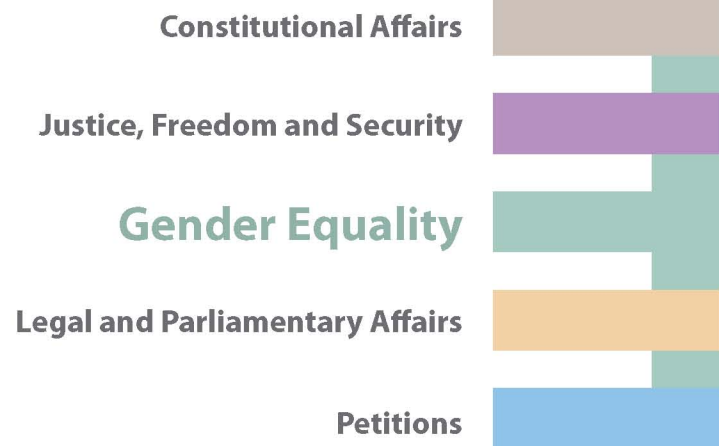




DIRECTORATE-GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT 
CITIZENS' RIGHTS AND CONSTITUTIONAL AFFAIRS



Women and unpaid family care work in the EU

STUDY



DIRECTORATE GENERAL FOR INTERNAL POLICIES

**POLICY DEPARTMENT C: CITIZENS' RIGHTS AND
CONSTITUTIONAL AFFAIRS**

GENDER EQUALITY

Women and unpaid family care work in the EU

STUDY

Abstract

This study provides an analysis of the size and value of unpaid family care work at the European Union level. It proposes a method which relies on harmonised European surveys. It also compares two EU member States, Italy and Poland, whose time use data contain additional detailed information on child care and elderly care work. The study aims at improving the existing indicators in order to have a reliable quantitative picture to use in discussions on unpaid family care work at EU level.

This document was requested by the European Parliament's Committee on Women's Rights and Gender Equality.

AUTHORS

Fondazione Giacomo Brodolini - Italy

Ms Francesca Francavilla (Policy Studies Institute, UK)
Ms Gianna Claudia Giannelli (University of Florence, Italy)
Ms Gabriela Grotkowska (University of Warsaw, Poland)
Mr Luca Piccoli (Paris School of Economics, France)
Mr Mieczyslaw W. Socha (University of Warsaw, Poland)

SCIENTIFIC COMMITTEE

Ms Francesca Bettio (University of Siena, Italy)
Ms Gianna Claudia Giannelli (University of Florence, Italy)
Ms Janneke Plantenga (University of Utrecht, Holland)
Ms Silvia Sansonetti (Fondazione G. Brodolini, Italy)
Ms Annamaria Simonazzi (Fondazione G. Brodolini and Sapienza University of Rome, Italy)

RESPONSIBLE ADMINISTRATOR

Ms H el ene CALERS
Policy Department Citizens' Rights and Constitutional Affairs
European Parliament
B-1047 Brussels
E-mail: poldep-citizens@europarl.europa.eu

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ABOUT THE EDITOR

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poldep-citizens@europarl.europa.eu

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LIST OF ABBREVIATIONS

BHPS	British Household Panel Survey
ECHP	European Community Household Panel
EGGSIE	Expert Group on Gender, Social Inclusion and Employment
EUROSTAT	European Statistics Bureau
EU-SILC	European Statistics on Income and Living Conditions
GDP	Gross Domestic Product
HETUS	Harmonised European Time Use Survey
HHSA	Household Satellite Account
IHLS/ILFI	Italian Household Longitudinal Survey
ILO	International Labour Organisation
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
ISTAT	Italian Statistics Bureau
NA	National Accounts
SAUCW	Satellite Accounts on Unpaid Care Work
SHARE	Survey of Health, Ageing and Retirement in Europe
SNA	System of National Accounts
UFCW	Unpaid Family Care Work

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EXECUTIVE SUMMARY

Aim of the study. The aim of this study is to provide a methodology to analyse the size and value of unpaid family care work in Europe. The first objective is an analysis of unpaid family care work at the EU level conducted on harmonised European surveys. The second objective is a comparison between two EU Member States, Italy and Poland, whose time use data contain additional detailed information on child and adult care. Both objectives aim at improving the indicators on unpaid family care work in order to have a reliable quantitative picture to use in discussions on this issue.

Definition of unpaid family care work. Unpaid family care work is defined as those caring activities mainly provided without any monetary return by members of a household to children and adults of the same household or to relatives living outside the household. A care activity is defined as productive if it can be delegated to another person. This is the so-called “third party” criterion.

Motives for studying unpaid work. There are several reasons for studying unpaid family care work, each one connected to policy issues. The most relevant for the present study are:

- *interrelation with labour market work*, especially important for women. Women’s participation in the labour market is related to domestic work, fertility choices, child care and elderly care tasks. The policy relevance of this aspect is, needless to say, enormous, ranging from labour market policies, to policies regarding the public provision of care services;
- *measuring its contribution to GDP* and answering questions like what reality would look like if unpaid domestic work was included in national accounts, what this would imply for economic growth and income distribution, whether women’s economic position would be strengthened;
- *tracking gender inequalities* arising from the unequal sharing of domestic/family care tasks between women and men.

Background questions of this study. In presenting facts and figures and reviewing the literature, the background questions of the study are:

- does unpaid family care work have a discouraging effect on participation in the labour market?
- What are the channels through which this effect takes place, and in which countries?
- What is the relation of unpaid family care work with the level of education, occupational segregation, gender discrimination, and lack of resources for reconciling work with family life?

Facts and figures. A general quantitative description of the phenomenon has shown that in the EU countries:

- time devoted to domestic work plus time spent in child care exceeds, on average, time spent in the labour market;
- domestic work, child care work and elderly care work are predominantly performed by women;
- gender gaps in domestic work, defined as the difference between mean male and female minutes per day spent in this activity, decrease as education increases;
- time spent in child care work increases with education for both males and females;

- gender gaps in child care increase with the level of education. This is due to the more than proportional increase with the level of education of child care performed by women with respect to men.

Literature review. The review of the literature has been structured to cover all components of household work: domestic work, child care and elderly care work.

Domestic work

- Domestic work continues to be predominantly carried out by women.
- Although different patterns can be seen across some identified groups of countries, the division of domestic work does not seem to change much over time.
- Although gender gaps are persistent, where women have their own labour income, more equal sharing of domestic work between men and women seems to occur.
- Some studies suggest that domestic work has a negative impact on female wages through the reduced accumulation of skills for the market.

Child care

- Unpaid family child care is mainly a woman's task all over Europe.
- It negatively affects both the decision to participate in the labour force and the number of hours of work supplied by women.
- Child care welfare regimes in their variegated forms ease both the decision to work and the decision about how many hours of work to supply.
- Differences in participation and fertility rates for women from different European countries can be attributed both to household/individual characteristics and to institutions.
- Education has a prominent role: it increases the probability of paid work, but also the number of hours parents spend with children.
- Childcare and optional parental leaves have a larger impact on the fertility and participation decisions of women at lower educational levels.
- Part-time opportunities (when well-paid and protected) have a larger impact on the outcomes of women with higher educational levels.
- The Nordic countries show the lowest gender gaps in child care and a mix of policies that eases both parental work and family child care.
- Women in the Mediterranean countries still have to bear most of the burden of domestic work and care of children. Child care arrangements remain the major instrument enabling women to enter paid employment.
- The Western countries lie in between the Nordic and the Mediterranean situation.
- The new member countries of the EU show a combination of traditional and innovative features.

Elderly care

- Unpaid family elderly care is mainly the women's task all over Europe.
- Its relation with participation in the labour market is unclear. Due to the fact that time dedicated to this kind of care is much less than child care, there is no unidirectional evidence.
- The effect of different care regimes is also unclear.
- Despite the stark cross-country heterogeneity, the available evidence seems to suggest the higher effectiveness of formal care with respect to informal care.

- Informal care is an effective substitute for formal care as long as the needs of the elderly are low and require an unskilled type of care. In Sweden and the United Kingdom home care services have been concentrated on the most serious cases. Germany has invested mostly in family care provided by the State.
- France and the Netherlands have also promoted a greater provision of professional home care services as part of a new approach designed to combine employment creation with the greater coverage of social needs.
- Italy stands as an example of what might be the consequences of the absence of reforms, with a substantial recourse to female migrant workers. This model has spread across Southern Europe raising complex issues of equity and sustainability from an employment perspective.

Data and measurement methods

The study exploits the EU level information on unpaid family care work contained in the European Statistics on Income and Living Conditions (EU-SILC by EUROSTAT) for 2006 and in the Harmonised European Time Use Survey (HETUS, by EUROSTAT, different years for each country). The data sources for the analysis on Italy are The Multipurpose Time Use Survey 2003/4 (by the Italian Central Statistical Office) and the cross-section for Italy drawn from EU-SILC 2006. For Poland, the Polish Time Use Survey for 2003/4 (by the Polish Central Statistical Office) has been used.

The value of unpaid family care work in a country can be derived with three methods:

- Multiplying the total amount of hours spent in caring activities in a year by the wage rate of the family care givers. This is the wage the care givers earn in the market if they also work in the market. If the care givers do not work in the market, this is the wage they could earn, given their characteristics.
- Multiplying the total amount of hours spent in caring activities in a year by the wage of a domestic worker.
- Multiplying the total amount of hours spent in caring activities in a year by the wage of workers performing similar tasks in the market (that is, the wage of a teacher for teaching, of a public driver for transporting, the wage of a nurse for elderly caring).

Results of the EU level analysis. One of the main tasks of the study has been to devise a methodology to estimate a monetary value of unpaid domestic work and unpaid family care work at the EU level. The analysis has been conducted for the EU25 countries (except Malta), both for comparative reasons and to give some indications of the weight that unpaid domestic work has in each European economy. Several problems arise with the available data. The main obstacle to be overcome has been that the European harmonised income survey (EU-SILC) does not collect time use information, implying the necessity to integrate it with the European harmonised survey on the use of time (HETUS). As a consequence, some simplifying assumptions had to be made in order to obtain sensible estimates. It is for this reason that the value has been estimated following all available methods of the "input approach", in order to estimate a range of variation, more than a precise value. Another problem of these data sources is that they do not contain information on unpaid family elderly care, so that this part of the analysis had to be limited to child care.

Value of unpaid family care in the EU as a whole. Applying the described methods and depending on the methodology used:

- the estimated value of unpaid family domestic work and unpaid family care work taken together ranges between a minimum of 27.1 per cent and a maximum of 37.0 per cent of EU GDP

- the estimated value of unpaid family care work ranges between a minimum of 3.9 per cent and a maximum of 5.8 per cent of EU GDP.

These figures may appear large, but the time devoted to domestic work plus the time spent in child care exceeds, on average, the time spent in the labour market.

Value of unpaid family care at a country level. The study also reports the values of unpaid family care work at a country level, thus showing the different contributions that family child care work would give to each economy if included in the national accounts. This contribution varies from the lowest values found for Latvia, the Czech Republic, Slovakia and Estonia (2 to 3 per cent) to the highest values found for Poland, Germany, Cyprus, the Netherlands and the United Kingdom (over 6 per cent). Looking at the role of each Member State, the results show that the larger an economy is, the bigger is its contribution to the overall EU values of unpaid domestic work and unpaid family care work. However, this is due to the combination of larger populations with higher salaries, not to a higher amount of time devoted to domestic activities in these countries.

The contribution of women to the value of unpaid family care work is large and in several countries it is more than two times the contribution of men. This is expected, since the average time women devote to childcare is two and a half times the time devoted by men. In this case the gender time gap is too large to be offset by the gender pay gap.

Results of the comparative analysis for Italy and Poland. Regarding the comparison of the methodology adopted at country level and at EU level, the advantages of the micro-data analysis conducted on these two countries are that using micro data on time use, which are not available for all EU countries, it is possible to:

- better identify the population contributing to unpaid family care work (that is, by age, work status, day of the week, household characteristics),
- know precisely the time devoted to *child care* and *elderly care work*. This last component is particularly important because not only do the data and methods adopted in Chapter 4 not allow this to be taken into account, but also because, as seen in Chapter 2, there is growing interest in elderly care and no studies that estimate its value,
- better identify the value of each unit of unpaid family care work (hourly labour income) supplied by the population contributing to unpaid family care,
- use more sophisticated techniques to impute labour income to individuals observed in time use surveys (the so called "matching" of different surveys) in order to derive more reliable estimates.

The comparison of the use of time in the two countries has shown that Italians participate somewhat less than Poles in child care, but substantially more in elderly care (around three times more). This has a demographic explanation, since the Polish population is younger than the Italian population.

As to the distribution of time of people who perform these activities, there are not significant differences in time spent in primary child care for both males and females (around two hours a day on average for females and one hour for males). As to elderly care, Poles spend around forty per cent less than Italians in this activity. However, since the average time allocated to elderly care activities is generally much lower than child care in both countries, there are not large differences in time allocated to total unpaid family care.

An important determinant of the total value of care is the value of each unit of care. The discrepancy in the hourly wages between Italy and Poland represents probably the main explanation of the difference in the value of unpaid family care work in the two countries. In fact, in Poland, hourly wages are 20 per cent of hourly wages in Italy.

As a consequence, a mere comparison between the absolute values of unpaid family care work in Italy and Poland is meaningless not only because of the different population sizes, but also because the data on labour incomes in the two countries refer to two different years, 2003 for Poland and 2006 for Italy. Considering these caveats, it is useful to report the value of unpaid family work obtained with micro-data in percentage of GDP.

The percentage of the unpaid family care work (net of taxation) on GDP is around 6.2 per cent in Italy and 4.5 per cent in Poland.

Comparison with the results obtained at the EU level. This is problematic in the case of Poland. The first reason is that income from labour refers to different years, 2006 and 2003 respectively, and in 2004 Poland has become a member of the EU. Average nominal wages have increased between 2003 and 2006 by 11-12 per cent and the exchange rate has changed from 4.61 PLN per EURO in 2003/04 to 3.89 in 2006.

The second reason is that in the EU level analysis wages are gross (EU-SILC provides them gross of labour taxes), while in the two-country analysis for Italy and Poland wages drawn from the time use survey are net. In a typical Polish labour contract, taxation on labour ranges from 33 to 37 per cent in the period considered. Considering these caveats, to make results of the EU level and two-country analysis comparable, it is useful to report the net value of unpaid family work obtained with micro-data in gross value and compute the percentage of GDP. In terms of GDP, elderly care is around 0.3 per cent and child care is around 6 per cent. Since the figure for child care estimated at EU level is 8.5 per cent, the analysis at the EU level overestimates the value of unpaid family child care work for Poland.

For Italy, the comparison is less problematic, since data on income are drawn from the same source. The estimates in Euros differ by around ten billions (69.5 vs 81). Moreover, the analysis at the EU level has not allowed taking elderly care into account. Once elderly care is included, the value of family care work increases by around 23 billion Euros. In terms of GDP, child care (net of labour taxation) is around 4.7 per cent and elderly care around 1.5 per cent. The net value of child care on GDP estimated in Chapter 4 is equal to 5.5 per cent. Given the higher precision of the estimated values with micro data, it may be concluded that *the analysis at the EU level overestimates the total value of unpaid family child care in Italy.*

Care of the elderly in the value of unpaid family work. Data and methods adopted in this analysis have taken into account the weight of elderly care in the value of unpaid family work. This is particularly important in ageing societies. In fact, family elderly care is quite relevant in Italy, a country with a relatively old population compared to the rest of Europe. In Poland, elderly care turns out to be less prominent, also because of the younger population. Since the two countries are quite similar in terms of family care the estimated value of unpaid family elderly care should represent two similar regimes at different stages of ageing. This means that *in perspective, all EU countries should place more attention on collecting data on elderly care, both paid and unpaid.*

Assessment on the validity of the EU level analysis. Taking for granted that estimates on micro data are more precise, the comparison with results obtained with the micro-data

analysis has shown that the EU level estimated value of child care is not so far from the value obtained here for the two countries studied, for Italy in particular. It might then be inferred, keeping in mind all caveats, that the EU level technique might be adopted with a certain degree of confidence. The allocation of time is a structural phenomenon, exhibiting very slow changes. For this reason, even if the time use surveys employed in the estimation refer to different years across countries, this should not represent a problem. The main element of variability is introduced by monetary values, like labour incomes. Using income surveys of the same year is, under this respect, fundamental for the country comparisons at a point in time, since many countries, like Poland, have experienced substantial economic growth rates, rapid changes in wages and in exchange rates, especially in the process of entering the EU.

1. INTRODUCTION

Unpaid family care work accounts for a large share of a population's effort to survive, to reproduce and to increase its well-being. Many individuals spend a significant part of their time in performing care activities, sometimes by their own choice and sometimes because they cannot afford to buy similar services in the market, or because these services are rationed or not adequately provided by the State. It is therefore important to have a clear representation of their amount relative to all other activities performed in a society.

Once this amount is known, certain questions must be addressed regarding the value to be attributed to these activities, a problem which is important in at least two ways. First, knowing the value of unpaid family care work would help to make this work "economically" visible, giving an economic evaluation of the work performed by family caregivers which could be compared to the value of market activities. This would be particularly important for gender equality, since family care is still predominantly provided by women. Second, it would enable cost-benefit analysis to be employed so as to choose the most efficient and least costly way to provide them. For example, it would help in deciding what is the best strategy for supplying unpaid family care work, either through the market, the State, or a combination of these; or whether it is better that households take the burden of it, and, if so, if household's income should be adequately supported by the State.

As a result, many questions arise when discussing unpaid family care work, for example to what extent it should become visible through the market, to what extent it represents an obstacle to women's access to the labour market, or to what extent it should be guaranteed to children or elderly people to improve their well-being. Whatever the question posed, one of the main problems concerns the methodology that should be applied to measure it.

However, neither the magnitude nor the value of unpaid family care work is easy to measure. For the magnitude the only satisfactory tools for measurement are represented by national surveys on how people allocate time between different activities. These surveys on the use of time are complex and costly but, by now, widely available and comparable between many different countries. As to its value, this is a more difficult task to accomplish, since these activities very often have no market price (for example if they are exclusively provided by the State) and if they do have one it is difficult to attribute the same price to a service found in the market to a similar caring activity provided by members of a household to other members. However, economists, and social scientists in general, have recently made significant improvements in developing well funded methodologies to solve these problems.

The aim of this study is to provide a methodology to analyse the magnitude and value of unpaid family care work at the EU level. The first objective is an analysis of unpaid family care work at the EU level conducted on harmonised European surveys. The second objective is a comparison between two EU member States, Italy and Poland, whose surveys contain information on child care and elderly care work which is more detailed than what is contained in the harmonised European surveys. Both objectives aim at improving the indicators on unpaid family care work to obtain a reliable quantitative picture to use in discussions on this issue. As to data sources, the study uses the EU level information on unpaid family care work contained in the European Statistics on Income and Living Conditions (EU-SILC by EUROSTAT) for 2006, and in the Harmonised European Time Use Survey (HETUS, by EUROSTAT, different years for each country). The data sources for the

analysis on Italy are The Multipurpose Time Use Survey 2003/4 (by the Italian Central Statistical Office) and the cross-section for Italy drawn from EU-SILC 2006. For Poland, the Polish Time Use Survey for 2003/4 (by the Polish Central Statistical Office) has been used.

The literature related to unpaid family care work has a long tradition, starting in the 60s with the attempts of economists to include household production and family care work in the national accounts for domestic product. Before presenting the measurement method and its results, this study adds to the literature review, providing a systematic account of the rich harvest of recent contributions on topics related to unpaid family care work and the methods used to measure it.

Plan of the study

After the introductory remarks of **Chapter 1**, **Chapter 2** touches on some aspects related to the European debate on unpaid family care work, distinguishing the general from the specific policy context. Section 2.1 introduces the aim of the study, a general definition and the motives for studying unpaid work. Section 2.2 offers a quantitative description of the distribution of time in the various activities in the EU countries. Section 2.3 reviews the literature related to unpaid family care work, distinguishing between its various components (domestic work, child care, elderly care). Section 2.4 summarises the discussion.

Chapter 3 reviews the definitions, the data and the existing methods for measuring unpaid work. Section 3.2 reviews the methodology for the Household Satellite Accounts that exploits the availability of time use surveys to estimate the value of “extended production” or “extended income”. Section 3.3 reviews the methods and results, achieved in the literature, that combine the advances in the accountancy techniques with the achievements of household economics by means of the econometric approach for imputing values to unpaid work. This prepares the ground for understanding the methodology applied to the selected data sources, whose procedures and results are presented in the following two chapters.

Chapter 4 adds, in Section 4.2, some supplementary description of the use of time in Europe. The focus is on the EU as a unique entity, using aggregate data. It also provides some evidence, drawn from EU-SILC, to deal with the paid/unpaid work connections discussed in Chapter 2. Section 4.3 deals with the main task of the chapter, namely, estimating and presenting the values of UPW and unpaid family care work through the integration of HETUS and EU-SILC. Section 4.4 concludes, summarising the most significant results and suggesting necessary improvements in data collection for conducting a more robust analysis at the EU level.

Chapter 5 assesses the quality of the results obtained from the proposed method of analysis focusing on Italy and Poland and using time use micro data. It also evaluates the potential informative gain with respect to the analysis conducted on the EU surveys. Section 5.2 reports the analysis and the results for Italy, Section 5.3 reports the analysis and the results for Poland, and Section 5.4 compares the analysis for the two countries and assesses the consistency of the results with those obtained at the EU level in Chapter 4.

Chapter 6 provides some general conclusions and contains some suggestions for improving the design of existing surveys at EU level.

