7: Care to grandchildren with employment status considered as endogenous

VARIABLES	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*
		All			Male			Female	
Not employed	0.954*	0.163***		0.122	0.116*		1.205**	0.173***	
	(0.523)	(0.0365)		(0.483)	(0.0611)		(0.515)	(0.0442)	
Partner never worked	0.0819	-0.0571**	-0.0137	0.280*	-0.0708***	0.00353			
	(0.126)	(0.0238)	(0.0191)	(0.153)	(0.0250)	(0.0186)			
Female	0.332***	0.117***	0.160***						
	(0.0720)	(0.00961)	(0.0105)						
Age	-0.0394	-0.00725***	0.0402***	-0.00326	-0.00362	0.0386***	-0.0532*	-0.00876***	0.0424***
	(0.0294)	(0.00228)	(0.00118)	(0.0315)	(0.00412)	(0.00177)	(0.0277)	(0.00255)	(0.00146)
Years of education	0.00389	0.00564***	-0.00819***	-0.0382***	0.00764***	-0.00715***	0.0142	0.00307	-0.00866***
	(0.00832)	(0.00147)	(0.00106)	(0.0129)	(0.00207)	(0.00144)	(0.00944)	(0.00189)	(0.00146)
Living with partner	-0.0338	0.0442*	0.0398**	0.171	0.176***	0.0251	-0.308**	0.00217	0.0343
	(0.128)	(0.0242)	(0.0181)	(0.277)	(0.0376)	(0.0273)	(0.138)	(0.0289)	(0.0258)
limitations in	-0.171**	-0.0176	0.0535***	-0.241	-0.000855	0.0435**	-0.0904	-0.0140	0.0618***
ADLs or IADLs= 1	(0.0727)	(0.0145)	(0.0124)	(0.158)	(0.0248)	(0.0208)	(0.0802)	(0.0172)	(0.0156)
limitations with	-0.0643	-0.0204**	0.0506***	0.0449	-0.0135	0.0623***	-0.105*	-0.0251*	0.0405***
daily activities	(0.0524)	(0.0101)	(0.00771)	(0.0928)	(0.0156)	(0.0108)	(0.0610)	(0.0129)	(0.0105)

VARIABLES	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*
Chronic diseases	0.00533	0.0261***	0.0479***	-0.0619	0.0493***	0.0422***	-0.0526	0.00914	0.0506***
	(0.0525)	(0.00984)	(0.00737)	(0.0880)	(0.0148)	(0.0103)	(0.0612)	(0.0127)	(0.00994)
Physical inactivity	0.0272	-0.188***	0.0578***	0.615***	-0.222***	0.0862***	0.0427	-0.173***	0.0446**
	(0.116)	(0.0207)	(0.0167)	(0.224)	(0.0301)	(0.0260)	(0.136)	(0.0272)	(0.0221)
Real assets	0.000480	0.00357**	-0.00293**	-0.0242*	0.00560**	-0.00636***	0.00229	0.00284	-0.000839
	(0.00739)	(0.00170)	(0.00122)	(0.0146)	(0.00257)	(0.00197)	(0.00765)	(0.00186)	(0.00148)
urban = Big city	0.137*	0.0210	-0.00833	0.295**	-0.0201	-0.00603	0.0816	0.0503***	-0.0153
	(0.0765)	(0.0171)	(0.0120)	(0.142)	(0.0245)	(0.0166)	(0.0866)	(0.0193)	(0.0161)
urban = Village, rural area	-0.0184	-0.0347***	0.00964	0.172**	-0.0461***	0.0170	-0.0252	-0.0194	-0.000643
	(0.0498)	(0.0109)	(0.00743)	(0.0875)	(0.0147)	(0.0105)	(0.0550)	(0.0126)	(0.00994)
HH size	0.221**	0.0119	-0.0124	-0.0340	0.0303	-0.0114	0.329***	-0.00949	-0.00472
	(0.104)	(0.0193)	(0.0129)	(0.179)	(0.0264)	(0.0179)	(0.116)	(0.0239)	(0.0205)
Not labour income (asin)	-0.00488	-0.000567	0.00260*	-0.00801	-0.00294	9.59e-05	0.00142	0.00125	0.00461**
	(0.00923)	(0.00187)	(0.00150)	(0.0154)	(0.00253)	(0.00188)	(0.0128)	(0.00267)	(0.00227)
Employed children	0.446***	0.0793***	0.000756	0.170	0.0522**	0.0322*	0.448***	0.0825***	-0.0264
	(0.0898)	(0.0179)	(0.0128)	(0.157)	(0.0251)	(0.0181)	(0.0990)	(0.0209)	(0.0172)
Number of grandchildren	0.0348**	0.00670**	0.00878***	0.0112	0.00624	0.00987***	0.0289*	0.00489	0.00779***
	(0.0143)	(0.00272)	(0.00194)	(0.0245)	(0.00397)	(0.00280)	(0.0150)	(0.00311)	(0.00253)
Granchildren age	-0.0276***	-0.0226***	0.00151	0.0440***	-0.0182***	0.000514	-0.0285***	-0.0240***	0.00234*
	(0.00826)	(0.00115)	(0.000939)	(0.0128)	(0.00170)	(0.00129)	(0.00857)	(0.00128)	(0.00123)
Grandchildren distance	-0.155***	-0.0436***	0.00204	8.66e-05	-0.0366***	0.00424**	-0.166***	-0.0452***	7.94e-05
	(0.0140)	(0.00206)	(0.00152)	(0.0218)	(0.00293)	(0.00212)	(0.0141)	(0.00240)	(0.00200)
Ratio male children	-0.170**	-0.0630***	-0.00328	0.157	-0.0595***	0.000948	-0.271***	-0.0662***	-0.00640
	(0.0676)	(0.0149)	(0.0101)	(0.117)	(0.0200)	(0.0140)	(0.0737)	(0.0169)	(0.0133)
Parents alive	-0.0307	-0.00645	-0.0124*	0.0234	-0.0100	-0.0129	-0.0275	0.000550	-0.0106
	(0.0510)	(0.0111)	(0.00731)	(0.0872)	(0.0148)	(0.00999)	(0.0564)	(0.0131)	(0.00978)
Number of adult children	-0.0945***	-0.00826	0.00431	-0.0384	-0.0135*	-0.00227	-0.0765**	0.00204	0.00965
	(0.0295)	(0.00528)	(0.00516)	(0.0486)	(0.00769)	(0.00736)	(0.0332)	(0.00616)	(0.00717)

VARIABLES	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*
Number of minor children	-0.109	-0.0907***	0.0230	0.438*	-0.106***	-0.00351	-0.230	-0.0696**	0.0504**
	(0.136)	(0.0247)	(0.0163)	(0.226)	(0.0341)	(0.0222)	(0.149)	(0.0315)	(0.0251)
SE	-0.828***	0.120***	-0.214***	-1.491***	0.150***	-0.136***	-0.754***	0.0872***	-0.283***
	(0.187)	(0.0236)	(0.0205)	(0.242)	(0.0331)	(0.0274)	(0.222)	(0.0297)	(0.0281)
DK	-0.810***	0.161***	-0.173***	-1.488***	0.200***	-0.140***	-0.904***	0.113***	-0.206***
	(0.169)	(0.0233)	(0.0216)	(0.245)	(0.0325)	(0.0285)	(0.188)	(0.0290)	(0.0297)
NL	-0.825***	0.161***	0.00592	-1.462***	0.202***	0.0226	-0.894***	0.114***	-0.0198
	(0.123)	(0.0219)	(0.0201)	(0.219)	(0.0305)	(0.0255)	(0.127)	(0.0277)	(0.0290)
BE	-0.150	0.117***	-0.000578	-0.684***	0.179***	0.0396*	-0.246*	0.0513*	-0.0418
	(0.118)	(0.0221)	(0.0193)	(0.215)	(0.0296)	(0.0236)	(0.127)	(0.0285)	(0.0277)
DE	-0.460***	0.0340	-0.0429**	-0.699***	0.0667*	-0.0227	-0.535***	-0.0154	-0.0711**
	(0.131)	(0.0250)	(0.0209)	(0.230)	(0.0352)	(0.0266)	(0.148)	(0.0316)	(0.0294)
FR	-0.121	0.0644***	-0.0113	-0.470**	0.106***	0.0697***	-0.156	0.0110	-0.0777***
	(0.122)	(0.0232)	(0.0192)	(0.229)	(0.0328)	(0.0232)	(0.140)	(0.0291)	(0.0273)
CH	-0.355*	0.0940***	-0.163***	-0.946***	0.150***	-0.164***	-0.402**	0.0305	-0.174***
	(0.195)	(0.0308)	(0.0279)	(0.314)	(0.0444)	(0.0373)	(0.203)	(0.0375)	(0.0358)
AT	-0.390***	0.0258	0.0941***	-0.496*	0.0902**	0.124***	-0.603***	-0.0468	0.0643**
	(0.146)	(0.0279)	(0.0207)	(0.255)	(0.0377)	(0.0263)	(0.153)	(0.0357)	(0.0291)
ES	-0.224	-0.111***	-0.0644***	-0.116	-0.0413	-0.0425	-0.188	-0.184***	-0.0923**
	(0.172)	(0.0294)	(0.0247)	(0.271)	(0.0397)	(0.0296)	(0.219)	(0.0406)	(0.0384)
CZ	-0.358***	-0.00118	-0.0107	-0.323	0.00746	-0.0472	-0.449***	-0.0148	0.00814
	(0.136)	(0.0277)	(0.0210)	(0.256)	(0.0398)	(0.0290)	(0.144)	(0.0333)	(0.0279)
PL	-0.280*	0.0322	0.109***	-0.665**	0.101**	0.0916***	-0.317*	-0.0192	0.109***
	(0.156)	(0.0281)	(0.0206)	(0.275)	(0.0400)	(0.0299)	(0.169)	(0.0350)	(0.0269)
w2	0.0383	0.00931	-0.0293***	-0.0501	0.000725	-0.0200	0.0827	0.0117	-0.0362***
	(0.0626)	(0.0134)	(0.00918)	(0.108)	(0.0182)	(0.0126)	(0.0699)	(0.0158)	(0.0123)
Num. of cars per capita		0.0306*	-0.0352***		0.0343	-0.0115		0.0499**	-0.0534***
		(0.0173)	(0.0121)		(0.0214)	(0.0186)		(0.0198)	(0.0153)

VARIABLES	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*
Leave bequest		0.0258**	-0.0162*		0.00794	-0.0189		0.0258*	-0.0106
		(0.0125)	(0.00896)		(0.0143)	(0.0127)		(0.0154)	(0.0119)
Fin. distress =		-0.0335*	0.0281**		-0.00142	0.00785		-0.0387*	0.0383**
With great difficulty		(0.0191)	(0.0141)		(0.0232)	(0.0215)		(0.0218)	(0.0173)
Religious organization		0.0527***	-0.00190		0.0354*	-0.0197		0.0424**	0.00817
		(0.0162)	(0.0126)		(0.0192)	(0.0180)		(0.0191)	(0.0169)
Ever had siblings		0.0446***	-0.0148		0.0283	-0.0132		0.0539***	-0.0169
		(0.0152)	(0.0113)		(0.0182)	(0.0155)		(0.0205)	(0.0154)
Eligibility			0.192***			0.179***			0.0533**
			(0.0294)			(0.0386)			(0.0263)
Eligibility x female			-0.0987***						
			(0.0213)						
Eligibility x number of child			-0.0237***			-0.0230***			-0.0302***
			(0.00656)			(0.00843)			(0.00817)
Eligibility x female			-0.00596						
x number of children			(0.00762)						
Partner eligibility			0.0272			0.0156			0.0509**
			(0.0202)			(0.0269)			(0.0258)
Partner eligibility x female			0.0204						
			(0.0153)						
Partner eligibility x			-0.00613			0.00772			-0.0140*
number of children			(0.00608)			(0.00940)			(0.00804)
Worse standard of living			-0.0612***			-0.0569***			-0.0635***
			(0.0100)			(0.0150)			(0.0136)
Constant	-0.105			1.573***			0.126		
	(0.401)			(0.487)			(0.462)		
		$\rho_{\bullet 2}$	$\rho_{\bullet 3}$		$\rho_{\bullet 2}$	$\rho_{\bullet 3}$		$\rho_{\bullet 2}$	$\rho_{\bullet 3}$
$\rho_{1\bullet}$		-0.0547	-0.248		-1.467***	0.0268		-0.00591	-0.404*

VARIABLES	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*
		(0.0816)	(0.217)		(0.0976)	(0.134)		(0.0749)	(0.232)
$\rho_{2\bullet}$			-0.201***			-0.116			-0.250***
			(0.0701)			(0.107)			(0.0897)
Observations	6407	10743	10743	2533	4755	4755	3874	5988	5988
Ncluster			7925						
loglikelihood			-22087			-9335			-12553
Inst. Wald test - SEL I eq			30.30			7.971			24.81
p-value			0.000			0.158			0.000
Hansen test			47.96			10.89			9.530
p-value			0.000			0.366			0.483
Emp Instr. Informativity test	83.11	176.7		39.09	69.44		27.08	50.62	
p-value	0.000	0.000		0.000	0.000		0.000	0.000	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2.8: Care to friends, neighbours, other relatives with employment status as exogenous

VARIABLES	*hcare*	*care*	*hcare*	*care*	*hcare*	*care*
	All		Male		Female	
Not employed	0.402***	0.0233***	0.535***	0.0255**	0.264**	0.0248***
	(0.0849)	(0.00696)	(0.122)	(0.0112)	(0.118)	(0.00893)
Partner never worked	-0.326	-0.0296**	-0.124	-0.0231		
	(0.207)	(0.0127)	(0.212)	(0.0147)		
Female never worked	0.387*	-0.0128			0.0383	-0.0213
	(0.205)	(0.0138)			(0.222)	(0.0139)
Female	0.457***	-0.0286***				
	(0.0631)	(0.00506)				
Age	0.00446	-0.00150**	-0.00467	-0.00207*	0.0179	-0.00123

VARIABLES	*hcare*	*care*	*hcare*	*care*	*hcare*	*care*
	(0.00793)	(0.000667)	(0.0112)	(0.00106)	(0.0112)	(0.000846)
Years of education	-0.0256***	0.00287***	-0.0182	0.00261**	-0.0360**	0.00330***
	(0.00987)	(0.000776)	(0.0124)	(0.00114)	(0.0153)	(0.00102)
Living with partner	-0.0666	-0.0650***	0.0146	-0.0755***	-0.109	-0.0620***
	(0.105)	(0.00933)	(0.145)	(0.0162)	(0.152)	(0.0114)
limitations in ADLs or IADLs= 1	-0.328***	0.00301	-0.169	-0.00898	-0.402***	0.00455
	(0.109)	(0.00894)	(0.192)	(0.0154)	(0.136)	(0.0109)
limitations with daily activities	0.0421	0.00878	-0.0450	0.00307	0.115	0.0149*
	(0.0659)	(0.00587)	(0.0917)	(0.00902)	(0.0943)	(0.00771)
Chronic diseases	0.101	0.00459	0.0616	0.00580	0.114	0.00469
	(0.0655)	(0.00575)	(0.0876)	(0.00880)	(0.0961)	(0.00764)
Physical inactivity	-0.207	-0.106***	0.209	-0.130***	-0.406	-0.0931***
	(0.295)	(0.00846)	(0.495)	(0.0128)	(0.377)	(0.0103)
Real assets	-0.0102	-0.00124	-0.0121	-0.00273**	-0.00251	-8.81e-05
	(0.00897)	(0.000864)	(0.0125)	(0.00137)	(0.0130)	(0.00110)
urban = Big city	-0.0128	-0.00861	0.115	-0.00679	-0.0924	-0.0129
	(0.104)	(0.00841)	(0.144)	(0.0128)	(0.149)	(0.0104)
urban = Village, rural area	0.0412	-0.0134**	0.00351	-0.00625	0.0459	-0.0176**
	(0.0654)	(0.00597)	(0.0853)	(0.00856)	(0.0967)	(0.00748)
HH size	-0.0526	0.0138***	-0.133***	0.0171***	0.0364	0.00986**
	(0.0384)	(0.00328)	(0.0506)	(0.00478)	(0.0547)	(0.00429)
Not labour income (asin)	-0.00903	5.43e-05	-0.0121	-0.000906	-0.00975	0.00112
	(0.0123)	(0.00101)	(0.0159)	(0.00141)	(0.0185)	(0.00143)
Parent alive	-0.0300	-0.0364***	0.0156	-0.0404***	-0.0151	-0.0315***
	(0.0711)	(0.00599)	(0.0910)	(0.00869)	(0.103)	(0.00747)
Has children	-0.0599	-0.0372***	-0.242	-0.0120	0.113	-0.0536***
	(0.119)	(0.0121)	(0.162)	(0.0166)	(0.180)	(0.0159)
Number of children	0.0805**	-0.0107***	0.157***	-0.0135***	-0.000636	-0.00835**

VARIABLES	*hcare*	*care*	*hcare*	*care*	*hcare*	*care*
	(0.0339)	(0.00340)	(0.0460)	(0.00478)	(0.0484)	(0.00411)
Has grandchildren	0.0789	-0.0228***	0.0605	-0.0226**	0.0977	-0.0236**
	(0.0850)	(0.00754)	(0.113)	(0.0109)	(0.120)	(0.00954)
Number of grandchildren	-0.00847	-0.000781	-0.0195	0.000296	-0.00452	-0.00190
	(0.0180)	(0.00171)	(0.0232)	(0.00258)	(0.0248)	(0.00209)
SE	-1.027***	0.0455***	-0.535***	0.0664***	-1.457***	0.0281
	(0.157)	(0.0143)	(0.205)	(0.0213)	(0.216)	(0.0175)
DK	-0.763***	0.0670***	-0.411*	0.0892***	-1.071***	0.0456**
	(0.167)	(0.0157)	(0.212)	(0.0228)	(0.234)	(0.0196)
NL	-0.533***	0.0817***	-0.406**	0.114***	-0.628***	0.0485***
	(0.155)	(0.0149)	(0.200)	(0.0221)	(0.210)	(0.0175)
BE	-0.141	0.0340**	0.0460	0.0505***	-0.235	0.0183
	(0.151)	(0.0133)	(0.201)	(0.0193)	(0.208)	(0.0160)
DE	-0.447***	0.0102	-0.141	0.0455**	-0.668***	-0.0189
	(0.151)	(0.0130)	(0.198)	(0.0200)	(0.215)	(0.0148)
FR	-0.454***	-0.0153	-0.107	-0.0231	-0.808***	-0.00898
	(0.160)	(0.0119)	(0.220)	(0.0171)	(0.212)	(0.0151)
CH	-0.572***	0.0180	-0.0967	0.0124	-0.927***	0.0208
	(0.179)	(0.0156)	(0.245)	(0.0231)	(0.242)	(0.0199)
AT	-0.0319	-0.0577***	0.242	-0.0468**	-0.273	-0.0667***
	(0.204)	(0.0119)	(0.263)	(0.0193)	(0.294)	(0.0135)
ES	-0.0929	-0.0877***	0.245	-0.114***	-0.373	-0.0672***
	(0.261)	(0.00993)	(0.367)	(0.0137)	(0.349)	(0.0133)
CZ	-0.474***	-0.0103	0.0529	-0.00197	-0.882***	-0.0127
	(0.182)	(0.0144)	(0.236)	(0.0215)	(0.258)	(0.0176)
PL	-0.432**	-0.0336**	-0.104	-0.00213	-0.783**	-0.0503***
	(0.214)	(0.0143)	(0.282)	(0.0235)	(0.318)	(0.0162)
Wave2	-0.122	-0.0230***	-0.0139	-0.0254***	-0.210*	-0.0255***

VARIABLES	*hcare*	*care*	*hcare*	*care*	*hcare*	*care*
	(0.0778)	(0.00660)	(0.101)	(0.00964)	(0.121)	(0.00843)
Num. of cars per capita		0.0209**		0.0169		0.0204*
		(0.00884)		(0.0134)		(0.0113)
Fin. distress = With great difficulty		-0.00323		-0.0191		0.00800
		(0.0104)		(0.0156)		(0.0132)
Leave bequest		0.0345***		0.0339***		0.0335***
		(0.00685)		(0.0100)		(0.00897)
Religious organization		0.0839***		0.0979***		0.0760***
		(0.0104)		(0.0165)		(0.0130)
Ever siblings		0.0266***		0.0355***		0.0193*
		(0.00778)		(0.0114)		(0.0105)
Constant	-1.318***		-1.426***		-0.808	
	(0.361)		(0.400)		(0.600)	
$\rho_{1\bullet}$		-0.125		-0.243**		0.0108
		(0.131)		(0.122)		(0.214)
Observations	3797	22464	1885	10212	1912	12252
Ncluster		16495				
loglikelihood		-17177		-8242		-8876
Selection Instruments Wald test		121.4		68.05		65.36
p-value		0.000		0.000		0.000

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2.9: Care to friends, neighbours, other relatives with employment status as endogenous

VARIABLES	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*
		All			Male			Female	
Not employed	0.331	0.0725***		0.390	0.0575*		0.122	0.0990***	

VARIABLES	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*
	(0.226)	(0.0229)		(0.303)	(0.0341)		(0.414)	(0.0314)	
Partner never worked	-0.315	-0.0291**	-0.0225*	-0.125	-0.0226	-0.00478			
	(0.207)	(0.0132)	(0.0134)	(0.212)	(0.0148)	(0.0125)			
Female	0.465***	-0.0349***	0.167***						
	(0.0688)	(0.00573)	(0.00675)						
Age	0.00854	-0.00430***	0.0359***	0.00343	-0.00386*	0.0338***	0.0249	-0.00542***	0.0392***
	(0.0138)	(0.00134)	(0.000777)	(0.0189)	(0.00208)	(0.00110)	(0.0239)	(0.00183)	(0.00108)
Years of education	-0.0248**	0.00330***	-0.00919***	-0.0193	0.00284**	-0.00605***	-0.0309*	0.00401***	-0.0120***
	(0.0101)	(0.000837)	(0.000731)	(0.0125)	(0.00116)	(0.000935)	(0.0166)	(0.00117)	(0.00108)
Living with partner	-0.0854	-0.0661***	0.0247***	0.0144	-0.0758***	0.0105	-0.198	-0.0624***	0.0343***
	(0.106)	(0.00977)	(0.00880)	(0.146)	(0.0161)	(0.0125)	(0.156)	(0.0121)	(0.0125)
limitations in	-0.307***	0.00246	0.0649***	-0.158	-0.0108	0.0583***	-0.375***	0.00839	0.0704***
ADLs or IADLs= 1	(0.113)	(0.00936)	(0.00938)	(0.194)	(0.0154)	(0.0144)	(0.142)	(0.0118)	(0.0127)
limitations with	0.0435	0.00766	0.0493***	-0.0380	0.00165	0.0521***	0.133	0.0131	0.0464***
daily activities	(0.0681)	(0.00619)	(0.00564)	(0.0931)	(0.00908)	(0.00749)	(0.0983)	(0.00828)	(0.00817)
Chronic diseases	0.106	0.00255	0.0341***	0.0674	0.00467	0.0303***	0.147	-0.000578	0.0363***
	(0.0662)	(0.00602)	(0.00545)	(0.0882)	(0.00885)	(0.00719)	(0.0972)	(0.00814)	(0.00793)
Physical inactivity	-0.226	-0.114***	0.0563***	0.217	-0.131***	0.0694***	-0.559	-0.102***	0.0438***
	(0.311)	(0.00865)	(0.0125)	(0.497)	(0.0128)	(0.0179)	(0.403)	(0.0111)	(0.0170)
Real assets	-0.0127	-0.00106	-0.00147*	-0.0130	-0.00259*	-0.00356***	-0.00853	-0.000180	-0.000162
	(0.00905)	(0.000899)	(0.000843)	(0.0126)	(0.00138)	(0.00121)	(0.0131)	(0.00115)	(0.00118)
urban = Big city	0.00467	-0.00968	-0.0185**	0.112	-0.00637	-0.0197*	-0.0837	-0.0146	-0.0208*
	(0.106)	(0.00874)	(0.00808)	(0.145)	(0.0128)	(0.0106)	(0.152)	(0.0110)	(0.0115)
urban = Village, rural area	0.0421	-0.0152**	0.0116**	0.00507	-0.00673	0.0144**	0.0669	-0.0217***	0.00639
	(0.0662)	(0.00617)	(0.00542)	(0.0854)	(0.00857)	(0.00701)	(0.0992)	(0.00789)	(0.00776)
HH size	-0.0594	0.0134***	-0.00479	-0.134***	0.0174***	-0.0174***	0.0342	0.00818*	0.00838*
	(0.0394)	(0.00343)	(0.00328)	(0.0506)	(0.00478)	(0.00424)	(0.0592)	(0.00460)	(0.00499)
Not labour income (asin)	-0.00706	-0.000410	0.00154	-0.0120	-0.000928	0.00155	-0.00300	0.000359	0.000735

VARIABLES	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*
	(0.0124)	(0.00104)	(0.000980)	(0.0159)	(0.00141)	(0.00119)	(0.0187)	(0.00152)	(0.00158)
Parent alive	-0.0243	-0.0367***	-0.0105**	0.0128	-0.0397***	-0.0104	-0.0485	-0.0342***	-0.00893
	(0.0717)	(0.00621)	(0.00534)	(0.0911)	(0.00873)	(0.00682)	(0.107)	(0.00791)	(0.00765)
Has children	-0.0551	-0.0393***	0.00163	-0.240	-0.0124	0.00894	0.0917	-0.0629***	0.00490
	(0.120)	(0.0126)	(0.0107)	(0.162)	(0.0166)	(0.0139)	(0.186)	(0.0170)	(0.0157)
Number of children	0.0900***	-0.0103***	0.00516	0.156***	-0.0131***	-0.00756*	0.0241	-0.00815*	0.0159***
	(0.0341)	(0.00357)	(0.00334)	(0.0463)	(0.00480)	(0.00447)	(0.0496)	(0.00444)	(0.00508)
Has grandchildren	0.0902	-0.0239***	-0.0132*	0.0584	-0.0223**	-0.00358	0.0993	-0.0261***	-0.0222**
	(0.0860)	(0.00782)	(0.00678)	(0.113)	(0.0109)	(0.00887)	(0.124)	(0.0101)	(0.00951)
Number of grandchildren	-0.0145	-0.00108	0.00783***	-0.0177	-5.51e-05	0.00789***	-0.0123	-0.00180	0.00805***
	(0.0183)	(0.00179)	(0.00171)	(0.0238)	(0.00261)	(0.00236)	(0.0256)	(0.00225)	(0.00226)
SE	-1.072***	0.0597***	-0.193***	-0.565***	0.0742***	-0.157***	-1.612***	0.0489**	-0.233***
	(0.170)	(0.0163)	(0.0117)	(0.216)	(0.0228)	(0.0156)	(0.259)	(0.0216)	(0.0165)
DK	-0.810***	0.0788***	-0.161***	-0.436**	0.0959***	-0.149***	-1.223***	0.0627***	-0.183***
	(0.177)	(0.0171)	(0.0127)	(0.220)	(0.0238)	(0.0163)	(0.262)	(0.0224)	(0.0180)
NL	-0.557***	0.0869***	-0.00841	-0.419**	0.118***	-0.0365**	-0.686***	0.0526***	0.00137
	(0.161)	(0.0156)	(0.0124)	(0.204)	(0.0224)	(0.0158)	(0.223)	(0.0190)	(0.0179)
BE	-0.158	0.0352**	0.00787	0.0442	0.0513***	0.0191	-0.365*	0.0181	-0.0138
	(0.155)	(0.0139)	(0.0121)	(0.203)	(0.0193)	(0.0152)	(0.220)	(0.0176)	(0.0176)
DE	-0.459***	0.0142	-0.0335***	-0.154	0.0488**	-0.0468***	-0.807***	-0.0172	-0.0347*
	(0.157)	(0.0139)	(0.0122)	(0.202)	(0.0203)	(0.0154)	(0.229)	(0.0163)	(0.0179)
FR	-0.481***	-0.0130	-0.0274**	-0.112	-0.0223	0.0117	-0.865***	-0.00429	-0.0659***
	(0.166)	(0.0126)	(0.0117)	(0.222)	(0.0171)	(0.0150)	(0.230)	(0.0168)	(0.0171)
CH	-0.625***	0.0298*	-0.126***	-0.128	0.0196	-0.154***	-1.071***	0.0350	-0.117***
	(0.188)	(0.0172)	(0.0150)	(0.255)	(0.0245)	(0.0191)	(0.265)	(0.0225)	(0.0211)
AT	-0.0566	-0.0604***	0.0790***	0.249	-0.0481**	0.0692***	-0.374	-0.0718***	0.0745***
	(0.209)	(0.0126)	(0.0144)	(0.265)	(0.0192)	(0.0185)	(0.307)	(0.0148)	(0.0204)
ES	-0.182	-0.0900***	-0.0462***	0.227	-0.112***	-0.0468***	-0.649	-0.0657***	-0.0563**

VARIABLES	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*
	(0.290)	(0.0111)	(0.0143)	(0.370)	(0.0140)	(0.0171)	(0.414)	(0.0165)	(0.0228)
CZ	-0.503***	-0.00927	-0.0175	0.0369	0.00120	-0.0599***	-0.996***	-0.0221	0.00653
	(0.185)	(0.0149)	(0.0131)	(0.238)	(0.0219)	(0.0173)	(0.264)	(0.0182)	(0.0187)
PL	-0.467**	-0.0359**	0.0830***	-0.101	-0.00197	0.0561***	-0.934***	-0.0608***	0.0877***
	(0.217)	(0.0148)	(0.0146)	(0.283)	(0.0234)	(0.0201)	(0.326)	(0.0169)	(0.0201)
Wave2	-0.121	-0.0211***	-0.0257***	-0.0165	-0.0249***	-0.0201**	-0.204*	-0.0163*	-0.0308***
	(0.0787)	(0.00689)	(0.00637)	(0.101)	(0.00965)	(0.00824)	(0.119)	(0.00907)	(0.00925)
Num. of cars per capita		0.0225**	-0.0392***		0.0174	-0.0140		0.0262**	-0.0607***
		(0.00918)	(0.00860)		(0.0134)	(0.0119)		(0.0118)	(0.0120)
Fin. distress =		-0.00718	0.0331***		-0.0200	0.0362***		-0.000522	0.0314**
With great difficulty		(0.0110)	(0.00978)		(0.0156)	(0.0137)		(0.0147)	(0.0139)
Leave bequest		0.0368***	-0.0178***		0.0345***	-0.0170**		0.0384***	-0.0180*
		(0.00713)	(0.00635)		(0.0101)	(0.00827)		(0.00957)	(0.00930)
Religious organization		0.0877***	0.00589		0.0976***	0.000999		0.0804***	0.00987
		(0.0109)	(0.00906)		(0.0165)	(0.0122)		(0.0137)	(0.0128)
Ever siblings		0.0275***	-0.00650		0.0355***	-0.00942		0.0206*	-0.00567
		(0.00808)	(0.00773)		(0.0113)	(0.00999)		(0.0111)	(0.0112)
Eligibility			0.198***			0.122***			0.0913***
			(0.0186)			(0.0205)			(0.0192)
Eligibility x female			-0.101***						
			(0.0128)						
Eligibility x number			-0.0151***			-0.00440			-0.0323***
of children			(0.00448)			(0.00517)			(0.00595)
Eligibility x female x			-0.00789						
number of children			(0.00549)						
Partner eligibility			0.0475***			0.0276			0.0720***
			(0.0136)			(0.0177)			(0.0180)
Partner eligibility x female			0.0112						

VARIABLES	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*	*hcare*	*care*	*nemp*
			(0.0114)						
Partner eligibility x			-0.00784*			0.00288			-0.0172***
number of children			(0.00443)			(0.00668)			(0.00609)
Worse standard of living			-0.0473***			-0.0470***			-0.0484***
			(0.00758)			(0.00998)			(0.0109)
Constant	-1.236***			-1.328***			-0.684		
	(0.394)			(0.442)			(0.728)		
		$\rho_{\bullet 2}$	$\rho_{\bullet 3}$		$\rho_{\bullet 2}$	$\rho_{\bullet 3}$		$\rho_{\bullet 2}$	$\rho_{\bullet 3}$
$\rho_{1\bullet}$		-0.137	0.0266		-0.242**	0.0540		-0.00621	0.0537
		(0.130)	(0.0740)		(0.122)	(0.104)		(0.229)	(0.133)
$\rho_{2\bullet}$			-0.120**			-0.0794			-0.193**
			(0.0557)			(0.0792)			(0.0829)
Observations	3685	21216	21216	1885	10212	10212	1800	11004	11004
Ncluster			15913						
loglikelihood			-24375			-11509			-12707
Selection Instr. Wald test			122.9			68.59			66.67
p-value			0.000			0			0
Hansen test			17.49			14.42			8.077
p-value			0.355			0.108			0.526
Emp. Instr. Informativity test	87.70	349.7		23.08	128.4		26.28	76.68	
p-value	0.000	0.000		0.000	0.000		0.000	0.000	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2.10: Care to adult children with employment status considered as exogenous

VARIABLES	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*
		All			Male			Female	

VARIABLES	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*
Not employed	0.240**	0.0106	0.00935*	0.154	0.0120	0.0231***	0.265*	0.00977	-0.00125
	(0.103)	(0.00763)	(0.00522)	(0.154)	(0.0123)	(0.00855)	(0.137)	(0.00961)	(0.00643)
Partner never worked	-0.314	-0.00973	-0.00492	-0.214	-0.00528	0.000364			
	(0.253)	(0.0161)	(0.00929)	(0.264)	(0.0184)	(0.00998)			
Never worked	0.446**	0.00437	0.00228				0.434*	-0.00162	-0.00759
	(0.212)	(0.0163)	(0.00924)				(0.230)	(0.0161)	(0.00985)
Female	0.295***	-0.0298***	0.00322						
	(0.0908)	(0.00548)	(0.00325)						
Age	0.0188	-0.00315***	0.00424***	0.0360*	-0.00327***	0.00448***	0.00719	-0.00305***	0.00407***
	(0.0121)	(0.000796)	(0.000556)	(0.0187)	(0.00123)	(0.000829)	(0.0145)	(0.000965)	(0.000654)
Years of education	-0.0199	0.00201**	0.00269***	-0.0442**	0.00253*	0.00361***	0.00194	0.00164	0.00176**
	(0.0130)	(0.000900)	(0.000637)	(0.0197)	(0.00135)	(0.000875)	(0.0176)	(0.00115)	(0.000780)
Living with partner	0.0556	-0.0178*	-0.00435	-0.0227	0.00807	-0.0553***	0.106	-0.0307***	0.0163**
	(0.122)	(0.00987)	(0.00646)	(0.201)	(0.0168)	(0.0108)	(0.156)	(0.0119)	(0.00732)
limitations in	-0.279**	0.0217**	-0.00490	-0.403*	0.0236	-0.00764	-0.244	0.0225*	-0.00293
ADLs or IADLs= 1	(0.135)	(0.0102)	(0.00765)	(0.243)	(0.0182)	(0.0134)	(0.161)	(0.0120)	(0.00859)
limitations with	-0.0451	0.00169	-0.000475	-0.0800	0.00518	-0.000304	-0.0142	-0.000621	-0.00153
daily activities	(0.0800)	(0.00644)	(0.00448)	(0.113)	(0.0101)	(0.00693)	(0.110)	(0.00819)	(0.00557)
Chronic diseases	-0.0769	0.0131**	0.00349	-0.202*	0.0162*	0.00615	0.0572	0.0109	0.00169
	(0.0808)	(0.00643)	(0.00430)	(0.119)	(0.00980)	(0.00679)	(0.111)	(0.00822)	(0.00564)
Physical inactivity	-0.494	-0.0763***	-0.0107	-0.395	-0.108***	-0.00416	-0.621*	-0.0579***	-0.0155
	(0.335)	(0.0105)	(0.00917)	(0.738)	(0.0159)	(0.0141)	(0.350)	(0.0132)	(0.0106)
Real assets	0.00206	-0.00112	-7.09e-06	0.0173	-0.000729	-0.000208	-0.00471	-0.00122	-0.000214
	(0.0121)	(0.00107)	(0.000822)	(0.0180)	(0.00168)	(0.00122)	(0.0160)	(0.00119)	(0.000899)
urban = Big city	-0.0934	-0.0175*	0.00139	0.000696	-0.0117	0.00220	-0.141	-0.0212*	0.00237
	(0.140)	(0.00990)	(0.00714)	(0.189)	(0.0151)	(0.00948)	(0.184)	(0.0112)	(0.00757)
urban = Village, rural area	0.111	-0.00805	-0.00971*	0.173	-0.00314	-0.00457	0.0207	-0.0124	-0.0141**
	(0.0849)	(0.00674)	(0.00519)	(0.117)	(0.00948)	(0.00659)	(0.107)	(0.00792)	(0.00567)

VARIABLES	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*
Not labour income (asin)	-0.0181	0.00177		-0.0152	0.000230		-0.0191	0.00294*	
	(0.0166)	(0.00118)		(0.0222)	(0.00166)		(0.0237)	(0.00163)	
Number of adult children	-0.0789	-0.00697*	0.0543***	-0.0778	-0.00388	0.0600***	-0.0804	-0.00886**	0.0496***
	(0.0537)	(0.00357)	(0.00323)	(0.0650)	(0.00503)	(0.00432)	(0.0699)	(0.00429)	(0.00350)
Number of minor children	-0.0532	-0.0169	-0.00789	0.0468	-0.0176	-0.00397	-0.297	-0.0144	-0.0136*
	(0.148)	(0.0108)	(0.00491)	(0.168)	(0.0127)	(0.00571)	(0.272)	(0.0164)	(0.00702)
Employed children	-0.231	-0.00966	0.112***	-0.355**	0.0143	0.122***	-0.149	-0.0270**	0.104***
	(0.149)	(0.0109)	(0.00533)	(0.181)	(0.0152)	(0.00680)	(0.186)	(0.0130)	(0.00586)
Children distance	-0.0425*	-0.00693***		-0.0371	-0.00961***		-0.0465*	-0.00483***	
	(0.0238)	(0.00143)		(0.0432)	(0.00205)		(0.0258)	(0.00166)	
Parent alive	-0.0419	-0.00385	0.00381	-0.0856	-0.00517	0.00649	-0.00837	-0.00309	0.00326
	(0.0871)	(0.00682)	(0.00507)	(0.121)	(0.00935)	(0.00673)	(0.112)	(0.00820)	(0.00553)
Has grandchildren	0.282	0.0172	0.159***	-0.0450	0.00357	0.165***	0.597***	0.0286**	0.154***
	(0.176)	(0.0107)	(0.0102)	(0.194)	(0.0150)	(0.0127)	(0.209)	(0.0131)	(0.0114)
Number of grandchildren	0.000936	0.00530***	0.00156	-0.0125	0.00846***	-0.00179	0.0141	0.00321	0.00370
	(0.0270)	(0.00177)	(0.00308)	(0.0423)	(0.00262)	(0.00431)	(0.0325)	(0.00201)	(0.00316)
SE	-1.820***	0.0996***	0.120***	-1.394**	0.156***	0.134***	-2.047***	0.0686***	0.109***
	(0.324)	(0.0220)	(0.00400)	(0.618)	(0.0346)	(0.00534)	(0.309)	(0.0244)	(0.00440)
DK	-1.800***	0.138***	0.119***	-1.124	0.211***	0.133***	-2.290***	0.0944***	0.108***
	(0.352)	(0.0246)	(0.00405)	(0.717)	(0.0379)	(0.00526)	(0.328)	(0.0275)	(0.00439)
NL	-1.462***	0.0816***	0.0987***	-0.918	0.143***	0.109***	-1.804***	0.0453**	0.0912***
	(0.288)	(0.0208)	(0.00511)	(0.571)	(0.0331)	(0.00664)	(0.283)	(0.0224)	(0.00538)
BE	-1.037***	0.0986***	0.0718***	-0.558	0.148***	0.0773***	-1.270***	0.0694***	0.0681***
	(0.295)	(0.0204)	(0.00594)	(0.572)	(0.0316)	(0.00791)	(0.279)	(0.0224)	(0.00626)
DE	-1.419***	0.0366*	0.0913***	-0.996**	0.0764**	0.0975***	-1.635***	0.0163	0.0861***
	(0.267)	(0.0194)	(0.00556)	(0.461)	(0.0312)	(0.00728)	(0.286)	(0.0213)	(0.00583)
FR	-1.800***	-0.0233	0.0880***	-1.421***	0.00965	0.101***	-1.943***	-0.0397**	0.0774***
	(0.301)	(0.0160)	(0.00526)	(0.441)	(0.0271)	(0.00662)	(0.362)	(0.0172)	(0.00581)

VARIABLES	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*
CH	-1.481***	0.0113	0.0913***	-0.744	0.0191	0.100***	-1.851***	0.00939	0.0847***
	(0.319)	(0.0217)	(0.00571)	(0.520)	(0.0341)	(0.00765)	(0.354)	(0.0247)	(0.00592)
AT	-1.204***	0.0404*	0.0691***	-0.669	0.0695**	0.0829***	-1.521***	0.0262	0.0594***
	(0.278)	(0.0212)	(0.00758)	(0.488)	(0.0344)	(0.00967)	(0.291)	(0.0236)	(0.00845)
ES	0.0516	-0.0967***	0.0136	0.525	-0.125***	0.0221**	-0.256	-0.0795***	0.00603
	(0.698)	(0.0133)	(0.00861)	(1.432)	(0.0195)	(0.0110)	(0.708)	(0.0155)	(0.00943)
CZ	-0.841***	0.0490**	0.0209**	-0.190	0.0927***	0.0325***	-1.222***	0.0280	0.0135
	(0.283)	(0.0214)	(0.00991)	(0.532)	(0.0345)	(0.0126)	(0.309)	(0.0234)	(0.0110)
PL	-0.593*	-0.00488	-0.0490***	-0.0904	0.00502	-0.0389**	-0.931**	-0.00895	-0.0547***
	(0.331)	(0.0195)	(0.0139)	(0.538)	(0.0322)	(0.0178)	(0.403)	(0.0220)	(0.0152)
Wave2	-0.257**	-0.000972	-0.00124	-0.275*	-0.0127	-0.000217	-0.235*	0.00669	-0.00206
	(0.106)	(0.00789)	(0.00560)	(0.147)	(0.0112)	(0.00728)	(0.140)	(0.00951)	(0.00623)
Num. of cars per capita		0.0264**			0.00324			0.0436***	
		(0.0103)			(0.0160)			(0.0118)	
Fin. distress =		-0.00927	-0.00367		-0.0153	-0.00761		-0.00994	-0.000226
With great difficulty		(0.0139)	(0.00824)		(0.0238)	(0.0116)		(0.0146)	(0.00840)
Religious organization		0.0289***	0.00340		0.0377***	-0.00247		0.0214**	0.00747
		(0.00800)	(0.00552)		(0.0122)	(0.00774)		(0.00957)	(0.00654)
Leave bequest		0.0259**	-0.0164**		0.0348*	-0.0124		0.0180	-0.0188**
		(0.0111)	(0.00816)		(0.0186)	(0.0120)		(0.0127)	(0.00931)
Ever had siblings		0.0253***	-0.0121**		0.0332**	-0.0109		0.0201*	-0.0127*
		(0.00922)	(0.00593)		(0.0157)	(0.00907)		(0.0114)	(0.00756)
Number of rooms			-0.0126***			-0.0135***			-0.0113***
			(0.00162)			(0.00216)			(0.00179)
Constant	0.629			0.871			0.426		
	(0.984)			(1.933)			(0.838)		
		$\rho_{\bullet 2}$	$\rho_{\bullet 3}$		$\rho_{\bullet 2}$	$\rho_{\bullet 3}$		$\rho_{\bullet 2}$	$\rho_{\bullet 3}$
$\rho_{1\bullet}$		-0.0863	-0.155		-0.129	-0.299		-0.0208	-0.0873

VARIABLES	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*	*hcare*	*care*	*nr*
		(0.312)	(0.225)		(0.577)	(0.346)		(0.241)	(0.210)
$\rho_{2\bullet}$			-0.515***			-0.509***			-0.483***
			(0.0955)			(0.131)			(0.134)
Observations	2366	17425	19822	1139	7640	8821	1227	9785	11001
Ncluster			14300						
loglikelihood			-15562			-7273			
Selection Instr. Wald test		35.52	91.35		21.80	63.20		24.80	64.02
p-value		0.000	0.000		0.001	0.000		0.000	0.000

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2.11: Care to adult children with employmnet status considered asa endogenous

VARIABLES	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*
	All				Male				Female			
Not employed	0.124	0.0460*	-0.184***		-0.106	0.00338	-0.116**		0.219	0.0707	-0.210***	
	(0.291)	(0.0273)	(0.0137)		(0.382)	(0.0411)	(0.0501)		(0.365)	(0.0449)	(0.0114)	
Partner never worked	-0.310	-0.00993	-0.0112	-0.0271*	-0.246	-0.00606	-0.00148	-0.00839				
	(0.257)	(0.0165)	(0.01000)	(0.0141)	(0.268)	(0.0182)	(0.0102)	(0.0132)				
Female	0.323***	-0.0342***	0.0265***	0.174***								
	(0.100)	(0.00668)	(0.00379)	(0.00733)								
Age	0.0297	-0.00503***	0.0148***	0.0383***	0.0521*	-0.00260	0.0119***	0.0357***	0.0160	-0.00625**	0.0160***	0.0409***
	(0.0204)	(0.00170)	(0.000988)	(0.000819)	(0.0280)	(0.00268)	(0.00276)	(0.00127)	(0.0244)	(0.00265)	(0.000993)	(0.00110)
Years of education	-0.0187	0.00274***	0.000444	-0.00699***	-0.0455**	0.00250*	0.00258***	-0.00474***	0.00723	0.00307**	-0.00181**	-0.00940***
	(0.0138)	(0.000956)	(0.000683)	(0.000818)	(0.0198)	(0.00136)	(0.000959)	(0.00109)	(0.0195)	(0.00135)	(0.000888)	(0.00119)
Living with partner	0.0364	-0.0172*	0.00635	0.0241**	-0.0128	0.00687	-0.0551***	-0.00932	0.0942	-0.0312**	0.0337***	0.0439***
	(0.125)	(0.0103)	(0.00726)	(0.00948)	(0.200)	(0.0167)	(0.0111)	(0.0159)	(0.167)	(0.0132)	(0.00849)	(0.0125)
limitations in	-0.296**	0.0187*	0.00811	0.0569***	-0.384	0.0236	-0.00150	0.0539***	-0.285*	0.0176	0.0137	0.0598***

VARIABLES	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*
ADLs or IADLs= 1	(0.140)	(0.0106)	(0.00784)	(0.00999)	(0.243)	(0.0182)	(0.0136)	(0.0157)	(0.172)	(0.0129)	(0.00929)	(0.0131)
limitations with	-0.0317	0.00127	0.0101**	0.0467***	-0.0679	0.00561	0.00620	0.0509***	0.00887	-0.00163	0.0118*	0.0446***
daily activities	(0.0816)	(0.00674)	(0.00476)	(0.00607)	(0.114)	(0.0102)	(0.00739)	(0.00827)	(0.113)	(0.00899)	(0.00627)	(0.00858)
Chronic diseases	-0.0727	0.0127*	0.0135***	0.0385***	-0.191	0.0165*	0.0125*	0.0349***	0.0707	0.00980	0.0134**	0.0402***
	(0.0821)	(0.00674)	(0.00458)	(0.00587)	(0.120)	(0.00989)	(0.00719)	(0.00777)	(0.116)	(0.00900)	(0.00624)	(0.00837)
Physical inactivity	-0.464	-0.0862***	0.00337	0.0475***	-0.408	-0.107***	0.00740	0.0652***	-0.592	-0.0711***	-0.00419	0.0306*
	(0.377)	(0.0107)	(0.00974)	(0.0131)	(0.736)	(0.0157)	(0.0144)	(0.0189)	(0.422)	(0.0141)	(0.0124)	(0.0178)
Real assets	0.00179	-0.000920	-0.000617	-0.000634	0.0163	-0.000727	-0.000796	-0.00304**	-0.00529	-0.00113	-0.000514	0.000420
	(0.0122)	(0.00109)	(0.000881)	(0.000947)	(0.0180)	(0.00167)	(0.00126)	(0.00137)	(0.0165)	(0.00124)	(0.000993)	(0.00134)
urban = Big city	-0.0942	-0.0160	0.000209	-0.0209**	-0.00643	-0.0119	0.00180	-0.0163	-0.140	-0.0184	0.000196	-0.0253**
	(0.140)	(0.0102)	(0.00755)	(0.00881)	(0.190)	(0.0149)	(0.00957)	(0.0117)	(0.191)	(0.0122)	(0.00865)	(0.0122)
urban = Village, rural area	0.117	-0.00770	-0.00704	0.0123**	0.182	-0.00284	-0.00144	0.0178**	0.0309	-0.0117	-0.0146**	0.00452
	(0.0861)	(0.00691)	(0.00548)	(0.00587)	(0.119)	(0.00943)	(0.00681)	(0.00761)	(0.110)	(0.00847)	(0.00639)	(0.00832)
Not labour income (asin)	-0.0195	0.00143		0.00197*	-0.0173	0.000155		0.000925	-0.0226	0.00230		0.00251
	(0.0166)	(0.00122)		(0.00103)	(0.0222)	(0.00165)		(0.00132)	(0.0240)	(0.00177)		(0.00155)
Number of adult children	-0.0692	-0.00614*	0.0534***	0.00782**	-0.0790	-0.00308	0.0583***	-0.00822	-0.0731	-0.00936**	0.0499***	0.0215***
	(0.0520)	(0.00365)	(0.00335)	(0.00390)	(0.0640)	(0.00498)	(0.00438)	(0.00548)	(0.0707)	(0.00471)	(0.00384)	(0.00551)
Number of minor children	-0.0619	-0.0185*	-0.00281	0.0225***	0.0342	-0.0188	-0.00277	-0.0109	-0.319	-0.0182	0.00506	0.0629***
	(0.147)	(0.0110)	(0.00511)	(0.00722)	(0.168)	(0.0126)	(0.00580)	(0.0105)	(0.275)	(0.0175)	(0.00785)	(0.0127)
Employed children	-0.206	-0.00852	0.119***	0.0288***	-0.332*	0.0183	0.124***	0.0292***	-0.153	-0.0311**	0.113***	0.0262**
	(0.146)	(0.0113)	(0.00574)	(0.00819)	(0.183)	(0.0152)	(0.00702)	(0.0111)	(0.194)	(0.0146)	(0.00685)	(0.0115)
Children distance	-0.0438*	-0.00698***		-0.0138***	-0.0422	-0.00978***		-0.00641	-0.0452*	-0.00430**		-0.0181***
	(0.0243)	(0.00153)		(0.00169)	(0.0435)	(0.00208)		(0.00391)	(0.0272)	(0.00199)		(0.00189)
Parent alive	-0.0290	-0.00553	-0.00221	-0.00614	-0.0902	-0.00518	0.00246	-0.00548	0.0192	-0.00616	-0.00318	-0.00535
	(0.0894)	(0.00698)	(0.00534)	(0.00572)	(0.121)	(0.00928)	(0.00696)	(0.00732)	(0.117)	(0.00874)	(0.00623)	(0.00804)
Has grandchildren	0.339**	0.0210**	0.160***	-0.00506	-0.0398	0.00799	0.167***	-0.000842	0.650***	0.0329**	0.150***	-0.0116
	(0.164)	(0.0105)	(0.0104)	(0.00740)	(0.194)	(0.0146)	(0.0132)	(0.00957)	(0.197)	(0.0134)	(0.0124)	(0.0103)
Number of grandchildren	0.00217	0.00562***	0.00177	0.00850***	-0.00911	0.00826***	0.000391	0.00959***	0.0160	0.00388*	0.00222	0.00804***

VARIABLES	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*
	(0.0275)	(0.00184)	(0.00303)	(0.00182)	(0.0415)	(0.00263)	(0.00438)	(0.00252)	(0.0344)	(0.00219)	(0.00332)	(0.00245)
SE	-1.817***	0.108***	0.115***	-0.168***	-1.477**	0.157***	0.129***	-0.128***	-2.126***	0.0730***	0.0995***	-0.215***
	(0.333)	(0.0233)	(0.00624)	(0.0134)	(0.642)	(0.0356)	(0.00637)	(0.0194)	(0.330)	(0.0278)	(0.00892)	(0.0189)
DK	-1.795***	0.145***	0.121***	-0.138***	-1.197	0.212***	0.132***	-0.122***	-2.371***	0.0934***	0.107***	-0.164***
	(0.359)	(0.0255)	(0.00664)	(0.0145)	(0.735)	(0.0386)	(0.00642)	(0.0194)	(0.346)	(0.0294)	(0.00934)	(0.0205)
NL	-1.430***	0.0823***	0.0939***	0.00789	-0.976*	0.143***	0.104***	-0.00568	-1.836***	0.0333	0.0855***	0.00635
	(0.295)	(0.0217)	(0.00659)	(0.0134)	(0.584)	(0.0331)	(0.00745)	(0.0170)	(0.295)	(0.0237)	(0.00796)	(0.0195)
BE	-1.020***	0.0932***	0.0666***	0.0204	-0.598	0.147***	0.0742***	0.0406**	-1.318***	0.0492**	0.0616***	-0.00666
	(0.302)	(0.0213)	(0.00716)	(0.0130)	(0.579)	(0.0315)	(0.00840)	(0.0164)	(0.298)	(0.0240)	(0.00895)	(0.0191)
DE	-1.401***	0.0331*	0.0842***	-0.0184	-1.058**	0.0767**	0.0905***	-0.0217	-1.693***	0.000758	0.0793***	-0.0278
	(0.278)	(0.0200)	(0.00700)	(0.0134)	(0.477)	(0.0313)	(0.00842)	(0.0174)	(0.299)	(0.0219)	(0.00820)	(0.0192)
FR	-1.782***	-0.0244	0.0838***	0.0184	-1.484***	0.0114	0.101***	0.0621***	-1.977***	-0.0475***	0.0633***	-0.0250
	(0.314)	(0.0167)	(0.00661)	(0.0133)	(0.461)	(0.0270)	(0.00711)	(0.0187)	(0.384)	(0.0182)	(0.00871)	(0.0190)
CH	-1.531***	0.0135	0.0786***	-0.104***	-0.875	0.0174	0.0893***	-0.135***	-2.001***	0.00407	0.0724***	-0.0983***
	(0.330)	(0.0229)	(0.00841)	(0.0169)	(0.548)	(0.0348)	(0.0102)	(0.0221)	(0.359)	(0.0262)	(0.00980)	(0.0236)
AT	-1.193***	0.0322	0.0816***	0.0949***	-0.681	0.0717**	0.0877***	0.0964***	-1.625***	0.00261	0.0765***	0.0819***
	(0.293)	(0.0221)	(0.00826)	(0.0157)	(0.497)	(0.0345)	(0.0100)	(0.0205)	(0.316)	(0.0250)	(0.0100)	(0.0220)
ES	-0.387	-0.104***	-0.0103	-0.0574***	0.401	-0.125***	0.00538	-0.0521***	-0.907	-0.0863***	-0.0196	-0.0692***
	(0.858)	(0.0134)	(0.0108)	(0.0155)	(1.483)	(0.0189)	(0.0137)	(0.0188)	(0.980)	(0.0187)	(0.0146)	(0.0247)
CZ	-0.825***	0.0448**	0.00904	-0.0199	-0.260	0.0910***	0.0177	-0.0543***	-1.272***	0.0104	0.0101	-0.00149
	(0.292)	(0.0218)	(0.0112)	(0.0141)	(0.543)	(0.0345)	(0.0150)	(0.0187)	(0.324)	(0.0237)	(0.0129)	(0.0200)
PL	-0.588*	-0.0117	-0.0358***	0.0704***	-0.156	0.00290	-0.0435**	0.0557***	-0.973**	-0.0277	-0.0246	0.0692***
	(0.344)	(0.0198)	(0.0138)	(0.0154)	(0.540)	(0.0317)	(0.0181)	(0.0215)	(0.427)	(0.0221)	(0.0154)	(0.0211)
Wave2	-0.284***	0.000725	-0.00656	-0.0243***	-0.281*	-0.0128	-0.00226	-0.0263***	-0.282*	0.0110	-0.00970	-0.0238**
	(0.107)	(0.00819)	(0.00610)	(0.00691)	(0.147)	(0.0111)	(0.00749)	(0.00894)	(0.147)	(0.0103)	(0.00732)	(0.00985)
Num. of cars per capita		0.0285***		-0.0851***		0.000944		-0.0358**		0.0523***		-0.118***
		(0.0108)		(0.00946)		(0.0159)		(0.0172)		(0.0137)		(0.0118)
Fin. distress =		-0.00396	-0.00235	0.0237**		-0.0156	-0.00496	0.0202		-0.00102	0.000939	0.0254*

VARIABLES	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*
With great difficulty		(0.0147)	(0.00875)	(0.0102)		(0.0236)	(0.0117)	(0.0144)		(0.0166)	(0.00985)	(0.0141)
Leave bequest		0.0293***	-0.000255	-0.0127*		0.0372***	-0.00460	-0.0122		0.0218**	0.00252	-0.0127
		(0.00834)	(0.00587)	(0.00698)		(0.0120)	(0.00787)	(0.00910)		(0.0104)	(0.00737)	(0.0100)
Religious organization		0.0279**	-0.0126	0.0112		0.0353*	-0.0121	0.00593		0.0211	-0.0119	0.0119
		(0.0117)	(0.00869)	(0.00970)		(0.0182)	(0.0120)	(0.0135)		(0.0138)	(0.0105)	(0.0135)
Ever had siblings		0.0296***	-0.0114*	-0.00604		0.0324**	-0.0104	-0.00638		0.0289**	-0.0117	-0.0107
		(0.00946)	(0.00647)	(0.00849)		(0.0157)	(0.00913)	(0.0112)		(0.0121)	(0.00876)	(0.0121)
Number of rooms			-0.0140***	-0.00473**			-0.0148***	-0.00668***			-0.0126***	-0.00209
			(0.00170)	(0.00190)			(0.00219)	(0.00252)			(0.00201)	(0.00263)
Eligibility				0.176***				0.137***				0.0553***
				(0.0214)				(0.0277)				(0.0202)
Eligibility x female				-0.102***								
				(0.0154)								
Eligibility x number				-0.0114**				-0.00952				-0.0201***
of children				(0.00545)				(0.00666)				(0.00708)
Eligibility x female x				-0.00681								
number of children				(0.00655)								
Partner eligibility				0.0243*				-0.0137				0.0639***
				(0.0147)				(0.0201)				(0.0189)
Partner eligibility x female				0.0144								
				(0.0116)								
Partner eligibility x				-0.00311				0.0172**				-0.0179***
number of children				(0.00509)				(0.00827)				(0.00667)
Worse standard of living				-0.0500***				-0.0544***				-0.0460***
				(0.00784)				(0.0106)				(0.0110)
Constant	0.662				1.016				0.593			
	(1.008)				(1.964)				(1.048)			
		$\rho_{\bullet 2}$	$\rho_{\bullet 3}$	$\rho_{\bullet 4}$		$\rho_{\bullet 2}$	$\rho_{\bullet 3}$	$\rho_{\bullet 4}$		$\rho_{\bullet 2}$	$\rho_{\bullet 3}$	$\rho_{\bullet 4}$

VARIABLES	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*	*hcare*	*care*	*nr*	*nemp*
$\rho_{1\bullet}$		-0.118	-0.0647	0.0326		-0.107	-0.281	0.101		-0.0831	-0.0298	-0.00191
		(0.304)	(0.186)	(0.101)		(0.571)	(0.312)	(0.132)		(0.298)	(0.180)	(0.129)
$\rho_{2\bullet}$			-0.425***	-0.0997			-0.415***	0.0265			-0.421***	-0.181
			(0.0905)	(0.0744)			(0.132)	(0.107)			(0.144)	(0.131)
$\rho_{3\bullet}$				1.127***				0.690***				1.437***
				(0.104)				(0.268)				(0.116)
Observations	2286	16420	18668	18668	1139	7640	8821	8821	1147	8780	9847	9847
Ncluster				13758								
loglikelihood				-21725				-10092				-11449
Wald_test instruments												
p-value												
Selection Instr. Wald test		36.92	97.86			21.73	75.20			27.48	65.71	
p-value		0.000	0.000			0.001	0.000			0.000	0.000	
Hansen test				59.38				40.53				23.88
p-value				0.000				0.000				0.0672
Instr. Informativity Test F	36.48	291.0	326.8		17.60	107.0	124.8		5.659	60.77	55.32	
p-value	0.000	0.000	0.000		0.004	0.000	0.000		0.341	0.000	0.000	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2.12: Difference in allocated time to informal care between not employed and employed for grandchildren and parents

	Male		Female	
	Minutes/week looking after grandchildren	Minutes/week caring for parents	Minutes/week looking after grandchildren	Minutes/week caring for parents
AT	211.22	49.68	177.46	85.41
DE	171.97	31.64	156.87	91.93
SE	79.80	20.40	109.69	49.54
NL	83.89	22.49	134.21	78.68
ES	276.33	34.63	207.80	90.49
IT	322.56	32.02	301.06	139.20
FR	221.65	29.15	240.86	71.54
DK	82.73	20.35	106.05	47.57
CH	140.40	12.73	173.36	53.09
BE	188.44	44.03	243.07	121.63
CZ	218.92	40.34	205.71	68.39
PL	177.69	27.86	262.82	65.17

Table 2.13: Impact of the simulated pension reform

	Male			Female		
	Estimated individuals affected by the reform	Number of FTE to look after grandchildren	Number of FTE to care for parents	Estimated individuals affected by the reform	Number of FTE to look after grandchildren	Number of FTE to care for parents
AT	68,955	6,620	1,557	60,940	4,915	2,365
DE	810,654	63,368	11,661	725,378	51,723	30,311
SE	52,627	1,909	488	66,568	3,319	1,499
NL	116,112	4,427	1,187	35,238	2,149	1,260
ES	243,660	30,605	3,836	39,748	3,754	1,635
IT	272,383	39,937	3,964	196,970	26,955	12,462
FR	197,759	19,924	2,620	173,033	18,944	5,626
DK	22,540	847	208	24,801	1,195	536
CH	29,360	1,873	169	33,259	2,620	802
BE	92,417	7,916	1,849	55,895	6,175	3,090
CZ	39,144	3,895	717	73,831	6,903	2,295
PL	212,728	17,181	2,694	122,675	14,655	3,634

Table 2.14: Descriptive statistics of dependent, independent and instrumental variables

Variable name	Description	Mean	S.D.
Care to other people	dummy (=1) if informal care is provided to other people	0.1684	0.3742
Hcare to other people	Logaritm of hours of care provided to other people	-0.2304	1.8206
Not employed	dummy (=1) if an individual is not employed (retired or homemaker)	0.4788	0.4996
Never worked	dummy (=1) if a woman has never worked	0.0561	0.2301
Partner never worked	dummy (=1) if a man has a wife who never worked	0.0413	0.1989
Female	dummy (=1) if gender is female	0.5451	0.4980
Age	Age - 60 years (interval: [-10,9])	-0.7793	5.6715
Years of education	Years of education	11.070	3.9448
Living with partner	dummy (=1) if an individual lives with the partner	0.8251	0.3799
HH size	Househould size - 1	1.3756	1.0483
Not labour income (asin)	Asin trasformation of not labour income	9.2809	2.9345

Variable name	Description	Mean	S.D.
Care to other people	dummy (=1) if informal care is provided to other people	0.1684	0.3742
Hcare to other people	Logaritm of hours of care provided to other people	-0.2304	1.8206
Real assets	Asin trasformation of held real assets by the household	10.839	3.6270
urban = Big city	dummy (=1) if living in a big city	0.1243	0.3300
urban = Village, rural area	dummy (=1) if living in a village or a rural area	0.5209	0.4996
limitations in ADLs = 1	dummy (=1) if having limitations in ADLs or in IADLs	0.1059	0.3077
limitations with daily activities	dummy (=1) if having limitations with daily activities	0.3472	0.4961
Chronic diseases	dummy (=1) if having chronic diseases	0.3465	0.4759
Physical inactivity	dummy (=1) if an individual is physical inactive	0.0593	0.2362
Parent alive	dummy (=1) if having at least a parent or parent-in-law alive	0.5070	0.5000
Having children	dummy (=1) if having at least a children	0.9057	0.2922
Number of children	Number of children	2.1619	1.3131
Having grandchildren	dummy (=1) if having at least a grandchildren	0.5788	0.4938
Number of grandchildren	Number of grandchildren	1.9143	2.5270
Num. of cars per capita	Numbers of cars per capita. The measure is corrected for individuals living in the household with less than 18 years old (chlidren and grandchildren).	0.5117	0.3340
Fin. distress = With great difficulty	dummy (=1) if households have great difficulty to make ends meet.	0.0831	0.2760
Leave bequest	Chance of leaving inheritance more than 50.000 Euros [0,1]	0.5969	0.4216
Religious organization	dummy (=1) if partecipating in a religious organization in the free time.	0.0842	0.2777
Ever had siblings	dummy (=1) if having had any siblings	0.8927	0.3095
Number of rooms	Number of rooms	4.2158	1.6089
Eligibility	dummy (=1) if eligible for a pension	0.4486	0.4974
Eligibility x female	dummy (=1) if eligible for a pension, interacted by gender	0.2321	0.4222
Eligibility x number of children	dummy (=1) if eligible for a pension, interacted by number of children	0.9856	1.4166
Worse standard of living	Chance of standard of living will be worse [0,1]	0.4079	0.3166
Partner eligibility	dummy (=1) if partner is eligible for a pension	0.3288	0.4698

Variable name	Description	Mean	S.D.
Care to other people	dummy (=1) if informal care is provided to other people	0.1684	0.3742
Hcare to other people	Logaritm of hours of care provided to other people	-0.2304	1.8206
Partner eligibility x female	dummy (=1) if partner is eligible for a pension interacted by the gender	0.1083	0.3107
SE	Sweden	0.1008	0.3011
DK	Denmark	0.0783	0.2687
NL	The Netherland	0.1024	0.3032
BE	Belgium	0.0996	0.2995
DE	Germany	0.1068	0.3089
FR	France	0.0984	0.2979
CH	Switzerland	0.0466	0.2107
AT	Austria	0.0549	0.2279
ES	Spain	0.0725	0.2593
CZ	Czech Republic	0.0790	0.2697
PL	Poland	0.0549	0.2279
Wave 2006-2007	dummy (=1) if the interview was in 2006-07	0.3454	0.4755
Conditional on having a parent or parent-in-law alive			
Not coresiding	Not coresiding in the same household	0.9424	0.2329
Care to parents	dummy (=1) if informal care is provided to parents	0.2800	0.4490
Hcare to parents	Logaritm of hours of care provided to parents	0.6614	1.7139
Parent age	Age of the oldest parent alive (when the parent is dead, it is equal to zero)	61.814	36.353
Parent health = Poor	dummy (=1) if parent with the worst health has poor health conditions. Information mainly reported by the respondents.	0.2834	0.4506
Parent distance	Index of geographical distance from the parent alive. It is assumed that when both parents are alive and live outside the household, they live together or at the same distance. The distance is computed as the log natural of the mean distance between the two brackets, for instance if parents live at a distance of less than 1Km, ln(0.5) is computed.	2.0965	2.2152
Parent-in-law age	Age of the oldest parent-in-law alive	40.583	41.229
Parent-in-law health = Poor	dummy (=1) if parent-in-law with the worst health has poor health conditions.	0.1907	0.3929
Parent-in-law distance	Index of geographical distance from the parent-in-alive.	1.3975	2.0347
Number of siblings	Number of siblings alive	2.3944	2.044

Variable name	Description	Mean	S.D.
Care to other people	dummy (=1) if informal care is provided to other people	0.1684	0.3742
Hcare to other people	Logaritm of hours of care provided to other people	-0.2304	1.8206
Bequest	Chance of receiveing inheritance [0,1]	0.3268	0.3863
Conditional on having at least a grandchild			
Care to grandchildren	dummy (=1) if informal care is provided to grandchildren	0.5926	0.4914
Hcare to grandchildren	Logaritm of hours of care provided to grandchildren	1.5183	1.6762
Number of grandchildren	Number of grandchildren	2.2980	2.4970
Granchildren age	Mean age of youngest grandchidren. This is a proxy since only data about the youngest child of a child is available. The question is asked only for four children.	6.2847	4.8462
Grandchildren distance	Index of geographical distance from the closest grandchildren	4.5873	2.5993
Ratio male children	Ratio of male children	0.4966	0.3342
Conditional on having at least an adult child			
Not coresiding	Not coresiding in the same household	0.8793	0.3258
Care to adult children	dummy (=1) if informal care is provided to adult children	0.1361	0.3429
Hcare to adult children	Logaritm of hours of care provided to adult children	0.4828	1.8209
Number of adult children	Number of children aged over 18 years old	1.3130	1.1325
Number of minor children	Number of minor children	0.0902	0.3591
Employed children	Ratio of children who are employed. This is a proxy variables because the question is asked only to a maximum of 4 children.	0.7357	0.3527
Children distance	Index of geographical distance from children	3.2434	2.4101

3 Estimating the Intertemporal Elasticity of Substitution on error-ridden micro data[1]

3.1 Introduction

The Intertemporal Elasticity of Substitution (IES) is a preference parameter that is of interest to macroeconomists and policy makers, as it represents the willingness of consumers to respond to predictable changes in the real interest rate. Estimates of the IES on aggregate data are typically low and often imprecise (see Hall (1988), for one of the main examples on this); micro-based estimates are instead higher, typically in the .6-.8 range. In most cases, the literature uses US or UK data. In this chapter, I estimate the IES from the Euler equation for non-durable consumption using Italian microdata. The consumption data are based on recall questions and are drawn from the Survey on Household Income and Wealth (SHIW) from 1991 to 2012. I present estimates from both the log-linearized version of the Euler equation and the non-linear version, taking into account the presence of measurement error. In particular, I apply two GMM estimators proposed by Alan et al. (2009) which assume the presence of classical measurement error in the logarithm of consumption: the first estimator is more efficient if the assumption that the measurement error is log-normally distributed holds, the second is more robust but less efficient because no assumption on the error term is made. Given that a descriptive investigation of the data reveals that recall consumption data from SHIW are severely affected by heaping and rounding, I argue that measurement error is likely to be non-classical and apply an imputation technique proposed by Heitjan and Rubin (1990), following Battistin et al. (2003), to model the coarsening process and to impute true consumption expenditures. I further propose a more flexible technique and an extension to take into account panel information about the coarsening process, assuming that individuals are more likely to keep coarsening at the same multiples of consumption. I find strong evidence that the measurement error cannot be considered coarsened at random and depends on

[1]The chapter is based on a joint work with Guglielmo Weber (University of Padova).

the true, unobserved consumption. When estimating the non-linear Euler equation with reported consumption data, the standard GMM estimator (that ignores measurement error) and the first estimator proposed by Alan et al. (2009) that assumes log-normal classical measurement error produce implausible estimates of the IES (sometimes these estimates are even negative – but most often they are significantly larger than one). More importantly, the overidentifying restrictions test typically rejects the null. When I instead use multiple imputations of non-durable consumption and apply the first Alan et al. (2009) estimator I find precise estimates in line with the recent micro-based literature (in the 0.5-0.8 range), and the overidentifying restrictions are not rejected at least if I focus on a sample of couples. The second estimator proposed by Alan et al. (2009) should be robust to distributional assumptions of the (classical) measurement error process. However, by taking one more first difference, it forces the econometrician either to cut the sample size, or to reduce the instruments set. I chose to cut the instrument set and keep the same sample size, but this comes at the cost of running out of overidentifying restrictions. Parameter estimates using this method turn out to be similar to the ones based on the previous method, but less precise and do not change change much when I use reported or imputed consumption. A final remark is in order: the log linear approximation of the Euler equation produces estimates of the IES that are quite close to those obtained by the second, robust GMM method proposed by Alan et al. (2009), in line with what the Authors report for their US data, and this holds (pairwise) for both reported and imputed consumption.