A list of **References** ends the study, followed by some **Annexes** that resume the most technical aspects of the analysis.

2. UNPAID FAMILY CARE WORK IN EUROPE: A REVIEW OF THE LITERATURE

2.1 Introduction

As it is such an essential human activity, a large body of literature in the social sciences has tried to analyse unpaid family care work both theoretically and empirically. For some scholars conducting research in the area of gender and work, a central concern involves measuring and assigning value to unpaid informal care, and highlighting the sex/gender divisions that exist when it comes to who performs such types of work. Only when adequate tools are created to measure and value unpaid informal care, a better understanding will be available of how the social and economic costs of sustaining households relate to individuals' capacity to participate in the labour force.

General definition. Social scientists often classify unpaid work in the household as "informal", to indicate that set of unregulated activities whose inputs are basically the caregivers' own time. Informal care is thus distinguished from "formal care", that is, that set of activities regulated by law or by contract and that have time-off, money and market services as inputs. Unpaid family care encompasses care and assistance provided by members of a household to other members. This work is similar in character to paid care occupations, such as those related to childcare provision, nursing, and care of the elderly, which often are among the lowest paid occupations in the labour force. The majority of unpaid family caregivers are women, and the recipients of care are usually children, elders, and disabled members.

Motives for studying unpaid work. There are several motives for studying unpaid work, each one connected to policy issues. We mention the four of them which are the most relevant for the present study.

First, its interrelation with labour market work, especially important for women. In this field, the economic literature is very rich, with different approaches, ranging from the neoclassical household economics started by Becker (1965), to the bargaining approach (Lundberg, 2008), and to the feminist approach to the economics of the family (Folbre, 2008). The issue of women's participation is studied in the framework of the theory of allocation of time, thus involving the analysis of its interaction with domestic production, child care tasks, fertility choices and so on (Del Boca and Vuri, 2007; Cigno 2008). The policy relevance of this aspect is, needless to say, enormous, ranging from labour market policies to policies regarding the public provision of care services.

Second, measuring the contribution of unpaid work to GDP. This motive has led to the development of methods for "gender budgeting" with the aim of building satellite accounts to be incorporated in the System of National Accounts (Chadeau 1999, EUROSTAT 2000, 2003). The aim of this methodology is to answer questions like what reality would look like if unpaid domestic work were measured, valued and included in national accounts, what alternative estimations of economic growth and income distribution would imply, whether women's economic position would be strengthened (Nyberg, 2000).

Third, choosing the optimal mix of public and private resources for financing care in a welfare system. Some studies have concentrated on child care regimes in Europe (Bettio and Plantenga, 2008, Bettio and Plantenga 2004; Ray, Gornick and Schmitt, 2008), other studies on elderly care and equity and efficiency in home based care (Bettio and Solinas, 2009; Bettio, Simonazzi and Villa, 2006; Simonazzi, 2008).

Fourth, tracking gender inequalities arising from the unequal sharing of domestic/family care task between women and men (Aliaga, 2006), and promoting a gender-oriented budget in the field of fiscal policy.

Content of this chapter. The rest of this introduction touches on some aspects related to the European debate on unpaid family care work, distinguishing the general from the specific policy context. Section 2.2 offers a general quantitative description of the distribution of time in the various activities in the European countries. Section 2.3 reviews the literature related to unpaid family care work, distinguishing between its various components (domestic work, child care, care of the elderly). Section 2.4 summarises the discussion.

2.1.1 EU policy context

The discussion about the role of unpaid family care work has been growing substantially over the past decade at the European level. This is documented by several reports of the European Commission like those produced by the Expert Group on Gender, Social Inclusion and Employment (EGGSIE) on "Making Work Pay" (2005a), the "Reconciliation of work and private life" (2005b) and the Report on equality between women and men 2008 by the Directorate General "Employment, Social Affairs and Equal Opportunities" of the European Commission (2008).

Policy reforms to social protection systems and of related labour market programmes. The report "Making Work Pay" (2005a) surveys the policy reforms to social protection systems and of related labour market programmes which have been designed to integrate low-income groups into employment. This report discusses whether gender mainstreaming of the policy has occurred, and what gender impact these reforms were expected to have. In particular, it focuses on the wider incentives and barriers that are faced by those – still largely women – who take on the primary care role in households with young children, with a particular emphasis on the situation of mothers in low-income households (tax and benefits, active labour market policies, childcare, and so on).

Policies targeted towards the reconciliation of work and family life. The report "Reconciliation of work and private life" (2005b) contains an overview of policies targeted towards the reconciliation agenda of the 25 EU Member States. Reconciliation policies can be defined as policies that directly support the combination of work, family and private life. These include policies on childcare services, leave facilities, flexible working arrangements, and other reconciliation policies such as financial allowances for working parents. The report highlights the need to raise participation in the labour market and to stimulate population growth. An important issue for the coming years seems to be the streamlining of work and family policies into one integrated system of care, education and leisure services. Fragmentation, conflicting time schedules and difficulties in transitions from one service to another hinder the optimal use of services and constrain the growth of female labour-force participation.

2.1.2 Unpaid work specific policy context

Public policies with respect to unpaid work are of two types (Swiebel, 1999):

Specific or direct policies. These are explicitly aimed at unpaid work. They might include recognising it or making it more visible; influencing the quantity of unpaid work done in a society or changing the distribution of unpaid work among different groups in society.

Indirect policies. These are not designed and implemented with a view to affecting unpaid work as a primary policy objective, but they have implicit effects on unpaid work. Sometimes influencing unpaid work is included as an explicit secondary objective of a policy. Mostly, however, socio-economic policies have implicit effects on unpaid work.

Although this study relates to both aspects, the specific policies are our main interest, since new policy routes should attempt to make this work more visible. First of all this requires a methodology to measure its value, and this is the objective of the present research proposal.

One solution for better reconciling work with family responsibilities involves more paid employment in caring, but the conditions of work and employment in these jobs often leave much to be desired. Under-evaluation of paid care work goes hand in hand with lack of recognition of unpaid care work, which is seen as natural and not requiring skills. The growth of the care sector has provided more jobs for women, as most of this kind of work is done by women. Care workers are among the most poorly paid and have the highest turnover rates. Since it comes as the traditional task of women it is not perceived as requiring skill, but rather as something that comes naturally to women; it is barely recognised as a profession. Wage rates for child-care workers are even lower than average female wage rates, thus reinforcing the gender gap in earnings. The move away from public to private care services in many countries, with the state having more of a managerial than a providing role, means that women benefit less from the wage margin of public-sector employment and national wage determination for public-sector workers (Antonopoulos, 2008).

Questions addressed. In presenting facts and figures and reviewing the literature, the background questions of the study are: 1) Does unpaid family care work have a discouraging effect on participation, and what are the channels through which this effect takes place, and in which countries? 2) What is the relation of unpaid family care work with the level of education, occupational segregation, gender discrimination, and lack of resources for reconciling work with family life?

2.2 Unpaid work and the allocation of time in Europe: facts and figures

This section¹ presents some general evidence regarding the use of time in Europe and highlighting gender gaps and regional disparities. The first section of Chapter 4 provides more focused and detailed evidence by employment status, income and hours of market work. The focus here is on the distribution of time among the main activities by gender and education in all the countries covered by HETUS.

Table 1A Mean minutes per day by activity. Males and females aged 20 to 74, EU

	Belgium		Bulgaria		Estonia		Finland		France	
<i>Activity</i>	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Market work	212	128	234	172	295	205	246	168	252	152
Domestic work	154	246	168	297	161	276	140	222	137	246
Child care work	12	27	8	24	11	38	14	32	11	33
<i>Total work</i>	378	401	410	493	467	519	400	422	400	431
Leisure	373	324	310	240	324	275	388	348	283	246
Other	690	718	722	709	648	645	653	670	758	762
Total	1441	1443	1442	1442	1439	1439	1441	1440	1441	1439
	Germany		Italy		Latvia		Lithuania		Poland	
<i>Activity</i>	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Market work	234	129	287	127	338	234	314	231	264	149
Domestic work	154	252	98	312	126	239	141	267	144	267
Child care work	12	29	13	34	5	24	8	26	16	42
<i>Total work</i>	400	410	398	473	469	497	463	524	424	458
Leisure	374	348	342	271	311	270	310	244	348	296
Other	665	679	700	697	660	672	669	674	666	685
Total	1439	1437	1440	1441	1440	1439	1442	1442	1438	1439
	Slovenia		Spain		Sweden		United Kingdom			
<i>Activity</i>	Male	Female	Male	Female	Male	Female	Male	Female		
Market work	254	178	291	144	275	191	280	161		
Domestic work	164	283	94	278	154	211	145	245		
Child care work	14	33	13	36	19	33	15	42		
<i>Total work</i>	432	494	398	458	448	435	440	448		
Leisure	359	290	343	290	353	332	358	328		
Other	652	656	694	690	640	672	643	664		
Total	1443	1440	1435	1438	1441	1439	1441	1440		

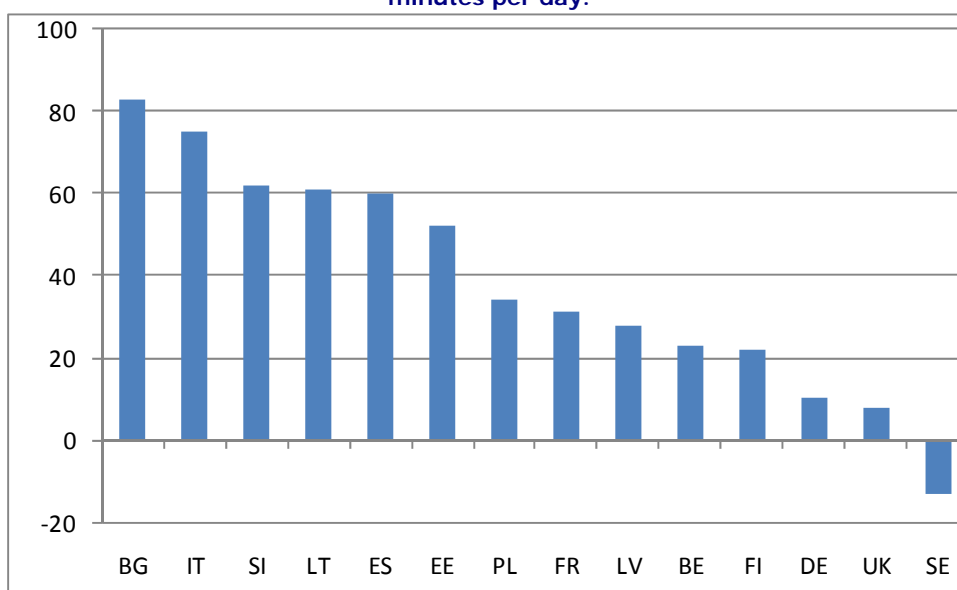
Note: Each country-survey refers to a different year. The time span varies between 1998 and 2005 (see Table A3.1)

Source: Harmonised European Time Use Survey

Table 1A confirms the evidence on gender gaps, with men working more for the market and engaging less in domestic tasks in all countries. The amount of total work, both domestic and for the market, is in general higher for females, as highlighted by existing differences between total work hours for women and men (see Figure 1).

¹ This section presents data drawn from the Harmonised European Time Use Survey (HETUS) database and table generating tool, but the interpretation of it and other views expressed in this text are those of the author. This text does not necessarily represent the views of the team behind the HETUS database or any national statistical institute which has contributed data to the HETUS database. The author bears full responsibility for all errors and omissions in the interpretation of the output of the HETUS database and table generating tool.

Figure 1 Difference between total work of women and men (20-74) in the EU. Mean minutes per day.



Source: our calculations on HETUS. Each country survey refers to a different year. The time span varies between 1998 and 2005 (see Table A3.1)

Positive differences are due to women’s excess of domestic and child care work. Negative differences are due to the excess of men’s market work and a more equal division of domestic tasks. The distinction by country shows that the distribution by gender of undistinguished total work is more equal in Germany, the United Kingdom, Norway and Sweden (less than 20 minutes) and more unequal in Bulgaria and Italy (more than 60 minutes). Italian women are the ones who spend the highest amount of time in domestic activities, the United Kingdom and Poland show the highest amount of time spent in child care, whereas Bulgaria and Latvia show the lowest. In line with what is known about women’s participation and employment in Western European countries, the highest share of time spent in market work is to be found in the Nordic countries and the lowest in the Mediterranean countries. The more recent Member States, like those in the Balkans and the Baltic countries, show the highest share of female market work in absolute terms.

As to the role of education, a great number of studies in the literature on human capital formation and labour give evidence of a significant positive relation between labour supply and the level of education through its effects on earnings (see e.g. the seminal study by Mincer and Polachek, 1974). Although there is relatively less evidence about the relation between domestic work/child care and education, the available studies seem to indicate a negative relation between education and domestic work and a positive relation with child care work (see on domestic work e.g. Addabbo and Caiumi, 2003; for the positive relation between education and child care see Folbre, 2007; Chalasani, 2007; Guryan et al., 2008)².

² See, on this subject, also the literature on the relation between parental education and the quality of child care (e.g. Blau, F. and A. J. Grossberg, 1990).

Table 1B focuses on gender gaps defined as the differences between mean male and female minutes per day spent in each activity by level of education. Gender gaps in market and domestic work tend to decrease in all countries as education increases, with only one exception (Slovenia, in market work, but by only a few minutes).

Table 1B Gender gaps in minutes of work, EU.

Male minus female mean minutes per day by level of education and tendency of gender gaps from low to high education

	Bulgaria		Estonia		Finland		France		Germany	
Work/Education	Low	High	Low	High	Low	High	Low	High	Low	High
Market work	62	46	119	73	121	76	121	63	115	88
Domestic work	-151	-97	-156	-84	-103	-58	-132	-67	-131	-89
Child care work	-16	-22	-20	-16	-26	-28	-19	-19	-4	-19
Total work	-105	-73	-57	-27	-8	-10	-30	-23	-20	-20

Tendency of gender gap as education increases:

Total work	-	-	-	-	-	-	-	-	-	-
domestic work	-	-	-	-	-	-	-	-	-	-
child care work	+	-	-	-	+	-	0	-	+	+
Total work	-	-	-	-	+	-	-	-	-	0

	Italy		Latvia		Lithuania		Poland			
Work/Education	Low	High	Low	High	Low	High	Low	High	Low	High
Market work	192	145	113	97	101	74	120	77		
Domestic work	-249	-143	-137	-80	-152	-96	-126	-74		
Child care work	-26	-25	-14	-18	-14	-19	-29	-24		
Total work	-83	-23	-38	-1	-65	-41	-35	-21		

Tendency of gender gap as education increases:

Market work	-	-	-	-	-	-	-	-	-	-
Domestic work	-	-	-	-	-	-	-	-	-	-
Child care work	-	-	+	-	+	-	-	-	-	-
Total work	-	-	-	-	-	-	-	-	-	-

	Slovenia		Spain		Sweden		United Kingdom			
Work/Education	Low	High	Low	High	Low	High	Low	High	Low	High
Market work	39	50	196	70	113	80	154	72		
Domestic work	-87	-80	-220	-80	-76	-59	-121	-63		
Child care work	-14	-42	-27	-32	-8	-19	-31	-37		
Total work	-62	-72	-51	-42	29	2	2	-28		

Tendency of gender gap as education increases:

Market work	+	-	-	-	-	-	-	-	-	-
Domestic work	-	-	-	-	-	-	-	-	-	-
Child care work	+	+	+	+	+	+	+	+	+	+
Total work	+	-	-	-	-	-	-	-	+	+

Note: High: top level of education (upper secondary or university). Low: middle school (three years of school after elementary school) or less. For Belgium no information available on education in the time use survey. This table is built on the basis of the distribution of mean minutes per day by activity and level of education drawn from HETUS.

Source: our calculations on HETUS.

Time spent in child care work increases with education for both males and females and in all countries. At variance with the other activities, gender gaps in child care increase in the majority of countries, except France where it does not vary, Italy and Poland where it decreases by a few hours, and Estonia where it shows a drastic decrease. The increase in gender gap in child care is due to the more than proportional increase with level of education of child care by women compared to men. This is in line with the literature that documents evidence of a positive relation between time spent in child care and education. However, some additional findings reported in the literature are not confirmed, e.g. the evidence in Chalasani (2007) according to which in the USA this increase is equally proportional for mothers and fathers. The total-work gender gap, due to the increase in female market work and male domestic work, decreases as education increases in all countries except Finland, Germany, Slovenia and the United Kingdom.

2.3 Review of the literature

Any analysis of unpaid work in the family begins from the more general problem of the allocation of time within the household. In this framework, the use of time of family members is interdependent. and each individual will specialise in the activity in which he/she is most productive. It has been recognised, at least since the work of Becker (1965), that a significant proportion of time not allocated to market labour is spent producing goods and services within the household. Questions of individual labour supply, inequality, taxation, household formation and dissolution, and fertility, among others, require the formulation of models that take account of the multi-person nature of most households and explicitly incorporate household production.

This initial condition of discrepancies in productivity may be generated by differentials in human capital and attitudes to gender roles, and might constitute the starting point for bargaining over the distribution of paid and unpaid work within a couple. If one partner specialises in unpaid work, her/his human capital declines relative to the more paid-work-specialised partner, leading to an intensification of work-role differentiation over time. The recent analyses on these issues, based on the time allocation framework, have concentrated on investigating the *causes* of these differentials in initial conditions that tend to arise and perpetuate over the life cycle.

The literature on the allocation of time aims to understand (i) the causes that generate the selection of individuals into particular household and paid-unpaid work statuses, (ii) the relation between changes in these statuses and changes of attitudes to family care responsibilities, (iii) the role of policy regimes in determining the paid-unpaid work distribution, (iv) how to make unpaid work visible and measurable, in order to compare its magnitude and value with that of paid work.

Content of this section. The section is organised in the following sub-sections.

- *Section 2.3.1* reviews the literature on the relation between *domestic work and market work*. It focuses first on the relation between domestic work and employment and then on the relation between domestic work and wages.
- *Section 2.3.2* reviews the literature on the relation between *family child care, market work and child care regimes*. It first reviews the literature on female participation in the labour market and child care regimes and then focuses on the time-use literature on parental time spent with children.
- *Section 2.3.3* reviews the literature on the relation between *family care of the elderly, market work and elderly care regimes*. It first reviews the literature on

female participation in the labour market and elderly care regimes and then focuses on the time-use literature on time spent with parents by adult children.

- *Summaries* of main findings conclude each sub-section.

The type of data used in the studies reviewed include household living standards surveys (cross-section and longitudinal) and time-use surveys, both country specific and harmonised at the European level.

2.3.1 Domestic work and market work

Domestic work and employment

The literature is rich in comparative analyses on the allocation of time between work and family, with a focus on gender differences.

At the European level, using qualitative data drawn from the European Quality of Life Survey 2003, Voicu and Voicu (2007) conduct a comparative analysis on the gender division of domestic work within the couple. They concentrate on differences across countries, finding various patterns across Europe. In the Nordic countries, couples spend a relatively restricted amount of time on housework, sharing it quite equally. In the Southern countries, as well as in Ireland and the United Kingdom, wives daily spend plenty of time on domestic chores, while men tend to avoid such activities. In most of the ex-communist countries, both spouses spend many hours, daily, on housework. In the Western-Central Europe, the daily housework load is higher than in Scandinavia but lower than in the Eastern and Southern countries. However, most of the Western couples involve men less often in housework than the Nordic and ex-communist countries, and they display higher gender inequalities.

A study by Solera (2008) compares Italy and the United Kingdom using event history data (British Household Panel Survey, BHPS, and Italian Household Longitudinal Survey, ILFI) and methods to investigate changes across cohorts in the effect of family responsibilities on women's transitions in and out of paid work. The effects of marriage and motherhood are stronger in a liberal welfare regime such as the British one. In Italy, where demand for labour is relatively low and gender role norms are quite traditional, reconciliation policies are weak but largely compensated by intergenerational and kinship solidarity, fewer women enter paid work, but when they do so they interrupt less than the British women on becoming wives or mothers.

Overall, it seems that the division of domestic labour does not change much over time. Breen and Cooke (2005) ask why the gendered division of domestic labour has proved so resistant to change despite the growth in married women's labour-force participation. Using data for 22 countries from the 1994 International Social Survey Programme they show that what is required is that there be a greater proportion of economically autonomous women within the society as a whole, together with a sufficiently large proportion of men who, if faced with an economically autonomous woman, would rather participate in domestic tasks than endure marital breakdown.

To appreciate the perception of the burden of domestic work within the couple, Davis and Greenstein (2004) use data from the International Social Justice Project in which the division of household work was measured by asking each partner who usually did the housework. Like Breen and Coke (2005), they find significant national differences in the division of domestic work: in nations where women are more employed in the market, like Russia, women are more likely to report that husbands perform at least half of the household work.

Turning to studies that use time-use data, Anxo et al. (2007) study gender differences in the allocation of time between market work, domestic work and leisure, conducting a comparative analysis of Italy, France, Sweden and the United States. They first define four typologies of households that follow the life-course of an individual biography, that is, single and childless young people, childless couples, couples with resident children, older couples or singles without children living at home. Their results show that "the greatest "revolution" in the time that individuals spend in unpaid work remains related to the presence of children, especially the youngest (under 6 years old). When they become mothers, Italian women are those whose domestic time increases most in absolute terms (more than 22 hours on average per week) followed by American women (more than 18 hours on average per week), all other things being equal. French and Swedish women increase it by about 16 hours. As children grow up, women reduce the time devoted to unpaid work, but when children are teenagers or young adults (16-25) they still spend from 5 hours more per week (in Sweden) to 13 hours more (in Italy) in unpaid work than cohabiting women without children" (p.15). After the peak of the child-care period, domestic work tends to decrease for both females and males, and starts increasing again slightly after retirement for both females and males. The positive gender differential is always present, showing its largest value in Italy and its lowest value in Sweden.