The remainder of the chapter is structured as follows. Section 2 presents the Euler equation and the estimators used in the empirical analysis. Section 3 presents the data and a descriptive overview of heaping and rounding in the recall consumption data from SHIW. Section 4 presents the multiple imputation technique applied to the data to deal with the problem of heaping and rounding. Then, in Section 5 I present estimation of the IES and in Section 6 I report some robustness checks using different measures of consumption and a simple matching technique from diary consumption data. Section 7 concludes with a short discussion.

3.2 Euler Equation

As stressed in Attanasio and Weber (2010), in a life cycle model under uncertainty household consumption is a complicated function of income, wealth, demographics, and their stochastic properties. However some preference parameters can be identified by estimating the first order conditions of the intertemporal optimization problem.

I consider a standard life cycle model where the individual consumes a single good, has time-separable preferences, and holds long and possibly short positions on a single asset. The first order condition from this problem is

$$U^{'}\left(C_t\right) = \beta E_t\left[\left(1+R_{t+1}\right)U^{'}\left(C_{t+1}\right)\right] \tag{3.1}$$

where C_t is consumption at time t, $U^{'}\left(C_t\right)$ is the marginal utility of consumption, β is the discount factor, R_{t+1} is the real interest rate. The functional form is:

$$U\left(C_t\right) = \frac{C_t^{1-\gamma}}{1-\gamma} \tag{3.2}$$

where γ is the relative risk aversion, $\frac{1}{\gamma}$ is the Inter-temporal Elasticity of Substitution (IES) and $\frac{\gamma+1}{2}$ is the coefficient of relative prudence.

If we substitute (2) in (1), we can rewrite the equation such that we get the following Euler equation:

$$E_t\left[\left(\frac{C_{t+1}}{C_t}\right)^{-\gamma}\left(1+R_{t+1}\right)\beta\right] = 1 \tag{3.3}$$

where the innovation in marginal discount utility is such that $E_t\left[\epsilon_{t+1}\right] = 1$:

$$\left(\frac{C_{t+1}}{C_t}\right)^{-\gamma}\left(1+R_{t+1}\right)\beta = \epsilon_{t+1} \tag{3.4}$$

An equation similar to (3) was first tested by Hall (1978) and can be used to estimate β and γ using a nonlinear GMM method (EGMM). Hansen and Singleton (1982) proposed a log-linearized version of the Euler equation to avoid the difficulties of non linearity from the previous equation. They consider:

$$\Delta\ln C_{t+1} = \alpha_{t+1} + \frac{1}{\gamma}\ln\left(1+R_{t+1}\right) + e_{t+1} \tag{3.5}$$

where $\Delta\ln C_{t+1}$ is the difference between $\ln C_{t+1}$ and $\ln C_t$, and α_{t+1} depends on the two preference parameters β and γ and on the conditional second moment of expected utility in equation (3). While the log linearized equation (AGMM) is supposed to be more robust to classical measurement error, it does not identify β and the time variability in α_{t+1} may cause difficulties in finding valid instruments. Starting from the standard GMM estimator and assuming a classical measurement error in $\ln C_{t+1}$ and $\ln C_t$, Alan et al. (2009) propose two GMM estimators to deal with this problem. They consider that reported consumption is multiplied by a measurement error which is assumed stationary and independent of "everything" ($c_t^o = c_t^* \eta_t$):

$$\left(\frac{c_{t+1}^o}{c_t^o}\right)^{-\gamma}(1+r_{t+1})\,\beta = \epsilon_{t+1}\left(\frac{\eta_{t+1}}{\eta_t}\right)^{-\gamma} \tag{3.6}$$

The assumption of stationary independence gives the following result:

$$E_t\left[\epsilon_{t+1}\left(\frac{\eta_{t+1}}{\eta_t}\right)^{-\gamma}\right] = E_t\left(\epsilon_{t+1}\right)E_t\left[\left(\frac{\eta_{t+1}}{\eta_t}\right)^{-\gamma}\right] \tag{3.7}$$

$$= 1\cdot E_t\left[\left(\frac{\eta_{t+1}}{\eta_t}\right)^{-\gamma}\right] = \kappa \tag{3.8}$$

If reported consumption data is affected by classical measurement error, standard non-linear GMM estimation (4) would yield inconsistent estimates Amemiya (1985). If the measurement error is constant $\eta_t = \eta$ then $\kappa = 1$.

For their first estimator Alan et al. (2009) assume that the measurement error is log-normal $log\eta_t \sim N(\mu, \nu)$:

$$\kappa = E\left[\left(\frac{\eta_{t+1}}{\eta_t}\right)^{-\gamma}\right] = exp\left\{\gamma^2\nu\right\} \tag{3.9}$$

and they derive the first GMM estimator (GMM-K) where:

$$u_{t+1}^1 = \left(\frac{c_{t+1}^o}{c_t^o}\right)^{-\gamma}(1+r_{t+1})\,\beta - \kappa \tag{3.10}$$

$$u^1_{t+2} = \left(\frac{c^o_{t+2}}{c^o_t}\right)^{-\gamma} (1 + r_{t+1}) (1 + r_{t+2}) \beta^2 - \kappa \tag{3.11}$$

To identify the three parameters of the model β, γ, ν, a constant and a single instrument (a suitably lagged value of the interest rate) is enough to deliver four orthogonality conditions (thus generating one overidentified restriction). If $\kappa = 1$ the assumption of log-normal distribution is not likely to hold and the estimator is inefficient and can be consistently estimated using the EGMM estimator.

The second estimator (GMM-D) is obtained differencing equations (10) and (11):

$$\zeta_{t+2} = \left[\left(\frac{c^o_{t+1}}{c^o_t}\right)^{-\gamma} (1 + r_{t+1}) \beta\right] - \left[\left(\frac{c^o_{t+2}}{c^o_t}\right)^{-\gamma} (1 + r_{t+1}) (1 + r_{t+2}) \beta^2\right] \tag{3.12}$$

where $E_t [\zeta_{t+2}] = 0$ and ζ_{t+2} is uncorrelated with consumption information at time $t - 1$ and other information dated t. The GMM-D estimator does not make any assumption on the error distribution and is more robust even if less efficient. It is just identified unless lags are used as instruments.

However when consumption data are affected by non classical measurement error, and in particular they are affected by heaping and rounding, η_t is not independent of reported consumption. The previous estimators will not provide consistent estimates of the IES and the discount factor. In section 4 I will suggest a technique to treat heaped and rounded data.

3.3 Data

The data is drawn from the Survey on Household Income and Wealth (SHIW) run by the Bank of Italy. SHIW is an Italian survey of a representative sample of the Italian population which contains detailed information about income and work activities, real and financial wealth and household characteristics. Since 1987 SHIW has added a longitudinal sample whose size increased over time. It contains also a few questions about expenditure of food, non-durable goods and services and durable goods. The survey is run every two years, with the only exception after 1995, when the subsequent wave was run in 1998. The questions related to expenditures on food and non-durable goods and services are retrospective: there are mainly two single questions about food and non-durable consumption in a typical month of the previous year. This kind of questions is typically characterized by recall errors. I consider only waves when food and non durable consumption are elicited with a similar question to avoid reporting differences due to question wording differences. Non-durable consumption is considered from 1991 to 2012 (11 waves)[2] and food consumption is considered from 1991 to 2010[3].

Then, I consider the corresponding information about consumption collected by the Italian Institute for Statistics (ISTAT): the Survey of Family Budgets (SFB). SFB is diary-survey that collects detailed information on expenditure. In particular I would like to compare information on food and non-durable consumption between SFB and SHIW and analyze the differences in the amount of reported consumption between the two data sources. Before comparing consumption data, it is necessary to make the two surveys comparable and I follow the procedure in Battistin et al. (2003). While the two surveys are both random samples of the Italian population, there are differences in sampling techniques and response rates. The differences are taken into account computing weights for SFB survey using a propensity score technique Rosenbaum and Rubin (1983) with a set of common variables between the two datasets[4].

Tables 3.1 and 3.2 report a descriptive overview of the main variables used in the analysis for the different waves of SFB and SHIW. They include family characteristics like the region of residence, the number of adults and children by age class, homeownership and household head characteristics like age, gender, employment status and education. The averages show that there are small differences across the SFB and SHIW surveys: SHIW seems to oversample older and larger families. The weighting procedure for the SFB data on consumption should make the amounts comparable. If we graphically analyze the distribution of the reported consumption data (Figure 3.1 and 3.2) it is possible to note that there are peaks at round values in SHIW non durable consumption data, suggesting that the respondents are likely to round off the true consumption at specific values and heaping seems to increase with the amount of reported consumption[5]. Instead for consumption

[2]In 1987 and 1989 waves the yearly non durable consumption is computed as the sum between the annualized food consumption in a typical month and the yearly expenditure without food consumption. In 2012 the question is asked only for a subsample of household heads born in odd years, while the remaining household heads are asked a set of questions for different type of expenditures.

[3]Food expenditure was not asked in 1987. In 1991 and 1993 the question does not explicitly ask to report for food outside home, but from a comparison between SHIW and SFB, individuals seems to include it on their consumption expenditure. While in 2012 the expenditure for food outside the household is asked separately, so it is not considered in the analysis.

[4]Propensity scores for waves from 1987 to 2012 are reported in Table D.1 in the Appendix.

[5]The same rounding on the distribution can be found on food consumption data. See Figure A.1 in Appendix.

data collected using diary survey, the distribution of consumption is smooth and it is less affected by the problem of heaping and rounding. If we assume that true consumption is well represented by diary data collected in SFB, the recall data collected in SHIW appears severely affected by heaping and rounding and this error is likely to be non classical. The rounding problem is evident both with amounts reported in Italian Liras (before 2002) and in Euros (after 2002). Since we are considering the rounding mechanism, I assume that there is rounding also in the exchange rate to make the amounts comparable before and after Euro adoption. Indeed also looking at the data it seems that individuals consider a rounded exchange rate of 1 Euro = 2,000 Italian Liras[6]. Figure 3.3 reports the proportions of amounts of non-durable consumption rounded at different multiples before and after the Euro adoption. The multiples are 100, 500 and 1,000 thousand of Italian Liras before 2002 and 50, 100 and 500 Euro after 2002. Basically I consider four categories for the rounding process from those values of consumption which are not considered as rounded to those which are more likely to be affected by severe rounding mechanism. The figures show that over time households are more likely to round amounts at bigger multiples and that the proportion of recall consumption expenditure which is not affected by a rounding problem[7] falls from around 10% to around 2%. Figures seem also to suggest that with the Euro adoption, the rounding could have become more severe: while the proportion of reported amounts at multiples of 1,000 thousand of Italian Liras and 500 Euro stays almost the same in the period from 2000 to 2012, households are less likely to report amounts at 100 thousand of Italian Liras or 50 Euro, but they prefer to round at multiples of 100 Euro.

The same feature is observed for food consumption data (Figure 3.4), even if the coarsening process is less severe than the rounding for non durable consumption because of the lower expenditure in food. The possible correlation between the size of the rounding mechanism and the value of reported amount of consumption supports the idea that the measurement error is non-classical and it should be treated if we want to consistently estimate the Euler equation.

3.4 Multiple imputation technique for heaped and rounded data

Heitjan and Rubin (1990) propose a multiple imputation procedure to make inference when data is affected by heaping and rounding. The method has been

[6] The nominal exchange rate is 1 Euro = 1.936,27 Italian Liras.
[7] The rounding is at multiples of less than 100,000 Italian Liras (50 Euro).

previously applied to SHIW consumption data of the 1995 wave by Battistin et al. (2003). The idea is that the rounding process is not random and it depends on the unknown true value of a given variable. If it was random, the measurement error could be classical and the GMM estimators proposed by Alan et al. (2009) would be appropriate. In the previous section I showed that recall consumption data is affected by heaping and rounding on certain multiples of Lira, before 2002, and on certain multiples of Euro, after 2002. Basically we observe w, the logarithm of the heaped value of consumption, while the true value $w^* \sim f(w^*, \theta)$ is unobserved where θ is an unknown parameter. I depart from Battistin et al. (2003) and consider a more general and flexible procedure to apply the same method on all the consumption data from different years and with different currency.

I assume that the coarseness of W can be summarized by a continuous random variable G^*. The conditional distribution of W given W^* and G^* is degenerate:

$$f(w|w^*, g^*, z) = \begin{cases} 1 & if\ w = w(w^*, g^*) \\ 0 & if\ w \neq w(w^*, g^*) \end{cases} \tag{3.13}$$

where Z is an exogenous set of observables, mainly household characteristics. Battistin et al. (2003) consider only three types of rounding where the true value of consumption lies on a fixed central interval with respect to the reported amount. I prefer to relax this assumption and instead of modeling more rounding mechanisms, I adapt the size of the interval where the true amount of consumption is. Basically I consider three multiples where the bigger multiple is linked to a more severe rounding. I define R^L and R^E two sets of round-off at different multiples depending on the currency: the first is 100, 500, 1000 thousand Italian Liras for the period before 2002, the second is 50, 100 and 500 Euro for the period after 2002. The maximum difference between reported and true consumption is assumed to be proportional to the true unknown consumption data. For each currency, the multiples are respectively R_1, R_2, R_3 and they are such that:

$$exp(w) \in R_1 \Rightarrow |exp(w^*) - exp(w)| \leq 0.10 \cdot exp(w^*) \tag{3.14}$$
$$exp(w) \in R_2 \Rightarrow |exp(w^*) - exp(w)| \leq 0.15 \cdot exp(w^*) \tag{3.15}$$
$$exp(w) \in R_3 \Rightarrow |exp(w^*) - exp(w)| \leq 0.20 \cdot exp(w^*) \tag{3.16}$$

where the heaped value of consumption is within an interval of the true value of consumption which becomes wider at higher values of true consumption and when preferences for rounding are for bigger multiples. Hence, if two individuals have the same preferences to report amount at a specific multiple, the heaping and rounding correction will be lower (higher) for lower (higher) amounts of consumption. For instance with this flexible procedure it is possible to correct heaping and rounding also when the household head thought about consumption in weekly terms and reported monthly consumption by multiplying by four without modeling a specific rounding mechanism[8].

Then, I define $H(w)$ as the inverse image of w, such that the set of couples (W^*, G^*) are consistent with the value w. G^* is not directly observed but it can be inferred by the coarsened value w. The posterior distribution of θ is

$$f(\theta|w,z) = \int f(\theta|w^*,z)\, f(w^*|w,z)\, dw \tag{3.17}$$

The imputation scheme needs $f(w^*|w,z)$ to be implemented or alternatively the joint posterior distribution (g^*, w^*): $f(g^*, w^*|w,z)$, which is used to take draws of w^*.

The joint posterior distribution can be written as:

$$f(g^*, w^*|w, z, \psi, \xi) \propto f(w^*|z, \psi)\, f(g^*|w^*, z, \xi)\, f(w|g^*, w, z, \xi) \tag{3.18}$$

where $\psi : f(w^*, z|\psi)$ and $\xi : f(g^*, w|w^*, z, \xi)$. Since the values of true consumption w_i^* and heaping type g_i^* determine together the observed heaped amount of consumption w, I have that:

$$f(w|g^*, w^*, z, \xi) = \prod_{i=1}^{n} \delta(g_i^*, w_i^*, w_i) \tag{3.19}$$

where

$$\delta(g_i^*, w_i^*, w_i) = \begin{cases} 1 & if \;\; (g_i^*, w_i^*) \in H(w_i) \\ 0 & otherwise \end{cases} \tag{3.20}$$

[8]See for instance peaks at 800 and 1,200 Euro or thousands of Italian Lira on SHIW reported consumption in the first column of Figure 3.1 and 3.2.

Consequently, the distributions that need specification to multiply impute true consumption w^* are first $f\left(w^*|z,\psi\right)$ and $f\left(g^*|w^*,z,\xi\right)$, and second the prior distribution for ψ and ξ.

Rubin (1987) defines three tasks to create multiple imputations: the modeling task, which specifies a model to predict missing values, the estimation task, which defines the posterior distribution, and the imputation task, which draws missing values given estimated parameters and observed values.

MODELING TASK

In rounded-data problems, g is known or observed, and $f\left(g^*|w^*,z,\xi\right)$ is implicitly considered to be free of w^* with ξ a priori independent of ψ. When there is uncertainty about g^*, the situation is more realistic as argued by Heitjan and Rubin (1990). The model used to predict true consumption is the class of normal linear regression models:

$$w_i^*|z_i,\psi \sim N\left(\beta_0+\beta_1 z_i,\sigma^2\right) \tag{3.21}$$

where the independence across units given parameters is assumed. The model for the heaping type is considered independent of the covariates z, too, and I assume that it is a function of the true consumption:

$$g_i^*|w_i^*,z_i,\xi \sim N\left(\eta_0+\eta_1 w_i^*,\tau^2\right) \tag{3.22}$$

where $\xi=\left(\eta_0,\eta_1,log\left(\tau\right)\right)$. In my case the model for the heaping type is an ordered three-category probit regression on true consumption.

The resulting model specification given observed z and unknown model parameters $\Phi\left(\beta_0,\beta_1,log\left(\sigma\right),\eta_0,\eta_1 log\left(\tau\right)\right)$ is a bivariate normal distribution for the unobserved $\left(g_i^*,w_i^*\right)$:

$$\left(\begin{array}{c} g_i^* \\ w_i^* \end{array}|\Phi\right) \sim N\left(\left[\begin{array}{c} \eta_0+\eta_1\beta_0+\eta_1\beta_1 z_i \\ \beta_0+\beta_1 z_i \end{array}\right],\left[\begin{array}{cc} \tau^2+\eta_1^2\sigma^2 & \eta_1\sigma^2 \\ \eta_1\sigma^2 & \sigma^2 \end{array}\right]\right) \tag{3.23}$$

ESTIMATION TASK

The bivariate normal distribution $f(g_i^*, w_i^*|\Phi)$ is unobserved. To impute the true value of consumption and the heaping preferences, it is necessary first to estimate the parameters Φ. The posterior distribution is:

$$f(\Phi|w,z) \propto \prod_{i=1}^{n} \int_{H(w_i)} f(g_i^*, w_i^*|\Phi)\, dg_i^* dw_i^* \tag{3.24}$$

The posterior distribution is approximated using standard large-sample normal approximation with mean equal to the posterior mode $\hat{\Phi}$ and variance-covariance equal to the negative inverse of the second derivative of the log posterior. Basically, in the estimation task, $\hat{\Phi}$ is obtained from the maximization of the log-likelihood of a bivariate normal distribution where the logarithm of reported consumption value is regressed on household characteristics and the observed heaping preferences are regressed on the estimated true log consumption and on a set of instruments which are supposed to affect the heaping type and not the value of consumption. Results of these estimation procedures are reported in Table 3.6 for waves from 1993 to 2012[9]. In all waves it is possible to observe that the rounding process is not random and is more relevant for high values of consumption.

In the equation for the heaping type a set of instruments are added to avoid identification by functional form Rubin (1987). The instruments for the heaping type are the payment methods used by the respondents and information provided by the interviewer like the duration of the interview and the respondent's understanding of the questions. It is remarkable that in 2002 and 2004[10] household heads who had a better ability to report amounts in Euros have a higher propensity to round at bigger multiples. This confirms the results from the graphical analysis of the coarsening process which showed that over time rounding became more widespread.

IMPUTATION TASK

The imputation task is the final step to jointly multiple impute the true value of consumption and the heaping preferences. Given both a drawn value of Φ from the estimation task and the fixed observed (w, z), (g_i^*, w_i^*) are independent confined bivariate normals. I draw (g_i^*, w_i^*) from the bivariate normal distribution (24) and if $\delta(g_i^*, w_i^*, w_i) = 1$ I consider w_i^* as a good imputed value for w_i, otherwise another set of (g_i^*, w_i^*) is drawn until it satisfies the constraint defined in (14) -

[9] The table reports only $\hat{\Phi}$ for non durable consumption with the panel imputation technique. The cross section estimations do not differ much and they are reported in Table B.1 of Appendix section, as estimations for food consumption which are reported in Table A.1 and A.2 respectively for the panel and cross section method.

[10] In the following waves the interviewer was not asked anymore about the ability of the respondent to report amounts in Euros.

(16).[11]The imputation task is repeated $m = 100$ times, so we will have 100 sets of true consumption values and heaping preferences for each wave.

3.4.1 Recursive multiple imputation technique

In the existing literature on heaping and rounding, only a cross section dataset was considered. In this case we are interested in the consumption of panel households. Therefore I use the additional information from the previous interview to predict the heaping type during the current interview. I consider that a household head has preferences about the type of coarsening and is more likely to round at the same multiples across different waves. In particular I consider the imputed type of heaping in the previous wave:

$$g^*_{i,t-1} = \begin{cases} g^{IMP}_{i,t-1} & if\ t \geq t_0 + 1 \\ 0 & if\ t = t_0 \end{cases} \tag{3.25}$$

where g^{IMP} is the true imputed rounding, t stays for the current wave and t_0 is the first wave when the household participated at the survey. Then, I consider a different version of equation (22) such that:

$$g^*_{i,t}|w^*_{i,t}, z_{i,t}, \xi_t, g^*_{t-1} \sim N\left(\eta_{0,t} + \eta_{1,t}w^*_{i,t} + \rho_t g^*_{t-1}, \tau^2_t\right) \tag{3.26}$$

The coarsening process depends on the current level of consumption and on the previous type of coarsening. The coarsening process in the previous wave can be of four different types: no coarsening, coarsening at multiples of 50, coarsening at multiples of 100, and coarsening at multiples of 500 Euro[12]. According to this assumption, the bivariate normal distribution (23) will change as well.

[11]The process is repeated maximum 1,000 times. In most cases less than 0.5% of the imputed values do not satisfy the constraint. The flexible intervals make the imputation task only slightly faster. In the degenerate case where the intervals are unconstrained, the first draw is a good imputed value, and the imputation task would give values of consumption as if consumption was missing.

[12]Before 2002, the multiples are respectively of 100, 500, 1000 thousand of Italian Liras. In 2002 the change of the currency affects also the preferences of rounding at a specific multiple. I decide to consider also in this case the previous imputed type of heaping, because the coarsening is comparable for amount of 50 and 500 Euro with a rounded exchange rate of 1 Euro equals to 2,000 Italian Liras. Instead the rounding at 500,000 Italian Liras (which corresponds to 250 Euro) is not that common after the Euro adoption and household heads seem to prefer rounding at multiples of 100 Euro.

In Table 3.6 I show that the imputed type of heaping at the previous wave is useful to predict the type of rounding at the current wave[13]. In particular a preference of rounding at bigger multiples is related to a higher propensity to round at the bigger multiples also in the current wave. This supports the idea that individuals are more likely to round at same multiples. This is important especially when the amount of consumption is stable across time.

3.4.2 Analysis of imputations

To validate the imputed values of consumption, I provide a graphical and descriptive overview of the multiple imputations and a comparison with the recall data from SHIW and diary data from SFB. In the third column of Figure 3.1 and 3.2, I report the average of the distributions from 100 implicates of the recursively imputed non durable consumption for each wave. The multiple imputation technique is particularly effective to treat the problem of heaping and rounding, even if the distribution is not as smooth as the one using SFB data. In particular if we analyze the cumulative distribution functions of the reported non durable consumption from SHIW and the imputed one (Figure 3.3), it is possible to note that the procedure solves the problems of heaping in the distribution.

As it was previously found by Battistin et al. (2003) using 1995 data from SHIW and SFB, there is under reporting for non durable consumption in SHIW. The under reporting is a common problem for all the SHIW waves that I consider, both for food[14] and non durable consumption (see Table 3.4 and 5), even if for food consumption the under reporting is much lower.

Using a more flexible procedure in the imputation technique, I am able to partly reduce the under reporting problem, without using any information from SFB dataset. In Section 6 I am going to use a simple matching technique, as robustness check, to multiply impute non durable consumption from SFB to SHIW dataset with a set of common variables. The simple matched non durable consumption is not affected by the problem of heaping and rounding and also of under-reporting, but with this procedure the differences in consumption between waves are mainly related to changes in household characteristics.

[13] The heaping type is not significant in the 1993 wave. However this can be explained by the small size of the panel sample in the older waves.

[14] Only in 1995 SHIW and SFB distributions for food consumption are very similar.

3.5 Estimation of IES

For the empirical estimation of the IES and the discount factor I consider four different estimators: the log-linear Euler equation estimator (AGMM), the non-linear GMM estimator (EGMM) and the two GMM estimators proposed by Alan et al. (2009) which take into account the classical measurement error assuming that it has a log-normal distribution (GMM-K) or without assuming any distribution (GMM-D). These estimators are applied to different non-durable consumption data: the reported value of consumption from SHIW, the multiple imputations of the true non-durable consumption obtained using both the panel and cross section methods. The main sample consists of 7,069 households that are observed at least for three consecutive waves and at most 11 waves with household heads aged 25 to 80 (20,995 observations).

Before applying the various estimators it is necessary to adjust them to consider that the period between each wave is of two years with the exception between 1995 and 1998 when the elapsed period is three years. So we change equation (3) to the following one:

$$E_t\left[\left(\frac{C_{t+\pi}}{C_t}\right)^{-\gamma}(1+R_{t+1})(1+R_{t+2})(1+R_{t+3})^{d_{1995,t}}\,\beta^{(2+d_{1995,t})}\exp\left(\triangle\mathbf{x}'_{t+\pi}\theta\right)\right]=1 \tag{3.27}$$

where π is the years passed from a wave to the previous one and $d_{1995,t}$ is a dummy variable which is equal to one when time t is 1995, x is a set of demographic variables and θ a vector of additional parameters to estimate. The demographic variables are useful to capture the differences in the marginal utility of consumption, and they are the number of adults, the number of children and the number of earners inside the household. According to this definition of the Euler equation, the log-linear version and the GMM estimators proposed by Alan et al. (2009) can be straightforwardly derived. I also assume that the households face a common real interest rate series based on the Italian 1-year Treasury bill rates (BOT) net of inflation[15].

Estimations of the Euler equations are reported in Table 3.6 for three measures of consumption (reported, panel and cross imputed non durable consumption) and the four estimators. In the columns I report the IES,$1/\gamma$, the discount factor, β, and the parameters for the demographic changes between waves which are all considered endogenous. As instruments I consider a convenient lagged measure for

[15]The series of the real interest rate is yearly aggregated following Hall (1988).

the real interest rate and the number of adults, children and earners at previous waves. The number of the observations is lower only for the log-linear estimator (14,233) because it requires more lagged instruments.

Results show that when the heaped and rounded non-durable consumption is used the estimated IES is greater than 1 for the nonlinear GMM estimator and GMM-K. Instead the log-linear and the robust estimator proposed by Alan et al. (2009) (GMM-D) give an estimation of the IES between 0.7 and 0.8. However the over-identifying restrictions[16] are strongly rejected[17]. When the panel imputed data from consumption are used, I estimate the Euler equations for each single implicate independently[18] and combine estimates adjusting the standard errors according to Rubin (1987). The estimated IES is in the 0.7-0.9 range, but the estimates are slightly more imprecise because of the variability of the multiple imputations. Also in these cases the tests of over-identifying restrictions are highly rejected but the size of the rejection is much lower. The use of panel or cross imputed non durable consumption provides similar results. At the same time the recursive imputation technique helps to improve the estimation of the rounding preference especially for long-panel households.

The rejection of the over-identifying restrictions can be motivated by problems with the choice of the instruments and their weakness, or by the failure of the assumption that the Euler equations hold every period for some households. I test both cases: first considering only a subsample of couples who should be less likely to be liquidity constrained and then considering the Euler equation without the number of earners as an endogenous demographic variable.

In Table 3.7 estimations only for couple households are replicated. When the reported consumption data are used results are similar. Instead multiple imputations of non-durable consumption provide estimates of the IES in the 0.55-0.72 range for the different estimators and in particular the test of over-identifying restrictions for the GMM-K is not rejected. These results suggest that for households with single members the Euler equation does not hold across time. But the implausible

[16]The reported test is a geometric average of all the computed tests. For AGMM and EGMM estimators the test has three degrees of freedom, while for GMM-K they are only two.

[17]Except for the GMM-D estimator because it is just identified. To test over-identifying restrictions also for the GMM-D it is necessary to use more lagged instruments at the cost of losing observations. I prefer to keep the nonlinear GMM estimators comparable applying the estimation to the same sample.

[18]I exclude estimations of the Euler equations when the estimation did not converge or produced an implausible estimate. An implausible estimate is defined as the case when the ratio between the maximum and minimum eigenvalue is over 200,000. This is a high value chosen to prevent the selection of only the best results because of the variability in the multiple imputation technique or by the weakness of the instruments. The maximum number of considered estimations is 100 and it is reported in column m.

estimates of the IES are mainly caused by the non classical measurement error. When the multiple imputation technique is applied, the measures of non-durable consumption are "cleaned" from the heaping and rounding but they are still affected by classical measurement error, so the GMM-K estimator is appropriate to efficiently estimate the IES. At the same time AGMM and GMM-D estimators are robust and provide plausible estimates of the IES also when the reported consumption data are considered.

In addition to the IES, I show estimates of the discount factors and other demographic parameters. When the GMM-K and GMM-D estimators are used the estimated discount rate lies in the 0.025-0.026 range and it is precisely estimated for different measures of consumption, while EGMM provides more imprecise estimates with higher values of discount rate: more than 4% using the reported expenditures, or more than 9% when using the multiple imputations. The number of adults, children and earners are positively associated with consumption growth, with imprecise estimates when GMM-D is used.

Finally I report estimates where the number of earners is excluded from the set of endogenous variables (see Table 3.8). The exclusion does not seem to affect estimations.

3.6 Robustness checks

In this section I estimate the Euler equations using the previous four estimators and alternative measures of the consumption data: food consumption and another definition of non-durable consumption which includes rents and non-monetary transfers. Then I consider another technique to multiply impute non-durable consumption and solve the problem of under-reporting. The method is based on a simple matching technique from the SFB data.

Food consumption is often considered as a proxy for total non-durable consumption. The necessary assumption to use food instead of non-durable consumption to estimate the IES is that the utility from food and other consumption goods is separable. We make this assumption too. As I showed in Section 3 also food consumption data from SHIW are affected by heaping and rounding, hence also in this case the multiple imputation technique should be applied. I estimate the Euler equation using the reported food consumption and multiple panel imputed data (see Table 3.9). Results show that the EGMM and GMM-K estimators do not provide reliable estimates of the IES which takes even negative values, also when the panel imputed food expenditures are used or when only couple households are analyzed. While the GMM-D estimator is more robust, the estimated IES has a value slightly greater than 1. Instead the discount factor is well estimated in all three estimators, but less precisely for EGMM. The poor estimation of the IES using food consumption is not a new result: Attanasio and Weber (1995) find it using US data from the Consumer Expenditure (CEX) survey. In particular they show that food is a necessity and preferences are non-separable between food and other non-durable consumption.

Attanasio and Weber (1995) include also a definition of non-durable consumption. The various components they have considered are: food at home and away from home, and other non-durable goods and services excluding housing, health and education expenditure. In SHIW dataset non-durable consumption is asked in a single question and it explicitly asks to excludes durables and rents. If we define a different measure of non-durable consumption such that we include also rents and non-monetary transfers, we add to the heaped and rounded data other expenditures[19]. The Euler equations are estimated using reported amounts and the four GMM estimators. Results are reported in Table 3.10 and they show that the problem of heaping and rounding is less important for estimating the IES. The size of the over-identifying restrictions test is smaller with respect to the same estimations on non-durable consumption without rents and non monetary transfers. The difference with respect to the previous results can be explained by the role of rents and house prices or also by the reduction of the size of non-classical measurement errors because of the sum of several variables.

All the previous measures of consumption do not consider the problem of under reporting of SHIW consumption data with respect to the SFB data. I consider another measure of consumption based on multiple imputations of true consumption using a simple matching technique from SFB data. The method consists of modeling non-durable consumption over several covariates on SFB data (validated data) and the estimates are used to multiply impute true non-durable consumption in SHIW (unvalidated data). This procedure has been applied in Battistin et al. (2003) and it is related to previous techniques (i.e. Lee and Sepanski (1995); Brownstone and Valletta (1996)) that use validated data to obtain a reliable estimate of the unvalidated data or its measurement error. Basically the procedure considers jointly the data from SFB and SHIW and a common set of covariates. Then, the common set of variables are regressed on the consumption expenditure from SFB (see Table C.1) and some predictions are made on the consumption data from SHIW. After that a set of 100 imputed values are generated starting from the predictions made with the simple matching technique.

Estimations of the Euler equations are reported in Table 3.11 also for the subsample

[19] These expenditures could be also affected by problems of heaping and rounding, but we assume they do not.

of couples: the estimated IES for AGMM and GMM-D are over 1, and the GMM-K does not perform well mainly because the assumption of log-normal distribution of the classical measurement error does not hold; instead the standard non-linear GMM estimator (EGMM) gives an estimated IES in the 0.5-0.6 range without a rejection of the over-identifying restrictions, but the estimated discount factor is under estimated.

This method allows to solve the problem of under reporting in SHIW consumption data and is not affected by heaping and rounding, but it does not use any information from the reported amount of consumption. Hence, the change between waves of the non-durable consumption is mainly driven by changes in individual and household characteristics.

3.7 Conclusions

In this chapter I have estimated the Intertemporal Elasticity of Substitution (IES) using Italian microdata. Consumption data from SHIW are severely heaped and rounded at specific multiples of thousand of Italian Liras before 2002 or Euros after 2002. I show that coarsening mechanism is positively correlated with the true unobserved non-durable consumption and that coarsening increased after Euro adoption. Estimating the Euler equation with nonlinear GMM model provides inconsistent estimates when the consumption data are affected by non-classical measurement error Amemiya (1985).

I have presented a multiple imputation technique to model and treat the problem of heaping and rounding. Then I have extended the technique to keep into account the panel feature of the data, suggesting a recursive technique where the imputed rounding at the previous wave is used to improve prediction of the current type of rounding.

To estimate the IES I consider the log-linearized version of the Euler equation, the standard nonlinear version and two GMM estimators proposed by Alan et al. (2009) that consider only a classical measurement error. When recall consumption data are used, the nonlinear GMM estimator and the efficient estimator of Alan et al. (2009) (GMM-K) which assumes log-normal distribution of the classical measurement error produce implausible estimates that are related to the size of the measurement error and lead to rejection of the over-identifying restrictions. When the heaping and rounding in the consumption data are treated, the multiple imputation produce estimates in the 0.5-0.8 range and the over-identifying restrictions are not rejected at least for the GMM-K estimator and when I focus on a sample of couples. Instead the AGMM and the robust estimator of Alan et al. (2009) (GMM-D) which does not make any assumption on distribution of the measurement error are more robust but less efficient. Remarkably, estimates do not change much when the reported and multiple imputations are used.

I suggest that it is important to treat the non-classical measurement error with a multiple imputation method. The method is flexible and it is not necessary to model explicitly all the possible rounding preferences. Then, results show that the imputed true expenditures are still affected by classical measurement error that is likely to have a log-normal distribution, so the first estimator proposed by Alan et al. (2009) jointly with the imputation technique is the best method to estimate consistently the IES. This method provides also plausible estimates of the discount rate in the 0.025-0.026 range. For the estimation of the IES considering the recursive method does not seem to improve results, but this could be effective especially for long panel data, and especially in the last waves of SHIW because the panel sample is greater.

A limitation of the multiple imputation procedure is that the “cleaning” of the data from heaping and rounding depends on the importance of rounding in the data. From SHIW consumption it can be shown that long panel households are more likely to report the same amount of consumption for several consecutive waves, especially after Euro adoption. In some cases the variation in consumption growth is mostly noise and the technique may fail to solve the problem of heaping and rounding for the lack of changes in reported consumption.

Using food consumption as an alternative measure of non-durable consumption which is less affected by under-reporting produces implausible estimates of the IES (sometimes even negative). Then, imputing non-durable consumption from a validated data source like SFB with a simple matching technique provide a solution to the problem of under reporting and heaping. Plausible estimates of the IES are given by the nonlinear GMM estimator. Anyway this method does not use any information about the reported consumption of the household and consumption growth is mainly caused by changes in individual and family characteristics.

Further extensions of the multiple imputations technique could be developed and tested. It could be possible to consider a full panel technique but at the cost of assuming that rounding preferences are constant over time. Or a Sequential Regression Multiple Imputation (SRMI) can be applied. The SRMI procedure was suggested by Raghunathan et al. (2001). The method consists of running sequential regressions to estimate the parameters of interest used to draw the imputed values. After a first step, multiple imputations are used as a complete dataset and the estimation procedure is run again, until the estimates converge. In the analysis this method may provide an improvement of the estimation task because the estimated parameters will be less related to reported consumption which is used as a proxy for the unknown true consumption.

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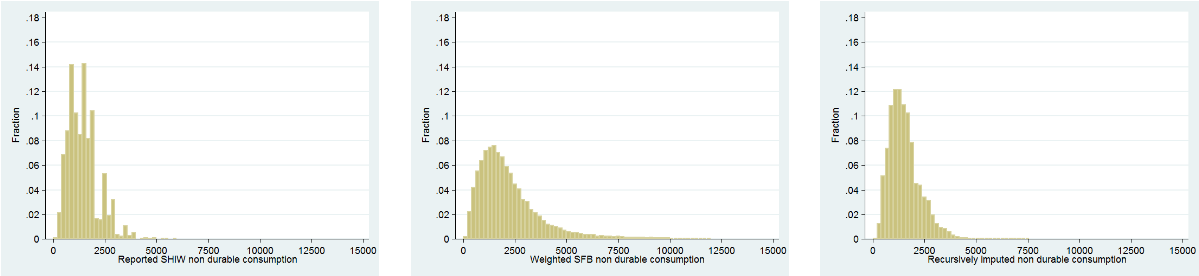
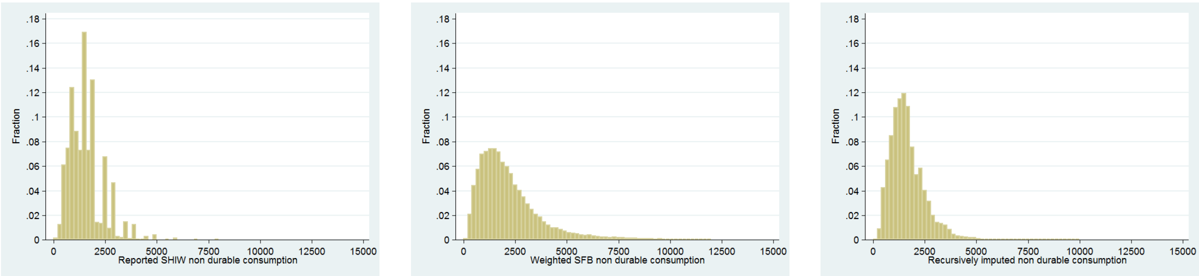
Figure 3.1: Figures of non durable consumption distribution for each wave from 1991 to 2000

SHIW	SFB weighted	Average SHIW imputations

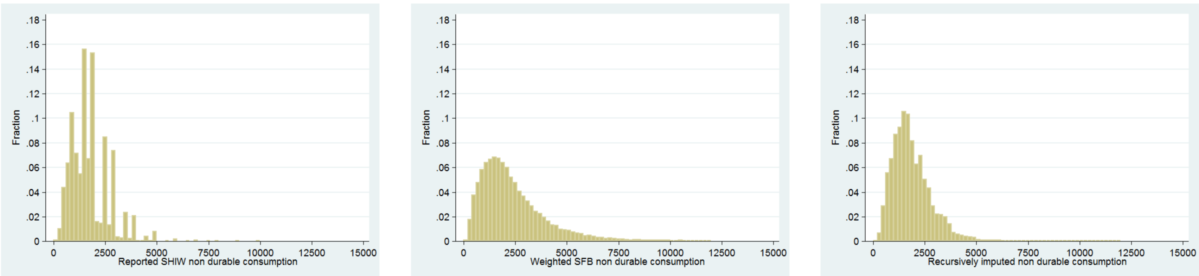
1991



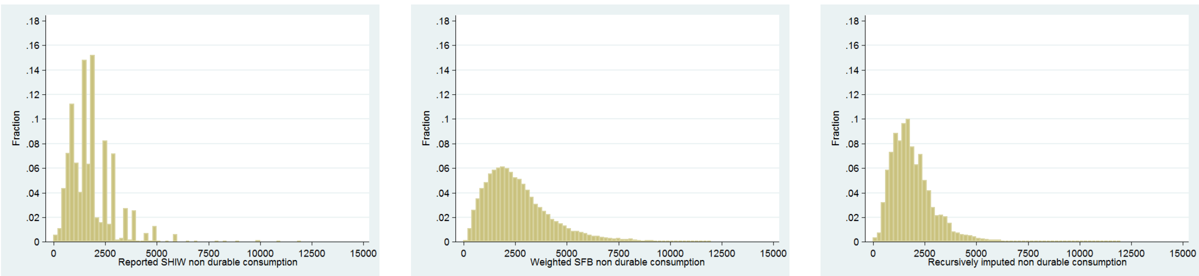
1993



1995



1998



2000

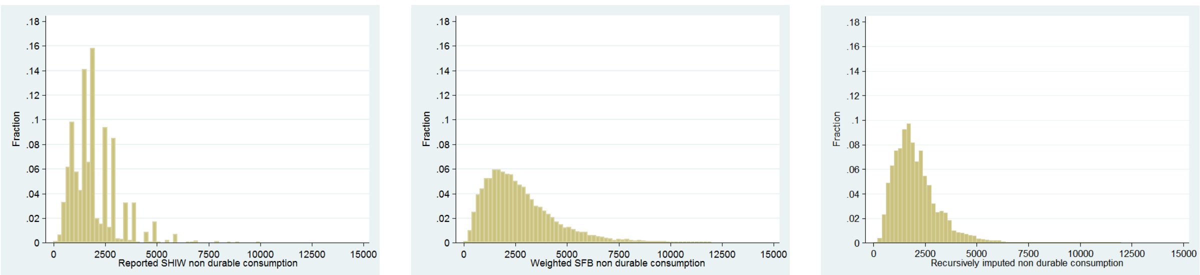
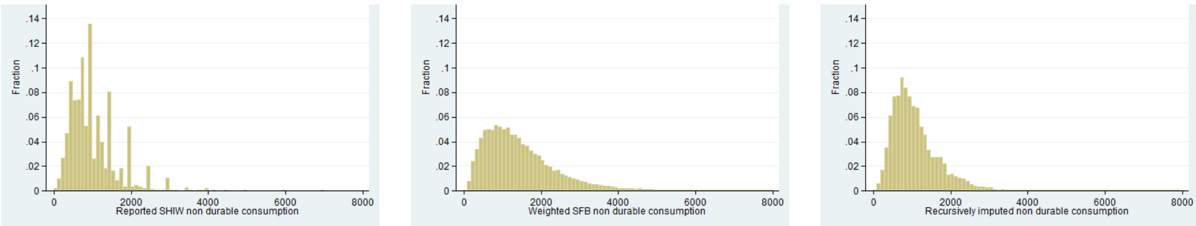


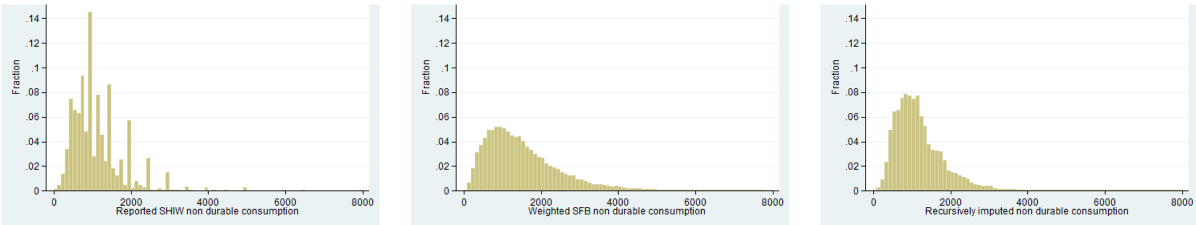
Figure 3.2: Figures of non durable consumption distribution for each wave from 2002 to 2010

SHIW	SFB weighted	Average SHIW imputations

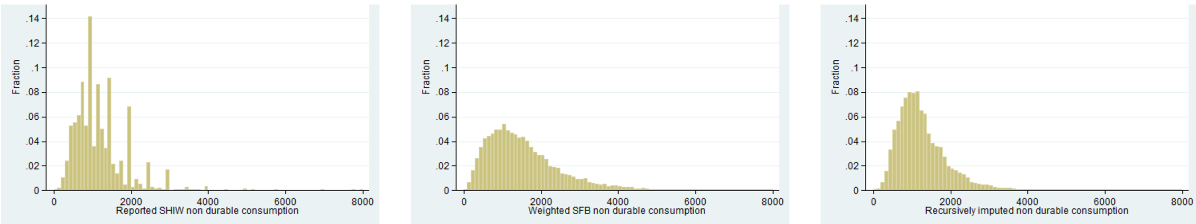
2002



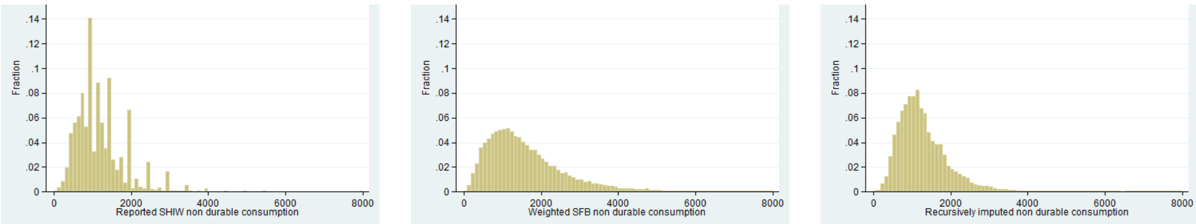
2004



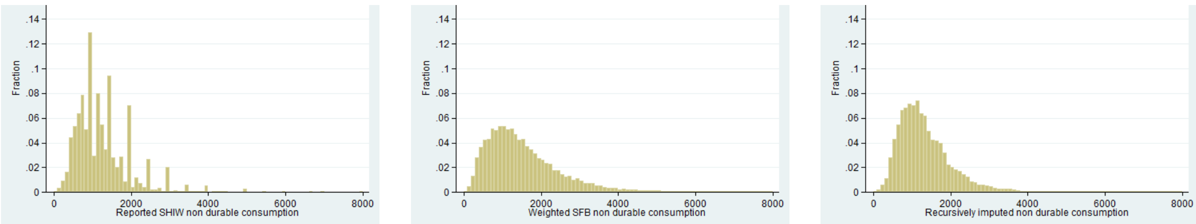
2006



2008



2010



2012

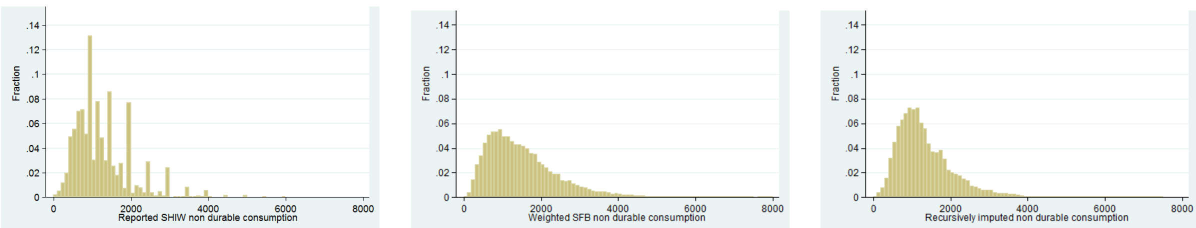
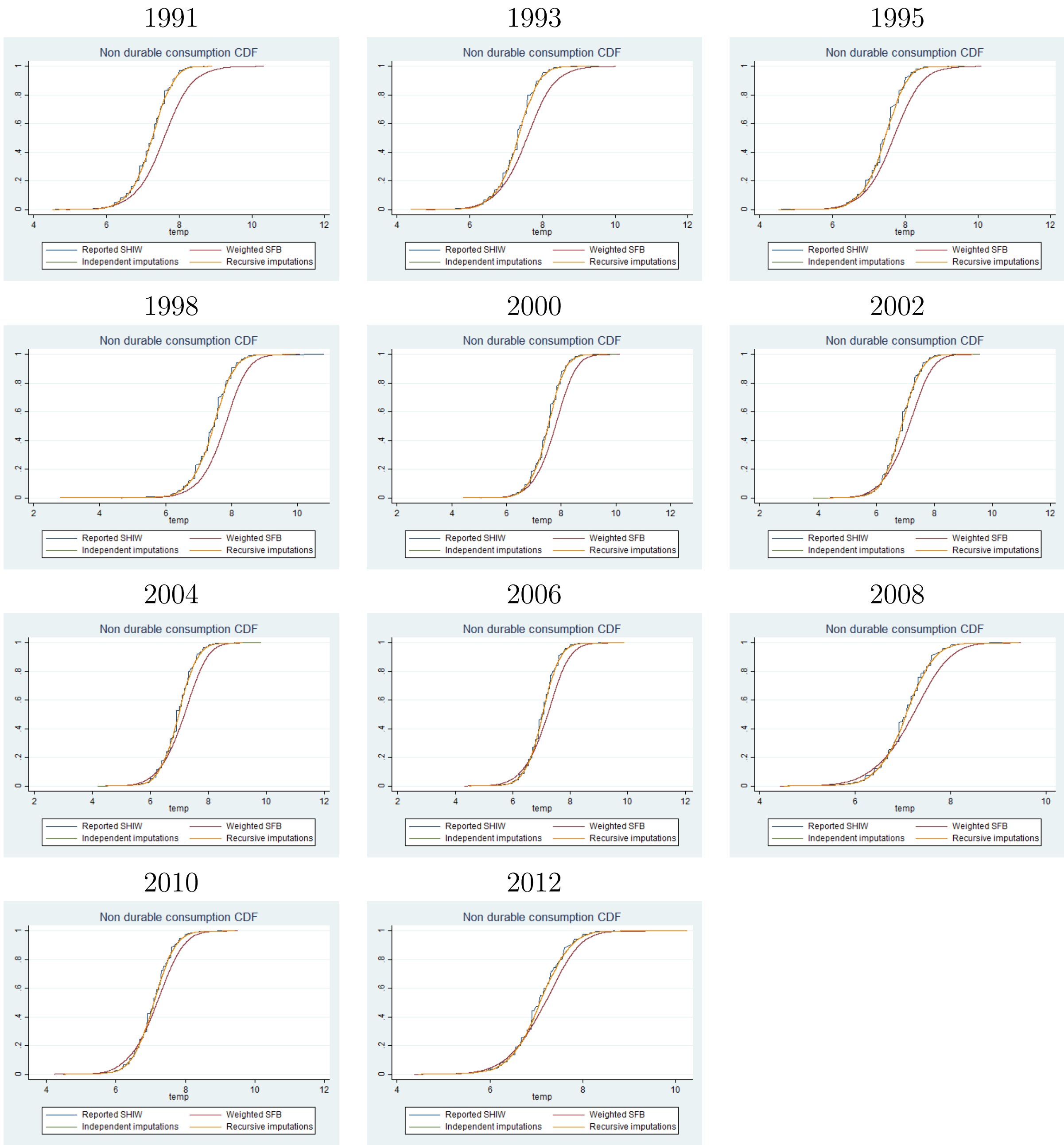


Figure 3.3: Cumulative distribution functions of reported and imputed non durable consumption from SHIW and reported consumption from SFB



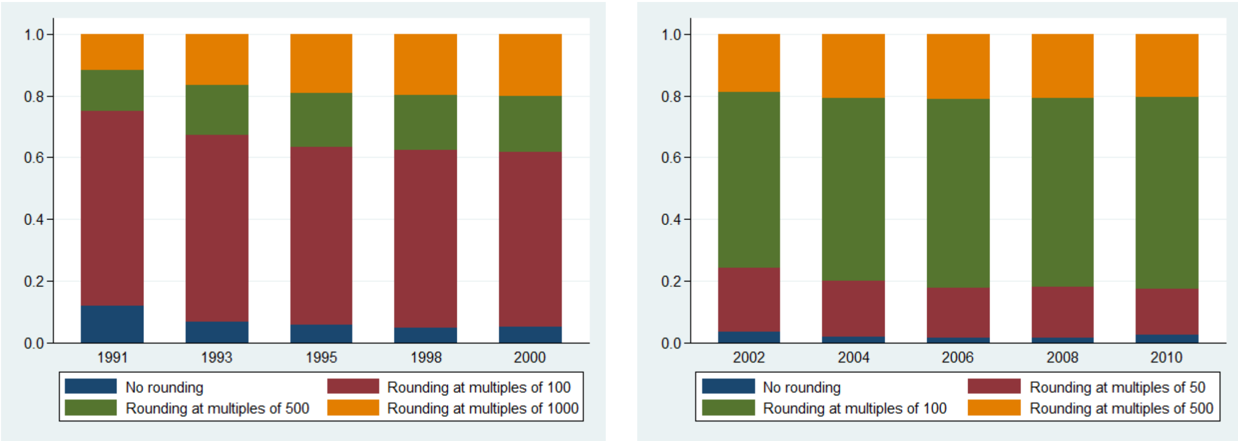


Figure 3.4: Rounding at different multiples for reported food consumption before and after Euro adoption

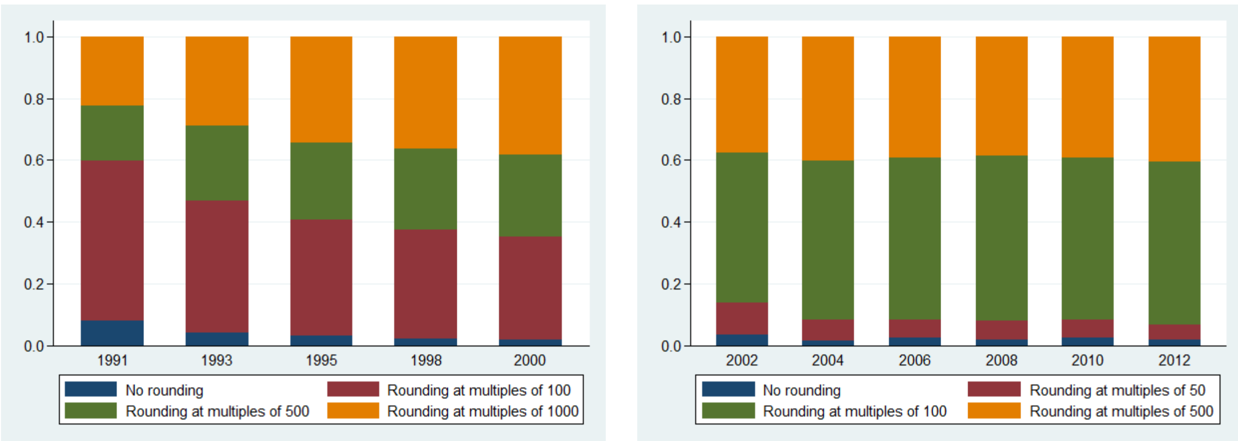


Figure 3.5: Rounding at different multiples for reported non durable consumption before and after Euro adoption

Table 3.1: Sample differences of main variables between SFB and SHIW survey by wave from 1989 to 2000

Variables	1989		1991		1993		1995		1998		2000	
	SFB	SHIW	SFB	SHIW	SFB	SHIW	SFB	SHIW	SFB	SHIW	SFB	SHIW
Number of members 18-24	0.0853	0.0941	0.0822	0.0863	0.0781	0.0864	0.0799	0.0790	0.0665	0.0647	0.0619	0.0610
Number of members 25-39	0.2047	0.1974	0.2089	0.2046	0.2181	0.2077	0.2197	0.2120	0.2198	0.2138	0.2157	0.2079
Number of members 40-59	0.2508	0.2486	0.2514	0.2496	0.2485	0.2336	0.2533	0.2404	0.2499	0.2403	0.2516	0.2475
Number of members 60-69	0.1570	0.1688	0.1567	0.1542	0.1550	0.1445	0.1465	0.1472	0.1584	0.1525	0.1548	0.1476
Number of members 70+	0.1505	0.1483	0.1603	0.1681	0.1629	0.1866	0.1648	0.1949	0.1862	0.2056	0.1937	0.2160
Central Italy	0.1907	0.1926	0.1943	0.2007	0.1949	0.1873	0.1937	0.1825	0.1855	0.1906	0.1854	0.1948
Southern Italy	0.3360	0.3289	0.3361	0.3229	0.3345	0.3214	0.3307	0.3322	0.3163	0.3292	0.3138	0.3363
Number of children 0-5	0.0433	0.0389	0.0408	0.0378	0.0379	0.0417	0.0379	0.0384	0.0337	0.0326	0.0353	0.0335
Number of children 6-14	0.0719	0.0685	0.0639	0.0646	0.0622	0.0668	0.0619	0.0615	0.0575	0.0659	0.0601	0.0614
Number of children 15-17	0.0303	0.0317	0.0297	0.0309	0.0296	0.0293	0.0268	0.0236	0.0214	0.0225	0.0204	0.0219
Number of children 18+	0.1126	0.1295	0.1140	0.1374	0.1172	0.1340	0.1278	0.1409	0.1269	0.1274	0.1209	0.1225
At least 2 members	0.7889	0.8268	0.7763	0.8179	0.7766	0.8247	0.7946	0.8169	0.7842	0.7931	0.7548	0.7913
At least 3 members	0.5479	0.5787	0.5320	0.5808	0.5322	0.5783	0.5477	0.5628	0.5052	0.5252	0.4931	0.5109
At least 4 members	0.3255	0.3416	0.3109	0.3422	0.3110	0.3430	0.3263	0.3282	0.2654	0.2941	0.2717	0.2857
Gender (male)	0.7848	0.8161	0.7755	0.7978	0.7764	0.7855	0.7818	0.7806	0.7683	0.7717	0.7560	0.7738
Age 18-24	0.0110	0.0109	0.0083	0.0093	0.0080	0.0070	0.0073	0.0050	0.0057	0.0043	0.0057	0.0067
Age 25-39	0.2265	0.2114	0.2243	0.1999	0.2230	0.2144	0.2139	0.2022	0.1985	0.1966	0.1937	0.1860
Age 40-59	0.3954	0.4058	0.3891	0.3999	0.3855	0.3952	0.3982	0.3931	0.3762	0.3864	0.3823	0.3896
Age 60-69	0.1937	0.2074	0.1954	0.1966	0.1952	0.1760	0.1870	0.1887	0.1965	0.1853	0.1905	0.1816
Age 70+	0.1728	0.1645	0.1825	0.1942	0.1871	0.2073	0.1929	0.2110	0.2188	0.2273	0.2239	0.2359
Head unemployed	0.0153	0.0082	0.0141	0.0130	0.0204	0.0202	0.0249	0.0367	0.0286	0.0399	0.0262	0.0280
Head out of labor force	0.4113	0.3899	0.4220	0.4125	0.4332	0.4273	0.4445	0.4435	0.4887	0.4498	0.4771	0.4618
Education ≥ 8	0.4770	0.5218	0.5159	0.5320	0.5416	0.5426	0.5705	0.5641	0.6140	0.6138	0.6359	0.6200
Education ≥ 13	0.2219	0.2839	0.2500	0.2895	0.2596	0.2675	0.2827	0.2959	0.3333	0.3456	0.3479	0.3516
University degree	0.0502	0.0698	0.0563	0.0651	0.0604	0.0622	0.0646	0.0654	0.0760	0.0778	0.0845	0.0820

Homeowner	0.6794	0.6417	0.6996	0.6558	0.7019	0.6332	0.7257	0.6566	0.6959	0.6655	0.7196	0.6941

Table 3.2: Sample differences of main variables between SFB and SHIW survey by wave from 2002 to 2012

Variables	2002		2004		2006		2008		2010		2012	
	SFB	SHIW	SFB	SHIW	SFB	SHIW	SFB	SHIW	SFB	SHIW	SFB	SHIW
Number of members 18-24	0.0579	0.0563	0.0515	0.0548	0.0532	0.0501	0.0528	0.0471	0.0509	0.0549	0.0507	0.0534
Number of members 25-39	0.2126	0.2120	0.1998	0.2080	0.1962	0.2115	0.1882	0.1949	0.1836	0.1629	0.1653	0.1671
Number of members 40-59	0.2514	0.2579	0.2665	0.2691	0.2752	0.2703	0.2805	0.2723	0.2846	0.2788	0.2966	0.2915
Number of members 60-69	0.1496	0.1442	0.1446	0.1422	0.1420	0.1411	0.1438	0.1467	0.1410	0.1521	0.1413	0.1456
Number of members 70+	0.2054	0.2153	0.2245	0.2203	0.2159	0.2173	0.2195	0.2311	0.2269	0.2387	0.2350	0.2329
Central Italy	0.1942	0.1993	0.1955	0.2049	0.1951	0.2015	0.1967	0.2091	0.1981	0.1988	0.1984	0.1893
Southern Italy	0.3261	0.3352	0.3226	0.3185	0.3221	0.3132	0.3203	0.3093	0.3189	0.3168	0.3183	0.3222
Number of children 0-5	0.0357	0.0297	0.0292	0.0299	0.0339	0.0315	0.0331	0.0324	0.0342	0.0312	0.0332	0.0303
Number of children 6-14	0.0607	0.0599	0.0589	0.0549	0.0577	0.0547	0.0574	0.0536	0.0554	0.0568	0.0557	0.0555
Number of children 15-17	0.0201	0.0218	0.0198	0.0178	0.0194	0.0201	0.0189	0.0188	0.0188	0.0209	0.0177	0.0195
Number of children 18+	0.1249	0.1219	0.1246	0.1129	0.1126	0.1110	0.1082	0.1025	0.1074	0.1006	0.1068	0.0985
At least 2 members	0.7452	0.7671	0.7365	0.7435	0.7163	0.7471	0.7065	0.7279	0.6970	0.7444	0.6834	0.7067
At least 3 members	0.4838	0.5006	0.4631	0.4606	0.4486	0.4596	0.4357	0.4308	0.4234	0.4365	0.4097	0.4292
At least 4 members	0.2680	0.2841	0.2498	0.2533	0.2409	0.2485	0.2327	0.2351	0.2206	0.2414	0.2239	0.2342
Gender (male)	0.7371	0.7710	0.7322	0.7548	0.7227	0.7600	0.7228	0.7500	0.7118	0.7527	0.7065	0.7286
Age 18-24	0.0047	0.0065	0.0031	0.0061	0.0055	0.0042	0.0063	0.0064	0.0055	0.0081	0.0044	0.0115
Age 25-39	0.1869	0.1820	0.1609	0.1837	0.1719	0.1847	0.1658	0.1654	0.1610	0.1394	0.1453	0.1458
Age 40-59	0.3765	0.3919	0.3922	0.3968	0.3903	0.3963	0.3948	0.3934	0.3969	0.4027	0.4054	0.4084
Age 60-69	0.1837	0.1780	0.1752	0.1671	0.1729	0.1704	0.1708	0.1726	0.1666	0.1837	0.1669	0.1765
Age 70+	0.2384	0.2417	0.2611	0.2463	0.2496	0.2444	0.2538	0.2621	0.2633	0.2661	0.2719	0.2578
Head unemployed	0.0251	0.0300	0.0250	0.0286	0.0251	0.0304	0.0279	0.0280	0.0296	0.0345	0.0394	0.0535
Head out of labor force	0.4854	0.4426	0.4770	0.4359	0.4725	0.4286	0.4701	0.4419	0.4730	0.4354	0.4792	0.4037
Education ≥ 8	0.6341	0.6358	0.6657	0.6673	0.6908	0.7044	0.7143	0.7136	0.7303	0.7395	0.7406	0.7548

Education $\geq$ 13	0.3381	0.3569	0.3728	0.3807	0.3935	0.4098	0.4100	0.3458	0.4443	0.3668	0.4454	0.3791
University degree	0.0745	0.0788	0.0825	0.0871	0.0919	0.0941	0.1002	0.0968	0.1177	0.1124	0.1182	0.1169
Homeowner	0.7273	0.6936	0.7282	0.6836	0.7328	0.6950	0.7504	0.7017	0.7358	0.6882	0.7239	0.6782

Table 3.3: Estimation of Φ for non durable consumption and for waves between 1991 and 2010 - recursive method

	1993	1995	1998	2000	2002	2004	2006	2008	2010	2012
w	0.703***	0.813***	0.709***	0.744***	0.783***	0.909***	0.897***	0.784***	0.816***	0.798***
	(0.050)	(0.048)	(0.050)	(0.049)	(0.049)	(0.052)	(0.055)	(0.054)	(0.051)	(0.065)
$g^*_{t-1} = -1$	0.021	-0.174	0.033	-0.180	0.041	0.018	-0.429***	-0.191	-0.381**	-0.098
	(0.079)	(0.112)	(0.158)	(0.138)	(0.151)	(0.112)	(0.139)	(0.127)	(0.160)	(0.177)
$g^*_{t-1} = 1$	-0.005	-0.071**	-0.084**	-0.132***	-0.094**	-0.147**	-0.207***	-0.254***	-0.366***	-0.104
	(0.032)	(0.033)	(0.040)	(0.035)	(0.037)	(0.060)	(0.070)	(0.072)	(0.075)	(0.109)
$g^*_{t-1} = 2$	0.020	0.052	0.043	0.074	0.029	-0.046	-0.088***	-0.091***	-0.142***	0.030
	(0.079)	(0.055)	(0.060)	(0.051)	(0.055)	(0.036)	(0.034)	(0.033)	(0.033)	(0.046)
$g^*_{t-1} = 3$	0.060	0.123*	0.131**	0.338***	0.216***	0.121**	0.072	0.139**	0.178***	0.322***
	(0.085)	(0.065)	(0.065)	(0.054)	(0.057)	(0.057)	(0.053)	(0.057)	(0.056)	(0.076)
Having a bank account	0.114***	0.050	0.056	0.054	-0.028	-0.104**	0.075	0.146***	0.067	-0.086
	(0.036)	(0.037)	(0.042)	(0.041)	(0.039)	(0.040)	(0.057)	(0.050)	(0.055)	(0.093)
Bank payments	0.055	0.052	0.070**	0.091***	-	-	-0.094***	-0.163***	-0.066**	0.057
	(0.035)	(0.033)	(0.034)	(0.032)			(0.032)	(0.032)	(0.033)	(0.045)
POS payments	0.032	-0.026	0.000	0.076**	-0.002	-0.017	-0.010	-0.009	-0.085**	-0.025
	(0.052)	(0.042)	(0.036)	(0.034)	(0.033)	(0.036)	(0.037)	(0.038)	(0.042)	(0.056)
Credit card	0.148***	0.138***	0.258***	0.141***	0.138***	0.146***	0.180***	0.212***	0.139***	0.171***
	(0.047)	(0.042)	(0.039)	(0.036)	(0.037)	(0.036)	(0.036)	(0.035)	(0.035)	(0.049)
Age > 70	-0.054	-0.003	0.052	-0.091*	-0.193***	-0.062	-0.090*	-0.039	-0.059	-0.040
	(0.039)	(0.046)	(0.052)	(0.049)	(0.050)	(0.051)	(0.049)	(0.047)	(0.053)	(0.082)
Fair understanding	-0.038	-0.009	0.088*	-0.200***	-0.124**	-0.026	0.038	-0.027	-0.111**	-0.020
	(0.062)	(0.043)	(0.048)	(0.047)	(0.048)	(0.050)	(0.047)	(0.045)	(0.050)	(0.076)
Good understanding	-0.150	0.114**	0.116***	-0.131***	-0.146***	-0.034	0.107**	0.070	0.078	-0.011
	(0.107)	(0.048)	(0.045)	(0.042)	(0.055)	(0.058)	(0.045)	(0.044)	(0.048)	(0.072)
Excellent understanding	0.013	0.039	-0.026	-0.110***	0.083**	0.083*	0.066*	-0.074**	-0.073**	-0.039
	(0.043)	(0.043)	(0.046)	(0.040)	(0.038)	(0.043)	(0.039)	(0.037)	(0.037)	(0.050)

	1993	1995	1998	2000	2002	2004	2006	2008	2010	2012
Long interview	-	0.236***	0.072	0.134***	0.117***	0.101***	0.001	0.003	-0.013	0.006
		(0.046)	(0.044)	(0.042)	(0.046)	(0.039)	(0.037)	(0.034)	(0.040)	(0.052)
Euro	-	-	-	-	0.029***	0.022**	-	-	-	-
					(0.010)	(0.011)				
τ_1	5.101***	5.816***	5.089***	5.147***	4.194***	4.851***	4.722***	3.930***	4.045***	3.900***
	(0.361)	(0.344)	(0.362)	(0.358)	(0.325)	(0.355)	(0.374)	(0.364)	(0.346)	(0.438)
τ_2	5.790***	6.522***	5.818***	5.901***	5.793***	6.671***	6.652***	5.864***	5.981***	5.889***
	(0.362)	(0.345)	(0.363)	(0.359)	(0.328)	(0.359)	(0.378)	(0.367)	(0.349)	(0.443)

	w	w	w	w	w	w	w	w	w	w
Number of members 18-24	0.064***	0.060***	0.112***	0.110***	0.097***	0.093***	0.032	0.078***	0.057**	0.098***
	(0.022)	(0.022)	(0.031)	(0.026)	(0.028)	(0.027)	(0.026)	(0.026)	(0.027)	(0.036)
Number of members 25-39	0.099***	0.112***	0.160***	0.158***	0.155***	0.121***	0.083***	0.102***	0.100***	0.110***
	(0.019)	(0.020)	(0.027)	(0.023)	(0.025)	(0.024)	(0.023)	(0.023)	(0.023)	(0.032)
Number of members 40-59	0.091***	0.133***	0.131***	0.154***	0.168***	0.133***	0.099***	0.138***	0.124***	0.090***
	(0.018)	(0.019)	(0.026)	(0.022)	(0.024)	(0.023)	(0.022)	(0.022)	(0.023)	(0.031)
Number of members 60-69	0.069***	0.085***	0.073***	0.094***	0.116***	0.076***	0.088***	0.090***	0.065***	0.049
	(0.020)	(0.020)	(0.028)	(0.024)	(0.025)	(0.025)	(0.024)	(0.024)	(0.024)	(0.033)
Number of members 70+	0.025	0.033	0.050	0.021	0.047*	-0.004	0.050*	0.057**	0.003	-0.012
	(0.022)	(0.022)	(0.032)	(0.026)	(0.028)	(0.027)	(0.026)	(0.026)	(0.027)	(0.036)
Central Italy	0.021	0.032	-0.001	0.051	0.121***	-0.020	0.007	0.070*	-0.074*	-0.006
	(0.036)	(0.036)	(0.050)	(0.041)	(0.040)	(0.039)	(0.040)	(0.038)	(0.041)	(0.061)
Southern Italy	-0.176***	-0.204***	-0.143***	-0.190***	-0.093***	-0.160***	-0.134***	-0.150***	-0.117***	-0.155***
	(0.031)	(0.031)	(0.043)	(0.035)	(0.036)	(0.035)	(0.034)	(0.034)	(0.036)	(0.050)
Number of children 0-5	0.022	0.019	0.041**	0.029*	0.014	0.015	0.033*	0.004	-0.038*	0.008
	(0.015)	(0.015)	(0.020)	(0.017)	(0.020)	(0.019)	(0.018)	(0.018)	(0.020)	(0.028)
Number of children 6-14	0.039***	0.004	0.053***	0.038***	-0.005	0.036**	0.016	0.023	-0.001	-0.004
	(0.011)	(0.011)	(0.015)	(0.014)	(0.016)	(0.016)	(0.015)	(0.015)	(0.016)	(0.022)