Burda et al. (2007) make a further distinction in total time: they divide total time into market work, household production (those activities substituting market goods and services for one's own time), "tertiary activities" ("those things that we cannot pay other people to do for us, but must do ourselves, like eating and sleeping") and leisure. They define total work as the sum of time spent in market work and household production (p. 2). They find that in Germany, the Netherlands and the U.S. among people of the same level of education there is essentially no difference by gender in total work. Men work more in the market, women engage in more home production, but these balance out. The only exception is Italy, where men work substantially less in total than women, mainly because women engage in much more household production than women elsewhere, while men engage in less. The authors explain this regularity with the theory of social norms, according to which within education and within region gender differences should be smaller than inter-group differences.

Domestic work and wages

The allocation of time has also a central role in explaining gender wage differentials. The gender pay gap in full time work is a worldwide fact, and the difference increases when part-time work is included. In Europe, although the gap has closed considerably since the 1970s, convergence has slowed in recent years, with little change since the mid-1990s. To account for this gap, labour economics has focused on gender differences in skills, human capital and job characteristics. An important explanation for women's lower wages in this framework is that women have greater household commitments, leading them to interrupt their careers more frequently than men and invest less in human capital (Mincer and Polachek, 1974). In this way, household commitments have an indirect impact on the gender wage gap through differential skills acquisition. Moreover, tiring activities like domestic work reduce the amount of effort available for market work, resulting in lower productivity and wages. Bryan and Sevilla Sanz (2008) study this direct impact of domestic work on wages and find a negative effect of housework on wages in Britain using data from the British Household Panel Survey (1992-2004). The differential effect across gender and marital status suggests that the factors behind the relationship between housework and wages are the type and timing of housework activities as much as the actual time devoted to housework. Compared to single women, married women specialise in routine housework

which is done at times that may interfere with market work. Married men specialise to a lesser extent and their housework is not done on the margins of the working day. Polavieja (2008), using the second round of the European Social Survey, shows that the negative effect of domestic work on hourly earnings persists even after allowing for sex differences in sex-role attitudes and personal tastes. Bonke et. Al. (2005), like Bryan and Sevilla Sanz (2008) but using time budget data for Denmark, quantify the effects of timing and flexibility of housework on earnings of females and males. They find that women are penalised more than men by the inflexibility of domestic work, since the early closing of shops and day care institutions has a negative effect on earnings and careers of females especially at the top end of the distribution.

Summary of main findings on domestic work and market work

According to the main findings of this literature, domestic work continues to be predominantly carried out by women. Although different patterns can be envisaged across some identified groups of countries (for example, the Mediterranean, the Nordic, the Baltic countries) the division of domestic work does not seem to change much over time. Gender gaps whereby women do significantly more domestic work than men are persistent. However, where women have their own labour income, more equal sharing of domestic work between men and women seems to occur.

As to the effects on wages, there is evidence that domestic work has a negative impact on female wages through the reduced accumulation of skills for the market. This is due not only to the number of hours of domestic work that limit the time that could be allocated to market work, but also to the timing and inflexibility during the day.

These findings seem to imply that, without state intervention, the structure of incentives behind sex-differences in job-allocation, domestic work and earnings could persist even in the face of changes in sex-role attitudes and personal tastes.

2.3.2 Family child care, market work and child care regimes

The literature on these issues is copious. A lot of work has been done, for example, on the relation between motherhood and labour market participation of European women on child care and women's participation, parental investment in children, fertility and labour market participation, all of them related to unpaid family care work. This section overviews the most recent contributions, focusing mainly on the issue of child-care.

Female participation and child care regimes

According to EUROSTAT in the EU25 in 2006, the number of children aged up to compulsory school age was estimated at around 30 million. Among these children, 26 per cent of those less than three years old were attending formal childcare, while the percentage rose to 84 per cent among those from three years old to compulsory school age. The children not attending formal childcare were cared for by a parent, child minders or relatives and friends.

The proportion of those attending formal childcare differed significantly among Member States. For children aged less than three the highest percentages were recorded in Denmark (73 per cent), the Netherlands (45 per cent) and Sweden (44 per cent), and the lowest in the Czech Republic and Poland (both 2 per cent). For children aged three to compulsory school age, the highest proportions were observed in Belgium (98 per cent), Denmark (96 per cent) and France (94 per cent), and the lowest in Poland (28 per cent),

Lithuania (56 per cent) and Malta (57 per cent). For childcare of 30 hours a week or more, the highest shares in the age group less than three were observed in Denmark (66 per cent), Portugal (32 per cent) and Sweden (27 per cent).

The evidence documenting at all level of analysis a positive relation between female participation and child care services in Europe is by now very abundant. Among the most recent examples, Del Boca et al. (2008, 2009), using data from the European Community Household Panel (ECHP), explore the impact of social policies and labour market characteristics on women's decisions regarding work and childbearing. The two decisions are modeled jointly and, in addition to personal characteristics, variables related to the childcare system, parental leave arrangements, family allowances, and labour market flexibility are included. Their empirical results show that a non-negligible portion of the differences in participation and fertility rates for women from different European countries can be attributed to the characteristics of these institutions, and that the environmental effects vary by educational level. While labour market arrangements, such as part-time opportunities (when well-paid and protected) have a larger impact on the outcomes of women with higher educational levels, childcare and optional parental leaves have a larger impact on the fertility and participation decisions of women at lower educational levels.

Turning to area studies, Lewis et al. (2008), using the European Social Survey 2004/5, analyse how parents reconcile employment and child-care in Western European member states, and how much the EU-level policy on enhancing the formal provision of child-care is consistent with their preferences. They use information on working patterns and preferences, and on child-care use and preferences regarding the amount of formal provision. They find that working hours in formal employment remain a very important dimension of reconciliation practices, with large differences in both patterns and preferences. There is very little evidence of convergence towards a dual, full-time worker model family outside the Nordic countries, although the balance between the hours which men and women spend in paid work is becoming less unequal. Portuguese women express a strong preference for much more formal child-care; Dutch, German and British women are relatively satisfied with the amount they have, despite having much less developed formal provision than the Nordic countries. The authors conclude that, strong preferences for changes in working hours provide support for the development of policies that include child-care leaves, entitlements to part-time or flexible patterns of work, as well as formal child-care. Since countries vary enormously in terms of the nature of the existing policy package and patterns of adult labour-market participation, respect for parental choices is increasingly an issue with regard to the gender divisions of unpaid care work and employment.

Some previous studies reached a different conclusion. Larsen (2004), for example, examines the work and care strategies chosen by full-time working families with children in Finland, Italy, Portugal and the UK. The study investigates whether European families in different countries, facing the same problems of balancing employment and childcare responsibilities, respond to their situations in similar ways. Using qualitative data from the SOCCARE project³, the author makes a comparative analysis of couples in similar work and care situations. Using their working hours as the common denominator, the paper analyses their daily childcare arrangements and how these are impacted by gender roles, working

³ SOCCARE was a comparative European research project that has studied informal and formal social care arrangements for young children and older people. It was financed by the European Commission through its 5th Framework Programme, Key Action for Socio-Economic Research. The project included researchers from five European countries and it was co-ordinated by the Department of Social Policy and Social Work, University of Tampere. The project started on 1 March 2000 and ended after 42 months.

schedules, workplace flexibility, income levels, parents' educational background and availability of care facilities. At variance with much of the literature reviewed in this chapter, the paper concludes that European families' work and care strategies have many similarities and national differences may not be as marked.

The paper by Nicodemo and Waldmann (2009), focusing on the Mediterranean countries, analyses the connection between the married women's labour force participation, child care arrangements, and the time that husbands and wives spend taking care of children. They use the EU-SILC (European Survey on Income and Living Conditions) cross-section 2006 and data from the ECHP (European Community Household Panel) in 2001, because these two data-sets provide different information about child care and domestic work. The results show that while the Mediterranean countries have advanced in the integration of women into the labour market, in most of them women still have to bear the total burden of domestic work and care of children. They find that child care arrangements are a major instrument for women to enter in paid employment.

Turning to specific studies that investigate child care regimes, a comparative study on childcare services based on EU-SILC data (Plantenga and Remery, 2008) assesses the current state of affairs of formal child care arrangements in Europe. It emerges that the presence of a child affects female employment rather heavily, especially in the Czech Republic, Hungary and Slovakia. The total fertility rates are below replacement level in all EU Member States, but prove to be especially low in countries with low female participation levels. There is strong evidence that a sufficient supply of childcare services has a positive impact on participation, the fertility level and social inclusion. Bettio and Plantenga (2008) suggest two indicators, intensity of informal care and the availability of child services, to be based on data drawn from ECHP. The informal care intensity index is based on (i) the number of adults devoting at least two hours per day to caring for children, or elderly or disabled persons, divided by the number of 'potential beneficiaries'; (ii) the proportion of households which do not pay for regular child care services, divided by the total number of households with children. The highest values for this index are found in Mediterranean countries (Italy, Greece and Spain), whereas the lowest values are found for Scandinavian countries (Denmark and Finland; data for Sweden are not available). The availability of child services index is based on (i) the number of children under the age of three cared for by formal arrangements over the total number of children of the same age group; (ii) children between three years old and the mandatory school age cared for by formal arrangements (outside the family) as a proportion of all children of the same age group; (iii) the (prevalent) public/private nature of the child care facilities. However, they then do not find adequate data sources on which to construct the index, and have to rely only on the coverage rate of formal child care facilities for the youngest children. This index has the lowest values in the Mediterranean countries and the highest in the Scandinavian countries.

As to the new member countries of the EU, Szelewa and Polakowski (2008) compare childcare provisions. They take into account two pillars of childcare policy: publicly provided childcare services and parental leave provisions. In contrast to previous studies, they provide evidence of cross-country variation of childcare policies within the region. These differences are systematised by identifying four clusters of childcare policy. These are: "explicit familialism" (the State pursues some active policies to support the traditional family model), "implicit familialism" (policies are residual and formally neutral, with the assumption that family should not be interrupted in its task of educating children), "female mobilising" (policies support female participation easing the provision of private and public formal child care to be paid by households, rather than through parental leaves) and "comprehensive support" (the State pays child care to employed couples). The countries

are clustered as follows: the Czech Republic, Slovakia and Slovenia in the explicit familialism policy model; Estonia and Latvia in the female mobilising type policy; Lithuania and Hungary pursuing the childcare policies typical of the comprehensive support model; and finally the childcare policy in Poland resembles characteristics of the implicit familialism model.

Parental time spent with children

Time spent with children represents a fundamental investment in their development, and institutions play a crucial role as mediators between the female labour supply and time devoted to children. Ichino and Sanz-de-Galdeano (2003) have called attention to the role of child care and working-time arrangements, comparing evidence based on time use data for three countries: Italy, Germany and Sweden. While in all these countries working mothers appear to dedicate less time to child care than non-working mothers, in Sweden the difference between the two groups is the smallest. In Italy maternal work is associated with the largest loss of maternal child care. To shed light on the possible reasons for this finding they consider the role of part-time job opportunities and formal or informal child care arrangements. They argue that while child care facilities increase mothers' access to employment, it is the availability of flexible working arrangements that allows them to work and still have enough time to allocate to child care.

Joesch and Speiss (2006), using data from the 1996 wave of the European Community Household Panel for mothers with children under 16 years of age, compare how many hours per week mothers reported looking after children in nine European countries. They also explore to what extent cross-country differences in socio-demographic characteristics and parental employment contribute to differences in maternal time spent looking after children. They find cross-country differences in the mean number of hours mothers reported looking after children. Only a small portion of these differences is explained by variation in socio-demographic characteristics and employment status. Country-specific policies aimed at reconciling parenthood and employment appear to explain some of the differences.

Cardoso et al. (2008) introduce choices made by children themselves into the analysis of parental investment in children. They model youngsters' aged 15 to 19 use of time in activities not only related to study, but also to social-networking which can enhance personal interaction skills. Using data on time use for France, Italy and Germany, they study the link between time allocation by parents and time allocation by youngsters. Countries diverge with regard to the association between parents' and youngsters' allocation of time to socialising and to reading and studying activities, with Italy standing out as the country where that association, in particular between youngster and mother, is strongest. Their results are consistent with different mechanisms: parental role models directly influencing children's behaviour, intergenerational transmission of preferences, or network effects as individuals adapt their behaviour to social patterns.

Chalasanani (2007) shows, on data drawn from the American Time Use Survey for 1985 to 2003, that better educated parents used to and continue to spend more time with their children than the less educated. Although parents at all levels of education have increased their time with children over the years, the better educated have made relatively larger gains. Further, while mothers spend more time with children than fathers, the ratio of mothers' to fathers' child time was and continues to be lower for the better educated than the less educated.

Summary of main findings on family child care, market work and child care regimes

Parental choices are increasingly an issue with regard to the gender divisions of unpaid care work and employment. Although countries vary significantly in terms of the nature of the existing policy package and patterns of adult labour market participation, some regularities emerge from the literature reviewed. According to the main findings of this literature, child care work continues to be predominantly carried out by women. Time spent in child care is negatively related to female participation to the labour market and to the number of hours women work.

Differences in participation and fertility rates for women from different European countries can be attributed both to household/individual characteristics and to institutions. Among the former, one of the most important is the level of education. Education has a prominent role: it increases the probability of work, but also the number of hours parents spend with children, with different intensities in different countries. As to the role of institutions, childcare and optional parental leaves have a larger impact on the fertility and participation decisions of women at lower educational levels. Labour market arrangements, such as part-time opportunities (when well-paid and protected) have a larger impact on the outcomes of women with higher educational levels. These findings lead to the conclusion that, while child care facilities increase mothers' access to employment, it is the availability of flexible working arrangements that allows them to work and still have enough time to allocate to child care.

The choice of the policy mix of labour market arrangements and formal child care largely depends on country specificities. The categorisation of countries into groups with similar characteristics, reveals that the Nordic countries show the lowest gender gaps in child care and a mix of policies that eases both parental work and family child care. Women in the Mediterranean countries, instead, even if advancing in terms of integration into the labour market, still have to bear the total burden of domestic work and care of children. In this case, child care arrangements remain the major instrument enabling women to enter paid employment. The Western countries lie between these two extreme situations. As to the new member countries of the EU, there seems to be quite a lot of variety. The State pursues some active policies to support the traditional family model in the Czech Republic, Slovakia and Slovenia; policies are residual and formally neutral in Poland, while in Estonia and Latvia policies support female participation by easing the provision of private and public formal child care to be paid by households, rather than through parental leaves; both active and passive interventions to support women's work and families are present in Lithuania and Hungary.

2.3.3. Family care of the elderly, market work and elderly care regimes

Increasing interest in this topic accompanies the growing attention to the welfare consequences of elderly care provision in ageing societies. The policy question is how to choose the optimal mix of elderly care services and money transfers to families without either increasing public spending or producing disincentive employment effects.

Some literature has taken advantage of the Survey of Health, Ageing and Retirement in Europe (SHARE, 2008), a multidisciplinary and cross-national panel database of micro data on health, socio-economic status and social and family networks of more than 40,000 individuals aged 50 or over. However, due to the lack of detailed information in many time use surveys of European Member States, there is no research on time spent with the elderly based on time use data.

This section first reviews the studies on the relation between unpaid family elderly care work and female employment and then discusses the potential effects on unpaid family care work of different elderly care regimes in Europe.

Female participation and elderly care regimes

Faced with tight budgets, a recent trend in the EU countries has been to re-direct transfers from public provision of elderly care to informal care. As shown by Jacobzone and Jenson (2000, p.4) these benefits represent a compensation for the costs incurred in care giving, particularly when compared with a situation without benefits. However, they are sometimes offered at only symbolic levels, and do not appear necessarily to minimise gender-related inequalities. Their welfare-enhancing effects depend on their level. Their effects on women care-givers, and in particular on their participation in paid labour market activities, depend primarily on the level of benefits, as it is this which largely determines the reaction of care-givers to such benefits. However, the modest rates of benefits mean that they are unlikely to have been the main determinant of care provision in the majority of cases: care is provided because of need (and would have been even if no benefits had been paid).

Some other studies show that this expectation of replacement of formal care with informal care may have turned out to be in conflict with the target set in the European Employment Strategy for female employment rates in Europe. In fact, some research on the relation between informal care and labour force participation gives evidence of a negative relation (for the US, see Ettner, 1996; Kolodinsky and Shirey, 2000⁴). For Great Britain, Henz (2006), using retrospective family, employment, and caring data from the British Family and Working Lives Survey 1994 – 1995 for 9,139 British men and women, finds that family roles but not employment characteristics were relevant for men and women taking up caring. Being in a lower social class was, however, an important predictor of female carers leaving the labour market. Starting caring and quitting the labour market because of it were not affected by women working part time, nor by most aspects of job flexibility that were considered.

Sarasa (2008), using pooled ECHP data, analyses the effects of old age and disability benefits on women's decisions to allocate time to adult care giving. The main conclusions are the following: (i) non-means-tested provision of benefits lowers the risk of heavy adult care giving among all women, while means-tested benefits have no significant effect on poor women's behaviour, and (ii) providing services is more efficient than cash transfers in reducing women's probability of allocating many hours to adult care. Viitanen (2007), using the same data set but exploiting its panel nature, finds that an increase in government expenditure on formal residential care and home-help services for the elderly significantly decreases the probability of providing care to elderly parents living outside to household for a sample of European women aged 45-59. Contrasting the recent tendency of long-term care policies, some simulation results in the same paper show that increasing government expenditure on formal residential and home-help for the elderly can significantly increase the labour force participation rates of women across Europe.

The SHARE report (SHARE, 2008) provides descriptive evidence of the fraction of people helping old parents conditional on labour force participation. It emerges that there is stark cross-country heterogeneity. In Greece, Sweden and Denmark time spent in helping old parents does not depend on labour force participation, while in many other countries workers provide significantly less of this type of care than non-workers. Some studies

4 Wolf and Soldo, 1994, however, on the same data as Ettner (1996), do not find evidence of reduced propensities to be employed, or of reduced conditional hours of work, due to the provision of parental care.

based on the SHARE data set provide econometric evidence of the relation between formal and informal care giving and the effects on women's choices. For example, Crespo's (2006) estimates based on SHARE data show the causal effect of providing "intensive" informal care to elderly parents on labour market participation decisions of a sample of European daughters. The estimated probability of participating in the labour market is negatively affected by care giving for both Northern (Sweden, Denmark and the Netherlands) and Southern (Spain, Italy and Greece) countries. Moreover, a substantially stronger effect is found when care-giving and labour market participation are considered as being mutually dependent: more labour market participation means less care-giving. This shows that the potential opportunity costs in terms of reduced employment associated with the provision of informal care by women are seriously underestimated under the simplifying assumption that the direction of causality is such that more care-giving leads to less participation in the labour market.

As to the specificities of child care regimes, the need to restrain public spending has, in the past decade, obliged many European countries to restructure the system of social care. In this context, the case of long-term elderly care offers an example of reforms that have tried to rationalise the linkages between paid and unpaid work across key forms of provision. Pavolini and Ranci (2008), studying the case of six European countries, find that a special weight has been attached to home care services and measures aimed at supporting family care. While in Sweden and the United Kingdom home care services have been concentrated on the most serious cases, the countries of continental Europe have introduced the most significant innovations, with Germany investing mostly in family care, while France and the Netherlands also promoted greater provision of professional home care services as part of a new approach designed to combine employment creation with greater coverage of social needs. Italy stands as an example of what might be the consequences of the reforms, with a recourse to female migrant workers to such an extent that the Italian traditional family model of care is becoming a 'migrant in the family' model of care (Bettio, Simonazzi and Villa, 2006)⁵. This model stems from the recent experience of replacing unpaid family carers with low-cost immigrant workers directly employed by the families and often cohabiting with the elderly. This new model has spread across Southern Europe and raises complex issues of equity and sustainability from an employment perspective.

A strand of literature tests the hypothesis that informal care given by family members to the elderly is a substitute for formal care in Europe. Bonsang (2008), for example, focuses on two types of formal home care that are the most likely to interact with informal care provided by adult children: paid domestic help and nursing care. Using SHARE data, the results indicate that informal care substitutes for paid domestic help and that this substitution effect tends to disappear as the level of disability of the elderly person increases. In fact, informal care is complementary to nursing care only to a limited extent, independently of the level of disability. These results highlight the heterogeneous effects of informal care on formal care use and suggest that informal care is an effective substitute for long-term care as long as the needs of the elderly are low and require an unskilled type of care.

Time spent by adult children caring for parents

⁵ Degiuli (2007), through narratives of workers and the exploration of this 24-hour job, describes what it means to work as a home eldercare assistant in Italy. On the case of migrant women providing elderly care in Italy see also Da Roit (2007).

This is an area where there is almost no research at the European level, since time-use surveys are difficult to harmonise on this issue⁶. However, some national surveys contain detailed information on this issue, as is the case, to some extent, in the national surveys for Italy and Poland used in chapter 5 of this study.

Some small-scale studies have documented that when people assume the role of assisting a person with impairments or an older person, care activities account for a significant portion of their daily routines. Nevertheless, little research has investigated the problem of measuring the time that carers spend in care-related activities. Bittman et al. (2005) contrasts two different measures of care time. One is an estimate of average weekly hours drawn from a question in the 1998 Australian Survey of Disability, Ageing and Carers. The other is an estimate drawn from diaries in the 1997 national Australian Time Use Survey. Their study finds that diaries provide information for a more robust estimate, but only after one models the time use patterns in the days of carers to identify care-related activities, which diarists do not necessarily record as care. Such a measure of care time reveals that even people who offer only occasional assistance to a person with impairments tend to spend the equivalent of more than 10 minutes a day providing care.

The SHARE survey provides some evidence on the incidence and intensity of elderly care provided by adult children (see p.197). Germany, Greece and the Czech Republic are the countries with the highest proportion of children helping. The rate for the Czech Republic, in particular, is noticeably higher than for the rest of the SHARE countries. This rate is in line with other surveys run in the same country: a substantial amount of care within the family is traditionally expected and delivered in this country. Turning to the intensive margin of help, i.e. to the number of hours spent providing informal care, a clear North-South gap arises: this is consistent with the sociological literature (see, as an example, Reher, 1998): family ties are stronger in Mediterranean countries, and they induce adult children to think about formal care as something to avoid as long as family members are able to help for their elderly relatives. There is a substantial cross-country heterogeneity and cultural differences explain part of it, but individual choices are likely to depend on differences in institutional long term care systems as well.

Summary of main findings on family elderly care, market work and elderly care regimes

As documented by the literature reviewed, a recent trend in the EU countries has been to re-direct transfers from public provision of elderly care to informal care within families. The expectation of substitution of formal care with informal care may have turned out to be in conflict with the target set in the European Employment Strategy for female employment rates in Europe. In fact, some research on the relation between informal care and labour force participation gives evidence of a negative relation. However, the effects of these benefits on female care-givers, and in particular, on their participation in paid labour market activities, depend primarily on the level of benefits, as it is this which largely determines the reaction of care-givers to such benefits. However, the modest rates of benefits mean that they are unlikely to have been the main determinant of the conflict between care provision and labour market participation of women.

Despite the stark cross-country heterogeneity, the available evidence seems to support the higher effectiveness, under many respects, of formal care with respect to informal care.

⁶ Some surveys do not even contain detailed information on this issue. The HETUS data released to the public do not contain this variable, even if, according to the documentation, the variable "Help to an adult family member" (var. no. 391) and "Help to an adult of another household" (var. no. 428) are present. See https://www.testh2.scb.se/tus/tus/doc/Recording_domains.pdf.

The increase in government expenditure on formal residential care and home-help services for the elderly significantly decreases the probability of providing care to elderly parents living outside the household and increases the labour force participation rates of women across Europe.

In particular, professional home care services and measures aimed at supporting family care have been tried in continental Europe and some Nordic countries as part of a new approach designed to combine employment creation with the greater coverage of social needs. At variance with these experiments, in some other countries, mostly Mediterranean, the recent experience is the replacement of unpaid family carers with low-cost immigrant workers directly employed by the families and often cohabiting with the elderly. This new model raises complex issues of equity and sustainability from an employment perspective.

One strand of literature tests the hypothesis that informal care of the elderly by family members is a substitute for formal care in Europe. Two types of formal home care that are the most likely to interact with informal care provided by adult children emerge: paid domestic help and nursing care. Using SHARE data, the results indicate that informal care substitutes for paid domestic help and that this substitution effect tends to disappear as the elderly person's level of disability increases. In fact, informal care is complementary to nursing care only to a limited extent, independently of the level of disability. These results highlight the heterogeneous effects of informal care on formal care use and suggest that informal care is an effective substitute for long-term care as long as the needs of the elderly are low and require an unskilled type of care.

2.4 Summary

In this chapter unpaid family care work has been introduced and placed in context. A general quantitative description of the phenomenon has shown that in the European countries:

- domestic work, child care work and elderly care work are predominantly performed by women;
- gender gaps in domestic work, defined as the difference between mean male and female minutes per day spent in this activity, decrease as education increases;
- time spent in child care work increases with education for both males and females;
- gender gaps in child care increase with the level of education. This is due to the more than proportional increase with the level of education of child care performed by women compared to men.

The review of the literature has been structured to cover all components of household work: domestic work, child care and elderly care. The main findings of each block are the following.

Domestic work

- Domestic work continues to be predominantly carried out by women.
- Although different patterns can be seen across some identified groups of countries, the division of domestic work does not seem to change much over time.
- Although gender gaps are persistent, where women have their own labour income, more equal sharing of domestic work between men and women seems to occur.
- Some studies suggest that domestic work has a negative impact on female wages through the reduced accumulation of skills for the market.

Child care

- Unpaid family child care is mainly a woman's task all over the EU.
- It negatively affects both the decision to participate in the labour force and the number of hours of work supplied by women.
- Child care welfare regimes in their variegated forms ease both the decision to work and the decision about how many hours of work to supply.
- Differences in participation and fertility rates for women from different European countries can be attributed both to household/individual characteristics and to institutions.
- Education has a prominent role: it increases the probability of paid work, but also the number of hours parents spend with children.
- Childcare and optional parental leaves have a larger impact on the fertility and participation decisions of women at lower educational levels.
- Part-time opportunities (when well-paid and protected) have a larger impact on the outcomes of women with higher educational levels.
- The Nordic countries show the lowest gender gaps in child care and a mix of policies that eases both parental work and family child care.
- Women in the Mediterranean countries still have to bear most of the burden of domestic work and care of children. Child care arrangements remain the major instrument enabling women to enter paid employment.
- The Western countries lie in between the Nordic and the Mediterranean situation.
- The new member countries of the EU show a combination of traditional and innovative features.

Elderly care

- Unpaid family elderly care is mainly a woman's task all over the EU.
- Its relation with participation in the labour market is unclear. Due to the fact that time dedicated to this kind of care is much less than for child care, there is no unidirectional evidence.
- The effect of different care regimes is also unclear.
- Despite the stark cross-country heterogeneity, the available evidence seems to suggest the higher effectiveness of formal care with respect to informal care.
- Informal care is an effective substitute for formal care as long as the needs of the elderly are low and require an unskilled type of care. In Sweden and the United Kingdom home care services have been concentrated on the most serious cases. Germany has invested mostly in public family care.
- France and the Netherlands have also promoted a greater provision of professional home care services as part of a new approach designed to combine employment creation with the greater coverage of social needs.
- Italy stands as an example of what might be the consequences of the absence of reforms, with substantial recourse to female migrant workers. This model has spread across Southern Europe raising complex issues of equity and sustainability from an employment perspective.

3. SIZE AND VALUE OF UNPAID FAMILY CARE WORK: DEFINITIONS AND MEASUREMENT METHODS

3.1 Introduction

So far it has been considered how unpaid family care work relates with manifold aspects of social and economic life, placing special emphasis on the gendered division of labour, to show just how important it is to bring this issue into evidence in order to understand its implications for wellbeing, gender equality and the distribution of resources in the EU.

Having explained "why" it is needed to measure unpaid family care work, now the question "how" arises, namely, which tools have been proposed and used by researchers to measure and evaluate productive activities that take place within the household without involving monetary transactions.

Definition of caring activities. The first problem is to define the economic content of caring activities provided mainly by members of a household to children and adults of the same household living in or elsewhere. In order to treat these activities with economic methods, they have been grouped together under the label of "household production". The "third party criterion" (Reid 1934), according to which activities are productive if they can be delegated to another person, helps to distinguish non-productive activities from productive activities. However, since unpaid family care work covers all the unpaid activities directly related to care, the first problem that arises is that these kinds of activities involve behavioural and emotional elements. This aspect has important implications from a methodological point of view. For example, is there a perfect market substitute for the "love" content of child care provided by a mother to her child? And if not, what value should be imputed to it? Should not first be asked if it is meaningful to give it a value at all, or should it rather be directly subsumed in the vast array of non-productive activities? To answer these questions, the distinction between care motivations and consideration as to who benefits from it and where it takes place (Folbre, 2008) could be applied. "When care is used to describe the direct provision of a service, it typically conveys a sense of emotional engagement and personal connection" (Folbre, 2008, p. 179), and it is this that underlies care motivation; however, from the point of view of who benefits from it and where it takes place, "all seemingly non-economic motivations for providing care services can be subsumed under the rubric of utility maximisation" (Folbre, 2008, p. 181). The latter viewpoint is taken up here, that is, economic evaluation of the benefits supplied by care givers and received by care demanders.

Measurement. Several issues arise over the methodology to apply to assign a monetary value to unpaid work. Economic work in the marketplace is performed under competitive conditions, where efficiency and productivity matter, while household work is carried out within the household environment, where there is no pressure of competitive forces. Commodification through market exchange processes is essential for price/value formation; when there is no exchange, it is difficult to attribute any value to that activity (Antonopoulos, 2008).

Gronau (1973) was among the first researchers to recognise that:

«the absence of an open market for these outputs outside the household impedes the evaluation of this product. ... The cure for the absence of information on time inputs in non market activities lies in an intensive effort to collect time budget data». (p.164)

Today time use data have become a reality, but the problem of assigning a price to time spent in household production still remains somewhat challenging, for it entails a considerable number of assumptions. For example, are we to suppose that the quality of household services remains the same for all households, or that the quality of the home-produced services is similar to that in the market; is the wage to be attributed to an hour of domestic work to be the same as the market wage which the care givers forego, or the wage of a similar service produced in the market.

Data and methodology. Problems also arise with regard to the availability of the data required by the evaluation methodology. The ideal data would include information on household production, as well as income, for every member of the household. However income surveys typically do not contain detailed time use data, whereas time use figures are the main data source for household production; thus (regression) estimates derived from time use surveys are used to attribute unpaid domestic work time values to the income survey respondents utilising the variables common to both surveys. In a European comparative framework, another important issue is the harmonisation of national time use surveys. This process is still underway and, even though some significant progress has recently been made, only a subset of the European Member States have harmonised time-use data.

The content of this chapter. This chapter reviews the definitions, type of data and methods used so far to measure unpaid work. It starts from the Household Satellite Accounts methodology, which exploits the availability of time use surveys to estimate the value of the "extended production" or of the "extended income" (Section 3.2). Next, we review the methods and results of the most recent literature, combining accountancy techniques with household economics by means of econometric imputation of values to unpaid work (Section 3.3). This provides the foundations for the methodology applied in the following chapter. A Summary (Section 3.4) concludes the chapter.

3.2 Unpaid Care Work in the System of National Accounts

Many scholars, starting from the pioneering work by Margaret Reid (1934), have attempted to estimate the monetary value of home production with the aim of introducing reliable measures of the value of unpaid care and domestic work (as well as other economic activities such as volunteer work and education) in the System of National Accounts. The main objective of this research field is to incorporate monetary measures of home production into the framework of macroeconomic accounting in order to evaluate the economic contribution of unpaid work, and in particular the housework performed by women. Following the recommendation of the UN Statistical Commission⁷, national statistical offices have started to draw up accounts for economic activities falling outside the current production boundary. Accounts for the domestic sector are called "satellite" accounts, a flexible framework allowing for alternative concepts of Gross Domestic Product based on an extended production boundary including estimates for household production of services for own use.

In principle, there are two ways to measure and value unpaid work, the "input method" and the "output method" (OECD, 1995). The "input method" counts hours worked in unpaid productive activities and assigns a price to them, applying a comparable wage rate. The

⁷ This happened after two United Nations World Conferences, the Social Summit (Copenhagen, March 1995) and the Fourth World Conference on Women (Beijing, September 1995).

“output method” seeks to measure the results of unpaid production by assigning a price to the quantities of goods and services produced.

These methods have been developed on the basis of the experience of individual researchers in various initiatives conducted by international, European and national institutions. As a result, in national economic accounts economic activities are now categorised as follows:

(1) System of National Accounts (SNA) production activities (agriculture, industry and service production);

(2) non-SNA production activities (food preparation, child care, adult care, making and care of textiles, upkeep of dwelling and surroundings, repairs and maintenance of dwelling and household equipment, household management and shopping, gardening and pet care) and unpaid work for the community;

(3) non-economic activities, sometimes called personal activities (physiological and recreational activities and self-education).

This section deals with the methods adopted to build up Satellite Accounts on Unpaid Care Work⁸, focusing mainly on the input approach, whose common structure consists in computing the amount of unpaid work in terms of time and then assigning an economic value to it.

3.2.1 Time use surveys

A key component in the construction of non-market accounts is information on time use. Labour statistics are linked to the SNA system boundary by means of time-use surveys able to give information on the physical input of non-SNA activities, that is, hours of non-market work.

Time-use information can be gathered from diaries (“time budget data”) or from questionnaires, the former usually being the preferred method for unpaid work (see Kan and Pudney, 2008)⁹. Time budget data require individuals to compile a 24-hour diary and indicate, at 15-minute intervals, all their successive activities, whereas time use information collected in population surveys (“stylised data”) is typically based on the average hours spent on a certain activity on a normal week day. Hence, with time budget data it is possible to identify periods of multi-tasking (e.g., cleaning the house while watching the children) and the lengths of specific periods (e.g. doing housework two hours in the morning and again one hour in the evening) and cover 24 hours a day. In contrast, “stylised data” on various activities may well add up to more than 24 hours a day without providing information on multi-tasking, or add up to substantially less than 24 hours without providing information on what was done the rest of the day.

Even if time budget data are preferred, they have their drawbacks. One is that they typically collect data for only one or two days, and many collect data for only one household member. Since some individuals are interviewed during weekends, paid work may turn out to be underrepresented. Moreover, a drawback common to all time use surveys is that they do not usually measure human effort; that is, they make no distinction

⁸ See Annex 3.1 for the list of EUROSTAT definitions (EUROSTAT 2003).

⁹ Bonke (2005) shows on data from the Danish Time Use Survey 2001 that men are found to be more unreliable than women in evaluating their amount of work on the labour market, while the opposite is the case for the unpaid/household work, with women underreporting their contribution more than men. The implication is that labour supply studies based on questionnaire-information, are less accurate than studies based on diary-information.

between one hour worked in hard conditions and one hour worked in more comfortable circumstances. Kan and Pudney (2008) find that measurement error in time use data will bias the results of statistical models and propose methods to correct these biases. They recommend that data sources that contain both stylised and diary time use data should be developed, because such data sources are essential for the estimation of measurement error in time use data.

Unpaid domestic work drew the attention of policy-makers and statisticians in industrialised countries during the '70s. A large number of industrialised countries, such as the UK, Germany, the Netherlands, Finland, Japan, Australia and Canada, started conducting periodical time-use surveys to understand and estimate the contribution of unpaid work performed by men and, particularly, women to the total well-being of people. While estimating the contribution of unpaid work still remains important, over the years the purpose of conducting time-use surveys has expanded to shedding light on a variety of diverse socio-economic conditions.

The time-use field has a rich history of international co-operation and projects harmonising time-use data collected at different points in time, from different samples and across countries. Recently, Eurostat has coordinated the development of Harmonised European Time Use Study (HETUS) data collection guidelines, which were piloted in 20 countries between 1996 and 1998, and influenced time-use data collection in 21 countries between 1999 and 2003.

3.2.2 Monetary evaluation: the output and input approaches

As already mentioned, two alternatives are available for the monetary valuation of these activities (see Table 2): the first consists in directly valuing household output at the prices of equivalent market products, the second in valuing household output at cost of inputs. In the first case, the so-called "output approach", the great heterogeneity in the quality of the various home services produced by different households makes it difficult to provide a clear definition of the physical units of output in this sector. Moreover, there being no open market for these outputs outside the household it is particularly difficult to evaluate this product. However direct valuation at market prices is favoured in National Accounting (Goldschmidt-Clermont and Pagnossis-Aligisakis; 1999). This output-based valuation method requires measurement in physical quantities of household outputs: for instance, number and kinds of meals prepared, number of children taken care of, kilograms of laundry washed, etc. Once the value of non-SNA production is obtained by attributing the prices of equivalent market products, the corresponding mixed income can be calculated by subtracting the value of intermediate inputs and fixed capital consumption¹⁰.

In the second alternative, the so-called "input approach", the time inputs entering the non-market sector are valued at a certain wage level. Gronau (1973) first tried to estimate the price of time spent in home production by proposing a procedure to estimate the mean value of time for those involved in unpaid activities. Goldschmidt-Clermont and Pagnossis-Aligisakis (1999) provided valuations based on wages of polyvalent substitute household workers (generalists), i.e. workers who can perform, within the household premises, all or most of the productive activities performed by unpaid household members.

¹⁰ Alternatively, the wage rate per unit of output could be used, such as the labour charge for each meal prepared, charge per item of clothing washed and ironed, number of children tutored, payment for each elderly person given care and others. In countries where contract work is common, data on contract wage per unit of output might be available for work paid on a contract basis.

Table 2 Description of the approaches to evaluate unpaid work

Approach	Formula for estimation	Limitations	Implications	Basic data requirement
Output	Value = contract value in units of output or value of output less non-labour inputs	Applicable only where contract work is practised, detailed production cost available	Can overestimate unpaid work	Market value of contract work based on output, itemised production cost
Input				
Opportunity cost	Value = time spent x wage rate for jobs with person's qualification	It is not consistent with market evaluation Subject to job opportunities in the market	Can overestimate unpaid work	Time use, educational attainment of worker, wage/salary rate for position
Replacement (specialist) cost	Value = time spent on specific work x wage rate of specialist worker	Does not measure real productivity of unpaid work due to capital intensity of production	Data on consumer durable and multitask activities needed	Time use, type of work, wage rate of worker in market
Replacement (generalist) cost	Value = time spent for aggregate unpaid work x wage rate of domestic worker	Underestimates tasks needing special skills	Determines activities performed by domestic worker	Time use, wage rate of domestic worker

Source: UNDP (2003)

The Gronau study belongs to the tradition of the "opportunity cost" method, while the latter studies belong to the "market replacement" methodological stream. The opportunity cost uses the forgone wage of the person involved in performing the unpaid activities as a result of opting not to supply (all) working hours in the market. The most common wage used in this method is the potential wage of the person based on some occupational, educational, age or other relevant characteristics. Valuation of the same activity will therefore change depending upon who is engaged in the unpaid work. This approach assumes that the person has a job opportunity in the labour market and that the compensation is based on the worker's qualification or possible paid employment instead of the type of work done.

In the market replacement cost approach estimation can be disaggregated into various types of specialisation in activities; in other words, calculations are derived from wages for specialised activities like cooking, cleaning and caring. If the valuation is performed with a

generalist approach, it is based on the wage of a paid domestic worker. "Replacement" can be achieved with "specialist valuation", i.e. the compensation of the worker in the specific activity or the market wage of a specialist engaged in the same activity. In this case data are needed on time use for multitask activities and wage rate of worker in the market. The "specialist wage" can also be derived using wages of specialised workers in market enterprises or wages of specialised workers at home. If the valuation is performed with a "generalist approach", it is based on the wage of a paid domestic worker. In application of these approaches the "opportunity cost" approach yields highest estimation value, if the reference population is the same, with a clear risk of over-estimation. On the contrary the generalist approach seems to underestimate the value of the activities, while the "replacement specialist cost", according to the Guidebook on Integrating Unpaid Work (2003), lies in between.

3.3 Methodological advances and empirical evidence

Interest in the techniques to address household production, originally prompted by the need to incorporate unpaid work in the national accounts, has recently grown among micro-economists, also subsequent to the availability of time budget data and the recommendation by Hamermesh and Pfann (2005) to use them for scientific research. Before then, among the first pioneering studies, the paper by Jenkins and O'Leary (1995) critically reviews the micro-econometric evaluation of household production conducted up to the mid-90s (see Table 3) and proposes a new research strategy¹¹.

Table 3 Research reporting domestic work time regressions, by purpose

Purpose	Research
Behavioural modelling	Flood and Klevmarken (1993) Graham and Green (1984) Gronau (1977) Gronau (1980) Gnstafsson and Kjulin (1994) Kooreman and Kapteyn (1987)
Data matching	Apps (1994) Fuchs (1986) Gershuny and Halpin (1993) Manchester and Stapleton (1991) Gershuny and Robinson (1988)
Explaining trends in unpaid household work	Gershuny, Jones and Godwin (1988) Manchester and Stapleton (1991)

Source: Jenkins and O'Leary (1995, p. 270)

11 They use the UK Family Expenditure Survey micro-data for 1976 and 1986 for incomes and detailed time use data from the time use surveys of 1974/75 and of 1987 to impute personal household work times to respondents of the Family Expenditure Survey.

The strategy is to use regressions for matching. The proposed technique is as follows: since "income surveys typically do not contain detailed time use data, regression estimates derived from time use surveys are used to impute values of unpaid domestic work time to respondents to the income survey utilising the variables common to both surveys" (Jenkins and O'Leary, 1995, p. 269).

Another research question raised by the concept of 'extended income' is to what extent inequality and poverty might be affected by including the economic benefits of home production in the underlying measurement of economic well-being.

Several studies have dealt with this problem. Addabbo and Caiumi (2003), for example, conducted a micro-econometric analysis of unpaid work in Italy – the first the country saw dedicated to this topic. They used ISTAT time budget data (1989) matched with the Survey of household Income and Wealth by the Bank of Italy and ISTAT consumption survey, both collected in 1995. They applied both the opportunity cost and replacement cost (generalist, for a general housekeeper) methods to evaluate extended household income and equivalent¹² extended income. Their results show the average household extended income at 50 per cent and 23 per cent greater than the average household money income with, respectively, the opportunity and replacement cost methods. The equivalent extended income comes to 54 per cent and 42 per cent greater than the average household equivalent income with the opportunity and replacement cost methods respectively. Moreover, all the inequality indicators drop significantly for the extended income measures when including the value of unpaid work. Frick, Grabka and Groh-Samberg (2009) update the classification by Jenkins and O'Leary (1995), and provide an overview of previous studies analysing the distributional impact of home production. There is wide variation in the type of data used, the restrictions on the kind of home production activities considered, the populations addressed, and the approaches chosen to derive a monetary value for these activities. Accordingly, the estimated contribution of income from home production, measured as a percentage of the baseline cash income, varies from some 13 per cent to more than 200 per cent.