	1993	1995	1998	2000	2002	2004	2006	2008	2010	2012
Number of children 15-17	0.041***	0.042***	0.054***	0.050***	0.012	0.038*	0.021	-0.012	0.004	0.007
	(0.015)	(0.015)	(0.020)	(0.018)	(0.020)	(0.020)	(0.019)	(0.019)	(0.021)	(0.028)
Number of children 18+	0.043***	0.031*	-0.022	-0.006	-0.005	-0.002	0.044**	0.002	-0.001	-0.035
	(0.016)	(0.017)	(0.023)	(0.018)	(0.019)	(0.018)	(0.018)	(0.018)	(0.017)	(0.025)
Number of retired members	0.024*	0.030**	0.075***	0.062***	0.091***	0.074***	0.056***	0.085***	0.080***	0.094***
	(0.013)	(0.013)	(0.018)	(0.014)	(0.015)	(0.015)	(0.015)	(0.014)	(0.015)	(0.021)
At least 2 members	0.320***	0.259***	0.273***	0.235***	0.180***	0.191***	0.233***	0.224***	0.237***	0.245***
	(0.021)	(0.021)	(0.029)	(0.023)	(0.025)	(0.025)	(0.024)	(0.023)	(0.025)	(0.034)
At least 3 members	0.120***	0.085***	0.116***	0.105***	0.098***	0.072***	0.072***	0.080***	0.092***	0.132***
	(0.016)	(0.016)	(0.022)	(0.018)	(0.020)	(0.020)	(0.019)	(0.019)	(0.020)	(0.029)
At least 4 members	0.052***	0.068***	0.023	0.056***	0.055**	0.013	0.049**	0.061***	0.063***	0.011
	(0.017)	(0.017)	(0.023)	(0.020)	(0.023)	(0.022)	(0.021)	(0.021)	(0.022)	(0.032)
Gender (male)	0.135***	0.076***	0.115***	0.079***	0.046**	0.077***	0.095***	0.056***	0.123***	0.112***
	(0.019)	(0.020)	(0.026)	(0.021)	(0.021)	(0.019)	(0.018)	(0.018)	(0.019)	(0.026)
Age of the head	0.017***	0.011***	0.023***	0.018***	0.012***	0.005	0.013***	0.007*	0.003	0.017***
	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.006)
Age of the head^2	-1.343***	-0.667*	-1.576***	-1.209***	-0.611	0.050	-0.936**	-0.144	0.368	-0.810
	(0.343)	(0.349)	(0.487)	(0.376)	(0.390)	(0.370)	(0.373)	(0.353)	(0.370)	(0.537)
Head unemployed	-0.278***	-0.410***	-0.386***	-0.323***	-0.354***	-0.337***	-0.318***	-0.322***	-0.339***	-0.437***
	(0.026)	(0.022)	(0.026)	(0.026)	(0.028)	(0.027)	(0.026)	(0.025)	(0.023)	(0.030)
Head out of labor force	-0.083***	-0.084***	-0.082***	-0.082***	-0.113***	-0.141***	-0.092***	-0.105***	-0.085***	-0.073***
	(0.014)	(0.014)	(0.018)	(0.015)	(0.017)	(0.016)	(0.016)	(0.016)	(0.016)	(0.023)
Education ≥ 8	0.120***	0.146***	0.132***	0.111***	0.154***	0.132***	0.104***	0.097***	0.109***	0.115***
	(0.016)	(0.016)	(0.023)	(0.019)	(0.019)	(0.019)	(0.019)	(0.018)	(0.020)	(0.030)
Education ≥ 13	0.107***	0.079***	0.091***	0.086***	0.138***	0.100***	0.115***	0.143***	0.126***	0.145***
	(0.017)	(0.016)	(0.021)	(0.017)	(0.018)	(0.017)	(0.015)	(0.015)	(0.016)	(0.023)
University degree	0.190***	0.183***	0.214***	0.178***	0.179***	0.179***	0.172***	0.107***	0.135***	0.144***
	(0.027)	(0.024)	(0.031)	(0.024)	(0.026)	(0.024)	(0.023)	(0.022)	(0.022)	(0.031)

	1993	1995	1998	2000	2002	2004	2006	2008	2010	2012
Center * number 18-24	-0.018	-0.030	-0.011	-0.023	-0.025	-0.003	-0.070**	-0.047*	0.011	-0.038
	(0.021)	(0.020)	(0.028)	(0.026)	(0.029)	(0.028)	(0.028)	(0.028)	(0.028)	(0.042)
Center * number 25-39	-0.038**	-0.043**	-0.051**	-0.053***	-0.045**	0.054***	-0.032	-0.058***	0.019	0.012
	(0.018)	(0.017)	(0.023)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.021)	(0.031)
Center * number 40-59	0.014	-0.015	-0.013	-0.069***	-0.056**	0.054***	-0.002	-0.036*	0.024	0.002
	(0.019)	(0.019)	(0.025)	(0.021)	(0.022)	(0.021)	(0.021)	(0.021)	(0.022)	(0.031)
Center * number 60-69	0.000	-0.043**	-0.008	-0.037	-0.058**	0.055**	-0.005	-0.044*	0.027	0.009
	(0.022)	(0.021)	(0.030)	(0.024)	(0.025)	(0.024)	(0.023)	(0.022)	(0.023)	(0.033)
Center * number 70+	0.051**	-0.011	-0.013	-0.010	-0.023	0.072***	-0.009	-0.069***	0.029	0.059*
	(0.023)	(0.023)	(0.032)	(0.027)	(0.027)	(0.026)	(0.025)	(0.024)	(0.025)	(0.034)
Center * education $\geq$ 8	0.000	-0.008	0.029	0.002	-0.016	-0.026	0.042	0.027	0.030	-0.016
	(0.028)	(0.028)	(0.040)	(0.033)	(0.033)	(0.033)	(0.033)	(0.031)	(0.034)	(0.050)
Center * education $\geq$ 13	0.041	0.021	-0.020	0.033	-0.030	0.008	0.003	-0.028	-0.002	0.047
	(0.030)	(0.029)	(0.036)	(0.031)	(0.032)	(0.030)	(0.029)	(0.029)	(0.029)	(0.042)
Center * degree	-0.082*	-0.053	-0.093*	-0.033	-0.053	0.006	-0.010	-0.010	0.025	-0.002
	(0.047)	(0.045)	(0.053)	(0.045)	(0.050)	(0.044)	(0.042)	(0.040)	(0.038)	(0.056)
Center * gender	-0.065**	-0.029	-0.058	0.032	0.040	-0.023	0.000	0.032	-0.042	-0.070
	(0.032)	(0.032)	(0.042)	(0.034)	(0.035)	(0.033)	(0.032)	(0.030)	(0.032)	(0.045)
South * number 18-24	-0.057***	-0.049***	-0.043*	-0.055***	-0.058**	-0.043**	-0.049**	-0.034*	-0.042*	-0.032
	(0.016)	(0.016)	(0.022)	(0.021)	(0.023)	(0.022)	(0.022)	(0.021)	(0.022)	(0.030)
South * number 25-39	-0.046***	-0.054***	-0.058***	-0.076***	-0.086***	-0.006	-0.057***	-0.028*	-0.031*	-0.040
	(0.015)	(0.015)	(0.019)	(0.016)	(0.017)	(0.017)	(0.016)	(0.016)	(0.017)	(0.025)
South * number 40-59	-0.011	-0.045***	-0.026	-0.084***	-0.091***	-0.028	-0.043**	-0.091***	-0.068***	-0.014
	(0.017)	(0.017)	(0.022)	(0.018)	(0.019)	(0.019)	(0.018)	(0.018)	(0.019)	(0.026)
South * number 60-69	-0.005	-0.031	-0.017	-0.058***	-0.079***	-0.024	-0.023	-0.074***	-0.047**	0.010
	(0.018)	(0.019)	(0.025)	(0.021)	(0.022)	(0.022)	(0.020)	(0.020)	(0.021)	(0.029)
South * number 70+	0.052**	0.017	-0.029	0.020	-0.048**	0.045*	-0.018	-0.057***	-0.012	0.037
	(0.022)	(0.022)	(0.029)	(0.023)	(0.024)	(0.024)	(0.022)	(0.022)	(0.023)	(0.032)

	1993	1995	1998	2000	2002	2004	2006	2008	2010	2012
South * education$\geq$ 8	0.048**	-0.012	0.002	0.072***	0.010	-0.001	0.038	0.019	-0.005	0.004
	(0.024)	(0.024)	(0.033)	(0.027)	(0.028)	(0.028)	(0.027)	(0.026)	(0.028)	(0.041)
South * education$\geq$ 13	0.064**	0.133***	0.069**	0.054**	0.004	0.077***	0.026	0.055**	0.086***	0.022
	(0.027)	(0.025)	(0.032)	(0.027)	(0.029)	(0.027)	(0.025)	(0.025)	(0.025)	(0.036)
South * degree	0.058	0.061	0.035	0.039	0.037	0.054	0.048	0.102***	0.090**	0.143***
	(0.040)	(0.038)	(0.046)	(0.038)	(0.042)	(0.041)	(0.038)	(0.038)	(0.036)	(0.050)
South * gender	-0.071**	0.024	-0.067*	0.003	0.035	-0.006	0.007	0.077***	-0.006	-0.025
	(0.028)	(0.027)	(0.036)	(0.028)	(0.030)	(0.029)	(0.027)	(0.027)	(0.027)	(0.038)
Total surface	2.831*	10.222***	6.319***	6.693***	10.981***	13.072***	10.203***	10.690***	12.906***	16.277***
	(1.585)	(1.471)	(1.828)	(1.526)	(1.703)	(1.991)	(1.831)	(1.755)	(1.890)	(2.639)
Per-capita surface	15.123***	-4.174	6.542	6.918**	1.071	-1.000	0.062	-3.855	-1.638	-2.790
	(3.296)	(3.047)	(4.077)	(3.071)	(3.301)	(3.953)	(3.712)	(3.528)	(3.862)	(5.424)
Homeowner	0.042***	0.064***	0.036***	0.047***	0.079***	0.071***	0.067***	0.075***	0.107***	0.162***
	(0.009)	(0.009)	(0.012)	(0.010)	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)	(0.015)
Secondary residence	0.119***	0.112***	0.209***	0.144***	0.152***	0.141***	0.151***	0.120***	0.168***	0.111***
	(0.017)	(0.016)	(0.022)	(0.020)	(0.022)	(0.021)	(0.019)	(0.019)	(0.019)	(0.027)
Constant	5.942***	6.270***	5.813***	6.096***	5.604***	5.932***	5.887***	6.002***	6.023***	5.544***
	(0.100)	(0.101)	(0.138)	(0.111)	(0.114)	(0.108)	(0.109)	(0.104)	(0.107)	(0.160)
$ln\,(\sigma)$	-1.013***	-1.025***	-0.799***	-0.933***	-0.887***	-0.916***	-0.978***	-1.013***	-0.973***	-0.938***
	(0.008)	(0.008)	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.012)
N	7684	7667	6811	7583	7471	7441	7146	7235	7155	3729
N1	7375	7416	6668	7435	7211	7316	6957	7103	6976	3660
F-test instruments	45.89	73.68	100.18	94.66	49.02	42.97	63.04	83.68	58.61	18.74
p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
F-test g^{*}_{t-1}	1.53	16.65	13.95	85.85	33.73	18.79	32.12	40.60	82.92	28.71
p-value	0.82	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 3.4: Descriptive statistics for non durable consumption

	SHIW reported			SFB weighted			Panel imputations[(1)]			Cross imputations[(1)]			Simple Matching[(1)]		
	Mean	Median	Sd	Mean	Median	Sd	Mean	Median	Sd	Mean	Median	Sd	Mean	Median	Sd
1991	1511.33	1400	747.65	2411.91	1918.62	1954.64	1548.65	1418.75	759.98	1548.65	1418.75	759.98	2195.48	2018.36	1121.77
1993	1628.71	1500	823.62	2338.40	1885.55	1834.07	1671.95	1524.89	841.50	1671.87	1523.67	840.99	2151.46	1961.05	1113.53
1995	1829.15	1600	945.24	2579.10	2084.68	1996.86	1882.27	1704.55	966.48	1880.89	1703.86	964.85	2392.75	2175.60	1261.98
1998	1880.98	1700	1228.95	2728.73	2372.19	1746.18	1927.92	1720.92	1101.50	1925.90	1719.99	1098.15	2545.26	2397.42	1133.04
2000	2013.54	1800	1106.04	2754.94	2347.77	1836.76	2069.09	1845.26	1130.63	2067.81	1842.63	1130.36	2565.16	2391.15	1209.24
2002	1070.66	1000	621.56	1483.32	1245.41	1023.82	1108.00	962.84	637.63	1107.66	962.13	637.80	1392.62	1289.86	689.18
2004	1177.64	1000	677.52	1542.70	1305.72	1026.26	1213.85	1073.39	693.33	1213.13	1072.84	693.30	1449.41	1344.95	691.69
2006	1236.47	1100	679.65	1604.98	1365.71	1081.65	1282.27	1142.49	690.11	1279.94	1141.26	690.88	1510.05	1404.24	704.54
2008	1251.99	1100	648.77	1595.84	1353.23	1048.44	1299.39	1166.00	666.33	1297.81	1164.92	665.78	1508.78	1400.21	700.95
2010	1309.84	1200	732.90	1558.44	1321.48	1018.77	1362.48	1207.33	749.58	1360.86	1204.27	749.67	1475.09	1369.50	667.44
2012	1303.98	1200	729.31	1544.82	1330.45	983.12	1355.83	1181.21	752.57	1354.61	1179.82	750.46	1454.86	1337.30	658.72

(1) All the multiply imputed values from the 100 implicats are considered.

Table 3.5: Descriptive statistics for food consumption

	SHIW reported			SFB weighted			Panel imputations[(1)]			Cross imputations[(1)]		
	Mean	Median	Sd	Mean	Median	Sd	Mean	Median	Sd	Mean	Median	Sd
1991	755.43	700	359.21	820.03	738.06	449.70	759.78	718.31	363.11	759.78	718.31	363.11
1993	825.54	800	402.68	811.18	730.81	442.75	830.85	761.21	407.03	830.69	761.12	406.94
1995	868.10	800	443.31	866.44	780.90	473.82	874.16	794.84	448.40	873.89	795.12	448.04
1998	864.82	800	452.86	944.99	853.15	515.02	870.19	793.08	457.30	868.56	791.23	454.90
2000	882.66	800	459.94	934.14	835.19	537.66	888.98	812.72	465.91	888.76	812.68	465.13
2002	478.72	400	260.07	536.97	445.77	365.93	481.57	435.69	263.93	480.80	435.40	263.60
2004	511.16	500	267.29	523.97	453.91	321.05	513.74	462.80	270.42	513.27	462.58	270.21
2006	527.97	500	267.62	543.91	476.03	330.32	531.27	482.23	269.24	530.64	481.79	269.29
2008	523.39	500	248.09	553.56	481.24	335.13	527.91	483.61	252.31	527.28	482.82	252.29
2010	529.36	500	258.27	546.12	480.85	324.55	532.55	492.05	262.62	532.20	492.31	262.23

(1) All the multiply imputed values from the 100 implicats are considered.

Table 3.6: Estimation of Euler equation with reported, panel and cross imputed non durable consumption

Data		$1/\gamma$	β	θ_{AD}	θ_{CH}	θ_{EA}	κ	N	m	Hansen J test
Reported non durable	AGMM	0.771***		0.110***	0.0825***	0.0377		14,233		14.45
consumption		(0.256)		(0.0254)	(0.0192)	(0.0291)				0.002
	EGMM	1.316***	0.962***	0.0957**	0.0842**	0.0313**		20,995	-	185.4
		(0.452)	(0.0160)	(0.0480)	(0.0328)	(0.0155)				0.000
	GMM-K	1.664***	0.980***	0.0859***	0.0825***	0.0235	1.030***	20,995	-	396.3
		(0.543)	(0.00166)	(0.0252)	(0.0153)	(0.0162)	(0.0173)			0.000
	GMM-D	0.815***	0.976***	0.176***	0.186**	0.110		20,995	-	-
		(0.190)	(0.00418)	(0.0587)	(0.0780)	(0.0720)				
Panel imputations of	AGMM	0.691***		0.111***	0.084***	0.038		14,233	100	12.155
non durable consumption		(0.270)		(0.027)	(0.020)	(0.031)				0.007
	EGMM	0.776***	0.915***	0.173***	0.126**	0.070***		20,995	100	40.89
		(0.164)	(0.030)	(0.061)	(0.065)	(0.029)				0.000
	GMM-K	0.960***	0.975***	0.137***	0.102***	0.066**	1.098***	20,995	93	78.19
		(0.288)	(0.005)	(0.040)	(0.030)	(0.035)	(0.067)			0.000
	GMM-D	0.711**	0.975***	0.207	0.250	0.189		20,995	75	-
		(0.314)	(0.007)	(0.338)	(0.460)	(0.184)				
Cross imputations of	AGMM	0.699***		0.112***	0.085***	0.040		14,233	100	12.038
non durable consumption		(0.272)		(0.027)	(0.021)	(0.031)				0.007
	EGMM	0.781***	0.915***	0.170***	0.123**	0.071***		20,995	100	40.99
		(0.163)	(0.029)	(0.059)	(0.064)	(0.029)				0.000
	GMM-K	0.943***	0.975***	0.139***	0.102***	0.070**	1.103***	20,995	92	73.03
		(0.289)	(0.005)	(0.040)	(0.030)	(0.038)	(0.075)			0.000
	GMM-D	0.718***	0.975***	0.202	0.240	0.179		20,995	75	-
		(0.305)	(0.006)	(0.179)	(0.262)	(0.161)				

AGMM: constant and dummy for wave 1998 are not reported; endogenous variables are $ln\,(1+r_{t+1})$, $\triangle ad_{t+1}$, $\triangle ch_{t+1}$, $\triangle ea_{t+1}$; instruments are $ln\,(1+r_{t-1})$, ad_{t-1}, ad_{t-2}, ch_{t-1}, ch_{t-2}, ea_{t-1}, ea_{t-2}. EGMM: instruments are $(1+r_t)$, ad_t, ad_{t-1}, ch_t, ch_{t-1}, ea_t, ea_{t-1}. GMM-K: instruments for the first equation are $(1+r_{t-1})$, ad_{t-1}, ch_{t-1} and instruments for the second equation are ad_{t-1}, ch_{t-1}, ea_{t-1}. GMM-D: instruments are $(1+r_{t-2})$, ad_{t-1}, ch_{t-1},ea_{t-1}.Column m reports the number of valid estimations (the model converged or the ratio between the max and min eigenvalue was less than 200,000). Hansen J test for the imputed dataset is the geometric average of the tests run on each single implicate. Degrees of freedom are 3 for AGMM and EGMM, and 2 for GMM-K. No test of overidentifying restriction is run for GMM-D because of exact identification.

Table 3.7: Estimation of Euler equation with reported, panel and cross imputed non durable consumption for non-single households

		$1/\gamma$	β	θ_{AD}	θ_{CH}	θ_{EA}	κ	N	m	Hansen J test
Reported non durable consumption	AGMM	0.725***	-	0.0883***	0.0879***	0.0525*		11,745		16.70
		(0.277)		(0.0269)	(0.0192)	(0.0285)				0.001
	EGMM	1.121**	0.954***	0.0995	0.0832	0.0306*		17,273		72.18
		(0.460)	(0.0259)	(0.0767)	(0.0525)	(0.0172)				0.000
	GMM-K	1.220***	0.978***	0.0989***	0.0846***	0.0350**	1.049***	17,273		171.6
		(0.330)	(0.00224)	(0.0328)	(0.0241)	(0.0166)	(0.0267)			0.000
	GMM-D	0.830***	0.974***	0.121***	0.103**	0.0737		17,273		-
		(0.168)	(0.00484)	(0.0360)	(0.0511)	(0.0630)				
Panel imputations of non durable consumption	AGMM	0.635***		0.088***	0.087***	0.049		11,745	100	13.672
		(0.294)		(0.029)	(0.020)	(0.030)				0.003
	EGMM	0.690***	0.899***	0.209**	0.173**	0.067**		17,273	100	10.76
		(0.150)	(0.038)	(0.092)	(0.098)	(0.034)				0.013
	GMM-K	0.563***	0.965***	0.235***	0.177**	0.123**	1.305***	17,273	100	3.435
		(0.142)	(0.012)	(0.083)	(0.085)	(0.064)	(0.199)			0.329
	GMM-D	0.721***	0.972***	0.136**	0.141*	0.146		17,273	93	-
		(0.271)	(0.009)	(0.064)	(0.092)	(0.141)				
Cross imputations of non durable consumption	AGMM	0.640***		0.090***	0.088***	0.050		11,745	100	13.619
		(0.296)		(0.029)	(0.020)	(0.030)				0.003
	EGMM	0.702***	0.902***	0.200***	0.162**	0.067**		17,273	100	11.96
		(0.148)	(0.036)	(0.083)	(0.090)	(0.034)				0.007
	GMM-K	0.559***	0.964***	0.236***	0.172**	0.126**	1.313***	17,273	99	3.220
		(0.149)	(0.015)	(0.088)	(0.090)	(0.075)	(0.220)			0.359
	GMM-D	0.712***	0.972***	0.141**	0.146	0.148		17,273	87	-
		(0.301)	(0.014)	(0.080)	(0.117)	(0.199)				

AGMM: constant and dummy for wave 1998 are not reported; endogenous variables are $ln\,(1+r_{t+1})$, $\triangle ad_{t+1}$, $\triangle ch_{t+1}$, $\triangle ea_{t+1}$; instruments are $ln\,(1+r_{t-1})$, ad_{t-1}, ad_{t-2}, ch_{t-1}, ch_{t-2}, ea_{t-1}, ea_{t-2}. EGMM: instruments are $(1+r_t)$, ad_t, ad_{t-1}, ch_t, ch_{t-1}, ea_t, ea_{t-1}. GMM-K: instruments for the first equation are $(1+r_{t-1})$, ad_{t-1}, ch_{t-1} and instruments for the second equation are ad_{t-1}, ch_{t-1}, ea_{t-1}. GMM-D: instruments are $(1+r_{t-2})$, ad_{t-1}, ch_{t-1},ea_{t-1}.Column m reports the number of valid estimations (the model converged or the ratio between the max and min eigenvalue was less than 200,000). Hansen J test for the imputed dataset is the geometric average of the tests run on each single implicate. Degrees of freedom are 3 for AGMM and EGMM, and 2 for GMM-K. No test of overidentifying restriction is run for GMM-D because of exact identification.

Table 3.8: Estimation of Euler equation without the number of earners variable

		$1/\gamma$	β	θ_{AD}	θ_{CH}	θ_{EA}	κ	N	m	Hansen J test
Reported nondurable	AGMM	0.842***		0.105***	0.0308	-		14,233	-	11.69
consumption		(0.256)		(0.0182)	(0.0298)					0.003
	EGMM	1.290**	0.961***	0.0989*	0.0808**	-		20,995		155.1
		(0.511)	(0.0194)	(0.0592)	(0.0370)					0.000
	GMM-K	1.418***	0.979***	0.0990***	0.0811***	-	1.039***	20,995		294.4
		(0.439)	(0.00223)	(0.0320)	(0.0176)		(0.0230)			0.000
	GMM-D	0.890***	0.976***	0.179***	0.165***	-		20,995		-
		(0.167)	(0.00347)	(0.0479)	(0.0584)					
Panel imputations of	AGMM	0.765***		0.107***	0.031	-		14,233	100	10.250
nondurable consumption		(0.270)		(0.019)	(0.032)					0.006
	EGMM	0.732***	0.905***	0.197***	0.133*	-		20,995	100	23.74
		(0.167)	(0.037)	(0.075)	(0.074)					0.000
	GMM-K	0.826***	0.972***	0.170***	0.104***	-	1.129***	20,995	100	41.54
		(0.204)	(0.006)	(0.046)	(0.034)		(0.071)			0.000
	GMM-D	0.808***	0.975***	0.200*	0.189	-		20,995	100	-
		(0.264)	(0.005)	(0.105)	(0.129)					
Reported nondurable	AGMM	0.791***		0.106***	0.0507*	-		11,377		13.55
consumption		(0.276)		(0.0179)	(0.0290)					0.001
for non-single households	EGMM	1.096**	0.953***	0.105	0.0843	-		17,273		61.68
		(0.497)	(0.0300)	(0.0910)	(0.0605)					0.000
	GMM-K	1.127***	0.977***	0.111***	0.0887***	-	1.056***	17,273		137.4
		(0.289)	(0.00250)	(0.0376)	(0.0270)		(0.0301)			0.000
	chk GMM-D	0.886***	0.975***	0.131***	0.105**	-		17,273		-
		(0.155)	(0.00374)	(0.0333)	(0.0459)					
Panel imputations of	AGMM	0.704***		0.106***	0.047	-		11,377	100	11.38
nondurable consumption		(0.292)		(0.019)	(0.031)					0.003

for non-single households	EGMM	0.664***	0.892***	0.233**	0.190	-		17,273	100	6.465
		(0.171)	(0.049)	(0.117)	(0.117)					0.039
	GMM-K	0.826***	0.972***	0.170***	0.104***	-	1.129***	17,273	100	2.428
		(0.204)	(0.006)	(0.046)	(0.034)		(0.071)			0.297
	GMM-D	0.802***	0.975***	0.154***	0.137*	-		17,273		-
		(0.244)	(0.007)	(0.064)	(0.081)					

AGMM: constant and dummy for wave 1998 are not reported; endogenous variables are $ln\,(1+r_{t+1})$, $\triangle ad_{t+1}$, $\triangle ch_{t+1}$; instruments are $ln\,(1+r_{t-1})$, ad_{t-1}, ad_{t-2}, ch_{t-1}, ch_{t-2}. EGMM: instruments are $(1+r_t)$, ad_t, ad_{t-1}, ch_t, ch_{t-1}. GMM-K: instruments for the first equation are $(1+r_{t-1})$, ad_{t-1}, ch_{t-1} and instruments for the second equation are ad_{t-1}, ch_{t-1}. GMM-D: instruments are $(1+r_{t-2})$, ad_{t-1}, ch_{t-1}. Column m reports the number of valid estimations (the model converged or the ratio between the max and min eigenvalue was less than 200,000). Hansen J test for the imputed dataset is the geometric average of the tests run on each single implicate. Degrees of freedom are 2 for AGMM and EGMM, and 1 for GMM-K. No test of overidentifying restriction is run for GMM-D because of exact identification.

Table 3.9: Estimation of Euler equation with reported, panel and cross imputed food consumption

		$1/\gamma$	β	θ_{AD}	θ_{CH}	θ_{EA}	κ	N	m	Hansen J test
Reported food	AGMM	0.324		0.0798***	0.151***	0.114***		13,136		9.305
consumption		(0.342)		(0.0289)	(0.0213)	(0.0328)				0.026
	EGMM	-1.406	0.965***	-0.0982	-0.0496	-0.0265		19,354		120.6
		(1.863)	(0.0594)	(0.182)	(0.219)	(0.0320)				0.000
	GMM-K	-6.173***	0.983***	0.00612	0.0650***	-0.0387***	1.014***	19,354		2066
		(2.279)	(0.000434)	(0.00995)	(0.00907)	(0.00449)	(0.00233)			0.000
	GMM-D	1.136***	0.973***	0.173***	0.196***	0.0528		19,354		-
		(0.169)	(0.00260)	(0.0346)	(0.0466)	(0.0361)				
Panel imputations of	AGMM	0.233		0.090***	0.148***	0.112***		13,136	100	8.319
food consumption		(0.355)		(0.031)	(0.022)	(0.034)				0.040
	EGMM	-1.205**	0.955***	-0.124*	-0.073	-0.029**		19,354	44	82.87
		(0.581)	(0.032)	(0.084)	(0.108)	(0.014)				0.000
	GMM-K	-4.717**	0.983***	-0.003	0.056***	-0.040***	1.016***	19,354	73	1644.3
		(2.180)	(0.001)	(0.016)	(0.015)	(0.006)	(0.005)			0.000
	GMM-D	1.127***	0.973***	0.162***	0.190***	0.073**		19,354	100	-
		(0.178)	(0.003)	(0.033)	(0.048)	(0.040)				
Reported food	AGMM	0.454		0.0434	0.149***	0.120***		10,894		16.16
consumption		(0.366)		(0.0309)	(0.0212)	(0.0317)				0.001
for non-single households	EGMM	-1.252*	0.959***	-0.0984	-0.0447	-0.0236		15,998		88.12
		(0.661)	(0.0284)	(0.0631)	(0.0697)	(0.0161)				0.000
	GMM-K	-	-	-	-	-	-	15,998		-
	chk GMM-D	1.119***	0.974***	0.161***	0.178***	0.0121		15,998		-
		(0.189)	(0.00243)	(0.0366)	(0.0481)	(0.0362)				
Panel imputations of	AGMM	0.320		0.056*	0.145***	0.116***		10,894	100	14.026
food consumption		(0.380)		(0.033)	(0.022)	(0.033)				0.003
for non-single households	EGMM	-0.920**	0.934***	-0.140**	-0.082	-0.027*		15,998	92	33.23
		(0.410)	(0.049	(0.079)	(0.109)	(0.019)				0.000

GMM-K	-15.625	0.981***	0.012	0.068***	-0.043***	1.012***	15,998	28	3017.1
	(25.63)	(0.001	(0.015)	(0.014)	(0.005)	(0.003)			0.000
GMM-D	1.079	0.973	0.150	0.174	0.033		15,998	100	-
	(0.206)	(0.003	(0.037)	(0.053)	(0.041)				

AGMM: constant and dummy for wave 1998 are not reported; endogenous variables are $ln\,(1+r_{t+1})$, $\triangle ad_{t+1}$, $\triangle ch_{t+1}$, $\triangle ea_{t+1}$; instruments are $ln\,(1+r_{t-1})$, ad_{t-1}, ad_{t-2}, ch_{t-1}, ch_{t-2}, ea_{t-1}, ea_{t-2}. EGMM: instruments are $(1+r_t)$, ad_t, ad_{t-1}, ch_t, ch_{t-1}, ea_t, ea_{t-1}. GMM-K: instruments for the first equation are $(1+r_{t-1})$, ad_{t-1}, ch_{t-1} and instruments for the second equation are ad_{t-1}, ch_{t-1}, ea_{t-1}. GMM-D: instruments are $(1+r_{t-2})$, ad_{t-1}, ch_{t-1},ea_{t-1}.Column m reports the number of valid estimations (the model converged or the ratio between the max and min eigenvalue was less than 200,000). Hansen J test for the imputed dataset is the geometric average of the tests run on each single implicate. Degrees of freedom are 3 for AGMM and EGMM, and 2 for GMM-K. No test of overidentifying restriction is run for GMM-D because of exact identification.

Table 3.10: Estimations of Euler equation with a simple matching tecnique

		$1/\gamma$	β	θ_{AD}	θ_{CH}	θ_{EA}	κ	N	m	Hansen J test
Simple Matched	AGMM	1.408***		0.028	0.168***	0.064*		14,233	100	2.625
non durable consumption		(0.321)		(0.032)	(0.025)	(0.037)				0.453
	EGMM	0.566***	0.843***	0.274***	0.043	0.033		20,995	100	3.889
		(0.126)	(0.056)	(0.081)	(0.082)	(0.032)				0.274
	GMM-K	-1.812	0.989***	-0.052	0.048	-0.049	1.142**	20,995	9	678.5
		(3.515)	(0.007)	(0.140)	(0.069)	(0.057)	(0.501)			0.000
	GMM-D	1.189***	0.970***	0.150***	0.071**	0.014		20,995	100	-
		(0.197)	(0.003)	(0.032)	(0.033)	(0.033)				
Simple Matching tecnique	AGMM	1.730***		0.011	0.147***	0.043		11,044	100	3.22
non durable consumption		(0.347)		(0.034)	(0.027)	(0.039)				0.359
for non-single households	EGMM	0.589***	0.855***	0.233***	0.020	0.021		17,273	100	3.58
		(0.130)	(0.050)	(0.074)	(0.076)	(0.031)				0.310
	GMM-K	-1.912	0.989***	-0.050	0.054***	-0.036**	1.066***	17,273	21	445.2
		(2.376)	(0.006)	(0.076)	(0.020)	(0.021)	0.174			0.000
	GMM-D	1.307***	0.971***	0.118***	0.042*	-0.002		17,273	100	-
		(0.212)	(0.002)	(0.027)	(0.031)	(0.030)				

AGMM: constant and dummy for wave 1998 are not reported; endogenous variables are $ln\,(1+r_{t+1})$, $\triangle ad_{t+1}$, $\triangle ch_{t+1}$, $\triangle ea_{t+1}$; instruments are $ln\,(1+r_{t-1})$, ad_{t-1}, ad_{t-2}, ch_{t-1}, ch_{t-2}, ea_{t-1}, ea_{t-2}. EGMM: instruments are $(1+r_t)$, ad_t, ad_{t-1}, ch_t, ch_{t-1}, ea_t, ea_{t-1}. GMM-K: instruments for the first equation are $(1+r_{t-1})$, ad_{t-1}, ch_{t-1} and instruments for the second equation are ad_{t-1}, ch_{t-1}, ea_{t-1}. GMM-D: instruments are $(1+r_{t-2})$, ad_{t-1}, ch_{t-1},ea_{t-1}.Column m reports the number of valid estimations (the model converged or the ratio between the max and min eigenvalue was less than 200,000). Hansen J test for the imputed dataset is the geometric average of the tests run on each single implicate. Degrees of freedom are 3 for AGMM and EGMM, and 2 for GMM-K. No test of overidentifying restriction is run for GMM-D because of exact identification.