From this survey, the authors conclude that most of the studies find an inequality-reducing effect of home production. The main result of an equalising effect of home production can be expected on the basis of standard economic theory, assuming that households with lower overall working hours will spend more time on unpaid work, to compensate partly for lower incomes. Frazis and Stewart (2009), addressing the same problem of the relation between household extended income and inequality on the evidence of American time use data for 2003, also find that extended income is more equally distributed than money income.

3.4 Summary

This chapter has reviewed the literature on the measurement and evaluation of unpaid family care work. A number of points are to be borne in mind for a clear understanding of the following chapters, namely:

- unpaid family care work is defined as those caring activities mainly provided by members of a household to children and adults of the same household living in or out without no monetary return.

¹² Equivalent income corresponds to the adjusted income obtained by using the appropriate estimates of equivalence scales for each definition of income.

- The analysis concentrates on productive care activities. A care activity is defined as productive if it can be delegated to another person. This is the so-called "third party" criterion.
- The data needed to evaluate unpaid family care work are drawn from time use surveys and income surveys which have to be matched.
- The methods used for evaluation of unpaid family care work in the National Accounts follow the "input approach".
- The input approach consists of three methods: the opportunity cost, the generalist market replacement method, and the specialist market replacement method.
- The *opportunity cost*: hours spent in caring activities multiplied by the potential wage rate of the carer, that is, the wage he/she could earn if she/he worked in the market.
- The *generalist market replacement*: hours spent on care work multiplied by the wage rate of a domestic worker.
- The *specialist market replacement*: hours spent on care multiplied by the wage of a worker performing similar tasks in the market.
- In the literature, there is wide variation in the type of data and methods used. The estimated contribution of income from home production, measured as a percentage of the baseline cash income, varies from some 13 per cent to more than 200 per cent.
- Most studies find an inequality-reducing effect of home production. The main result of an equalising effect of home production can be expected assuming that households with lower overall working hours will spend more time on unpaid work, to compensate partly for lower income.

4. SIZE AND VALUE OF UNPAID FAMILY CARE WORK IN EUROPE: AN ANALYSIS ON EU-SILC MICRO-DATA AND HETUS

4.1 Introduction

The previous chapters of the study focus on the relation between unpaid domestic activities and participation in the labour market from a gender perspective (Chapter 2) and discuss the motives for taking this form of work into account, with a review of the methods for estimating its value (Chapter 3). The objective of this chapter is to develop a procedure to derive the size and value of unpaid domestic work and unpaid family care work for the European Union.

While at the country level several studies are available (see the survey in Chapter 3), a comprehensive and comparable evaluation for all Member States is still missing. This gap is filled in the present chapter combining the information present in the last harmonised income survey, the European Union Statistics on Income and Living Conditions by EUROSTAT (EU-SILC 2006), with that of the Harmonised European Time Use Surveys (HETUS).

EU-SILC 2006 is a European household survey for 24 EU member States¹³ plus Norway and Iceland, which are not included in this study. The dataset is rich in information on several household and individual variables, such as work status and characteristics, income, taxes and benefits, family composition, health and education. EU-SILC, however, does not collect information on the use of time, which is fundamental to properly estimate the values of unpaid domestic work and unpaid family care work. On the other hand, HETUS does not contain information on wages and incomes, but, being a collection of harmonised time use surveys, it provides exactly the information which is missing in EU-SILC.

To achieve the aims of the chapter, the evaluation strategy consists of assigning to each person observed in EU-SILC an imputed amount of time dedicated to unpaid domestic work and unpaid family care work derived from HETUS. Then, values of unpaid domestic work and unpaid family care work can be obtained using either the opportunity cost approach (that is, the forgone potential wage of the person involved in performing the unpaid activities as a result of opting not to supply those hours in the market; (see Chapter 3) or the market replacement approach (that is, the wage of a worker performing those hours in the market).

Several difficulties arise when carrying out this kind of analysis, and relatively strong assumptions are needed in order to obtain proper national and EU values of unpaid domestic work and unpaid family care work¹⁴. The method implemented in this chapter tries to overcome these difficulties and obtain reasonable figures. It is to be noted, however, that different estimated values can be found according to the technique used for the evaluation and the assumptions used in assigning time-use values. For this reason, all the estimated values are presented, providing a range within which it is reasonable to place the "true" values of unpaid domestic work and unpaid family care work. Nonetheless, the

¹³ Malta is not included in EU-SILC 2006.

¹⁴ Most of these difficulties arise because of data imperfections or limitations. See Annex A.4.1 for further details.

magnitude of the phenomenon that emerges from the study is significant and can possibly be considered as useful information by the policy maker.

The chapter is organised as follows. Section 4.2 gives some supplementary description of the use of time in the EU. Since the distribution of time for each European State has already been presented in Chapter 2 (Section 2.2), this section focuses on the EU as a unique entity. Section 4.3 presents the implemented methodologies and the obtained estimates of the EU values of unpaid domestic work and unpaid family care work. Results are presented both in the form of EU aggregate figures and as detailed gender and country specific comparable figures. Section 4.4 concludes, summarising the results and suggesting the necessary improvements in data collection for conducting a more robust analysis at the EU level.

4.2 Unpaid domestic work and unpaid family care work in the European Union: interactions with the labour market.

The distribution of time across different activities gives a first general picture of the daily share of time spent in domestic work. As emerged from tables 1A and 1B in Chapter 2, there is some variability among Member States, especially if one focuses on the gender dimension of the phenomenon.

Figure 2 Different categories of time use in the EU (minutes per day), males and females aged 20-74. (Source: HETUS)

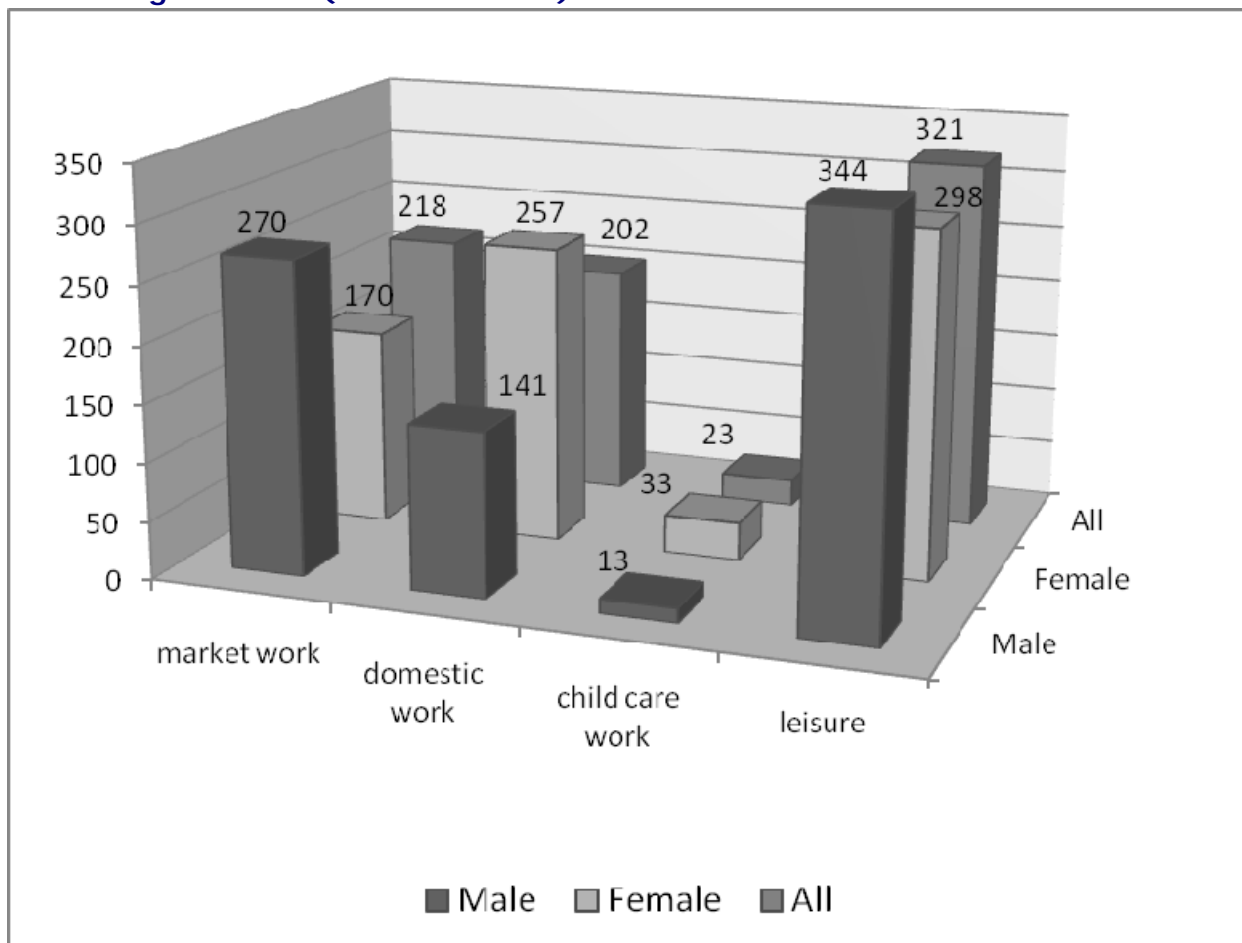
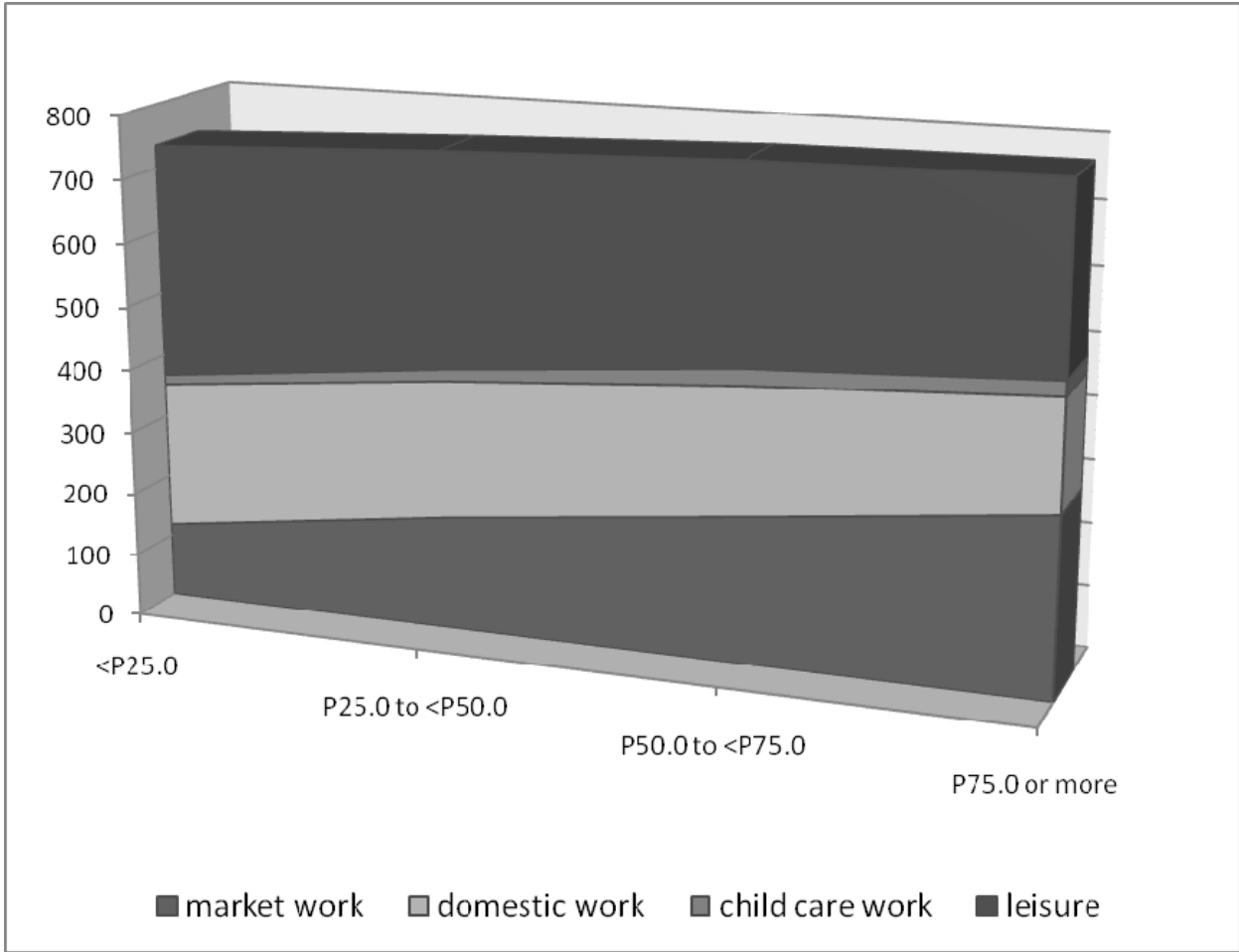


Figure 2 shows that looking at the whole sample (males plus females, all EU countries included in HETUS¹⁵), market work¹⁶ and domestic work amount to around 200 minutes each¹⁷, while leisure takes the largest share in the distribution of time, reaching a mean value of 320 minutes per day.

European women spend 290 minutes per day on domestic work and child care, while market work only absorbs less than three hours per day. As to European men, they work up to four and a half hours per day and they engage in domestic activities for two and a half hours per day.

Figure 2 also shows that EU child care work, compared to total domestic work, is a small share, especially the part carried out by fathers. Child care is probably underestimated by this type of analysis which only takes primary activities into consideration¹⁸.

Figure 3 Distribution of time in the EU by household income quintiles, males and females aged 20-74 (source: HETUS)



¹⁵ HETUS is a collection of national time use surveys recorded in different years. All the details about each survey, including the reference years, are reported in Table A3.1 of Annex A3. For this reason whenever a figure or a table is based on HETUS, the reference year is not reported.

¹⁶ The detailed definition of each of these categories is given in Annex A.4.1.

¹⁷ The sample refers to the entire population, including part-time and non-workers. For this reason the average time spent in market work may appear to be small.

¹⁸ For the robustness of the results, however, only primary activities must be taken into account.

The data suggest that time spent in child care is not only influenced by gender but also by household income. Considering the income distribution, belonging to the richest or the poorest quartiles is an important determinant (or consequence, depending on the direction of causality) of time allocation (Figure 3, quartiles are represented by P%, for example the first quartile is represented by <P25.0). For instance, individuals in the 25 per cent of the poorest families of their country (<P25.0) dedicate more time to leisure and to domestic work with respect to individuals belonging to the 25 per cent of the richest households (P75.0 or more). People who work more have more income and less time for leisure and domestic activities. In fact, leisure is eroding in favour of market work as household income increases. The share of domestic work is decreasing in the fourth and fifth income quartiles in favour of work time and, partially, child care.

Figure 4 Distribution of time in the EU by employment status, males and females aged 20-74 (Source: HETUS)

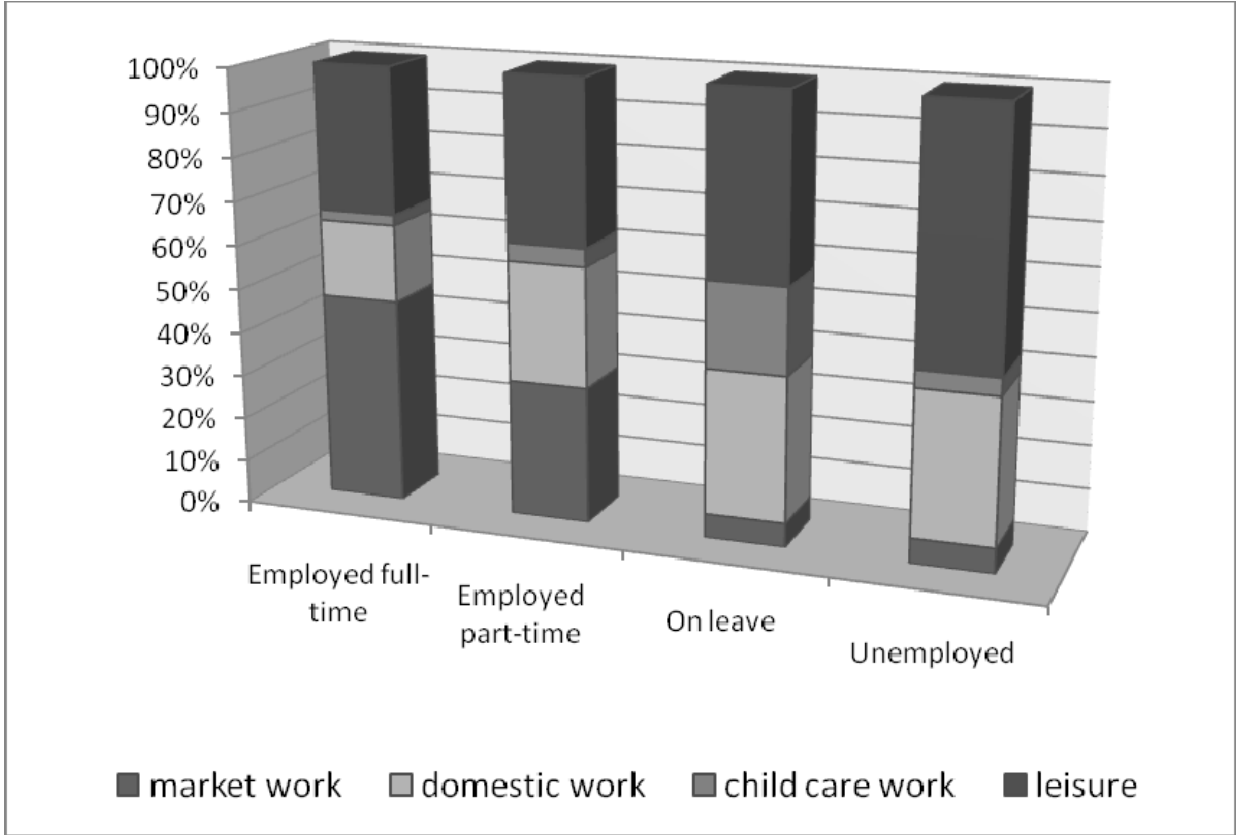


Figure 4 shows that individuals with different roles in the labour market have very different “time use profiles”. Data show that a considerable share of child care is carried out by persons “on leave” (parental leave) and by individuals who work part-time (mostly women). They substitute market work with domestic activities.

From these pictures, it emerges that domestic work and family care seem to remain a woman’s responsibility, following the traditional division of activities within the household. Thus, European women are characterised by a heavier load of domestic work and child care work with respect to men.

Table 4 Women working less than 30 hours because of domestic work by reasons of this choice in the European Countries

	Reasons for working less than 30 hours		Part-time women		Reasons for working less than 30 hours		Part-time women
	Domestic work	Other			Domestic work	Other	
BE	29.9%	70.1%	14.2%	LT	11.1%	88.9%	2.7%
CZ	25.2%	74.8%	2.7%	LU	55.0%	45.0%	12.8%
DK	11.9%	88.1%	10.8%	HU	21.8%	78.2%	3.2%
DE	35.3%	64.7%	22.3%	NL	47.4%	52.6%	25.8%
EE	19.4%	80.6%	3.9%	AT	63.4%	36.6%	12.0%
IE	45.1%	54.9%	12.4%	PL	12.0%	88.0%	4.1%
EL	12.0%	88.0%	4.9%	PT	20.1%	79.9%	5.0%
ES	34.9%	65.1%	6.5%	SI	*	*	1.4%
FR	29.0%	71.0%	12.1%	SK	*	*	2.6%
IT	19.9%	80.1%	5.9%	FI	4.6%	95.4%	6.7%
CY	37.6%	62.4%	3.9%	SE	9.9%	90.1%	14.8%
LV	22.3%	77.7%	3.4%	UK	46.2%	53.8%	16.2%
EU	33.9%	66.1%	11.9%				

* Information not collected

Source: EU-SILC 2006

EU-SILC data confirm this impression in Table 4. The table shows the distribution by country of women working less than 30 hours per week because of the necessity of engaging in domestic activities, for other reasons and percentage of part-time women (defined as percentage of women belonging to the active population and working less than 30 hours). At the EU level up to 96.8 per cent of individuals work less than 30 hours because of domestic activities are women: Table 4 shows the relevance of this phenomenon in each country.

In general, part-time workers are unevenly distributed across European countries. The countries with the most relevant numbers are the Netherland and Germany. A large part of these women would prefer to work more if they did not have to accomplish with domestic tasks (47% and 35% respectively). Similar figures are observed for Ireland, Spain, Cyprus, Luxembourg, Austria and the UK, but with lower rates of part time women. Most of the less developed countries have lower percentages of women that works less than 30 hours per week because of domestic work, but a smaller share of part time workers is also observed.

These figures might help in the interpretation of the country specific and overall European estimated values of unpaid domestic work and unpaid family care work reported in the next section.

4.3 The value of unpaid domestic work and unpaid family care work in the European Union

4.3.1 Data preparation and methodological description

The problem of evaluating unpaid domestic work in general, and unpaid family care work in particular, is in large part a problem of missing information. Surveys are designed for a specific objective and cannot be “complete” in the sense that it could be used for any kind of analysis. In particular, both EU-SILC and HETUS have useful but insufficient information to properly evaluate unpaid domestic work and unpaid family care work: EU-SILC is not sufficient alone because it lacks information about the time spent in these activities; HETUS lacks detailed information about household and personal incomes and jobs.

The obvious solution is to combine the information of the two dataset. However, this cannot be done using standard statistical tools¹⁹. With these datasets a specific procedure, described below, has to be applied. The idea is to exploit the information about market work time in EU-SILC to decompose non-market work time into domestic work, child care, leisure and other activities using HETUS data.

Data matching

As stated above, EU-SILC does not collect information on the use of time. For this reason, assigning a value to unpaid domestic work would be extremely imprecise using this survey alone. On the other hand, HETUS provides exactly the information which is missing in EU-SILC. Hence, in order to properly estimate the values of unpaid domestic work and unpaid family care work, it is necessary to provide a method for combining the information of the two sources.

Unfortunately, HETUS is not accessible in the form of individual records (micro-data): only personalised resuming tables can be generated through an on-line application²⁰. This is a limitation because it is not possible to observe the time-use behaviour of each individual in HETUS and to attribute a similar behaviour to similar individuals in EU-SILC, which is what standard data matching techniques usually do. However, the main aim of the present chapter is to provide EU and country values of unpaid domestic work and unpaid family care work and tables that can be generated through HETUS which are sufficiently detailed for this study. The example in the next page also clarifies this point.

Another relevant issue with HETUS is that it does not include several EU countries, which on the other hand are present in EU-SILC²¹. This reduces the number of countries whose time use information can be exploited directly. Still, it is possible to extend the analysis to all the countries using imputation techniques, i.e. statistical instruments that estimate statistically correct values to be assigned to missing data points.

Finally, there is a problem specifically related to the evaluation of caring activities. HETUS collects information on both child care and adult care activities, but it only reports child care activities as a separate category: adult care activities have relatively few observations on average and for quite specific households; for this reason HETUS aggregates it with other rarely observed activities into a mixed time-use category called “other domestic work”. As a consequence, in this chapter the term unpaid family care work refers only to child care activities²².

¹⁹ These tools are often called data matching techniques.

²⁰ For details check HETUS website at <https://www.testh2.scb.se/tus/tus/>

²¹ HETUS collects time-use information of 13 out of the 24 countries of EU-SILC used in this study. The 11 countries not covered by HETUS are: AT, CY, CZ, DK, EL, HU, IE, LU, NL, PT, SK.

²² A deeper analysis, including elderly and disability care, is conducted in Chapter 5.

The strategy to overcome these issues and to maintain the highest possible degree of individual detail in the data is the following:

- 1) Use the labour time information present in EU-SILC to compute non-market work time for each person;
- 2) Calculate (by country, gender and other personal characteristics) from HETUS the average shares of non-market work time spent in domestic work, childcare work, leisure and other activities²³;
- 3) Impute the non-market work time shares for the countries not present in HETUS according to several personal, household and environmental characteristics (see Annex 4.1 for details);
- 4) Multiply HETUS shares by the non-market work time of each person in EU-SILC according to country, gender and personal characteristics, obtaining for each person the time devoted to each activity.

This means, for example that to a young Italian man with no children, working 8 hours per day (that is 16 hours of non-market work time) observed in EU-SILC are assigned the corresponding average shares of domestic work, childcare, leisure and other activities observed in HETUS for a person with the same characteristics. If these shares are 35 per cent of domestic work, 0 per cent of childcare, 25 per cent of leisure and 45 per cent of other activities, the time devoted to each of them would be

Domestic work: $16 * 0.30 = 4.8$ hours per day

Childcare: $16 * 0 = 0$ hours per day

Leisure: $16 * 0.25 = 4$ hours per day

Other activities: $16 * 0.45 = 7.2$ hours per day

Hence, time use shares are used to compute the time spent in the categories of time use through the amount of non-market work time observed for each individual of EU-SILC.

Once that time use information is imputed for all countries, it is possible to compute the values of unpaid domestic work and unpaid family care work. In the literature (see Chapter 3) there are mainly two approaches for the evaluation of unpaid work: the opportunity cost (Gronau, 1973) and the Market Replacement (Pagnossis-Aligisakis, 1999).

Opportunity cost approach

The opportunity cost approach relies on the assumption that each hour devoted to domestic activities could potentially be productively employed in the labour market. Such an hypothesis implies that each hour of unpaid domestic work or unpaid family care work should be evaluated at the specific wage of each individual (for instance, the value of one hour of housework for a top-manager will be valued more than one hour of an employee's time).

²³ The detailed composition of each time-use category is reported in section A.4.1 of the Annex to Chapter 4.

This also implicitly defines the set of individuals that should be taken into account, i.e. workers and potential workers. Inactive people²⁴, by definition, could not actually work and their labour market contribution would be zero whatever their time employed in domestic activities is. The wage information, however, is available only for actual workers and the wage of potential workers must be estimated using an econometric technique.

The chosen estimator is the Heckman Selection model (Heckman, 1979; see below for details). The set of potential workers is defined as all non-working individuals older than 20 and younger than 65 who have no health limitation, are not in education and self-report as being unemployed or fulfilling domestic tasks. With this definition, there are 30 million potential workers in the EU, with respect to 158 million workers and a total adult population (aged 20-74) of 326 million²⁵.

The wage estimation for potential workers is conducted using a Heckman Selection model (Heckman, 1979), separately for men and women. The model takes into account that potential workers may have on average different characteristics from the workers, which represent a "selected" group estimating two equations. The first equation determines the probability of participating in the labour market according to a set of individual, household and environmental characteristics. The second equation estimates the wage level given the probability of participating in the labour market, hence correcting for the possible estimation bias.

To improve the estimation of potential wages, the procedure is applied to the natural logarithm of hourly wages. This choice largely improves the fitting power of the estimates and allows the avoidance of negative predicted salaries by construction²⁶. The variables used as predictors in the Heckman Selection model include: country and region of living, birth outside EU, achieved education level, health status, age, family size, being married, presence of children of varying age, presence of parents living in the household, ownership of car, ownership of a pc, some economic difficulty indicators, dwelling characteristics, living in rural or urban area, paying a mortgage, and so on (the details, as well as the estimated coefficient and the predicted salaries are reported in Sections A.4.2 and A.4.6 of the Annex to Chapter 4). The variables which are more likely to explain participation are usually different from those which are likely to explain the wage level, and this is taken into account in the estimation procedure.

Regarding wages, some difficulties arise from the incomplete harmonisation of income data between countries in EU-SILC. In fact, some countries only record gross yearly wages, others only record net wages and others both of them²⁷. The choice is to use gross wages whenever available and net wages as a proxy for gross wages when they are not available, that is for Greece, Italy, Latvia and Portugal. The choice is driven both by convenience, since there are more countries which report gross wages, and for comparative purposes, since different countries have different social contribution schemes and this effect is partially netted using gross wages. However, this choice could lead to an underestimation of the values of unpaid family care work and unpaid family care work for the countries for which net wages are used. The overall effect, however, should be small.

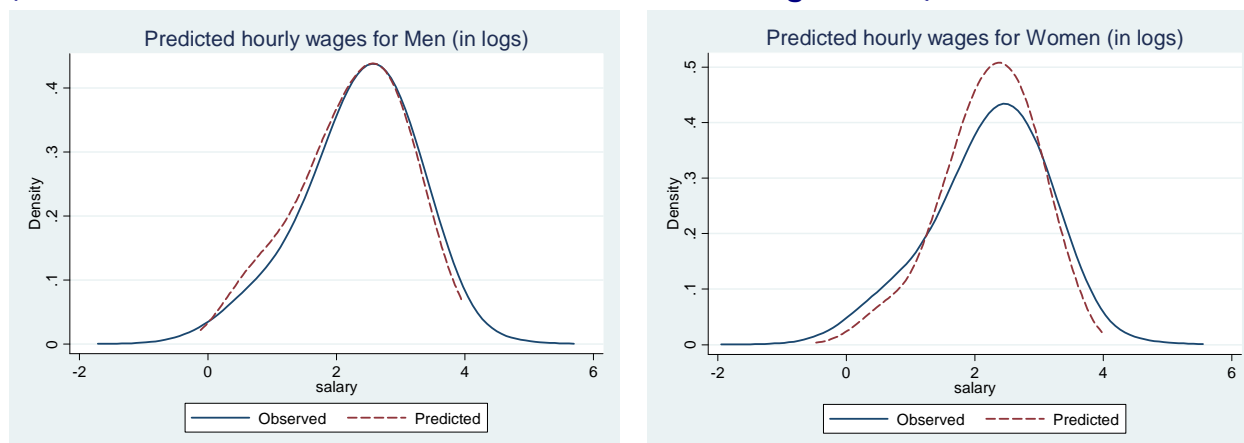
²⁴ Usually inactive people include all people that are not searching for a job and are not working (including retired, invalids students, housewives and so on). In the present study, instead, we consider housewives as part of the group of potential workers.

²⁵ These figures are computed from EU-SILC 2006, hence do not include Malta.

²⁶ The predicted hourly wages are the exponential of the predicted logarithms of wage and the result of an exponential function is always positive.

²⁷ Such a problem should not be present in EU-SILC 2007, which at the time of writing is not yet available.

**Figure 5 Observed and Imputed potential wages for men and women
(for the EU, estimates on EU-SILC 2006, values in logs of €/h)**



The distributions of the observed and predicted potential wages for men and women are presented in Figure 5 (potential wages are the predictions resulting from the estimation of the Heckman Selection model). While the distribution of predicted salaries closely follows that of observed salaries for men, except for a slight shift toward smaller values (which is expected), for women the difference is larger. This is due to the fact that the sample of potential workers includes people “fulfilling domestic tasks”, mostly women, who are usually considered as non active people. In the EU there are more than 23 million female potential workers, in respect to the number of female workers of almost 73 million. On the other side, there are just 7 million male potential workers out of over 83 million actual workers²⁸. This is why the wage equation for men is estimated more precisely than that for women.

Potential salaries predicted with the Heckman Selection model are used together with actual salaries to compute the values of unpaid domestic work and unpaid family care work in the EU and for each country, presented in Sections 4.3.2 and 4.3.3.

Market Replacement Approach

The Market Replacement approach aims at assigning a wage of a typical domestic worker to each hour of domestic activity. Depending on the reference wage the approach is called generalist, if the wage is chosen to be representative of an unspecialised (generalist) domestic worker or specialist if the wage is set specifically for each type of domestic activity, such as, for example, cleaning, cooking, caring and so on.

The market replacement approach underlies a different philosophy with respect to the opportunity cost: domestic activities are evaluated independently of the working capacity of the individuals. The value is given to the activity itself, not to the potential market work time that could be granted if domestic activities were not undertaken. This different approach implies that the reference population is larger. Here, the entire population contributes to the value of the unpaid domestic work and unpaid family care work, not only the active population as for the opportunity cost approach. The contribution of each person is evaluated at an average wage which is different for the generalist and specialist market

²⁸ Source: EU-SILC 2006.

replacement approaches. The details of the reference salaries in the two cases are described below.

The EU has a very heterogeneous situation with respect to salaries and labour market policies. Hence, to control for this heterogeneity, the generalist and specialist reference wages are computed at the country level. The chosen wage of generalist domestic worker is the ISCO-88 code 91 (Sales and services elementary occupation), which include, among other similar workers, the category "Domestic and related helpers, cleaners and launderers". Table A.4.4 in the Annex to Chapter 4 resumes the country average generalist wages.

The detailed information about time use categories present in HETUS allows deepening of the analysis of the market replacement approach. In fact, rather than considering the wage of a generalist domestic worker to be assigned to the value of unpaid family care work, it is possible to assign a specific wage²⁹ to each activity related to child care³⁰.

In this regard, HETUS collects information on the following child care activities: Physical care, supervision of child; Teaching, reading, talking with child; Transporting a child. For each of these three categories of childcare activities EU-SILC collects ISCO-88 codes of occupation classification. In particular, the chosen codes are 51 (Personal and protective services workers) for Physical care, supervision of a child; 23 (Teaching professionals) for Teaching, reading, talking with a child³¹; 83 (Drivers and mobile plant operators) for Transporting a child. The observed and imputed time devoted to disaggregated child care activities are presented in Table A.4.5 in the Annex to Chapter 4. Table A.4.6 reports country and gender average specialist wages.

Outsourced Child Care

Finally, there is another component which is taken into account for the evaluation of unpaid family care work, namely child care outsourced to other family members who provide it for free. The evaluation of outsourced child care is performed to enrich the estimation of unpaid family care work with opportunity cost. This approach, in fact, does not include the child care activity of inactive people. The estimation of outsourced child care is performed to take into account that parents may need to pay a caring service if other family members were not available.

While this enrichment is necessary with the opportunity cost approach, this is not the case with the market replacement approach. The latter approach, in fact, is calculated using the entire adult population, which already include the child care activity performed by inactive persons.

The time devoted to outsourced child care activities and the reference wages used to compute the value are presented in Table A.4.7 in the Annex to Chapter 4.

²⁹ To take into account a possible gender specialisation, salaries are also gender specific.

³⁰ Instead, for unpaid domestic work, HETUS detailed information is still available (as time devoted to ironing, washing, cleaning the house and so on) but it would not match with any occupational ISCO-88 code other than 91.

³¹ An alternative could have been code 33 (Teaching assistant professionals). This code would avoid including university professors which may overestimate the average parent teaching ability, but code 33 has too few observations in the data producing poor country/gender averages, so much so that for Greek and Irish men there are no observations.

4.3.2 The values of unpaid domestic work and unpaid family care work in the EU

This section presents the values of unpaid domestic work and unpaid family care work estimated with the opportunity cost and the market replacement approaches, both generalist and specialist, to take into account that different childcare activities may be evaluated at different salaries.

With the opportunity cost approach, their values are 2655 and 470 billion Euros for the unpaid domestic work and the unpaid family care work respectively, summing up to 3125 billion Euros. This value amounts to 27.1 per cent of the 2006 EU GDP (11543 billion Euros³² – Source: Eurostat 2006). On the other hand, the values estimated with the generalist market replacement approach are 3570 and 458 billion Euros. They sum up to 4028 billion Euros, which represents 34.9 per cent of the EU GDP.

These results may seem in contrast with the general findings in the economic literature, in which opportunity cost estimates are higher than the market replacement's. However it must be taken into account that, given the objective of our work, our calculations were not built to make a technical comparison between opportunity cost and market replacement approaches. Market replacement values are computed on a much larger population share than opportunity cost, which instead excludes all retired persons from the computation. If the reference population was the same, the market replacement values would drop to 1910 and 335 billion Euros for unpaid domestic work and unpaid family care work respectively, hence smaller than those found with the opportunity cost approach.

One could ask why the value of childcare is so small compared to the value of domestic work. The answer is related to how information on time use is collected, and on the very nature of childcare activities. First, the time use information is recorded taking into account that one could undertake two different activities at the same time. This, for instance, means that while a mother is ironing she could also be looking after her child. In this case, the primary activity is ironing, while the secondary activity is childcare. In the present study, only primary activities are used in the calculations and this could have considerably reduced the time devoted to childcare activities. This choice is motivated by the necessity of respecting daily time constraints in order to perform a correct imputation of time use values. In fact, given the need to attribute shares of non-market work time to each individual, and given that non-market work time is a fixed amount for each individual, adding time spent on childcare and domestic work recorded as secondary activities would have implied a subtraction of these values to other activities, which however were recorded as primary, with no other reason than that of considering childcare more important³³. The second reason is that not everybody has a child to take care of. Hence, the average time spent in child care appears small even though for families with children it could be a considerable amount of total daytime.

In part, however, it is possible to correct this possible underestimation problem. On one side, the generalist market replacement approach could be extended in order to take into account that a specialised salary could be attached to different activities of child care (specialist market replacement)³⁴. On the other hand the opportunity cost approach could be integrated to take into account the amount of time that children spend in outsourced child care.

³² This value refers only the 24 countries of EU-SILC, hence does not include Malta.

³³ For example adding time spent in childcare as a secondary activity could have implied to subtract this time from ironing, i.e. the primary activity.

³⁴ The salary of a professional childcare worker is usually higher than that of a domestic worker.

The value of unpaid family care work computed with the specialist market replacement approach is 674 billion Euros, which is 49 per cent larger than that computed with the generalist market replacement and represent 5.8 per cent of the European GDP. The estimated value of outsourced child care, instead, amounts to 77 billion Euros, yielding the opportunity cost value of unpaid family care work to 547 billion Euros, representing 4.7 per cent of EU GDP.

Table 5 Values of unpaid domestic work and unpaid family care work in the EU (in billions of Euros, % of GDP in brackets)

Approach	Unpaid domestic work	Unpaid family care work	Outsourced child care	Total
Generalist market replacement*	1910 (16.5%)	331 (2.9%)	77 (0.7%)	2318 (20.1%)
Opportunity cost	2655 (23.0%)	470 (4.1%)	77 (0.7%)	3202 (27.7%)
Generalist market replacement	3570 (30.9%)	458 (3.9%)	- (-)	4028 (34.9%)
Specialist market replacement	3570 (30.9%)	674 (5.8%)	- (-)	4244 (36.8%)

* Value computed using the same population base as the opportunity cost approach, that is, the active population aged 20-65. For the market replacement methods the reference age of the population is 20-74.

Table 5 summarises the estimated values of unpaid domestic work, unpaid family care work and outsourced childcare at the EU level.

The different underlying assumptions and techniques used to produce the values of Table 5 imply that the smaller and larger values can be interpreted as bounds. The smaller value (lower bound) is calculated using the most restrictive conditions and assumptions, that is only the active population and evaluating domestic activities at the wage of an unskilled domestic worker. The largest value (upper bound) is applied to a larger population share, the whole adult population, and evaluating domestic activities at the wage of more specialised workers. For the lower bound, the values of unpaid domestic work and unpaid family care work sum up to 20.1 per cent of the EU GDP. On the other hand, for the upper bound, the value rises to 36.8 per cent of the EU GDP. By chance, the opportunity cost value of unpaid domestic work and unpaid family care work stands almost exactly in the middle of the two bounds.

4.3.3 Unpaid domestic work and unpaid family care work in the Member States

This section presents the results concerning the values of unpaid domestic work and unpaid family care work by gender for each country. The aim is to provide some evidence about the relevance of unpaid domestic work and unpaid family care work in each country and to highlight the differences between EU member states. For simplicity, the focus is on the values estimated with the opportunity cost and specialist market replacement approaches only.

Table 6 Unpaid domestic work in EU Member States in 2006
(in billions of Euros; source of GDP values: Eurostat 2006)

Country	GDP	Opportunity cost				Specialist market replacement			
		male	female	Total	% GDP	male	female	Total	% GDP
BE	318.2	34.0	56.1	90.1	28.3%	51.4	75.2	126.6	39.8%
CZ	113.4	8.3	7.0	15.3	13.5%	9.2	9.3	18.5	16.3%
DK	218.3	29.2	26.6	55.8	25.6%	42.6	41.7	84.3	38.6%
DE	2321.5	262.0	401.0	663.0	28.6%	485.0	500.0	985.0	42.4%
EE	13.1	0.9	1.4	2.3	17.8%	0.7	1.4	2.0	15.5%
IE	177.2	16.2	18.6	34.8	19.6%	17.8	16.8	34.6	19.5%
EL*	213.2	13.7	16.8	30.5	14.3%	25.2	22.1	47.3	22.2%
ES	982.3	53.5	137.0	190.5	19.4%	75.3	178.0	253.3	25.8%
FR	1807.5	132.0	244.0	376.0	20.8%	198.0	305.0	503.0	27.8%
IT*	1480.0	56.4	216.0	272.4	18.4%	111.0	299.0	410.0	27.7%
CY	14.7	1.9	1.6	3.5	23.8%	2.2	1.3	3.5	23.7%
LV*	16.1	0.7	1.1	1.7	10.9%	0.5	1.1	1.6	9.9%
LT	24.0	1.5	2.6	4.1	17.0%	1.7	2.8	4.5	18.8%
LU	33.9	2.8	2.7	5.5	16.1%	2.0	2.3	4.3	12.7%
HU	90.0	6.7	6.8	13.5	15.0%	9.0	9.8	18.8	20.9%
NL	539.9	83.3	60.4	143.7	26.6%	107.0	85.3	192.3	35.6%
AT	257.3	29.3	26.8	56.1	21.8%	39.0	34.5	73.5	28.6%
PL	272.1	21.4	35.5	56.9	20.9%	27.3	46.1	73.4	27.0%
PT*	155.5	11.9	11.3	23.2	14.9%	14.7	15.4	30.1	19.4%
SI	31.0	3.0	4.3	7.3	23.5%	4.3	6.1	10.5	33.8%
SK	44.6	2.9	2.5	5.4	12.1%	3.9	3.7	7.6	17.0%
FI	167.0	14.8	19.7	34.5	20.7%	23.6	28.1	51.7	31.0%
SE	313.5	28.0	32.9	60.9	19.4%	36.5	43.6	80.1	25.6%
UK	1939.0	203.0	299.0	502.0	25.9%	244.0	338.0	582.0	30.0%

* Values computed on net wages

Looking at Table 6 it is possible to appreciate the relevance of unpaid domestic work in terms of percentage of GDP for each country of the study, together with the gender decomposition of these values.

As explained in the previous section, the generalist market replacement approach shows higher values with respect to the opportunity cost because of a larger population base over which the index is calculated. For instance, in Austria unpaid domestic work estimated with the opportunity cost approach accounts for 21.8 per cent of GDP, while with market replacement it accounts for 28.6 per cent. For some countries, however, this is not the case and the two values are very close or reversed. This is probably due to the very specific labour market conditions in these countries.