Table 3.11: Estimations of Euler equation with reported non durable consumption including rents and non-monetary transfers

		$1/\gamma$	β	θ_{AD}	θ_{CH}	θ_{EA}	κ	N	m	Hansen J test
Reported non durable	AGMM	0.972***	-	0.0999***	0.0606***	0.00976		14,233	-	10.13
consumption including		(0.220)		(0.0222)	(0.0166)	(0.0253)				0.018
rents and non monetary	EGMM	0.665***	0.928***	0.190***	0.121*	0.0412**		20,995	-	16.86
transfers		(0.100)	(0.0179)	(0.0596)	(0.0635)	(0.0197)				0.001
	GMM-K	0.737***	0.983***	0.158***	0.116***	0.0541***	1.108***	20,995	-	20.00
		(0.146)	(0.00197)	(0.0393)	(0.0348)	(0.0167)	(0.0465)			0.000
	GMM-D	1.038***	0.984***	0.0902***	0.0811***	0.0629**		20,995	-	-
		(0.133)	(0.00136)	(0.0204)	(0.0281)	(0.0287)				
Reported non durable	AGMM	0.943***		0.0852***	0.0724***	0.0310		11,745	-	9.902
consumption including		(0.229)		(0.0235)	(0.0170)	(0.0256)				0.019
rents and non monetary	EGMM	0.668***	0.929***	0.187***	0.124*	0.0271		17,273	-	11.94
transfers		(0.102)	(0.0180)	(0.0601)	(0.0652)	(0.0203)				0.008
for non-single households	GMM-K	0.587***	0.984***	0.209***	0.167***	0.0401	1.181***	17,273	-	4.298
		(0.093)	(0.00287)	(0.0561)	(0.0630)	(0.0258)	(0.0646)			0.117
	GMM-D	0.970***	0.984***	0.0833***	0.0655**	0.0559*		17,273	-	-
		(0.146)	(0.00153)	(0.0229)	(0.0307)	(0.0326)				

AGMM: constant and dummy for wave 1998 are not reported; endogenous variables are $ln\,(1+r_{t+1})$, $\triangle ad_{t+1}$, $\triangle ch_{t+1}$, $\triangle ea_{t+1}$; instruments are $ln\,(1+r_{t-1})$, ad_{t-1}, ad_{t-2}, ch_{t-1}, ch_{t-2}, ea_{t-1}, ea_{t-2}. EGMM: instruments are $(1+r_t)$, ad_t, ad_{t-1}, ch_t, ch_{t-1}, ea_t, ea_{t-1}. GMM-K: instruments for the first equation are $(1+r_{t-1})$, ad_{t-1}, ch_{t-1} and instruments for the second equation are ad_{t-1}, ch_{t-1}, ea_{t-1}. GMM-D: instruments are $(1+r_{t-2})$, ad_{t-1}, ch_{t-1},ea_{t-1}.Column m reports the number of valid estimations (the model converged or the ratio between the max and min eigenvalue was less than 200,000). Hansen J test for the imputed dataset is the geometric average of the tests run on each single implicate. Degrees of freedom are 3 for AGMM and EGMM, and 2 for GMM-K. No test of overidentifying restriction is run for GMM-D because of exact identification.

Appendix

Figure A.1: Figures of food consumption distribution per wave from 1991 to 2000

SHIW	SFB weighted	Average SHIW imputations

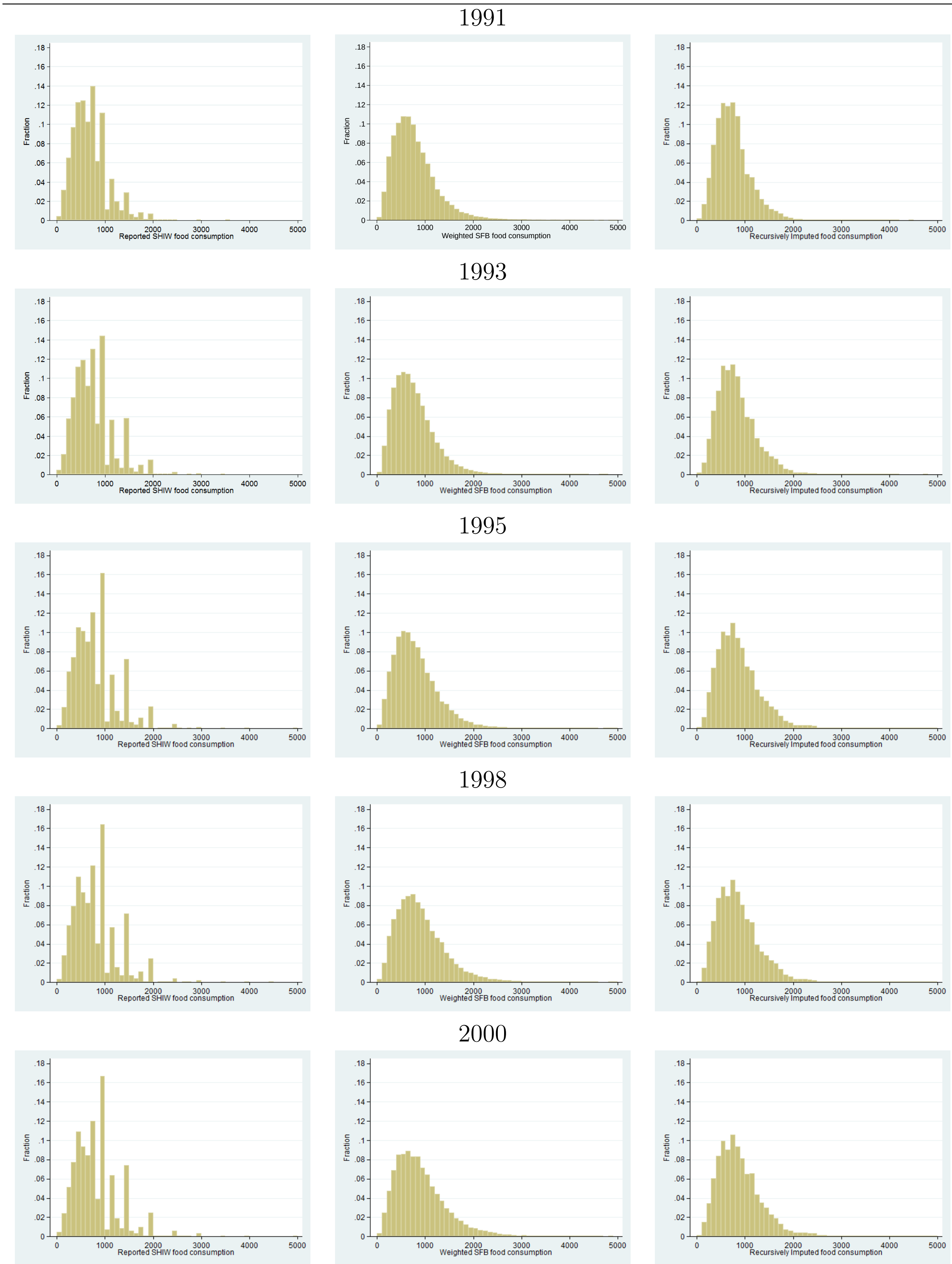
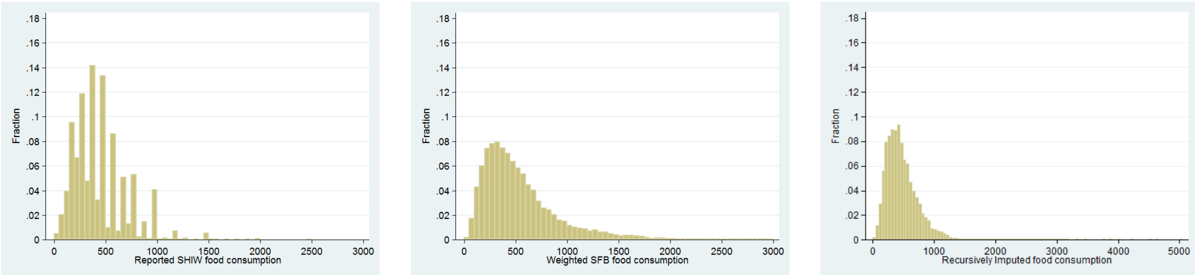


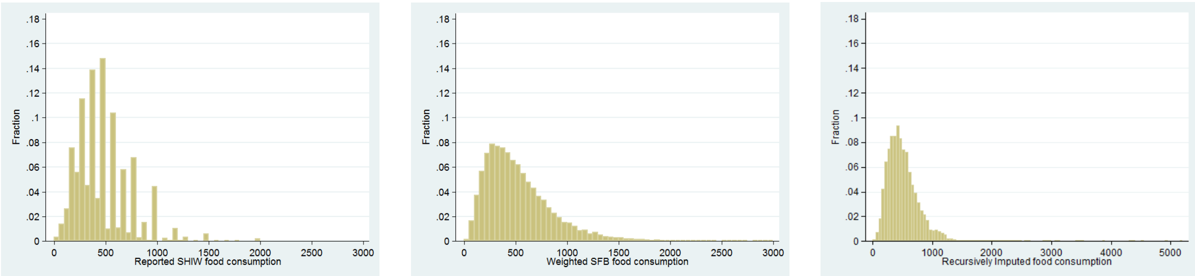
Figure A.2: Figures of food consumption distribution per wave from 2002 to 2010

SHIW	SFB weighted	Average SHIW imputations

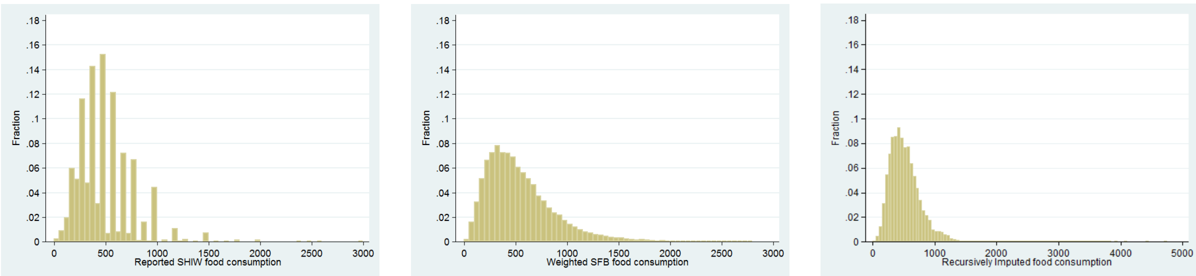
2002



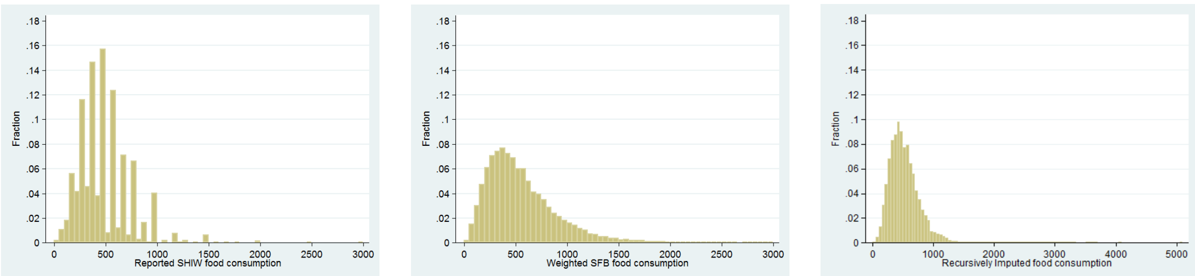
2004



2006



2008



2010

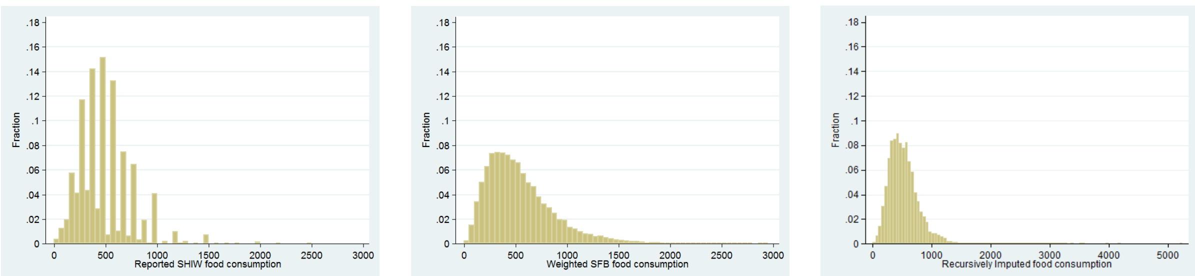


Figure A.3: Comulative distribution functions of reported and imputed food consumption from SHIW and reported consumption from SFB

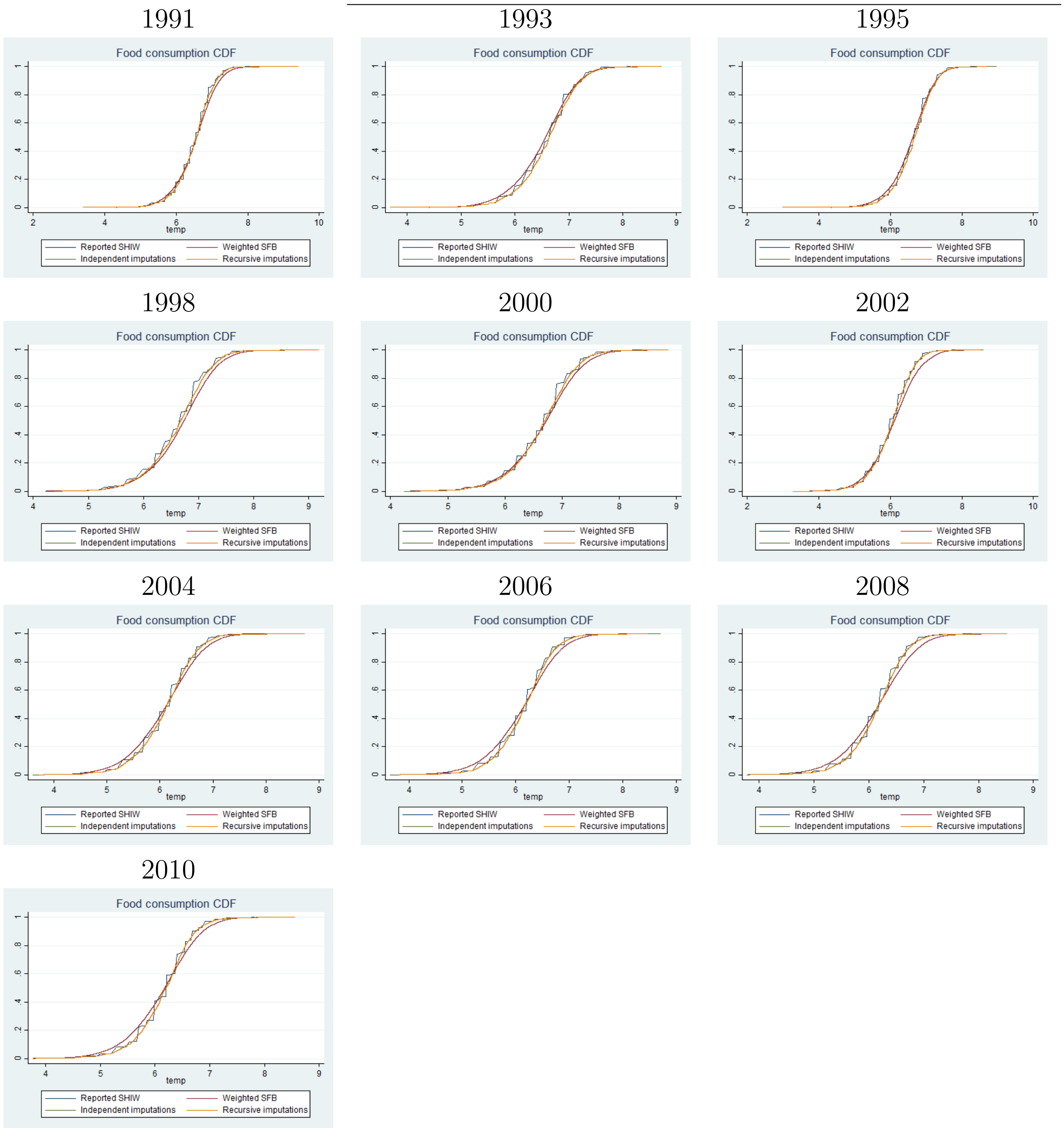


Table A.1: Estimation of Φ for food consumption for waves between 1991 and 2010 - recursive method

	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010
w	0.734***	0.799***	0.805***	0.841***	0.792***	0.878***	0.937***	0.978***	0.843***	0.900***
	(0.062)	(0.055)	(0.051)	(0.056)	(0.053)	(0.047)	(0.050)	(0.051)	(0.050)	(0.050)
$g^*_{t-1} = -1$	-0.131	-0.089	-0.183*	-0.214*	-0.084	-0.173*	-0.063	-0.164	-0.382**	-0.030
	(0.114)	(0.076)	(0.094)	(0.126)	(0.105)	(0.094)	(0.106)	(0.141)	(0.187)	(0.169)
$g^*_{t-1} = 1$	0.026	-0.069**	-0.044	0.053	-0.015	0.010	-0.049	-0.109**	-0.180***	-0.167***
	(0.040)	(0.033)	(0.032)	(0.037)	(0.032)	(0.031)	(0.045)	(0.047)	(0.047)	(0.047)
$g^*_{t-1} = 2$	0.099	0.034	0.177**	0.154*	0.115	0.163**	0.083**	0.011	0.016	0.020
	(0.145)	(0.124)	(0.088)	(0.090)	(0.078)	(0.076)	(0.035)	(0.034)	(0.032)	(0.034)
$g^*_{t-1} = 3$	0.052	0.100	0.326***	0.175*	0.233**	0.198**	0.224**	0.148*	0.201**	0.279***
	(0.189)	(0.139)	(0.103)	(0.099)	(0.091)	(0.086)	(0.089)	(0.082)	(0.084)	(0.094)
Having a bank account	0.046	0.121***	0.046	0.062	0.062	-0.002	-0.034	0.034	0.090*	0.199***
	(0.039)	(0.038)	(0.039)	(0.046)	(0.045)	(0.039)	(0.040)	(0.054)	(0.049)	(0.054)
Bank payments	0.070*	0.020	0.014	0.058	0.049			-0.072**	-0.063**	-0.022
	(0.042)	(0.038)	(0.035)	(0.036)	(0.034)			(0.031)	(0.031)	(0.032)
POS payments	-0.023	-0.086	-0.061	-0.006	0.011	-0.026	0.022	0.035	0.000	-0.005
	(0.075)	(0.057)	(0.045)	(0.038)	(0.036)	(0.033)	(0.036)	(0.036)	(0.037)	(0.041)
Credit card	0.116**	0.119**	0.091**	0.155***	0.057	0.101***	0.020	0.051	0.085**	0.052
	(0.048)	(0.049)	(0.043)	(0.041)	(0.038)	(0.036)	(0.035)	(0.034)	(0.034)	(0.034)
Age > 70	0.019	-0.103**	0.055	0.094*	-0.097*	-0.143***	-0.060	-0.016	-0.014	-0.023
	(0.056)	(0.042)	(0.050)	(0.057)	(0.053)	(0.050)	(0.050)	(0.048)	(0.046)	(0.053)
Fair understanding		-0.072	0.056	0.054	-0.030	-0.119**	0.073	-0.096**	-0.020	-0.032
		(0.068)	(0.046)	(0.053)	(0.051)	(0.048)	(0.049)	(0.045)	(0.044)	(0.049)
Good understanding		-0.233*	0.152***	0.112**	0.021	-0.100*	-0.010	0.003	0.021	0.012
		(0.123)	(0.051)	(0.050)	(0.046)	(0.055)	(0.057)	(0.044)	(0.042)	(0.046)
Excellent understanding		0.075	-0.063	0.072	0.019	0.027	0.064	0.005	-0.014	0.013
		(0.047)	(0.048)	(0.050)	(0.045)	(0.038)	(0.042)	(0.038)	(0.036)	(0.036)

	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010
Long interview			0.000	-0.004	0.163***	0.010	0.009	0.028	0.032	0.013
			(0.049)	(0.048)	(0.044)	(0.045)	(0.038)	(0.036)	(0.033)	(0.039)
Euro						0.009	0.030***			
						(0.010)	(0.010)			
τ_1	5.442***	5.739***	5.750***	6.082***	5.622***	4.470***	5.024***	4.979***	4.221***	4.614***
	(0.402)	(0.364)	(0.334)	(0.363)	(0.344)	(0.280)	(0.303)	(0.308)	(0.301)	(0.298)
τ_2	5.999***	6.311***	6.328***	6.666***	6.207***	6.219***	6.834***	6.852***	6.090***	6.562***
	(0.404)	(0.365)	(0.335)	(0.364)	(0.345)	(0.284)	(0.308)	(0.312)	(0.305)	(0.303)
	w	w	w	w	w	w	w	w	w	w
Number of members 18-24	0.102***	0.093***	0.116***	0.101***	0.128***	0.115***	0.151***	0.052**	0.138***	0.096***
	(0.023)	(0.024)	(0.025)	(0.029)	(0.028)	(0.029)	(0.027)	(0.026)	(0.025)	(0.027)
Number of members 25-39	0.122***	0.119***	0.113***	0.142***	0.147***	0.158***	0.163***	0.102***	0.153***	0.089***
	(0.021)	(0.021)	(0.022)	(0.025)	(0.025)	(0.025)	(0.024)	(0.023)	(0.023)	(0.023)
Number of members 40-59	0.132***	0.130***	0.172***	0.159***	0.169***	0.147***	0.179***	0.139***	0.195***	0.126***
	(0.020)	(0.020)	(0.021)	(0.024)	(0.023)	(0.024)	(0.024)	(0.022)	(0.022)	(0.023)
Number of members 60-69	0.107***	0.114***	0.150***	0.162***	0.142***	0.119***	0.147***	0.128***	0.181***	0.116***
	(0.022)	(0.021)	(0.023)	(0.026)	(0.025)	(0.026)	(0.025)	(0.024)	(0.023)	(0.024)
Number of members 70+	0.100***	0.087***	0.103***	0.105***	0.057**	0.074***	0.103***	0.090***	0.156***	0.051*
	(0.026)	(0.024)	(0.025)	(0.030)	(0.027)	(0.028)	(0.028)	(0.026)	(0.025)	(0.027)
Central Italy	0.058	0.035	0.142***	0.075	0.089**	0.029	0.004	0.026	0.047	-0.134***
	(0.040)	(0.039)	(0.040)	(0.047)	(0.044)	(0.041)	(0.039)	(0.040)	(0.037)	(0.042)
Southern Italy	-0.163***	-0.085**	-0.059*	-0.174***	-0.140***	-0.134***	-0.148***	-0.018	-0.083**	-0.074**
	(0.034)	(0.034)	(0.035)	(0.040)	(0.037)	(0.037)	(0.036)	(0.034)	(0.033)	(0.036)
Number of children 0-5	0.040***	0.042***	0.057***	0.076***	0.067***	0.036*	0.041**	0.058***	0.047***	0.016
	(0.015)	(0.016)	(0.016)	(0.019)	(0.018)	(0.020)	(0.020)	(0.018)	(0.018)	(0.020)
Number of children 6-14	0.055***	0.076***	0.056***	0.101***	0.081***	0.038**	0.066***	0.055***	0.053***	0.053***
	(0.011)	(0.012)	(0.013)	(0.014)	(0.015)	(0.016)	(0.016)	(0.015)	(0.014)	(0.016)

	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010
Number of children 15-17	0.061***	0.081***	0.100***	0.072***	0.087***	0.074***	0.060***	0.084***	0.032*	0.022
	(0.014)	(0.016)	(0.017)	(0.018)	(0.019)	(0.021)	(0.021)	(0.019)	(0.019)	(0.021)
Number of children 18+	0.022	0.009	-0.002	-0.001	0.000	-0.013	-0.041**	0.038**	-0.031*	-0.009
	(0.018)	(0.018)	(0.018)	(0.021)	(0.019)	(0.019)	(0.018)	(0.018)	(0.018)	(0.017)
Number of retired members	0.008	0.029**	0.007	0.027	0.028*	0.041***	0.020	0.023	0.024*	0.045***
	(0.015)	(0.014)	(0.014)	(0.016)	(0.015)	(0.015)	(0.015)	(0.015)	(0.014)	(0.015)
At least 2 members	0.267***	0.360***	0.286***	0.279***	0.287***	0.305***	0.303***	0.304***	0.305***	0.312***
	(0.025)	(0.023)	(0.024)	(0.027)	(0.024)	(0.026)	(0.026)	(0.024)	(0.023)	(0.025)
At least 3 members	0.115***	0.151***	0.133***	0.135***	0.125***	0.148***	0.092***	0.093***	0.092***	0.131***
	(0.017)	(0.017)	(0.018)	(0.020)	(0.019)	(0.021)	(0.020)	(0.019)	(0.019)	(0.020)
At least 4 members	0.042**	0.069***	0.086***	0.045**	0.048**	0.045*	0.042*	0.026	0.041**	0.063***
	(0.017)	(0.018)	(0.019)	(0.021)	(0.021)	(0.023)	(0.022)	(0.021)	(0.021)	(0.022)
Gender (male)	0.032	0.097***	0.066***	0.102***	0.044**	0.061***	0.049**	0.083***	0.004	0.072***
	(0.022)	(0.021)	(0.022)	(0.024)	(0.022)	(0.021)	(0.019)	(0.018)	(0.018)	(0.019)
Age of the head	0.018***	0.022***	0.014***	0.015***	0.015***	0.017***	0.010**	0.013***	0.014***	0.000
	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Age of the head^2	-0.016***	-0.016***	-0.009**	-0.009**	-0.008**	-0.011***	-0.003	-0.009**	-0.008**	0.007*
	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)
Head unemployed	-0.202***	-0.207***	-0.329***	-0.286***	-0.262***	-0.276***	-0.249***	-0.183***	-0.242***	-0.225***
	(0.035)	(0.029)	(0.024)	(0.024)	(0.027)	(0.029)	(0.027)	(0.026)	(0.025)	(0.023)
Head out of labor force	-0.095***	-0.032**	-0.019	-0.018	-0.036**	-0.048***	-0.064***	-0.026	-0.056***	-0.028*
	(0.015)	(0.016)	(0.016)	(0.017)	(0.016)	(0.017)	(0.016)	(0.016)	(0.015)	(0.016)
Education ≥ 8	0.088***	0.105***	0.152***	0.126***	0.120***	0.153***	0.135***	0.093***	0.076***	0.090***
	(0.018)	(0.017)	(0.018)	(0.021)	(0.020)	(0.020)	(0.019)	(0.019)	(0.017)	(0.020)
Education ≥ 13	0.019	0.031*	0.037**	0.025	0.025	0.053***	0.019	0.045***	0.067***	0.070***
	(0.018)	(0.019)	(0.018)	(0.019)	(0.018)	(0.018)	(0.017)	(0.015)	(0.015)	(0.017)
University degree	0.104***	0.053*	0.078***	0.162***	0.110***	0.080***	0.081***	0.104***	0.071***	0.070***
	(0.027)	(0.029)	(0.027)	(0.029)	(0.025)	(0.027)	(0.024)	(0.023)	(0.022)	(0.023)

	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010
Center * number 18-24	-0.062***	-0.025	-0.018	0.009	-0.054*	-0.022	-0.026	-0.051*	-0.037	-0.030
	(0.022)	(0.022)	(0.023)	(0.026)	(0.028)	(0.029)	(0.028)	(0.028)	(0.028)	(0.029)
Center * number 25-39	-0.036*	-0.045**	-0.022	-0.016	-0.035*	-0.032	0.020	-0.039**	-0.043**	0.033
	(0.020)	(0.020)	(0.019)	(0.021)	(0.021)	(0.021)	(0.020)	(0.020)	(0.020)	(0.021)
Center * number 40-59	0.013	-0.002	-0.029	-0.009	-0.038*	0.003	0.023	-0.019	-0.033	0.045**
	(0.022)	(0.021)	(0.021)	(0.023)	(0.022)	(0.022)	(0.021)	(0.021)	(0.021)	(0.022)
Center * number 60-69	0.034	-0.007	-0.094***	-0.017	-0.041	0.025	0.023	-0.002	-0.033	0.016
	(0.024)	(0.024)	(0.024)	(0.028)	(0.026)	(0.025)	(0.024)	(0.023)	(0.022)	(0.023)
Center * number 70+	0.040	0.021	-0.050*	0.008	0.007	0.050*	0.028	0.031	-0.045*	0.044*
	(0.027)	(0.025)	(0.026)	(0.030)	(0.028)	(0.028)	(0.026)	(0.025)	(0.024)	(0.025)
Center * education≥8	-0.004	0.000	-0.094***	-0.040	-0.039	0.007	-0.044	0.027	-0.016	-0.020
	(0.031)	(0.030)	(0.032)	(0.037)	(0.035)	(0.034)	(0.033)	(0.033)	(0.030)	(0.034)
Center * education≥13	0.024	0.019	0.040	0.026	0.039	0.043	0.056*	0.039	0.025	0.003
	(0.033)	(0.033)	(0.032)	(0.034)	(0.033)	(0.033)	(0.031)	(0.029)	(0.028)	(0.029)
Center * degree	-0.042	-0.048	-0.034	-0.073	0.006	-0.063	-0.008	0.015	0.014	0.045
	(0.050)	(0.051)	(0.050)	(0.049)	(0.047)	(0.051)	(0.045)	(0.042)	(0.040)	(0.039)
Center * gender	-0.029	-0.036	-0.007	-0.069*	0.052	-0.035	-0.006	-0.026	0.045	0.011
	(0.036)	(0.035)	(0.036)	(0.039)	(0.036)	(0.036)	(0.033)	(0.032)	(0.030)	(0.032)
South * number 18-24	-0.052***	-0.041**	-0.046**	-0.003	-0.062***	-0.057**	-0.046**	-0.050**	-0.054***	-0.040*
	(0.017)	(0.018)	(0.018)	(0.021)	(0.022)	(0.023)	(0.022)	(0.022)	(0.020)	(0.022)
South * number 25-39	-0.056***	-0.037**	-0.011	-0.038**	-0.042**	-0.060***	-0.024	-0.061***	-0.034**	-0.017
	(0.016)	(0.016)	(0.017)	(0.018)	(0.017)	(0.017)	(0.017)	(0.016)	(0.016)	(0.018)
South * number 40-59	-0.041**	-0.041**	-0.041**	-0.024	-0.065***	-0.064***	-0.037**	-0.081***	-0.069***	-0.079***
	(0.018)	(0.018)	(0.019)	(0.020)	(0.019)	(0.019)	(0.019)	(0.018)	(0.018)	(0.019)
South * number 60-69	-0.016	-0.038*	-0.035*	-0.053**	-0.067***	-0.047**	-0.047**	-0.064***	-0.091***	-0.063***
	(0.020)	(0.020)	(0.021)	(0.023)	(0.022)	(0.022)	(0.022)	(0.020)	(0.020)	(0.021)
South * number 70+	0.019	0.019	0.003	-0.033	0.003	-0.023	-0.035	-0.080***	-0.092***	-0.051**
	(0.025)	(0.023)	(0.024)	(0.027)	(0.024)	(0.025)	(0.024)	(0.022)	(0.022)	(0.023)

	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010
South * education$\geq$ 8	0.032	0.032	-0.031	-0.013	0.029	-0.005	-0.010	0.043	0.050**	0.044
	(0.025)	(0.026)	(0.026)	(0.030)	(0.029)	(0.029)	(0.028)	(0.027)	(0.025)	(0.028)
South * education$\geq$ 13	0.081***	0.107***	0.123***	0.113***	0.099***	0.076***	0.129***	0.051**	0.034	0.035
	(0.028)	(0.029)	(0.028)	(0.029)	(0.029)	(0.029)	(0.028)	(0.025)	(0.025)	(0.026)
South * degree	0.015	0.102**	0.117***	0.008	0.043	0.110**	0.084**	0.052	0.055	0.027
	(0.040)	(0.043)	(0.042)	(0.042)	(0.041)	(0.043)	(0.041)	(0.038)	(0.038)	(0.037)
South * gender	0.064**	-0.045	-0.006	0.003	0.039	0.041	0.045	0.020	0.047*	0.024
	(0.030)	(0.030)	(0.030)	(0.034)	(0.030)	(0.030)	(0.029)	(0.027)	(0.026)	(0.028)
Total surface	0.039**	-0.011	0.023	0.016	0.025	0.033*	0.042**	0.050***	0.027	0.056***
	(0.019)	(0.017)	(0.016)	(0.017)	(0.016)	(0.017)	(0.020)	(0.018)	(0.017)	(0.019)
Per-capita surface	0.020	0.102***	0.010	0.067*	0.047	0.038	0.084**	-0.021	0.009	-0.018
	(0.043)	(0.036)	(0.034)	(0.038)	(0.033)	(0.034)	(0.040)	(0.037)	(0.035)	(0.039)
Homeowner	0.030***	0.007	0.043***	0.031***	0.049***	0.051***	0.035***	0.057***	0.078***	0.097***
	(0.010)	(0.010)	(0.010)	(0.011)	(0.011)	(0.011)	(0.011)	(0.010)	(0.010)	(0.011)
Secondary residence	0.049***	0.061***	0.075***	0.132***	0.096***	0.084***	0.082***	0.111***	0.046**	0.048**
	(0.018)	(0.018)	(0.018)	(0.020)	(0.021)	(0.022)	(0.021)	(0.019)	(0.019)	(0.019)
Constant	5.303***	5.030***	5.248***	5.225***	5.276***	4.580***	4.857***	4.916***	4.832***	5.173***
	(0.108)	(0.109)	(0.113)	(0.129)	(0.118)	(0.117)	(0.109)	(0.109)	(0.102)	(0.108)
$ln\,(\sigma)$	-0.940***	-0.922***	-0.913***	-0.873***	-0.871***	-0.853***	-0.900***	-0.968***	-1.020***	-0.954***
	(0.008)	(0.008)	(0.008)	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
N	7816	7685	7662	6795	7580	7471	7441	7141	7235	7155
N1	6891	7172	7221	6471	7192	7206	7310	7031	7125	6976
F-test instruments	16.54	37.82	27.34	44.37	43.57	18.63	34.93	18.04	17.64	27.28
p-value	0.01	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.04	0.00
F-test g^*_{t-1}	3.97	8.24	32.19	14.49	17.01	19.28	18.94	15.34	36.06	38.04
p-value	0.41	0.08	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00

Table A.2: Estimation of Φ for food consumption for waves between 1991 and 2010 - cross method

	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010
w	0.741***	0.808***	0.836***	0.856***	0.813***	0.901***	0.964***	1.005***	0.883***	0.937***
	(0.0618)	(0.0549)	(0.0503)	(0.0552)	(0.0521)	(0.0470)	(0.0495)	(0.0507)	(0.0498)	(0.0494)
Having a bank account	0.0460	0.121***	0.0480	0.0652	0.0632	-0.000216	-0.0322	0.0345	0.0969**	0.203***
	(0.0389)	(0.0385)	(0.0394)	(0.0456)	(0.0448)	(0.0389)	(0.0398)	(0.0543)	(0.0485)	(0.0536)
Bank payments	0.0705*	0.0223	0.0118	0.0584	0.0516			-0.0706**	-0.0671**	-0.0211
	(0.0418)	(0.0377)	(0.0352)	(0.0359)	(0.0336)			(0.0312)	(0.0314)	(0.0321)
POS payments	-0.0205	-0.0843	-0.0659	-0.00536	0.0113	-0.0252	0.0245	0.0382	0.00356	-0.00292
	(0.0754)	(0.0566)	(0.0445)	(0.0382)	(0.0355)	(0.0329)	(0.0356)	(0.0358)	(0.0372)	(0.0412)
Credit card	0.115**	0.120**	0.101**	0.156***	0.0628*	0.103***	0.0231	0.0549	0.0878***	0.0570*
	(0.0475)	(0.0492)	(0.0431)	(0.0407)	(0.0375)	(0.0360)	(0.0346)	(0.0341)	(0.0337)	(0.0338)
Age > 70	0.0208	0.0762	-0.0589	0.0742	0.0206	0.0273	0.0113	0.00588	-0.0168	0.00815
	(0.0563)	(0.0469)	(0.0480)	(0.0499)	(0.0445)	(0.0382)	(0.0382)	(0.0384)	(0.0362)	(0.0365)
Fair understanding		-0.103**	0.0570	0.0930	-0.0986*	-0.143***	-0.0639	-0.0112	-0.0202	-0.0200
		(0.0425)	(0.0503)	(0.0568)	(0.0532)	(0.0499)	(0.0499)	(0.0478)	(0.0455)	(0.0528)
Good understanding		-0.0726	0.0585	0.0532	-0.0302	-0.120**	0.0701	-0.0925**	-0.0269	-0.0329
		(0.0684)	(0.0461)	(0.0527)	(0.0508)	(0.0484)	(0.0494)	(0.0453)	(0.0442)	(0.0490)
Excellent understanding		-0.234*	0.158***	0.114**	0.0219	-0.101*	-0.0115	0.00512	0.0171	0.0131
		(0.123)	(0.0510)	(0.0495)	(0.0458)	(0.0545)	(0.0571)	(0.0436)	(0.0423)	(0.0463)
Long interview				-0.00624	0.163***	0.0161	0.0645	0.0286	0.0369	0.0178
				(0.0482)	(0.0444)	(0.0449)	(0.0418)	(0.0359)	(0.0332)	(0.0388)
Euro						0.00944	0.0303***			
						(0.0100)	(0.0104)			
Panel	0.0189	-0.0535*	0.000940	0.0689**	0.0182	0.0351	0.0424	-0.0173	-0.0207	-0.00970
	(0.0350)	(0.0298)	(0.0290)	(0.0314)	(0.0289)	(0.0275)	(0.0273)	(0.0278)	(0.0276)	(0.0282)
τ_1	5.303***	5.797***	5.965***	6.191***	5.768***	4.609***	5.188***	5.152***	4.474***	4.850***
	(0.108)	(0.361)	(0.330)	(0.361)	(0.341)	(0.277)	(0.300)	(0.304)	(0.297)	(0.294)