Looking at the differences among Member States, Germany and Belgium have the highest values for unpaid domestic activities in terms of GDP percentage, whatever the estimation approach. On the contrary, smaller values are recorded for the Baltic countries and the

Czech Republic. In absolute terms (columns of Totals in Table 6), the main contributions to European unpaid work value are given by the largest countries, as Germany, the UK, France and Italy, characterised by higher wage levels and large populations.

These results are particularly interesting in terms of National Accounts. If EU Satellite Accounts with household productive activities were taken into account, the level and distribution of GDP across countries would produce a result very different from the standard representation. In this respect, several countries would have a 30 or more per cent higher GDP, while others would have it increased much less. This information can have a considerable weight for the policy maker when planning GDP growth strategies.

However, the main interest should not be that of computing extended GDP measures including unpaid domestic activities. These measures, in fact, could underestimate the negative effect of recession cycles in the economy, since the newly unemployed would increase their amount of time devoted to domestic activities. It would be more interesting to take into account these values when evaluating the opportunity to reform the actual system of family allowances.

Table 7 Unpaid family care work in EU Member States in 2006
(in billions of Euros; source of GDP values: Eurostat 2006)

Country	GDP	Opportunity cost				Specialist market replacement			
		Male	Female	Total	% GDP	Male	Female	Total	% GDP
BE	318.2	3.6	9.0	12.6	4.0%	5.5	12.0	17.5	5.5%
CZ	113.4	1.3	1.3	2.6	2.2%	1.6	1.6	3.2	2.8%
DK	218.3	4.3	4.2	8.4	3.9%	5.2	5.5	10.7	4.9%
DE	2321.5	31.8	66.1	97.9	4.2%	55.8	104.0	159.8	6.9%
EE	13.1	0.1	0.2	0.4	2.7%	0.1	0.3	0.4	2.8%
IE	177.2	2.9	3.8	6.7	3.8%	4.7	5.6	10.3	5.8%
EL*	213.2	2.2	2.8	5.0	2.4%	4.2	3.8	8.0	3.8%
ES	982.3	12.8	26.0	38.8	3.9%	21.5	35.0	56.5	5.8%
FR	1807.5	18.6	48.1	66.7	3.7%	27.9	61.6	89.5	5.0%
IT*	1480.0	13.8	35.7	49.5	3.3%	28.3	52.6	80.9	5.5%
CY	14.7	0.3	0.3	0.6	4.2%	0.5	0.5	1.0	6.6%
LV*	16.1	0.1	0.2	0.2	1.5%	0.1	0.3	0.4	2.3%
LT	24.0	0.2	0.3	0.5	1.9%	0.2	0.5	0.7	3.1%
LU	33.9	0.5	0.5	0.9	2.8%	0.6	0.6	1.2	3.5%
HU	90.0	1.2	1.3	2.4	2.7%	1.6	1.7	3.3	3.6%
NL	539.9	14.3	12.0	26.3	4.9%	16.9	15.5	32.4	6.0%
AT	257.3	4.4	4.6	9.0	3.5%	6.5	6.7	13.3	5.1%
PL	272.1	3.7	7.7	11.5	4.2%	8.1	15.1	23.2	8.5%
PT*	155.5	2.1	2.1	4.1	2.7%	3.8	3.7	7.4	4.8%
SI	31.0	0.4	0.7	1.0	3.3%	0.6	1.2	1.8	5.7%
SK	44.6	0.5	0.4	0.9	2.0%	0.6	0.6	1.2	2.8%
FI	167.0	2.0	3.3	5.3	3.2%	2.8	5.1	7.8	4.7%
SE	313.5	4.9	6.3	11.2	3.6%	6.3	8.9	15.2	4.8%
UK	1939.0	32.2	72.5	104.7	5.4%	41.5	85.3	126.8	6.5%

* Values computed on net wages

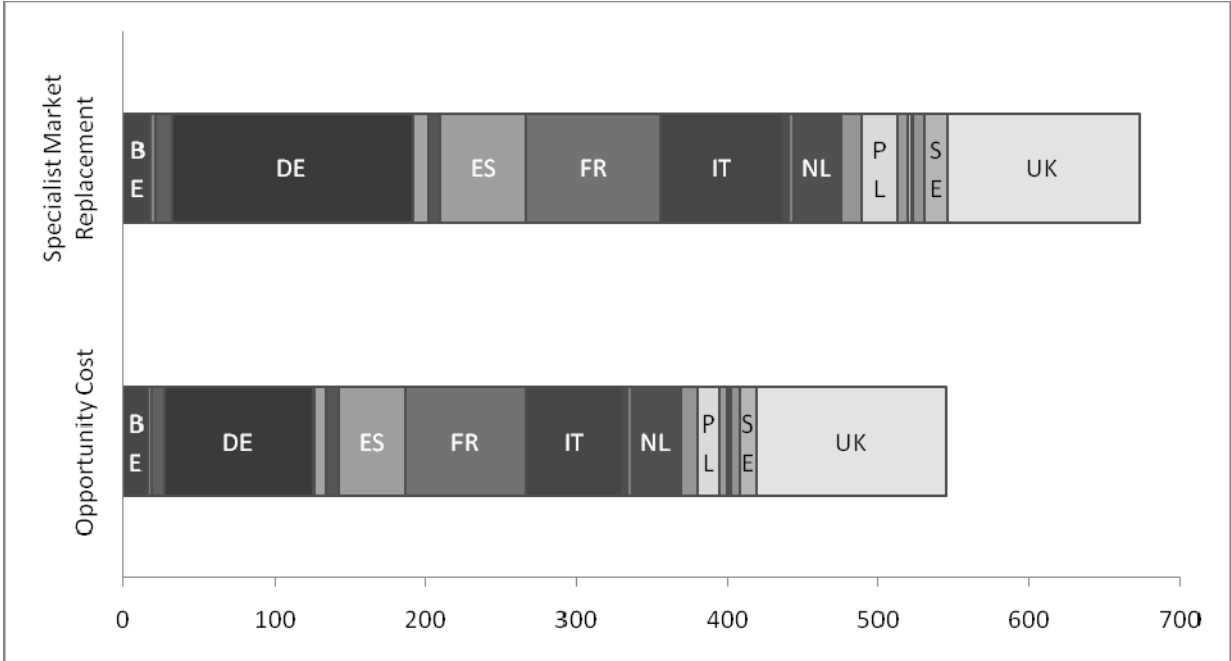
As regards unpaid family care work, Table 7 gives country and gender specific values using both the opportunity cost and the specialist market replacement approaches. Results show that the child care is rather similar in all countries, at least in GDP percentage terms, with a smaller variability with respect to the estimates of unpaid domestic work. The contribution varies from the lowest values found for Latvia, the Czech Republic, Slovakia and Estonia (2 to 3 per cent) to the highest values found for Poland, Germany, Cyprus, the Netherlands and the United Kingdom (over 6 per cent).

Looking at both Table 6 and Table 7 from a gender perspective, the difference in the contribution to the values of unpaid domestic work and unpaid family care work is less than expected. In fact, the time devoted to domestic activities by women is significantly larger than that of men. Nonetheless, men contribute to the values of unpaid domestic work and unpaid family care work almost as much as women do (at least in some countries).

This is mainly due to the gender pay gap still existing in Europe, which on average amounts to 16 per cent higher salaries for men. In the specific case of single earner couples, however, this gap may be substantially larger: the non-working spouse has a potential wage that is lower than the average wage of workers. Hence, the contribution of males to the values of unpaid domestic work and unpaid family care work is larger than expected because of the sum of these two effects, which are likely to go in the same direction. It is worth noting that this is true especially for the opportunity cost and specialist market replacement approaches, which take into account gender differentiation in salaries.

The overall contribution to the value of unpaid domestic work of men is considerable, around 38-43 per cent of the total. However, women generate most of the value, in particular for unpaid family care work, with around 64-66 per cent of the total.

Figure 6 Member States' contribution to unpaid family care work in the EU



Finally, the absolute values consistently show that few countries contribute for the most part to the European value of unpaid family care work³⁵ (see Figure 6). The main contribution is given by some of the “old” Member States. Germany, the UK, France, Italy and Spain alone produce 75 per cent of the EU value of unpaid family care work. The remaining countries, due to a small population possibly combined with lower wages levels, have a smaller footprint. Nevertheless, for each country, the dimension of unpaid domestic work and unpaid family care work is always important.

4.4 Summary and conclusions

After the review of the state of the art of the literature presented in the previous parts of the study, this chapter presents methodologies and results of a comprehensive evaluation of unpaid domestic work in the European Union, with special attention to unpaid family care work.

The first part proposes a descriptive analysis of how a person allocates his/her time at the EU level, focusing on domestic work and child care work. In this respect, the evidence is consistent with the literature reviewed in Chapter 2, confirming the persistence of gender specific roles within the family. Men spend more time working in the labour market and much less in domestic work. Some evidence also indicates that women allocate less time to work than they would like because of domestic and childcare activities.

The main task of the chapter is to devise a methodology to build a monetary value to unpaid domestic work and unpaid family care work at the EU level. The analysis is conducted for all EU25 countries (except Malta), both for comparative reasons and to give some indications of the weight that unpaid domestic work has in each European economy. Several problems arise with the available data. The main problem is that EU-SILC does not collect time use information, implying the necessity of integrating it with HETUS data. As a consequence, some simplifying assumptions are made in order to obtain sensible estimates. It follows that the results presented in this study should be considered more as indicative figures than precise estimates. This is the reason why boundary values are given, within which the real values of unpaid domestic work and unpaid family care work are likely to be located.

Both the opportunity cost and the market replacement approaches are applied, finding, for the EU as a whole, that the value of unpaid domestic work and unpaid family care work taken together ranges between a minimum of 27.1 per cent and a maximum of 37.0 per cent of GDP, and between a minimum of 3.9 per cent and a maximum of 5.8 per cent for family child care taken on its own, depending on the applied methodology. These figures may appear large, but, as shown in Figure 2, the time devoted to domestic work plus the time spent in child care exceeds, on average, the time spent in the labour market. Since both methodologies evaluate the time spent in domestic activities at market wage values, it follows that the overall values of unpaid domestic work and unpaid family care work should be expected to be as large.

The last part of the chapter discusses the values of unpaid domestic work and unpaid family care work at a country level, pointing out the different contribution that domestic work would provide to its own economy if included in the national accounts. This contribution varies from 9.9 per cent of GDP in Latvia to 42 per cent of GDP in Germany (Table 6). As regards the value of unpaid family care work at a country level in terms of

³⁵ Similar figures emerge from the analysis of unpaid domestic work values.

GDP (Table 7), the contribution varies from the lowest values found for Latvia, the Czech Republic, Slovakia and Estonia (2 to 3 per cent) to the highest values found for Poland, Germany, Cyprus, the Netherlands and the United Kingdom (over 6 per cent).

The disaggregation by gender shows that the contribution of women to the value of unpaid family care work is large and in several countries it is more than two times the contribution of men. This is expected, since the average time women devote to childcare is two and a half times the time devoted by men. In this case the gender time gap is too large to be offset by the gender pay gap (see Table 6 and Table 7).

Looking at the role of each Member State, the results show that the larger an economy is, the bigger its contribution is to the overall EU values of unpaid domestic work and unpaid family care work. However, this is due to the combination of larger populations with higher salaries, not to a higher amount of time devoted to domestic activities in these countries. In relative terms, for each country these values represent an important share of its own economy.

The last consideration is a demand for better data. If on the one side many of the harmonisation problems of EU-SILC will already be solved in the next wave of the survey (2007), on the other side data on time-use remain the most critical component when evaluating unpaid work. The attempt of HETUS to construct a harmonised database starting from single countries' surveys is a step forward, but still insufficient to provide a solid base for robust analyses, especially given the unavailability of the data at the micro level. The optimal solution would be that of conducting a European time use survey directly linked to EU-SILC, for example in the form of a special module of the questionnaire.

The next chapter will show the advantages of having the possibility of accessing better time-use data by studying two Member States for which time-use micro-data are available. In this case the analysis can be more detailed and meaningful.

5. IMPROVING MEASUREMENT OF UNPAID FAMILY CARE WORK: A COMPARATIVE STUDY ON MICRO-DATA FOR ITALY AND POLAND

5.1 Introduction

In order to overcome the lack of information at EU level, this chapter focuses on two member states, Italy and Poland, chosen for the quality of data on unpaid family care work, for the comparability of their surveys and for the high level of data harmonisation with EUROSTAT guidelines. They might constitute a good example of how to improve EUROSTAT surveys, in a rather simple way, to measure unpaid family care work.

For this study, the original micro data on time use have been made available by the respective National Statistical Offices. The availability of micro data allows for the improvement of the analysis under two respects. First, it offers a richer representation of family care activities, which includes, at variance with data used in the preceding chapters, family care provided to the elderly. Second, it allows for the application of more appropriate statistical techniques to link time use data to household survey data. Similarly to the analysis carried out in the previous chapter both the opportunity cost method and the replacement cost method are applied but here the estimated value of family care work has a higher degree of reliability with respect to the value estimated with the assumptions imposed by the lack of micro data in Chapter 4. This chapter will evaluate the potential informative gain with respect to the analysis conducted on the available EU surveys in Chapter 4. It will also assess the quality of the results obtained from the proposed method of analysis. The chapter is organised as follows: paragraph 5.2 reports the study for Italy, paragraph 5.3 reports the study for Poland, paragraph 5.4 concludes, comparing the results discussed in the previous paragraphs for the two countries and discusses the differences with the method of analysis and the results presented in Chapter 4.

5.2 Italy

5.2.1 Unpaid family care work in Italy

Participation in care is often studied to understand the determinants of the low participation of Italian women in the labour market. Italian women's participation is among the lowest in Europe. The female employment rate stands almost 13 percentage points below the EU average and 22 below the Lisbon target. However, Italian women report one of the lower gender-wage differentials among OECD countries even if some studies assert that the gap between the wages of men and women is underestimated if it is not taken into account that only the more educated and qualified women have access to the labour market (Olivetti and Petrongolo, 2008). The issue of unpaid family care work is not novel in the economic literature on Italy. There are several studies on the use of time in Italy; those relevant for this study are reviewed in Chapter 2. Most of them use the previous survey of the Multipurpose Time use Survey by ISTAT (Italian Central Statistical Office) and only a few recent still unpublished studies use the same source used in this report. Here, the most recent survey, relating to 2002/2003, is used for the analysis. As to the value of unpaid family care work, the only existing example is the work by Addabbo and Caiumi (2003), which, however, was more focused on the role of unpaid family care work for household

income distribution. Moreover their study was based on matching the time use survey with the household income survey of the Bank of Italy, which is not used here. Here, instead, EU-SILC data for Italy are used to match wages and incomes³⁶.

Using time use survey, time spent in each activity can be computed as: 1) the average minutes for the population as a whole; or 2) average minutes spent in child care among people who perform child care. In order to make results more comparable, HETUS uses method (1) to compute time spent in each activity and reports the participation rates to compensate for the lack of information on the distribution of time among the population (i.e. some individuals do not perform any care). This is the method used in Table 8, which shows the participation rate and the average time allocated to different activities by men and women in Italy. The results are consistent with those reported in Chapter 4 using HETUS, and with those reported in the previous literature.

Table 8 shows a lower participation in the labour market for women than for men (27.5 per cent against 51.6 per cent in the population aged 18-74 years). However, women always report a higher participation in unpaid work than men. Almost all the women (94.9 per cent) are enrolled in domestic activities, 29.1 per cent perform child care and 12.8 per cent perform adult care respectively. Male participation in unpaid work is lower in all the activities, reporting 64.7 per cent in domestic work, 19 per cent in child care and 9.6 per cent in adult care. These results are in line with previous studies that show that the sharing of time among men and women between market work and household work is highly differentiated by gender (Goldschmidt-Clermont and Pagnossis-Aligisakis 1995). Both men and women tend to perform work activities (paid and unpaid) more during the week days. The only exception is participation in domestic work for women that is equally spread among all the days of the week. Gender inequality is observed not only in the participation rate but also in the time devoted to each activity. Italian Multipurpose data confirm the general finding of a higher total working time for women than for men (Winquist, 2004). Women's working time³⁷ is notably higher than men's (7 hours and 9 minutes for women against 5 hours and 43 minutes for men) but men spend more than double the time of women in paid work whereas women's time spent in unpaid work is three times that of men.

Unpaid work can be distinguished in domestic work, child care and adult care. In all the unpaid activities women report a substantially higher number of minutes compared to men. The amount of time reported in Table 8 is partially affected by the participation rate. The average minutes, in fact, are computed on the total population and result in a lower amount of minutes for activities in which the participation is lower³⁸. This is particularly relevant, for example, for domestic work where there is a drastic difference in participation between men and women. However, the same problem arises for activities such as child and adult care in which the participation rate is conditioned not only by the individual's availability in performing the activity but also by the presence in the household of a child or an adult person who needs care.

³⁶ We preferred EU-SILC data to other available sources for many reasons. EU-SILC data are available for all the EU countries and allow a comparison between Chapter 4 and Chapter 5. They contain the ISCO-88 classification that enables the estimation using the Specialist Replacement approach, and they are up to date to 2006. The main assumption that we made using Multipurpose 2003 and EU-SILC 2006 is that time allocation observed in 2003 is a good proxy for 2006. This is not a strong assumption since many studies on time use show that time allocation tends to change very slowly with time.

³⁷ Here 'working time' includes paid work ("Employment" in Table 8), and unpaid work (domestic work, child care, adult care in Table 8). Child care and adult care also include time spent in transport for children and adults.

³⁸ This is because the average is given by the total time spent in the activities for people who perform the activities divided by the total population.

The following sections focus on child care and adult care and compute time spent in care among people who perform care (method 2 described above). This approach gives a clearer idea about the time constraints faced by people involved in care activities. The participation rate and the time spent in care will be also computed for different types of households, in order to capture the difference in time allocation among, for example, households with children under 5 years and households with old people or disabled members.

Table 8 Participation and average minutes per day spent in primary activities; by day of the week and gender (people aged 18-74) - Italy

Primary daily activities	PARTICIPATION (%)				MINUTES			
	WD	Sa.	Su.	Total	WD	Sa.	Su.	Total
	Women				Women			
Employment	33.4	18.4	7.1	27.5	135.3	69.1	23.8	109.9
Study	7.0	5.4	4.0	6.3	23.4	15.2	8.4	20.1
Domestic work	94.8	95.7	94.4	94.9	286.4	307.3	238.7	282.7
Child care	30.6		23.4	29.1	40.1	30.0	26.5	36.7
Adult care	13.3	12.3	11.2	12.8	8.7	7.4	7.0	8.3
Personal care	100.0	100.0	100.0	100.0	685.5	712.1	782.0	703.1
Leisure	95.6	96.7	98.4	96.2	192.1	219.0	277.8	208.1
Transport	88.3	90.8	82.4	87.8	65.5	77.6	73.7	68.4
Other	6.0	4.8	5.0	5.7	3.0	2.3	2.2	2.8
	Men				Men			
Job	61.7	37.8	14.7	51.6	305.7	153.8	57.6	248.3
Study	5.4	4.8	2.7	5.0	18.3	13.7	5.2	15.7
Domestic work	63.1	72.0	65.1	64.7	77.0	106.8	71.9	80.6
Child care	19.7	17.8	17.1	19.0	14.4	15.6	16.7	14.9
Adult care	9.8	10.2	8.3	9.6	6.6	6.4	5.7	6.4
Personal care	100.0	100.0	100.0	100.0	685.9	722.6	801.9	707.8
Leisure	96.7	98.1	98.9	97.2	241.0	313.5	378.8	271.2
Transport	94.4	94.8	89.7	93.8	88.4	105.5	100.0	92.5
Other	5.2	4.6	4.6	5.1	2.7	2.2	2.3	2.6
	Total				Total			
Job	47.3	27.9	10.9	39.3	218.6	110.5	40.4	177.7
Study	6.2	5.1	3.4	5.7	20.9	14.5	6.8	18.0
Domestic work	79.3	84.1	80.0	80.1	184.0	209.3	156.8	183.8
Child care	25.3	22.5	20.3	24.2	27.5	23.0	21.7	26.0
Adult care	11.6	11.3	9.8	11.3	7.6	6.9	6.4	7.4
Personal care	100.0	100.0	100.0	100.0	685.7	717.2	791.8	705.4
Leisure	96.2	97.4	98.6	96.7	216.0	265.2	327.4	239.0
Transport	91.3	92.7	86.0	90.7	76.7	91.2	86.6	80.2
Other	5.6	4.7	4.8	5.4	2.9	2.3	2.2	2.7

Note: Average minutes are computed on total population; WD= weekdays, Sa =Saturday, Su= Sunday.

Source: Multipurpose 2002/2003, authors' elaborations.

5.2.2 Average size of unpaid family care work in Italy

Female participation in primary and secondary care activities is higher for women than for men. Table 9 shows that 29 per cent of Italian women aged 18-74 are involved in primary child care and about 13 per cent in primary adult care. Men's participation in primary child care and primary adult care are 10 percentage points less and 3 percentage points less than women respectively. Empirical evidence suggests that care activities are mainly primary activities; in fact both women and men spend a substantially lower amount of time in secondary care activity than primary.

Participation in care activities is strongly affected by the individuals' life cycle. During their lifetimes individuals experience changes in their marital and economic status, household composition, economic and health conditions and so on. All these aspects affect their propensity to offer care or their need to receive care. The participation in care activities of a twenty-year old female student who lives with her parents is, for example, different from the participation of a forty-year old woman with two children or a seventy-year old woman with a grandchild and an unhealthy husband. Since all these aspects are strongly correlated with individual age the computation of participation among age groups helps, at least partially, to control for them, enabling one to disentangle the average value reported for men and women.