	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010
τ_2	5.491***	6.369***	6.540***	6.774***	6.352***	6.356***	6.995***	7.022***	6.337***	6.791***
	(0.401)	(0.362)	(0.331)	(0.362)	(0.342)	(0.281)	(0.304)	(0.308)	(0.301)	(0.299)
	w	w	w	w	w	w	w	w	w	w
Number of members 18-24	0.102***	0.0932***	0.116***	0.101***	0.127***	0.115***	0.151***	0.0518**	0.139***	0.0962***
	(0.0230)	(0.0237)	(0.0249)	(0.0285)	(0.0278)	(0.0288)	(0.0272)	(0.0256)	(0.0253)	(0.0268)
Number of members 25-39	0.122***	0.119***	0.113***	0.141***	0.147***	0.158***	0.162***	0.102***	0.153***	0.0887***
	(0.0211)	(0.0207)	(0.0223)	(0.0250)	(0.0246)	(0.0253)	(0.0244)	(0.0231)	(0.0231)	(0.0232)
Number of members 40-59	0.132***	0.130***	0.172***	0.159***	0.169***	0.147***	0.178***	0.139***	0.195***	0.127***
	(0.0205)	(0.0197)	(0.0212)	(0.0242)	(0.0234)	(0.0241)	(0.0235)	(0.0223)	(0.0220)	(0.0230)
Number of members 60-69	0.107***	0.114***	0.151***	0.162***	0.142***	0.119***	0.147***	0.128***	0.181***	0.116***
	(0.0221)	(0.0214)	(0.0225)	(0.0263)	(0.0250)	(0.0259)	(0.0253)	(0.0238)	(0.0233)	(0.0244)
Number of members 70+	0.0997***	0.0866***	0.103***	0.106***	0.0568**	0.0736***	0.103***	0.0892***	0.156***	0.0510*
	(0.0256)	(0.0244)	(0.0250)	(0.0296)	(0.0273)	(0.0280)	(0.0275)	(0.0264)	(0.0251)	(0.0269)
Central Italy	0.0580	0.0349	0.143***	0.0751	0.0883**	0.0289	0.00359	0.0259	0.0473	-0.133***
	(0.0399)	(0.0394)	(0.0404)	(0.0466)	(0.0436)	(0.0413)	(0.0392)	(0.0396)	(0.0373)	(0.0416)
Southern Italy	-0.163***	-0.0849**	-0.0590*	-0.173***	-0.141***	-0.134***	-0.148***	-0.0184	-0.0826**	-0.0745**
	(0.0343)	(0.0342)	(0.0349)	(0.0404)	(0.0369)	(0.0367)	(0.0354)	(0.0340)	(0.0330)	(0.0359)
Number of children 0-5	0.0397***	0.0414***	0.0565***	0.0757***	0.0666***	0.0359*	0.0404**	0.0576***	0.0474***	0.0162
	(0.0148)	(0.0157)	(0.0163)	(0.0188)	(0.0184)	(0.0203)	(0.0195)	(0.0181)	(0.0181)	(0.0198)
Number of children 6-14	0.0552***	0.0760***	0.0551***	0.101***	0.0812***	0.0379**	0.0652***	0.0546***	0.0532***	0.0528***
	(0.0114)	(0.0124)	(0.0127)	(0.0142)	(0.0149)	(0.0164)	(0.0159)	(0.0149)	(0.0144)	(0.0157)
Number of children 15-17	0.0610***	0.0807***	0.100***	0.0717***	0.0876***	0.0745***	0.0604***	0.0842***	0.0329*	0.0215
	(0.0142)	(0.0158)	(0.0168)	(0.0184)	(0.0194)	(0.0208)	(0.0206)	(0.0194)	(0.0189)	(0.0206)
Number of children 18+	0.0219	0.00955	-0.00210	-0.000922	0.000201	-0.0128	-0.0409**	0.0380**	-0.0315*	-0.00859
	(0.0177)	(0.0178)	(0.0184)	(0.0209)	(0.0190)	(0.0189)	(0.0184)	(0.0175)	(0.0176)	(0.0174)
Number of retired members	0.00806	0.0290**	0.00716	0.0267	0.0280*	0.0411***	0.0196	0.0226	0.0236*	0.0444***
	(0.0146)	(0.0140)	(0.0143)	(0.0164)	(0.0153)	(0.0152)	(0.0150)	(0.0146)	(0.0137)	(0.0152)

	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010
At least 2 members	0.267***	0.360***	0.286***	0.279***	0.287***	0.304***	0.303***	0.304***	0.305***	0.312***
	(0.0249)	(0.0234)	(0.0237)	(0.0268)	(0.0244)	(0.0258)	(0.0257)	(0.0238)	(0.0229)	(0.0249)
At least 3 members	0.115***	0.151***	0.133***	0.135***	0.125***	0.148***	0.0924***	0.0932***	0.0910***	0.130***
	(0.0172)	(0.0174)	(0.0178)	(0.0200)	(0.0195)	(0.0208)	(0.0203)	(0.0189)	(0.0185)	(0.0202)
At least 4 members	0.0416**	0.0694***	0.0869***	0.0453**	0.0485**	0.0453**	0.0425*	0.0258	0.0409**	0.0628***
	(0.0174)	(0.0182)	(0.0187)	(0.0208)	(0.0209)	(0.0231)	(0.0223)	(0.0212)	(0.0206)	(0.0222)
Gender (male)	0.0318	0.0966***	0.0662***	0.102***	0.0442**	0.0606***	0.0497**	0.0827***	0.00382	0.0717***
	(0.0217)	(0.0207)	(0.0218)	(0.0243)	(0.0218)	(0.0211)	(0.0194)	(0.0182)	(0.0175)	(0.0189)
Age of the head	0.0180***	0.0218***	0.0145***	0.0147***	0.0145***	0.0173***	0.00962**	0.0133***	0.0141***	-0.000243
	(0.00399)	(0.00401)	(0.00415)	(0.00482)	(0.00431)	(0.00429)	(0.00401)	(0.00402)	(0.00375)	(0.00401)
Age of the head^2	-0.0155***	-0.0156***	-0.00923**	-0.00921**	-0.00826**	-0.0105***	-0.00348	-0.00871**	-0.00757**	0.00681*
	(0.00376)	(0.00374)	(0.00389)	(0.00453)	(0.00399)	(0.00398)	(0.00373)	(0.00372)	(0.00348)	(0.00373)
Head unemployed	-0.202***	-0.207***	-0.329***	-0.285***	-0.261***	-0.276***	-0.248***	-0.182***	-0.241***	-0.224***
	(0.0347)	(0.0287)	(0.0243)	(0.0242)	(0.0271)	(0.0285)	(0.0272)	(0.0262)	(0.0246)	(0.0229)
Head out of labor force	-0.0946***	-0.0316**	-0.0191	-0.0183	-0.0363**	-0.0480***	-0.0635***	-0.0252	-0.0555***	-0.0280*
	(0.0152)	(0.0155)	(0.0155)	(0.0169)	(0.0161)	(0.0169)	(0.0163)	(0.0159)	(0.0153)	(0.0159)
Education ≥ 8	0.0882***	0.105***	0.151***	0.126***	0.120***	0.152***	0.136***	0.0934***	0.0759***	0.0894***
	(0.0179)	(0.0173)	(0.0179)	(0.0212)	(0.0202)	(0.0195)	(0.0193)	(0.0185)	(0.0173)	(0.0201)
Education ≥ 13	0.0193	0.0311*	0.0365**	0.0249	0.0245	0.0535***	0.0192	0.0451***	0.0666***	0.0703***
	(0.0183)	(0.0188)	(0.0183)	(0.0194)	(0.0181)	(0.0179)	(0.0169)	(0.0153)	(0.0152)	(0.0165)
University degree	0.104***	0.0528*	0.0777***	0.162***	0.111***	0.0804***	0.0804***	0.104***	0.0720***	0.0708***
	(0.0270)	(0.0288)	(0.0266)	(0.0286)	(0.0253)	(0.0268)	(0.0240)	(0.0224)	(0.0219)	(0.0226)
Center * number 18-24	-0.0621***	-0.0256	-0.0171	0.00925	-0.0542*	-0.0219	-0.0257	-0.0512*	-0.0362	-0.0303
	(0.0225)	(0.0225)	(0.0228)	(0.0260)	(0.0278)	(0.0290)	(0.0282)	(0.0276)	(0.0279)	(0.0285)
Center * number 25-39	-0.0361*	-0.0449**	-0.0226	-0.0162	-0.0344*	-0.0324	0.0204	-0.0382*	-0.0438**	0.0325
	(0.0199)	(0.0195)	(0.0193)	(0.0213)	(0.0207)	(0.0207)	(0.0201)	(0.0196)	(0.0195)	(0.0211)
Center * number 40-59	0.0127	-0.00218	-0.0295	-0.00927	-0.0383*	0.00286	0.0234	-0.0182	-0.0329	0.0460**
	(0.0218)	(0.0209)	(0.0208)	(0.0232)	(0.0220)	(0.0223)	(0.0207)	(0.0208)	(0.0205)	(0.0222)

	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010
Center * number 60-69	0.0344	-0.00746	-0.0951***	-0.0177	-0.0406	0.0247	0.0232	-0.00170	-0.0332	0.0162
	(0.0243)	(0.0236)	(0.0239)	(0.0276)	(0.0259)	(0.0252)	(0.0237)	(0.0233)	(0.0220)	(0.0234)
Center * number 70+	0.0400	0.0210	-0.0499*	0.00720	0.00706	0.0499*	0.0282	0.0320	-0.0446*	0.0436*
	(0.0275)	(0.0252)	(0.0256)	(0.0301)	(0.0281)	(0.0275)	(0.0258)	(0.0253)	(0.0237)	(0.0251)
Center * education $\geq$ 8	-0.00414	2.70e-05	-0.0942***	-0.0401	-0.0391	0.00749	-0.0439	0.0260	-0.0164	-0.0202
	(0.0309)	(0.0304)	(0.0316)	(0.0369)	(0.0351)	(0.0341)	(0.0333)	(0.0331)	(0.0303)	(0.0339)
Center * education $\geq$ 13	0.0242	0.0190	0.0405	0.0264	0.0396	0.0431	0.0562*	0.0393	0.0255	0.00242
	(0.0333)	(0.0326)	(0.0323)	(0.0337)	(0.0327)	(0.0329)	(0.0305)	(0.0288)	(0.0283)	(0.0288)
Center * degree	-0.0419	-0.0480	-0.0336	-0.0722	0.00569	-0.0635	-0.00786	0.0146	0.0143	0.0454
	(0.0501)	(0.0513)	(0.0500)	(0.0492)	(0.0474)	(0.0512)	(0.0444)	(0.0416)	(0.0397)	(0.0385)
Center * gender	-0.0293	-0.0356	-0.00654	-0.0685*	0.0524	-0.0338	-0.00566	-0.0255	0.0453	0.0107
	(0.0357)	(0.0348)	(0.0356)	(0.0392)	(0.0364)	(0.0355)	(0.0328)	(0.0321)	(0.0300)	(0.0319)
South * number 18-24	-0.0520***	-0.0409**	-0.0460**	-0.00313	-0.0621***	-0.0564**	-0.0464**	-0.0497**	-0.0544***	-0.0402*
	(0.0169)	(0.0176)	(0.0179)	(0.0208)	(0.0217)	(0.0231)	(0.0217)	(0.0216)	(0.0203)	(0.0223)
South * number 25-39	-0.0557***	-0.0365**	-0.0108	-0.0383**	-0.0413**	-0.0595***	-0.0240	-0.0605***	-0.0339**	-0.0168
	(0.0162)	(0.0165)	(0.0166)	(0.0180)	(0.0167)	(0.0172)	(0.0172)	(0.0164)	(0.0162)	(0.0174)
South * number 40-59	-0.0414**	-0.0405**	-0.0407**	-0.0242	-0.0646***	-0.0645***	-0.0372**	-0.0806***	-0.0689***	-0.0794***
	(0.0180)	(0.0183)	(0.0185)	(0.0203)	(0.0188)	(0.0194)	(0.0189)	(0.0178)	(0.0176)	(0.0189)
South * number 60-69	-0.0163	-0.0377*	-0.0349*	-0.0529**	-0.0669***	-0.0465**	-0.0463**	-0.0645***	-0.0906***	-0.0628***
	(0.0202)	(0.0199)	(0.0208)	(0.0233)	(0.0217)	(0.0223)	(0.0219)	(0.0203)	(0.0197)	(0.0207)
South * number 70+	0.0188	0.0189	0.00358	-0.0331	0.00298	-0.0226	-0.0341	-0.0799***	-0.0917***	-0.0508**
	(0.0249)	(0.0235)	(0.0240)	(0.0268)	(0.0241)	(0.0248)	(0.0237)	(0.0223)	(0.0216)	(0.0227)
South * education$\geq$ 8	0.0318	0.0324	-0.0305	-0.0128	0.0294	-0.00446	-0.0102	0.0423	0.0497**	0.0446
	(0.0253)	(0.0257)	(0.0263)	(0.0302)	(0.0285)	(0.0288)	(0.0280)	(0.0273)	(0.0253)	(0.0278)
South * education$\geq$ 13	0.0812***	0.107***	0.123***	0.113***	0.0997***	0.0758***	0.129***	0.0513**	0.0345	0.0346
	(0.0277)	(0.0288)	(0.0284)	(0.0294)	(0.0286)	(0.0292)	(0.0275)	(0.0254)	(0.0246)	(0.0255)
South * degree	0.0155	0.102**	0.118***	0.00843	0.0429	0.110**	0.0847**	0.0517	0.0544	0.0270
	(0.0396)	(0.0430)	(0.0419)	(0.0422)	(0.0405)	(0.0428)	(0.0412)	(0.0383)	(0.0375)	(0.0365)

	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010
South * gender	0.0639**	-0.0448	-0.00548	0.00323	0.0385	0.0409	0.0454	0.0209	0.0481*	0.0250
	(0.0302)	(0.0300)	(0.0302)	(0.0337)	(0.0302)	(0.0302)	(0.0288)	(0.0270)	(0.0262)	(0.0275)
Total surface	0.0391**	-0.0103	0.0235	0.0162	0.0257	0.0337*	0.0425**	0.0503***	0.0273	0.0569***
	(0.0191)	(0.0172)	(0.0164)	(0.0169)	(0.0161)	(0.0173)	(0.0200)	(0.0182)	(0.0172)	(0.0190)
Per-capita surface	0.0197	0.101***	0.00988	0.0670*	0.0472	0.0369	0.0841**	-0.0197	0.00961	-0.0194
	(0.0427)	(0.0359)	(0.0344)	(0.0379)	(0.0325)	(0.0336)	(0.0398)	(0.0370)	(0.0347)	(0.0389)
Homeowner	0.0303***	0.00705	0.0426***	0.0309***	0.0490***	0.0511***	0.0354***	0.0572***	0.0781***	0.0969***
	(0.00958)	(0.00983)	(0.0100)	(0.0113)	(0.0108)	(0.0110)	(0.0106)	(0.0102)	(0.00984)	(0.0105)
Secondary residence	0.0488***	0.0609***	0.0757***	0.132***	0.0963***	0.0835***	0.0821***	0.111***	0.0463**	0.0484**
	(0.0183)	(0.0181)	(0.0179)	(0.0201)	(0.0206)	(0.0223)	(0.0212)	(0.0193)	(0.0185)	(0.0192)
Constant	6.048***	5.031***	5.248***	5.224***	5.277***	4.579***	4.857***	4.916***	4.833***	5.174***
	(0.402)	(0.109)	(0.113)	(0.129)	(0.118)	(0.116)	(0.109)	(0.108)	(0.102)	(0.108)
$ln\,(\sigma)$	-0.940***	-0.922***	-0.913***	-0.873***	-0.871***	-0.853***	-0.899***	-0.968***	-1.020***	-0.954***
	(0.00800)	(0.00807)	(0.00808)	(0.00858)	(0.00813)	(0.00819)	(0.00820)	(0.00837)	(0.00832)	(0.00836)
N	7816	7685	7662	6795	7580	7471	7441	7141	7235	7155
N1	6891	7172	7221	6471	7192	7206	7310	7031	7125	6976
F-test instruments	16.91	41.09	29.71	50.85	46.58	20.77	38.14	18.68	20.91	29.86
p-value	0.00963	4.82e-06	0.000956	1.86e-07	1.12e-06	0.0228	3.59e-05	0.0445	0.0217	0.000902

Table B.1: Estimation of Φ for non durable consumption for waves between 1991 and 2010 - cross method

	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010	2012
w	0.514***	0.706***	0.832***	0.727***	0.797***	0.813***	0.936***	0.939***	0.829***	0.873***	0.838***
	(0.0492)	(0.0497)	(0.0474)	(0.0497)	(0.0487)	(0.0487)	(0.0515)	(0.0544)	(0.0529)	(0.0503)	(0.0647)
Having a bank account	0.0606*	0.114***	0.0531	0.0569	0.0529	-0.0227	-0.104**	0.0810	0.148***	0.0769	-0.0870
	(0.0357)	(0.0359)	(0.0369)	(0.0416)	(0.0409)	(0.0391)	(0.0404)	(0.0565)	(0.0497)	(0.0544)	(0.0929)
Bank payments	0.0461	0.0556	0.0536	0.0751**	0.105***			-0.0959***	-0.164***	-0.0716**	0.0553
	(0.0380)	(0.0348)	(0.0331)	(0.0337)	(0.0316)			(0.0321)	(0.0324)	(0.0326)	(0.0447)
POS payments	0.231***	0.0333	-0.0242	0.000554	0.0818**	0.00374	-0.0139	-0.00785	-0.00543	-0.0832**	-0.0196
	(0.0688)	(0.0522)	(0.0421)	(0.0363)	(0.0338)	(0.0333)	(0.0364)	(0.0368)	(0.0381)	(0.0417)	(0.0553)
Credit card	0.116***	0.149***	0.143***	0.261***	0.152***	0.147***	0.152***	0.187***	0.221***	0.160***	0.189***
	(0.0438)	(0.0465)	(0.0415)	(0.0392)	(0.0362)	(0.0370)	(0.0360)	(0.0355)	(0.0352)	(0.0349)	(0.0482)
Age > 70	-0.0136	0.0130	0.0379	-0.0246	-0.109***	0.0827**	0.106***	0.0684*	-0.0744**	-0.0811**	-0.0450
	(0.0497)	(0.0434)	(0.0435)	(0.0456)	(0.0404)	(0.0379)	(0.0388)	(0.0394)	(0.0370)	(0.0370)	(0.0502)
Fair understanding		-0.0536	-0.00544	0.0509	-0.0982**	-0.194***	-0.0639	-0.0874*	-0.0422	-0.0571	-0.0381
		(0.0387)	(0.0462)	(0.0516)	(0.0484)	(0.0497)	(0.0505)	(0.0489)	(0.0466)	(0.0532)	(0.0821)
Good understanding		-0.0375	-0.00849	0.0869*	-0.200***	-0.127***	-0.0305	0.0383	-0.0301	-0.108**	-0.0225
		(0.0625)	(0.0426)	(0.0478)	(0.0467)	(0.0484)	(0.0502)	(0.0465)	(0.0453)	(0.0497)	(0.0760)
Excellent understanding		-0.150	0.117**	0.116***	-0.134***	-0.147***	-0.0350	0.110**	0.0744*	0.0880*	-0.0104
		(0.107)	(0.0480)	(0.0449)	(0.0422)	(0.0545)	(0.0583)	(0.0451)	(0.0436)	(0.0474)	(0.0721)
Long interview			0.237***	0.0749*	0.145***	0.130***	0.0852**	0.00249	0.00469	-0.0127	0.0135
			(0.0460)	(0.0443)	(0.0421)	(0.0454)	(0.0428)	(0.0372)	(0.0340)	(0.0397)	(0.0522)
Euro						0.0292***	0.0222**				
						(0.00999)	(0.0106)				
Panel	0.0274	0.00496	-0.0181	-0.0110	0.0110	-0.00339	-0.0256	-0.0787***	-0.0573**	-0.105***	0.0792**
	(0.0316)	(0.0273)	(0.0270)	(0.0293)	(0.0269)	(0.0277)	(0.0279)	(0.0285)	(0.0283)	(0.0288)	(0.0402)
τ_1	3.968***	5.123***	5.967***	5.223***	5.554***	4.405***	5.040***	5.029***	4.263***	4.475***	4.191***
	(0.350)	(0.359)	(0.342)	(0.359)	(0.354)	(0.322)	(0.351)	(0.368)	(0.358)	(0.340)	(0.432)

	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010	2012
τ_2	4.521***	5.812***	6.672***	5.951***	6.302***	5.999***	6.856***	6.953***	6.189***	6.397***	6.173***
	(0.351)	(0.360)	(0.343)	(0.360)	(0.355)	(0.324)	(0.355)	(0.372)	(0.361)	(0.344)	(0.438)
	w	w	w	w	w	w	w	w	w	w	w
Number of members	0.00166	0.0636***	0.0595***	0.112***	0.110***	0.0963***	0.0933***	0.0330	0.0780***	0.0564**	0.0970***
18-24	(0.0208)	(0.0218)	(0.0224)	(0.0307)	(0.0262)	(0.0282)	(0.0269)	(0.0256)	(0.0256)	(0.0265)	(0.0356)
Number of members	0.126***	0.0985***	0.111***	0.161***	0.158***	0.156***	0.120***	0.0834***	0.102***	0.100***	0.109***
25-39	(0.0191)	(0.0191)	(0.0200)	(0.0270)	(0.0231)	(0.0247)	(0.0241)	(0.0231)	(0.0234)	(0.0230)	(0.0322)
Number of members	0.128***	0.0905***	0.133***	0.132***	0.154***	0.168***	0.133***	0.0995***	0.138***	0.125***	0.0897***
40-59	(0.0185)	(0.0181)	(0.0190)	(0.0261)	(0.0220)	(0.0236)	(0.0232)	(0.0223)	(0.0223)	(0.0228)	(0.0308)
Number of members	0.0923***	0.0685***	0.0851***	0.0739***	0.0937***	0.116***	0.0759***	0.0877***	0.0900***	0.0641***	0.0481
60-69	(0.0200)	(0.0197)	(0.0202)	(0.0284)	(0.0236)	(0.0253)	(0.0251)	(0.0238)	(0.0236)	(0.0242)	(0.0324)
Number of members	0.0871***	0.0251	0.0331	0.0499	0.0204	0.0468*	-0.00323	0.0498*	0.0568**	0.00326	-0.0130
70+	(0.0231)	(0.0225)	(0.0224)	(0.0319)	(0.0256)	(0.0274)	(0.0272)	(0.0263)	(0.0255)	(0.0266)	(0.0363)
Central Italy	-0.0284	0.0207	0.0322	-0.000774	0.0526	0.120***	-0.0194	0.00829	0.0718*	-0.0721*	-0.00629
	(0.0361)	(0.0362)	(0.0362)	(0.0500)	(0.0410)	(0.0404)	(0.0387)	(0.0395)	(0.0378)	(0.0411)	(0.0609)
Southern Italy	-0.177***	-0.176***	-0.203***	-0.142***	-0.188***	-0.0926***	-0.158***	-0.132***	-0.149***	-0.117***	-0.154***
	(0.0309)	(0.0314)	(0.0312)	(0.0434)	(0.0347)	(0.0358)	(0.0351)	(0.0340)	(0.0334)	(0.0355)	(0.0502)
Number of children	-0.00187	0.0224	0.0186	0.0415**	0.0292*	0.0137	0.0148	0.0323*	0.00348	-0.0381*	0.00814
0-5	(0.0134)	(0.0145)	(0.0146)	(0.0204)	(0.0173)	(0.0199)	(0.0193)	(0.0181)	(0.0183)	(0.0196)	(0.0279)
Number of children	0.00844	0.0391***	0.00440	0.0532***	0.0383***	-0.00490	0.0353**	0.0159	0.0226	-0.00130	-0.00479
6-14	(0.0103)	(0.0114)	(0.0114)	(0.0154)	(0.0140)	(0.0161)	(0.0158)	(0.0148)	(0.0146)	(0.0156)	(0.0224)
Number of children	0.0178	0.0412***	0.0415***	0.0539***	0.0509***	0.0117	0.0377*	0.0209	-0.0127	0.00289	0.00743
15-17	(0.0129)	(0.0146)	(0.0151)	(0.0199)	(0.0183)	(0.0204)	(0.0204)	(0.0194)	(0.0192)	(0.0204)	(0.0283)
Number of children	0.0963***	0.0430***	0.0311*	-0.0218	-0.00604	-0.00547	-0.00186	0.0443**	0.00259	-0.000562	-0.0342
18+	(0.0160)	(0.0163)	(0.0165)	(0.0225)	(0.0179)	(0.0185)	(0.0182)	(0.0176)	(0.0178)	(0.0172)	(0.0246)
Number of retired	0.0283**	0.0239*	0.0305**	0.0758***	0.0628***	0.0906***	0.0735***	0.0564***	0.0853***	0.0806***	0.0941***
members	(0.0132)	(0.0129)	(0.0128)	(0.0177)	(0.0144)	(0.0149)	(0.0149)	(0.0146)	(0.0139)	(0.0150)	(0.0212)

	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010	2012
At least 2 members	0.246***	0.320***	0.258***	0.272***	0.234***	0.179***	0.190***	0.233***	0.224***	0.237***	0.245***
	(0.0224)	(0.0215)	(0.0212)	(0.0288)	(0.0229)	(0.0252)	(0.0254)	(0.0238)	(0.0232)	(0.0247)	(0.0341)
At least 3 members	0.106***	0.120***	0.0848***	0.116***	0.104***	0.0980***	0.0717***	0.0723***	0.0796***	0.0911***	0.131***
	(0.0156)	(0.0160)	(0.0159)	(0.0215)	(0.0183)	(0.0204)	(0.0201)	(0.0189)	(0.0187)	(0.0200)	(0.0286)
At least 4 members	0.0398**	0.0522***	0.0679***	0.0232	0.0564***	0.0556**	0.0136	0.0490**	0.0617***	0.0634***	0.0110
	(0.0158)	(0.0168)	(0.0168)	(0.0225)	(0.0197)	(0.0226)	(0.0221)	(0.0212)	(0.0209)	(0.0220)	(0.0319)
Gender (male)	0.0466**	0.135***	0.0761***	0.114***	0.0793***	0.0466**	0.0770***	0.0943***	0.0553***	0.122***	0.112***
	(0.0196)	(0.0190)	(0.0195)	(0.0262)	(0.0204)	(0.0206)	(0.0192)	(0.0182)	(0.0178)	(0.0186)	(0.0262)
Age of the head	0.0116***	0.0175***	0.0110***	0.0232***	0.0183***	0.0121***	0.00538	0.0132***	0.00713*	0.00285	0.0171***
	(0.00360)	(0.00368)	(0.00372)	(0.00516)	(0.00405)	(0.00420)	(0.00397)	(0.00402)	(0.00380)	(0.00397)	(0.00587)
Age of the head^2	-1.176***	-1.343***	-0.664*	-1.583***	-1.191***	-0.603	0.0496	-0.929**	-0.132	0.366	-0.798
	(0.339)	(0.343)	(0.348)	(0.487)	(0.375)	(0.389)	(0.369)	(0.372)	(0.352)	(0.369)	(0.535)
Head unemployed	-0.377***	-0.278***	-0.410***	-0.385***	-0.321***	-0.352***	-0.336***	-0.318***	-0.321***	-0.338***	-0.434***
	(0.0314)	(0.0263)	(0.0217)	(0.0260)	(0.0254)	(0.0279)	(0.0269)	(0.0262)	(0.0249)	(0.0227)	(0.0298)
Head out of labor force	-0.175***	-0.0826***	-0.0843***	-0.0819***	-0.0823***	-0.113***	-0.141***	-0.0926***	-0.105***	-0.0856***	-0.0728***
	(0.0138)	(0.0143)	(0.0139)	(0.0182)	(0.0152)	(0.0165)	(0.0162)	(0.0159)	(0.0155)	(0.0157)	(0.0226)
Education $\geq$ 8	0.0996***	0.120***	0.146***	0.132***	0.111***	0.154***	0.132***	0.104***	0.0972***	0.109***	0.116***
	(0.0161)	(0.0159)	(0.0160)	(0.0228)	(0.0189)	(0.0191)	(0.0191)	(0.0185)	(0.0175)	(0.0199)	(0.0303)
Education $\geq$ 13	0.102***	0.107***	0.0794***	0.0913***	0.0863***	0.138***	0.100***	0.115***	0.143***	0.126***	0.145***
	(0.0165)	(0.0173)	(0.0164)	(0.0209)	(0.0170)	(0.0175)	(0.0167)	(0.0153)	(0.0154)	(0.0163)	(0.0234)
University degree	0.186***	0.190***	0.183***	0.215***	0.178***	0.180***	0.179***	0.172***	0.108***	0.135***	0.144***
	(0.0245)	(0.0266)	(0.0239)	(0.0310)	(0.0239)	(0.0263)	(0.0238)	(0.0225)	(0.0222)	(0.0223)	(0.0311)
Center * number 18-24	-0.0467**	-0.0180	-0.0299	-0.0112	-0.0243	-0.0247	-0.00302	-0.0700**	-0.0473*	0.0118	-0.0377
	(0.0203)	(0.0207)	(0.0204)	(0.0282)	(0.0263)	(0.0285)	(0.0280)	(0.0276)	(0.0283)	(0.0282)	(0.0421)
Center * number 25-39	-0.0258	-0.0375**	-0.0429**	-0.0515**	-0.0530***	-0.0455**	0.0532***	-0.0322*	-0.0586***	0.0179	0.0125
	(0.0180)	(0.0180)	(0.0173)	(0.0230)	(0.0195)	(0.0203)	(0.0199)	(0.0196)	(0.0198)	(0.0209)	(0.0312)
Center * number 40-59	0.0126	0.0136	-0.0144	-0.0132	-0.0689***	-0.0558**	0.0537***	-0.00261	-0.0366*	0.0237	0.00337
	(0.0197)	(0.0192)	(0.0186)	(0.0251)	(0.0207)	(0.0218)	(0.0205)	(0.0208)	(0.0207)	(0.0219)	(0.0312)

	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010	2012
Center * number 60-69	0.0330	-0.000487	-0.0434**	-0.00809	-0.0366	-0.0570**	0.0546**	-0.00503	-0.0440**	0.0281	0.0101
	(0.0220)	(0.0217)	(0.0214)	(0.0298)	(0.0244)	(0.0247)	(0.0235)	(0.0233)	(0.0223)	(0.0232)	(0.0333)
Center * number 70+	0.0559**	0.0514**	-0.0111	-0.0134	-0.0104	-0.0233	0.0711***	-0.0101	-0.0692***	0.0295	0.0597*
	(0.0248)	(0.0233)	(0.0230)	(0.0324)	(0.0264)	(0.0270)	(0.0256)	(0.0253)	(0.0240)	(0.0248)	(0.0342)
Center*education≥8	-0.0282	0.000225	-0.00846	0.0283	0.00108	-0.0151	-0.0257	0.0415	0.0271	0.0302	-0.0157
	(0.0279)	(0.0280)	(0.0283)	(0.0398)	(0.0329)	(0.0334)	(0.0329)	(0.0330)	(0.0307)	(0.0335)	(0.0494)
Center*education≥13	-0.00193	0.0409	0.0211	-0.0202	0.0337	-0.0304	0.00841	0.00384	-0.0283	-0.00223	0.0473
	(0.0301)	(0.0300)	(0.0290)	(0.0364)	(0.0308)	(0.0323)	(0.0302)	(0.0288)	(0.0287)	(0.0285)	(0.0418)
Center * degree	-0.0376	-0.0821*	-0.0532	-0.0927*	-0.0329	-0.0530	0.00536	-0.0109	-0.0114	0.0251	-0.00363
	(0.0453)	(0.0472)	(0.0450)	(0.0531)	(0.0447)	(0.0502)	(0.0441)	(0.0417)	(0.0403)	(0.0382)	(0.0554)
Center * gender	0.00691	-0.0653**	-0.0295	-0.0576	0.0318	0.0399	-0.0232	1.42e-05	0.0322	-0.0429	-0.0709
	(0.0322)	(0.0319)	(0.0319)	(0.0421)	(0.0341)	(0.0347)	(0.0324)	(0.0320)	(0.0304)	(0.0315)	(0.0450)
South * number 18-24	-0.0537***	-0.0566***	-0.0498***	-0.0430*	-0.0557***	-0.0571**	-0.0437**	-0.0491**	-0.0347*	-0.0423*	-0.0316
	(0.0153)	(0.0162)	(0.0161)	(0.0224)	(0.0204)	(0.0226)	(0.0215)	(0.0216)	(0.0206)	(0.0221)	(0.0301)
South * number 25-39	-0.0867***	-0.0460***	-0.0537***	-0.0577***	-0.0762***	-0.0856***	-0.00596	-0.0572***	-0.0288*	-0.0310*	-0.0400
	(0.0147)	(0.0151)	(0.0149)	(0.0194)	(0.0157)	(0.0169)	(0.0170)	(0.0163)	(0.0164)	(0.0173)	(0.0249)
South * number 40-59	-0.0431***	-0.0108	-0.0452***	-0.0264	-0.0835***	-0.0908***	-0.0277	-0.0433**	-0.0917***	-0.0681***	-0.0144
	(0.0162)	(0.0169)	(0.0165)	(0.0219)	(0.0177)	(0.0190)	(0.0187)	(0.0178)	(0.0178)	(0.0187)	(0.0262)
South * number 60-69	-0.0246	-0.00484	-0.0307*	-0.0175	-0.0583***	-0.0781***	-0.0242	-0.0239	-0.0738***	-0.0470**	0.00963
	(0.0182)	(0.0183)	(0.0186)	(0.0251)	(0.0204)	(0.0219)	(0.0216)	(0.0203)	(0.0200)	(0.0205)	(0.0284)
South * number 70+	-0.000948	0.0524**	0.0168	-0.0289	0.0191	-0.0482**	0.0448*	-0.0191	-0.0577***	-0.0122	0.0377
	(0.0225)	(0.0216)	(0.0215)	(0.0289)	(0.0226)	(0.0243)	(0.0235)	(0.0223)	(0.0219)	(0.0225)	(0.0316)
South*education≥ 8	0.0416*	0.0483**	-0.0122	0.00218	0.0730***	0.0100	-0.00164	0.0371	0.0189	-0.00436	0.00242
	(0.0229)	(0.0237)	(0.0236)	(0.0325)	(0.0268)	(0.0282)	(0.0277)	(0.0273)	(0.0257)	(0.0275)	(0.0410)
South*education≥13	0.0200	0.0641**	0.133***	0.0694**	0.0542**	0.00367	0.0764***	0.0257	0.0545**	0.0844***	0.0216
	(0.0250)	(0.0265)	(0.0254)	(0.0317)	(0.0269)	(0.0286)	(0.0272)	(0.0253)	(0.0249)	(0.0252)	(0.0355)
South * degree	0.00117	0.0585	0.0611	0.0340	0.0412	0.0372	0.0545	0.0485	0.102***	0.0915**	0.143***
	(0.0358)	(0.0397)	(0.0377)	(0.0458)	(0.0382)	(0.0420)	(0.0408)	(0.0383)	(0.0381)	(0.0362)	(0.0501)

	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010	2012
South * gender	0.0451*	-0.0708**	0.0237	-0.0675*	0.00233	0.0341	-0.00708	0.00724	0.0772***	-0.00562	-0.0243
	(0.0272)	(0.0275)	(0.0270)	(0.0362)	(0.0283)	(0.0295)	(0.0285)	(0.0270)	(0.0265)	(0.0272)	(0.0382)
Total surface	4.878***	2.837*	10.23***	6.353***	6.788***	11.02***	13.13***	10.23***	10.77***	13.01***	16.38***
	(1.725)	(1.585)	(1.469)	(1.825)	(1.519)	(1.698)	(1.986)	(1.825)	(1.749)	(1.881)	(2.632)
Per-capita surface	4.033	15.12***	-4.155	6.517	6.805**	1.092	-1.037	0.0343	-3.918	-1.675	-2.853
	(3.845)	(3.295)	(3.043)	(4.069)	(3.058)	(3.292)	(3.943)	(3.698)	(3.517)	(3.844)	(5.407)
Homeowner	0.0740***	0.0419***	0.0637***	0.0358***	0.0467***	0.0790***	0.0709***	0.0670***	0.0750***	0.107***	0.161***
	(0.00865)	(0.00904)	(0.00895)	(0.0121)	(0.0102)	(0.0108)	(0.0105)	(0.0102)	(0.00996)	(0.0104)	(0.0149)
Secondary residence	0.0895***	0.119***	0.112***	0.209***	0.144***	0.152***	0.142***	0.151***	0.121***	0.169***	0.111***
	(0.0166)	(0.0167)	(0.0161)	(0.0218)	(0.0194)	(0.0219)	(0.0210)	(0.0193)	(0.0188)	(0.0190)	(0.0268)
Constant	6.264***	5.942***	6.270***	5.810***	6.098***	5.604***	5.932***	5.888***	6.006***	6.023***	5.546***
	(0.0973)	(0.100)	(0.101)	(0.138)	(0.111)	(0.114)	(0.108)	(0.108)	(0.103)	(0.107)	(0.160)
$ln\,(\sigma)$	-1.054***	-1.013***	-1.025***	-0.799***	-0.933***	-0.887***	-0.916***	-0.978***	-1.013***	-0.973***	-0.938***
	(0.00800)	(0.00807)	(0.00808)	(0.00857)	(0.00813)	(0.00819)	(0.00820)	(0.00837)	(0.00832)	(0.00837)	(0.0116)
N	7816	7684	7667	6811	7583	7471	7441	7146	7235	7155	3729
N1	7202	7375	7416	6668	7435	7211	7316	6957	7103	6976	3660
F-test instruments	39.51	46.48	77.70	105.0	108.9	54.12	46.25	72.79	94.53	85.20	26.02
p-value	0.000	4.90e-07	0	0	0	4.61e-08	1.29e-06	0	0	0	0.00372

Table C.1: Regression models of non durable consumption using SFB data - Simple matching tecnique

	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
VARIABLES	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010	2012
Number of members 18-24	-0.0401	-0.0742	0.166**	-0.0378	0.0213	-0.126	-0.238**	0.0686	-0.0367	0.155	-0.265
	(0.0888)	(0.0834)	(0.0806)	(0.102)	(0.103)	(0.114)	(0.111)	(0.122)	(0.117)	(0.143)	(0.161)
Number of members 25-39	0.0457	0.0486	0.171**	-0.0102	0.0567	0.00950	-0.0913	0.170	-0.0759	0.143	-0.301**
	(0.0852)	(0.0791)	(0.0767)	(0.0958)	(0.0957)	(0.107)	(0.0999)	(0.112)	(0.108)	(0.133)	(0.147)
Number of members 40-59	-0.0299	0.0165	0.126*	-0.00748	0.00456	0.0500	-0.0847	0.149	-0.0529	0.181	-0.235
	(0.0827)	(0.0780)	(0.0756)	(0.0936)	(0.0929)	(0.105)	(0.0986)	(0.110)	(0.106)	(0.131)	(0.145)
Number of members 60-69	-0.194**	-0.141*	-0.0602	-0.130	-0.0875	-0.0521	-0.167*	0.0900	-0.163	0.109	-0.268*
	(0.0823)	(0.0773)	(0.0753)	(0.0932)	(0.0922)	(0.106)	(0.0985)	(0.110)	(0.106)	(0.132)	(0.144)
Number of members 70+	-0.440***	-0.333***	-0.266***	-0.362***	-0.392***	-0.310***	-0.445***	-0.250**	-0.405***	-0.161	-0.467***
	(0.0832)	(0.0788)	(0.0759)	(0.0930)	(0.0925)	(0.107)	(0.0989)	(0.109)	(0.106)	(0.131)	(0.143)
Central Italy	-0.0345	-0.0453	-0.0122	-0.124**	0.0545	0.0719	0.0581	-0.156***	0.0478	0.0598	-0.0695
	(0.0475)	(0.0474)	(0.0504)	(0.0591)	(0.0609)	(0.0549)	(0.0583)	(0.0583)	(0.0597)	(0.0615)	(0.0637)
Southern Italy	-0.123***	-0.235***	-0.204***	-0.209***	-0.116**	-0.0803*	-0.138***	-0.226***	-0.159***	-0.0800	-0.244***
	(0.0408)	(0.0391)	(0.0400)	(0.0471)	(0.0465)	(0.0448)	(0.0472)	(0.0469)	(0.0485)	(0.0495)	(0.0492)
Number of children 0-5	-0.469***	-0.389***	-0.372***	-0.340***	-0.284***	-0.435***	-0.435***	-0.275**	-0.421***	-0.106	-0.452***
	(0.0765)	(0.0719)	(0.0698)	(0.0904)	(0.0915)	(0.102)	(0.0988)	(0.110)	(0.107)	(0.129)	(0.145)
Number of children 6-14	-0.303***	-0.254***	-0.218***	-0.276***	-0.244***	-0.276***	-0.408***	-0.184*	-0.348***	-0.0534	-0.369***
	(0.0736)	(0.0699)	(0.0672)	(0.0867)	(0.0862)	(0.0988)	(0.0937)	(0.107)	(0.102)	(0.127)	(0.142)
Number of children 15-17	-0.114	-0.115	-0.0937	-0.181*	-0.0846	-0.136	-0.282***	-0.102	-0.195*	-0.00980	-0.188
	(0.0782)	(0.0743)	(0.0727)	(0.0928)	(0.0924)	(0.105)	(0.0993)	(0.113)	(0.111)	(0.133)	(0.147)
Number of children 18+	0.200***	0.181***	0.110***	0.103**	0.0417	0.141***	0.128***	-0.0549	0.0149	0.0264	0.0493
	(0.0396)	(0.0353)	(0.0346)	(0.0443)	(0.0440)	(0.0435)	(0.0440)	(0.0463)	(0.0459)	(0.0468)	(0.0471)
At least 2 members	0.370***	0.363***	0.353***	0.349***	0.340***	0.375***	0.372***	0.384***	0.359***	0.321***	0.301***
	(0.0134)	(0.0127)	(0.0120)	(0.0157)	(0.0147)	(0.0130)	(0.0128)	(0.0129)	(0.0128)	(0.0127)	(0.0127)
At least 3 members	0.205***	0.207***	0.220***	0.180***	0.173***	0.198***	0.186***	0.208***	0.184***	0.183***	0.146***

VARIABLES	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010	2012
	(0.0131)	(0.0119)	(0.0118)	(0.0147)	(0.0154)	(0.0137)	(0.0135)	(0.0143)	(0.0141)	(0.0148)	(0.0149)
At least 4 members	0.166***	0.177***	0.154***	0.132***	0.116***	0.160***	0.144***	0.162***	0.135***	0.131***	0.140***
	(0.0104)	(0.00990)	(0.00982)	(0.0116)	(0.0119)	(0.0113)	(0.0117)	(0.0120)	(0.0126)	(0.0131)	(0.0127)
Gender (male)	0.110***	0.0894***	0.0945***	0.0784***	0.0752***	0.0670***	0.0727***	0.0124	0.0560***	0.0767***	0.0855***
	(0.0158)	(0.0150)	(0.0142)	(0.0169)	(0.0164)	(0.0151)	(0.0151)	(0.0158)	(0.0155)	(0.0160)	(0.0153)
Age of the head=18-24	0.0141	0.0323	-0.0440	0.00955	-0.0799	0.175***	0.0432	0.0553	-0.0453	-0.0379	0.0604
	(0.0475)	(0.0428)	(0.0538)	(0.0735)	(0.0743)	(0.0646)	(0.0859)	(0.0678)	(0.0691)	(0.0730)	(0.0962)
Age of the head=25-39	-0.0578***	-0.0690***	-0.0698***	-0.0443**	-0.0894***	-0.00875	-0.0534**	-0.0725***	-0.0306	0.00527	0.00414
	(0.0182)	(0.0169)	(0.0169)	(0.0207)	(0.0215)	(0.0208)	(0.0216)	(0.0222)	(0.0230)	(0.0231)	(0.0255)
Age of the head=60-69	0.0431**	0.0416**	0.0406**	0.0257	0.0318	0.0332	0.0241	0.0282	0.0623***	0.0722***	0.0384
	(0.0195)	(0.0187)	(0.0187)	(0.0218)	(0.0223)	(0.0215)	(0.0220)	(0.0233)	(0.0229)	(0.0239)	(0.0252)
Age of the head=70plus	0.0639**	0.0269	0.0456*	0.0452	0.0870***	0.0526*	0.0636**	0.0829***	0.102***	0.157***	0.116***
	(0.0279)	(0.0258)	(0.0252)	(0.0321)	(0.0324)	(0.0294)	(0.0293)	(0.0316)	(0.0316)	(0.0324)	(0.0347)
Head unemployed	-0.126***	-0.135***	-0.180***	-0.186***	-0.242***	-0.159***	-0.140***	-0.199***	-0.133***	-0.149***	-0.186***
	(0.0302)	(0.0245)	(0.0237)	(0.0266)	(0.0280)	(0.0258)	(0.0274)	(0.0289)	(0.0289)	(0.0292)	(0.0255)
Head out of labor force	-0.102***	-0.0991***	-0.0888***	-0.0818***	-0.0765***	-0.0885***	-0.0929***	-0.0779***	-0.0771***	-0.0856***	-0.103***
	(0.0119)	(0.0112)	(0.0113)	(0.0128)	(0.0127)	(0.0124)	(0.0128)	(0.0136)	(0.0136)	(0.0153)	(0.0153)
Education ≥ 8	0.107***	0.144***	0.130***	0.119***	0.157***	0.155***	0.147***	0.149***	0.150***	0.183***	0.132***
	(0.0124)	(0.0123)	(0.0126)	(0.0151)	(0.0149)	(0.0147)	(0.0158)	(0.0164)	(0.0170)	(0.0180)	(0.0181)
Education ≥ 13	0.153***	0.110***	0.130***	0.118***	0.117***	0.113***	0.0889***	0.0915***	0.105***	0.118***	0.140***
	(0.0140)	(0.0133)	(0.0126)	(0.0136)	(0.0136)	(0.0130)	(0.0132)	(0.0138)	(0.0133)	(0.0140)	(0.0138)
University degree	0.117***	0.169***	0.127***	0.134***	0.142***	0.117***	0.108***	0.138***	0.142***	0.131***	0.142***
	(0.0225)	(0.0218)	(0.0202)	(0.0216)	(0.0194)	(0.0201)	(0.0202)	(0.0193)	(0.0201)	(0.0191)	(0.0179)
Center * number 18-24	-0.123**	-0.00479	-0.0840	5.95e-05	-0.118	-0.0535	-0.00605	0.0496	-0.200**	-0.243***	-0.0251
	(0.0625)	(0.0614)	(0.0641)	(0.0808)	(0.0793)	(0.0813)	(0.0913)	(0.0798)	(0.0887)	(0.0866)	(0.101)
Center * number 25-39	-0.0459	0.0110	-0.0832	0.0778	-0.132**	-0.0246	-0.103*	0.123*	-0.0394	-0.120*	0.00624
	(0.0555)	(0.0540)	(0.0555)	(0.0637)	(0.0631)	(0.0589)	(0.0622)	(0.0626)	(0.0628)	(0.0654)	(0.0680)
Center * number 40-59	0.0190	-0.0100	-0.0930*	0.0669	-0.135**	-0.0738	-0.162***	0.0632	-0.104*	-0.0909	-0.00118

VARIABLES	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010	2012
	(0.0514)	(0.0511)	(0.0518)	(0.0613)	(0.0625)	(0.0573)	(0.0600)	(0.0604)	(0.0618)	(0.0631)	(0.0654)
Center * number 60-69	0.0131	-0.0515	-0.0587	0.0544	-0.173***	-0.0953*	-0.159***	-0.0330	-0.0926	-0.0874	0.0418
	(0.0461)	(0.0462)	(0.0484)	(0.0576)	(0.0587)	(0.0533)	(0.0562)	(0.0565)	(0.0567)	(0.0587)	(0.0604)
Center * number 70+	0.00423	-0.0547	-0.0835*	0.0731	-0.239***	-0.125**	-0.137**	0.0744	-0.0786	-0.0730	0.0434
	(0.0485)	(0.0482)	(0.0498)	(0.0593)	(0.0599)	(0.0544)	(0.0567)	(0.0567)	(0.0578)	(0.0587)	(0.0608)
Center * education $\geq$ 8	0.0299	-0.0554***	-0.0347*	0.0645**	-0.0772***	-0.0282	-0.0356	-0.00105	-0.0273	-0.0364	-0.0132
	(0.0210)	(0.0212)	(0.0209)	(0.0279)	(0.0294)	(0.0265)	(0.0282)	(0.0290)	(0.0299)	(0.0313)	(0.0322)
Center * education $\geq$ 13	-0.0169	0.0395*	0.0207	-0.00750	-0.0235	-0.0243	0.0194	-0.000918	-0.00284	-0.0156	-0.0246
	(0.0235)	(0.0227)	(0.0216)	(0.0255)	(0.0261)	(0.0243)	(0.0250)	(0.0246)	(0.0246)	(0.0253)	(0.0255)
Center * degree	0.0116	-0.0446	0.00660	0.00899	-0.0189	0.0123	-0.0141	-0.0364	0.000663	0.0241	0.00422
	(0.0366)	(0.0363)	(0.0345)	(0.0385)	(0.0344)	(0.0381)	(0.0342)	(0.0349)	(0.0338)	(0.0340)	(0.0334)
Center * gender	-0.0257	-0.0115	0.0173	-0.00708	0.0257	0.00938	0.0156	0.0472**	0.0193	-0.0141	-0.00309
	(0.0223)	(0.0221)	(0.0214)	(0.0272)	(0.0282)	(0.0235)	(0.0237)	(0.0239)	(0.0243)	(0.0245)	(0.0246)
South * number 18-24	-0.173***	-0.0850*	-0.264***	-0.179***	-0.162**	-0.128**	-0.168**	-0.126*	-0.236***	-0.121*	-0.0732
	(0.0521)	(0.0508)	(0.0520)	(0.0601)	(0.0643)	(0.0602)	(0.0712)	(0.0672)	(0.0714)	(0.0703)	(0.0687)
South * number 25-39	-0.127***	-0.0695	-0.174***	-0.0471	-0.118**	-0.146***	-0.131**	-0.0179	-0.0331	-0.113**	0.0276
	(0.0481)	(0.0449)	(0.0459)	(0.0519)	(0.0504)	(0.0488)	(0.0512)	(0.0509)	(0.0532)	(0.0542)	(0.0545)
South * number 40-59	-0.184***	-0.146***	-0.179***	-0.0586	-0.165***	-0.202***	-0.140***	-0.0656	-0.120**	-0.137***	-0.0326
	(0.0444)	(0.0421)	(0.0433)	(0.0503)	(0.0490)	(0.0465)	(0.0502)	(0.0487)	(0.0509)	(0.0509)	(0.0512)
South * number 60-69	-0.209***	-0.114***	-0.162***	-0.105**	-0.196***	-0.246***	-0.148***	-0.115**	-0.101**	-0.162***	-0.0284
	(0.0399)	(0.0381)	(0.0394)	(0.0465)	(0.0451)	(0.0442)	(0.0464)	(0.0453)	(0.0469)	(0.0476)	(0.0467)
South * number 70+	-0.154***	-0.0610	-0.185***	-0.0988**	-0.157***	-0.189***	-0.148***	-0.0399	-0.128***	-0.196***	-0.0149
	(0.0428)	(0.0403)	(0.0402)	(0.0476)	(0.0463)	(0.0444)	(0.0464)	(0.0460)	(0.0478)	(0.0482)	(0.0470)
South * education$\geq$ 8	0.0160	-0.0136	-0.0152	0.0397*	0.0113	-0.0218	0.000702	-0.0179	-0.0144	-0.0543**	-0.0225
	(0.0188)	(0.0178)	(0.0186)	(0.0229)	(0.0224)	(0.0217)	(0.0227)	(0.0233)	(0.0245)	(0.0259)	(0.0252)
South * education$\geq$ 13	-0.0247	0.0469**	0.0359*	0.0659***	0.0510**	0.0636***	0.0702***	0.0499**	0.0455**	0.0177	-0.00186
	(0.0215)	(0.0199)	(0.0188)	(0.0211)	(0.0207)	(0.0197)	(0.0201)	(0.0201)	(0.0203)	(0.0210)	(0.0204)
South * degree	0.104***	-0.0252	0.0354	0.00659	0.0431	0.0259	0.0732**	0.0414	0.00695	0.0162	0.0399

VARIABLES	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010	2012
	(0.0339)	(0.0332)	(0.0304)	(0.0329)	(0.0301)	(0.0323)	(0.0318)	(0.0298)	(0.0295)	(0.0296)	(0.0279)
South * gender	6.56e-06	0.000620	0.0311	0.0215	0.0187	0.0182	-0.0192	0.0533**	0.0276	0.00350	-0.0103
	(0.0216)	(0.0202)	(0.0194)	(0.0242)	(0.0226)	(0.0205)	(0.0206)	(0.0207)	(0.0210)	(0.0211)	(0.0199)
Homeowner	0.0597***	0.0617***	0.0662***	0.0943***	0.0757***	0.0836***	0.0987***	0.0942***	0.138***	0.144***	0.160***
	(0.00701)	(0.00682)	(0.00686)	(0.00849)	(0.00863)	(0.00817)	(0.00832)	(0.00870)	(0.00912)	(0.00939)	(0.00905)
Secondary residence	0.350***	0.374***	0.388***	0.203***	0.224***	0.218***	0.212***	0.218***	0.221***	0.239***	0.196***
	(0.0141)	(0.0134)	(0.0123)	(0.0137)	(0.0137)	(0.0137)	(0.0137)	(0.0143)	(0.0143)	(0.0143)	(0.0137)
Constant	7.015***	7.017***	7.023***	7.222***	7.250***	6.564***	6.786***	6.618***	6.761***	6.467***	6.927***
	(0.0814)	(0.0767)	(0.0745)	(0.0921)	(0.0912)	(0.105)	(0.0979)	(0.109)	(0.105)	(0.131)	(0.143)
Observations	32,132	34,242	34,374	21,420	23,563	27,084	24,507	23,230	23,063	21,945	22,669
loglikelihood	-25923	-26925	-26954	-16080	-18357	-21510	-19053	-18007	-17904	-16742	-17304
Root MSE	0.543	0.532	0.530	0.513	0.528	0.536	0.527	0.526	0.526	0.519	0.520
R2 Adjusted	0.415	0.424	0.437	0.392	0.398	0.412	0.403	0.388	0.373	0.369	0.342

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table D.1: Propensity score to compute weights for SFB

	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010	2012
VARIABLES	shiw	shiw	shiw	shiw	shiw	shiw	shiw	shiw	shiw	shiw	shiw
Number of members 18-24	1.471***	2.422***	2.012***	1.520***	1.208***	-0.00188	0.809*	-0.803*	-0.0720	-0.421	-1.293***
	(0.404)	(0.427)	(0.418)	(0.492)	(0.441)	(0.452)	(0.451)	(0.455)	(0.440)	(0.449)	(0.441)
Number of members 25-39	1.982***	2.649***	2.367***	1.539***	1.304***	0.213	0.143	-0.753*	-0.0228	-0.614	-1.434***
	(0.393)	(0.415)	(0.405)	(0.470)	(0.419)	(0.428)	(0.424)	(0.425)	(0.411)	(0.418)	(0.412)
Number of members 40-59	2.342***	3.156***	2.987***	2.132***	2.037***	0.737*	0.675	-0.324	0.278	-0.234	-0.896**
	(0.386)	(0.408)	(0.398)	(0.461)	(0.409)	(0.421)	(0.416)	(0.416)	(0.403)	(0.409)	(0.399)
Number of members 60-69	2.431***	3.711***	3.516***	2.771***	2.436***	1.339***	1.171***	0.264	0.911**	0.280	-0.224
	(0.383)	(0.405)	(0.396)	(0.456)	(0.405)	(0.419)	(0.415)	(0.414)	(0.399)	(0.406)	(0.397)
Number of members 70+	2.621***	4.297***	4.291***	3.173***	3.058***	1.769***	1.405***	0.721*	1.389***	0.898**	0.326
	(0.384)	(0.405)	(0.395)	(0.454)	(0.403)	(0.420)	(0.414)	(0.411)	(0.399)	(0.405)	(0.394)
Central Italy	0.742***	0.778***	0.728***	1.050***	1.368***	0.283	0.280	-0.0779	0.0454	0.567**	0.314
	(0.201)	(0.204)	(0.209)	(0.228)	(0.227)	(0.221)	(0.227)	(0.230)	(0.230)	(0.229)	(0.228)
Southern Italy	0.655***	0.470***	0.549***	0.784***	0.646***	0.0851	0.313*	0.0140	0.336*	0.724***	0.314*
	(0.161)	(0.167)	(0.169)	(0.186)	(0.179)	(0.182)	(0.185)	(0.186)	(0.184)	(0.188)	(0.186)
Number of children 0-5	1.202***	2.206***	2.173***	1.315***	1.180***	-0.892**	0.0154	-1.073***	-0.248	-1.630***	-2.412***
	(0.369)	(0.395)	(0.383)	(0.456)	(0.407)	(0.419)	(0.415)	(0.414)	(0.404)	(0.403)	(0.397)
Number of children 6-14	1.759***	2.373***	2.335***	1.603***	1.157***	-0.568	-0.254	-1.102***	-0.249	-1.086***	-1.813***
	(0.357)	(0.384)	(0.372)	(0.440)	(0.391)	(0.403)	(0.399)	(0.399)	(0.387)	(0.387)	(0.378)
Number of children 15-17	1.883***	1.995***	1.963***	1.656***	1.415***	-0.0726	-0.197	-0.349	0.141	-1.150***	-1.237***
	(0.372)	(0.401)	(0.392)	(0.460)	(0.415)	(0.425)	(0.424)	(0.424)	(0.413)	(0.416)	(0.407)
Number of children 18+	0.791***	0.466***	0.797***	0.446***	0.358**	-0.202	-0.304*	0.415**	0.185	-0.199	-0.247
	(0.147)	(0.144)	(0.143)	(0.170)	(0.156)	(0.163)	(0.164)	(0.167)	(0.164)	(0.166)	(0.166)
Number of retired members	0.193***	0.456***	0.366***	0.223***	0.278***	0.279***	0.194***	0.145***	0.229***	0.275***	0.215***
	(0.0508)	(0.0493)	(0.0482)	(0.0535)	(0.0475)	(0.0450)	(0.0439)	(0.0435)	(0.0428)	(0.0431)	(0.0418)
At least 2 members	0.0470	0.186***	0.121**	0.0514	0.00474	0.239***	0.0620	0.0455	-0.0339	0.0863*	0.237***

	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010	2012
	(0.0493)	(0.0478)	(0.0478)	(0.0554)	(0.0510)	(0.0501)	(0.0502)	(0.0516)	(0.0509)	(0.0515)	(0.0518)
At least 3 members	0.244***	0.259***	0.220***	0.118**	0.147***	0.166***	0.110**	-0.00349	0.101**	0.143***	0.140***
	(0.0409)	(0.0406)	(0.0408)	(0.0461)	(0.0445)	(0.0445)	(0.0459)	(0.0473)	(0.0477)	(0.0478)	(0.0475)
At least 4 members	-0.0488	-0.144**	0.00195	0.119*	0.213***	0.0672	0.0411	0.118**	0.0412	-0.0135	0.0367
	(0.0599)	(0.0572)	(0.0568)	(0.0631)	(0.0565)	(0.0540)	(0.0535)	(0.0532)	(0.0522)	(0.0531)	(0.0519)
Gender (male)	0.645***	0.122	0.349*	0.457**	1.024***	0.771***	0.921***	0.333	0.499**	0.539**	0.903***
	(0.168)	(0.186)	(0.183)	(0.233)	(0.197)	(0.221)	(0.226)	(0.237)	(0.211)	(0.215)	(0.220)
Age of the head = 25-39	0.111	0.110	0.207***	0.154*	0.255***	0.154*	0.314***	0.0770	-0.0655	-0.0978	0.0881
	(0.0729)	(0.0726)	(0.0733)	(0.0829)	(0.0807)	(0.0829)	(0.0845)	(0.0877)	(0.0875)	(0.0898)	(0.0908)
Age of the head = 60-69	-0.0792	-0.303***	-0.119	-0.116	-0.165**	-0.244***	-0.275***	-0.256***	-0.194**	0.0559	0.113
	(0.0731)	(0.0731)	(0.0728)	(0.0831)	(0.0779)	(0.0805)	(0.0831)	(0.0865)	(0.0861)	(0.0841)	(0.0855)
Age of the head = 70+	-0.258**	-0.724***	-0.758***	-0.529***	-0.745***	-0.638***	-0.690***	-0.679***	-0.541***	-0.332***	-0.270**
	(0.102)	(0.0990)	(0.0981)	(0.113)	(0.105)	(0.104)	(0.106)	(0.112)	(0.111)	(0.110)	(0.111)
Head unemployed	0.165	0.294***	0.596***	0.610***	0.318***	0.312***	0.212**	0.305***	0.223***	0.470***	0.564***
	(0.106)	(0.0870)	(0.0748)	(0.0748)	(0.0805)	(0.0834)	(0.0844)	(0.0875)	(0.0850)	(0.0781)	(0.0684)
Head out of labor force	0.0890**	0.0328	-0.155***	-0.357***	-0.169***	-0.193***	-0.0373	-0.202***	-0.254***	-0.465***	-0.598***
	(0.0438)	(0.0431)	(0.0420)	(0.0451)	(0.0430)	(0.0439)	(0.0448)	(0.0475)	(0.0474)	(0.0474)	(0.0463)
Education $\geq$ 8	0.243***	0.0835*	0.0680	0.213***	0.123**	0.0809	-0.00971	0.147**	0.409***	0.629***	0.451***
	(0.0509)	(0.0491)	(0.0503)	(0.0588)	(0.0559)	(0.0537)	(0.0562)	(0.0570)	(0.0561)	(0.0599)	(0.0595)
Education $\geq$ 13	0.316***	0.188***	0.273***	0.224***	0.294***	0.182***	0.117**	0.0978**	-0.508***	-0.477***	-0.437***
	(0.0531)	(0.0534)	(0.0517)	(0.0546)	(0.0512)	(0.0501)	(0.0500)	(0.0490)	(0.0494)	(0.0511)	(0.0501)
University degree	0.0497	0.0753	0.0445	-0.0518	-0.0163	-0.0416	0.134*	-0.00269	0.375***	0.302***	0.258***
	(0.0812)	(0.0841)	(0.0776)	(0.0814)	(0.0728)	(0.0752)	(0.0722)	(0.0718)	(0.0711)	(0.0696)	(0.0681)
Center * number 18-24	-0.652**	-0.467*	-0.390	-0.203	-0.370	0.493	-0.276	0.0377	-0.0759	-0.186	0.132
	(0.263)	(0.263)	(0.269)	(0.302)	(0.305)	(0.308)	(0.323)	(0.330)	(0.331)	(0.333)	(0.336)
Center * number 25-39	-0.565**	-0.597**	-0.710***	-0.347	-0.745***	-0.111	-0.0715	-0.138	0.0108	-0.390	0.00474
	(0.232)	(0.238)	(0.241)	(0.253)	(0.248)	(0.246)	(0.248)	(0.255)	(0.256)	(0.256)	(0.262)
Center * number 40-59	-0.613***	-0.826***	-0.758***	-0.460*	-0.720***	-0.0787	-0.143	-0.156	-0.0569	-0.529**	-0.165

	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010	2012
	(0.218)	(0.220)	(0.221)	(0.239)	(0.231)	(0.233)	(0.235)	(0.241)	(0.243)	(0.241)	(0.240)
Center * number 60-69	-0.598***	-0.831***	-0.958***	-0.677***	-0.807***	0.0129	-0.0914	0.232	0.0518	-0.224	0.0340
	(0.196)	(0.199)	(0.204)	(0.222)	(0.217)	(0.214)	(0.219)	(0.221)	(0.221)	(0.218)	(0.218)
Center * number 70+	-0.435**	-0.943***	-0.842***	-0.658***	-0.844***	-0.0607	-0.103	0.138	0.124	-0.366*	-0.123
	(0.202)	(0.204)	(0.206)	(0.224)	(0.221)	(0.216)	(0.220)	(0.222)	(0.222)	(0.218)	(0.218)
Center * education $\geq$ 8	-0.276***	-0.0657	-0.234***	-0.211**	-0.253**	-0.181*	-0.157	-0.0907	-0.0683	-0.246**	-0.152
	(0.0889)	(0.0877)	(0.0896)	(0.105)	(0.102)	(0.0959)	(0.0995)	(0.103)	(0.100)	(0.105)	(0.106)
Center * education $\geq$ 13	-0.247**	-0.0686	-0.0195	-0.0506	-0.250***	-0.0567	0.0253	0.0123	0.0356	0.102	0.100
	(0.0962)	(0.0941)	(0.0926)	(0.0984)	(0.0948)	(0.0926)	(0.0913)	(0.0922)	(0.0927)	(0.0913)	(0.0909)
Center * degree	-0.0612	-0.180	-0.190	0.00415	-0.202	-0.0224	-0.305**	-0.0465	-0.120	0.0483	-0.0844
	(0.146)	(0.149)	(0.143)	(0.143)	(0.135)	(0.142)	(0.132)	(0.132)	(0.129)	(0.121)	(0.119)
Center * gender	0.0291	-0.0256	0.0540	-0.171*	-0.280***	-0.107	0.0854	0.0834	0.0701	0.110	0.108
	(0.0900)	(0.0889)	(0.0893)	(0.0981)	(0.0926)	(0.0841)	(0.0831)	(0.0850)	(0.0833)	(0.0838)	(0.0836)
South * number 18-24	-0.328	-0.0276	-0.0473	0.0896	0.0233	-0.0833	-0.380	-0.252	0.00367	-0.173	0.119
	(0.205)	(0.215)	(0.219)	(0.246)	(0.241)	(0.255)	(0.260)	(0.271)	(0.261)	(0.267)	(0.269)
South * number 25-39	-0.594***	-0.431**	-0.357*	-0.138	0.166	0.0532	-0.525**	-0.104	-0.137	-0.392*	0.321
	(0.190)	(0.199)	(0.198)	(0.212)	(0.203)	(0.206)	(0.211)	(0.210)	(0.209)	(0.213)	(0.214)
South * number 40-59	-0.440**	-0.433**	-0.235	-0.388*	-0.161	0.134	-0.259	0.00260	-0.258	-0.417**	0.0678
	(0.176)	(0.183)	(0.182)	(0.198)	(0.188)	(0.191)	(0.194)	(0.195)	(0.194)	(0.197)	(0.196)
South * number 60-69	-0.0977	-0.166	-0.287*	-0.372**	-0.178	0.0859	-0.344*	0.0140	-0.283	-0.373**	-0.00143
	(0.157)	(0.162)	(0.164)	(0.180)	(0.174)	(0.177)	(0.180)	(0.181)	(0.178)	(0.180)	(0.177)
South * number 70+	-0.260	-0.428**	-0.482***	-0.241	-0.0774	0.0379	-0.227	-0.145	-0.402**	-0.622***	-0.226
	(0.166)	(0.167)	(0.168)	(0.183)	(0.175)	(0.177)	(0.180)	(0.182)	(0.178)	(0.181)	(0.179)
South * education$\geq$ 8	-0.116	-0.0794	-0.175**	-0.348***	-0.365***	-0.179**	-0.172**	-0.271***	-0.482***	-0.608***	-0.355***
	(0.0745)	(0.0742)	(0.0753)	(0.0859)	(0.0817)	(0.0812)	(0.0834)	(0.0854)	(0.0839)	(0.0867)	(0.0853)
South * education$\geq$ 13	-0.201**	-0.0246	-0.171**	-0.137	-0.289***	-0.170**	-0.152*	-0.0757	0.232***	0.172**	0.133*
	(0.0816)	(0.0826)	(0.0806)	(0.0838)	(0.0805)	(0.0807)	(0.0802)	(0.0797)	(0.0795)	(0.0787)	(0.0767)
South * degree	0.277**	0.0242	0.0964	0.219*	0.190	0.340***	0.0375	0.0237	-0.334***	-0.147	-0.112

	1991	1993	1995	1998	2000	2002	2004	2006	2008	2010	2012
	(0.121)	(0.126)	(0.121)	(0.122)	(0.116)	(0.120)	(0.120)	(0.119)	(0.119)	(0.112)	(0.108)
South * gender	0.0423	-0.0907	-0.194**	-0.158*	-0.261***	-0.137*	-0.0526	0.0148	0.0234	0.0282	-0.121*
	(0.0793)	(0.0773)	(0.0762)	(0.0855)	(0.0777)	(0.0738)	(0.0735)	(0.0740)	(0.0727)	(0.0724)	(0.0699)
Homeowner	-0.445***	-0.448***	-0.450***	-0.193***	-0.239***	-0.305***	-0.221***	-0.268***	-0.301***	-0.276***	-0.175***
	(0.0270)	(0.0270)	(0.0273)	(0.0311)	(0.0298)	(0.0295)	(0.0300)	(0.0306)	(0.0309)	(0.0312)	(0.0307)
Secondary residence	0.0468	0.159***	0.105**	-0.287***	-0.325***	-0.437***	-0.432***	-0.317***	-0.291***	-0.410***	-0.273***
	(0.0542)	(0.0523)	(0.0516)	(0.0561)	(0.0567)	(0.0598)	(0.0590)	(0.0588)	(0.0581)	(0.0578)	(0.0539)
Constant	-3.888***	-4.775***	-4.593***	-3.618***	-3.400***	-1.967***	-1.691***	-0.729*	-1.375***	-1.012**	-0.433
	(0.382)	(0.404)	(0.394)	(0.456)	(0.405)	(0.418)	(0.414)	(0.414)	(0.399)	(0.407)	(0.396)
Observations	40,320	42,331	42,509	28,566	31,561	35,095	32,519	30,998	31,038	29,896	30,820
loglikelihood	-19978	-20270	-20336	-15794	-17593	-18565	-17903	-17222	-17353	-16894	-17379
N	40320	42331	42509	28566	31561	35095	32519	30998	31038	29896	30820

Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1