The age distribution of the participation rate shows that women and men in the 31-50 age category are more involved in child care than younger or older people. This is not surprising since the fertility rate for women aged less than 30 years is very low in Italy³⁹ and women and men older than 50 have older children who need less care. On the contrary, evidence on adult care shows a higher participation among men and women aged more than 40 years with a strong increase for people aged 51-74. This is due to the fact that, usually adult care refers to that of an individual's own parents who need more care as they become older and their children achieve maturity. Adult care, as a secondary activity, is much less probable than secondary child care, thus indicating a more absorbing set of tasks to be performed when caring for an elderly or disabled person. The comparison with previous studies based on less recent surveys suggests an increase in care participation in recent years. Addabbo and Caiumi (2003), for example, using the ISTAT time budgeted survey data 1989, report a participation rate of people in the age category 18-64 in care (both child and adult) of 10.8 for women and 17.0 for men. Although these values are not perfectly comparable with those in Table 8 because computed using a different age group category and a different data source they seem to indicate a notable lower participation in care in previous years.

Table 9 shows that women and men, in different work statuses, choose a different allocation of time. Young working men participate in child care more than non-working men of the same age (18-50 years). The contrary is observed for men aged more than 50 years. This apparently unexpected result is due to the heterogeneity of the category of non-working men. The low participation of young non-working men derives from the very low participation of students (about 3 per cent) who are all reported in the age classes 18-30 and 30-40 and the relatively low participation of pre-retired men in the 41-50 age class.

³⁹ According to OECD statistics the mean age of Italian women at the birth of the first child is 28.7 years, placing Italy in the 26th position among the 35 countries, ordered from the lowest to the highest fertility age at first birth, for which statistics are available (www.oecd.org/els/social/family/database).

Table 9 Participation (%) in child and adult care (primary and secondary) by gender, age groups and work status (people aged 18-74) - Italy

	18-30	31-40	41-50	51-65	60-74	Total	18-30	31-40	41-50	51-65	66-74	Total
	Women Non-Working						Men Non-Working					
Primary child care	20.7	74.8	34.2	13.6	12.1	25.6	3.6	25.8	21.1	11.5	7.6	9.3
Secondary child care	10.9	39.3	19.6	5.5	3.7	12.4	1.7	14.8	7.7	2.7	1.4	2.7
Primary adult care	5.0	9.4	21.7	23.5	15.0	14.7	4.8	6.4	14.5	24.1	17.4	16.1
Secondary adult care	0.6	0.4	1.6	2.7	0.8	1.2	0.0	0.0	0.0	0.7	0.3	0.4
	Women Working						Men Working					
Primary child care	20.4	58.6	32.4	9.5	11.2	34.4	10.2	39.8	30.1	7.2	2.1	24.0
Secondary child care	10.0	34.3	19.9	4.3	2.6	19.6	3.3	17.9	15.6	3.9	0.1	11.2
Primary adult care	5.5	6.8	14.8	14.8	14.4	10.0	3.8	5.1	7.4	9.6	7.2	6.4
Secondary adult care	0.5	0.4	1.9	2.3	1.8	1.1	0.1	0.3	0.4	0.7	0.1	0.3
	All Women						All Men					
Primary child care	20.6	65.0	33.2	12.2	12.1	29.1	7.7	38.9	29.5	9.3	7.1	19.0
Secondary child care	10.5	36.3	19.8	5.1	3.7	15.3	2.7	17.7	15.0	3.4	1.3	8.4
Primary adult care	5.2	7.8	17.7	20.5	15.0	12.8	4.2	5.2	7.8	16.5	16.6	9.6
Secondary adult care	0.6	0.4	1.8	2.6	0.8	1.1	0.0	0.3	0.3	0.7	0.3	0.3

Source: Multipurpose 2002/2003, authors' elaborations.

At variance with men, the participation in child care of working women in each age group is always lower than the participation of non-working women in the same age group.

Since the participation rate in child care here is computed on all women aged 18-74 the low participation rate observed can be due to the low fertility rate among working women. This suggests that women feel maternity and child care is a barrier to their participation in the labour market. This interpretation is supported by the statistics on participation in child care for households with young children (see Table A5.1 in the Annex to Chapter 5). For women in households with children aged 0-5 years old the participation rate in child care (both as a primary and secondary activity) is higher for working women compared with non-working women even if the difference is only a few percentage points (e.g. 92 per cent of non-working women and 95 per cent of working women).

To correctly interpret these results it is necessary to keep in mind that the definition of child care and adult care used in Table 9 and Table 10 refers to the whole care performed as primary or secondary activity, also including care performed outside the household. Table 11 and Table 12 describe separately care performed inside and outside the household.

Table 10 Mean minutes per day of child and adult care (primary and secondary) by gender, age groups, and work status (people aged 18-74 years) - Italy

Age band	18-30	31-40	41-50	51-65	60-74	Total	18-30	31-40	41-50	51-65	66-74	Total
	Non-Working Women						Non-Working Men					
Primary child care	181.7	158.6	88.2	98.9	100.3	134.8	63.5	83.7	104.9	76.0	107.1	86.6
Secondary child care	74.8	79.7	62.4	75.9	86.1	75.8	50.7	56.4	57.0	68.2	46.1	58.0
Primary adult care	67.0	49.5	49.1	66.0	79.0	66.2	62.5	94.3	64.2	81.0	70.2	75.4
Secondary adult care	15.1	28.0	16.8	54.1	41.8	39.2	-	-	-	36.6	30.0	34.6
Time in presence of children	421.0	373.9	377.5	328.8	289.2	382.3	264.3	337.9	247.7	256.3	294.0	285.5
	Working Women						Working Men					
Primary child care	164.4	129.2	70.1	73.7	79.4	116.5	75.3	80.4	75.6	54.2	58.9	76.8
Secondary child care	63.6	72.9	58.3	51.9	23.6	67.0	63.2	54.3	46.1	54.1	15.3	51.8
Primary adult care	77.0	54.8	52.4	70.1	59.8	60.2	56.1	49.6	52.7	58.8	117.5	55.3
Secondary adult care	15.2	63.2	64.4	30.1	108.8	50.5	12.5	14.0	28.4	17.5	10.0	19.3
Time in presence of children	313.8	280.0	290.6	525.4	209.2	289.8	234.8	234.8	234.8	227.5	110.0	234.6
	All Women						All Men					
Primary child care	174.1	142.6	77.9	92.2	99.6	126.3	73.3	80.6	77.1	67.1	105.9	78.4
Secondary child care	70.1	75.8	60.0	69.1	84.5	71.3	60.2	54.4	46.5	59.5	45.9	52.5
Primary adult care	71.6	52.2	50.7	67.0	78.3	64.3	58.9	53.2	54.1	74.2	71.9	66.6
Secondary adult care	15.1	48.2	46.5	46.8	47.1	43.6	12.5	14.0	28.4	26.6	29.7	24.5
In presence of children*	375.9	321.4	327.4	392.2	288.1	334.7	240.9	238.7	235.2	236.7	292.9	238.3

Note: mean minutes are computed on the population performing care.

*Children less than 10 years old.

Source: Multipurpose 2002/2003, authors' elaborations.

Turning to time spent in child and adult care, women spend on average 48 minutes per day more than men in primary child care and about 20 minutes more than men in secondary child care. Women also spend 20 minutes more than men in secondary adult care but men spend only a few minutes more than women in primary adult care. The average higher time of men devoted to primary adult care is due to the higher amount of time (9 minutes) non-working men devoted to primary adult care compared to women.

It is interesting to note that even if the average minutes dedicated to adult care are much lower than those dedicated to child care, the overall participation rate in this activity is quite high and higher among non-working women and men.

Adult care is more equally distributed by gender, probably because each partner in a middle-aged couple has the burden of looking after his/her own elderly parents, since elderly parents may prefer to be looked after by their own children. This is even more so when males are retired.

Non-working women spend on average approximately 20 minutes more than working women in primary child care and approximately 10 minutes more in secondary child care. This suggests that not only do working women report a low participation in care but also that, those who participate, spend less time in care compared to non-working women. Primary adult care is more equally distributed among workers and non-workers but this is not the case of secondary adult care. The main difference is observed between working and non-working men, with non-working men spending 15 minutes more than working men in secondary adult care.

Folbre et al. (2007) pointed out the importance of the use of different definitions of child care and indicate time spent in presence of children as an additional measure that can be considered with primary and secondary child care. According with this debate, Table 10 reports time spent in the presence of children. Due to the question available in the Multipurpose survey only time spent in the presence of children under 10 years can be computed, so that the reported minutes underestimate the total time spent in the presence of children of any age in the household. Working people spend less time with children while performing other activities than not working people. Working women spend one and a half hours less with their children under 10 years old than non-working women, whereas working men spend about fifty minutes less. Gender differences are evident disregarding work status. The gap between men and women is larger for non-working people with women spending one hour and thirty-seven minutes more with children under 10 years old than non-working men. Working women spend only fifty-five minutes more than working man in the presence of their children showing that work for the market limits the time women spend with their children and makes their time allocation more similar to that of men.

Disaggregating child care activities

The previous tables have shown that women tend to participate more in child care and to spend more time with children than men. A further question is how different child care activities are distributed among men and women. Taking for granted that women spend more time than men in performing care, are men and women specialised in different types of tasks or are different types of tasks equally distributed by gender?

The last block in Table 11 compares time spent by women and men on each child care task disregarding employment status. Women spend nearly half of their total time devoted to child care in physical care and supervision of children (52 minutes out of 126 minutes) while men spend only a small proportion of their time in this task (17 minutes out of 78 minutes) and spend more time in leisure activities with children (play, read, speak), even more than women (31 minutes for men versus 26 minutes for women). However, it is particularly interesting to compare task division among men and women looking at their working status. The distribution of tasks of working people confirms that working men spend more time than working women in leisure activities whereas the physical care of

children is delegated to women. On the other hand, huge differences are observed among non-working men and women.

Table 11 Average minutes per day of primary child care, by type of child care, gender, age group and work status (people aged 18-74 years) - Italy

Age group	18-30	31-40	41-50	51-60	61-74	Total	18-30	31-40	41-50	51-65	66-74	Total
	Non-Working Women						Non-Working Men					
Physical care and supervision of children	108.5	71.6	25.0	4.8	6.1	52.1	7.7	17.6	19.9	1.4	4.0	6.2
Help children for homework	6.9	17.6	14.2	1.7	2.5	11.2	8.2	2.6	5.4	4.6	0.0	3.6
Play, read and speak with children	36.6	28.8	12.7	4.2	4.7	20.9	34.6	34.9	33.9	6.2	1.3	13.5
To take children to school	24.6	39.5	31.4	8.3	0.8	26.2	8.4	21.1	43.0	15.5	1.9	14.3
Care of children in other household	4.8	1.0	4.8	80.0	86.2	24.3	4.6	7.5	2.7	48.2	99.9	49.1
<i>Total primary child care</i>	<i>181.7</i>	<i>158.6</i>	<i>88.2</i>	<i>98.9</i>	<i>100.3</i>	<i>134.8</i>	<i>63.5</i>	<i>83.7</i>	<i>104.9</i>	<i>76.0</i>	<i>107.1</i>	<i>86.6</i>
<i>Participation to child care in other household (%)</i>	<i>1.3</i>	<i>1.3</i>	<i>2.0</i>	<i>9.9</i>	<i>10.4</i>	<i>6.2</i>	<i>0.4</i>	<i>2.7</i>	<i>1.4</i>	<i>7.6</i>	<i>7.1</i>	<i>5.2</i>
	Working Women						Working Men					
Physical care and supervision of children	96.4	58.9	17.0	11.3	1.9	51.2	24.3	22.8	13.2	4.0	0.0	18.6
Help children for homework	2.5	8.4	9.5	4.3	0.0	7.6	0.0	2.8	6.9	3.2	0.0	4.0
Play, read and speak with children	39.9	32.0	13.7	4.7	0.1	27.1	39.6	41.6	26.5	9.3	0.0	34.3
To take children to school	21.2	28.1	26.4	9.4	1.6	25.8	7.5	11.4	25.9	23.6	0.0	16.7
Care of children in other household	4.3	1.6	3.5	44.0	75.7	4.7	3.8	1.8	2.9	14.1	58.9	3.2
<i>Total primary child care</i>	<i>164.4</i>	<i>129.2</i>	<i>70.1</i>	<i>73.7</i>	<i>79.4</i>	<i>116.5</i>	<i>75.3</i>	<i>80.4</i>	<i>75.6</i>	<i>54.2</i>	<i>58.9</i>	<i>76.8</i>
<i>Participation to child care in other household (%)</i>	<i>1.6</i>	<i>1.4</i>	<i>1.5</i>	<i>3.7</i>	<i>10.3</i>	<i>2.0</i>	<i>0.5</i>	<i>1.0</i>	<i>1.2</i>	<i>1.7</i>	<i>2.1</i>	<i>1.1</i>
	All Women						All Men					
Physical care and supervision of children	103.2	64.7	20.4	6.5	6.0	51.7	21.4	22.6	13.6	2.5	3.9	16.6
Help children for homework	5.0	12.6	11.5	2.3	2.4	9.6	1.4	2.8	6.8	4.1	0.0	3.9
Play, read and speak with children	38.1	30.5	13.3	4.3	4.5	23.8	38.7	41.3	26.9	7.5	1.3	30.9
Transporting children	23.1	33.3	28.5	8.6	0.8	26.0	7.6	11.8	26.7	18.8	1.8	16.3
Care of children in other household	4.6	1.3	4.1	70.5	85.9	15.1	4.0	2.1	2.9	34.2	98.9	10.7
<i>Total primary child care</i>	<i>174.1</i>	<i>142.6</i>	<i>77.9</i>	<i>92.2</i>	<i>99.6</i>	<i>126.3</i>	<i>73.3</i>	<i>80.6</i>	<i>77.1</i>	<i>67.1</i>	<i>105.9</i>	<i>78.4</i>
<i>Participation to child care in other household (%)</i>	<i>1.4</i>	<i>1.3</i>	<i>1.7</i>	<i>7.8</i>	<i>10.4</i>	<i>4.5</i>	<i>0.5</i>	<i>1.1</i>	<i>1.2</i>	<i>4.5</i>	<i>6.6</i>	<i>2.5</i>

Note: mean minutes are computed on the population performing care.

"Total primary child care" is given by the sum of "physical care and supervision of children", "help children for homework", "Play, read and speak with children", "to take children to school" and "other child care activities", "Care of children in other household". In this table we do not report "other child care activities". This is a residual category that reports on average only values lower than 1 minute. The rows "Participation to children care in other household" indicate the participation rate in child care outside the household.

Source: Multipurpose 2002/2003, authors' elaborations.

Non-working women are still specialised in physical care and supervision of children but they also spend more time than men in leisure activities with children and transport of children. Non-working men spend a very limited amount of time in child care activities, if child care outside the household is excluded. On average they spend only 38 minutes per day in child care. The majority of the time they devote to child care is outside the household. Non-working men in the age group 18-74 spend 49 minutes on care outside the

household out of a total of 87 minutes devoted to child care. Child care outside the household is essentially concentrated among men and women older than 50. This is confirmed both in terms of participation and minutes spent in child care activities. The participation in child care in other households for non-working people (last row of the first block in Table 11) is drastically higher for people older than 50 (about 7 per cent for non-working men and about 10 per cent for non-working women) and for the same age group the time spent in child care is hugely higher than for younger people (about eighty minutes for women and more than 50 for men). The category of care of children in other households is particularly relevant since it covers the time grandmothers and grandfathers (who do not live in the same household as their children) spend with their grandchildren. In Italy, in the presence of rationed formal services for child care, grandparents represent a fundamental source of child care as the data in Table 11 clearly show (Ichino and Sanz-de-Galdeano, 2003; Nicodemo e Wadman, 2009).

Table 11 also shows, not surprisingly, that younger men and women tend to spend more time in physical care and supervision of children, in leisure activities with children and in transport of children. This is probably due to the fact that younger people tend to have small children who need more care. Table A5.1 in the Annex to Chapter 5 confirms this interpretation showing that women and men in households with children aged 0-5 spend more time in physical child care, leisure activities with children and transport of children than the average.

Disaggregating adult care activities

As observed in Table 9 the overall participation rate in adult care is quite high: 13 per cent of women aged 18-74 and 10 per cent of men in the same age group. Work status seems to affect the probability of undertaking adult care. In fact both men and women participate more if they are non-working (15 per cent of non-working women versus 10 per cent of working women and 16 per cent of non-working men versus 6 per cent of working men). However, the amount of time individuals dedicate to adult care is much lower than that spent in child care (see Table 10). Table 12 shows that the main type of activities performed as adult care are, for both working and non-working people, care outside the household and transport of adults. Care outside the household includes, for example, time daughters and sons aged 18-74 spend with their parents who live in a different house⁴⁰. It is interesting to note that the lower share of time working people devote to adult care is due to a low amount of time spent in physical care and company, whereas time spent in the other activities remains roughly the same. A high gender specialisation is observed in adult care, even disregarding people's work status. Women are specialised in physical care but men spend a notable amount of time more than women (32 minutes versus 9 minutes) in the transport of adults. Concerning time spent in adult care outside the household, even if the participation rate is not very high (3.5 per cent for women and 1.8 per cent for men) women and men spend a significant amount of time in this activity (15 minutes for men versus 25 minutes for women). It is interesting to note that participation in adult care outside the household is higher for non-working women and men (4 per cent and 3 per cent respectively) but working men and women spend more time in adult care than people who are non-working (28 minutes versus 24 minutes for women and 16 minutes versus 14 minutes for men).

⁴⁰ Unfortunately, the Multipurpose survey doesn't allow one to know which activities are performed outside the household and the family relationship between who performs care and who receives it.

Participation in adult care is notably higher for women and men in households in which there are members with specific health problems (see Table A1.5.3 in Annex 1). 36.8 per cent of women participate in adult care in households with at least one person with very bad health, 22.4 per cent in households with at least one person older than 74 and 17.7 per cent in households with at least one disabled person. Male participation in adult care is lower than female participation reporting a rate of 22.8 per cent, 16.1 per cent and 18.6 per cent in the same household categories respectively. Not surprisingly, women and men in households with members with health problems tend to participate less in adult care outside the household. In these households, people spend a large amount of time in physical care. This is particularly evident for households with members with very bad health in which women spend on average 94 minutes in physical care. A substantial amount of time is also spent in the company and transport of unhealthy adult people, whereas less time is devoted to other activities.

Table 12 Average minutes of primary adult care, by type of adult care, gender and work status (people aged 18-74 years) - Italy

	Women			Men			All		
	Non-Working	Working	Total	Non-Working	Working	Total	Non-Working	Working	Total
Physical care	21.1	11.3	18.1	9.8	5.2	7.8	16.9	8.2	13.8
Company	8.5	3.3	6.9	6.1	4.3	5.3	7.6	3.8	6.3
Transport	8.3	9.7	8.7	37.0	24.5	31.6	18.9	17.2	18.3
Other	4.3	7.9	5.4	8.3	5.5	7.1	5.8	6.6	6.1
Adult care outside the household	23.9	28.0	25.2	14.2	15.8	14.9	20.3	21.8	20.9
<i>Total</i>	<i>66.1</i>	<i>60.2</i>	<i>64.3</i>	<i>75.4</i>	<i>55.3</i>	<i>66.6</i>	<i>69.6</i>	<i>57.7</i>	<i>65.3</i>
<i>Participation in adult care outside the household (%)</i>	<i>4.0</i>	<i>2.9</i>	<i>3.5</i>	<i>2.8</i>	<i>1.3</i>	<i>1.8</i>	<i>3.5</i>	<i>1.9</i>	<i>2.7</i>

Note: mean minutes are computed on the population performing care.

"Total primary adult care" is given by the sum of "Physical care", "Company", "Transport", "Other adult care", and "Adult care outside the household". "Other adult care" includes "help to adults in the family for differ activities: extra-domestic work, study, voluntary work" and "Other activities of care and help to household's adults".

Source: Multipurpose 2002/2003, authors' elaborations.

5.2.3 The value of unpaid family care work in Italy

In order to estimate the value of unpaid family care work, after the evaluation of its size, it is necessary to estimate the unitary value of unpaid family care work (e.g. the value of one hour spent in care activities).

The total value of unpaid family care work at national level depends on the number of people performing it, on the amount of time that each person devotes to this activity and on the value attributed to each unit of time. In the previous sections the time spent in child and adult care and the participation rate for each group has been discussed. Table 13 summarises the participation rate and the average time spent in child and adult care and reports the Italian population involved in the two activities.

Table 13 Participation rates (%) and average minutes per day in child and adult care, by gender and work status (population aged 18-74) - Italy

	Participation rate in child care	Number of people who perform child care (millions)	Average time spent on primary child care (minutes per day)	Participation rate in adult care	Number of people who perform adult care (millions)	Average time spent on primary adult care (minutes per day)
Working women	32.4	2.69	116.5	9.50	0.82	60.2
Non-Working Women	23.6	2.93	134.8	13.30	1.73	66.1
Working Men	22.6	2.93	76.5	7.30	0.89	55.3
Non-Working Men	8.2	0.54	86.6	15.10	0.95	75.4

Source: EU-SILC 2006 and Multipurpose 2002/2003, authors' elaborations.

As discussed in the previous chapters there are two methods of attributing a wage to the unpaid family care work. One is called the opportunity cost method and is based on the assumption that the time spent in unpaid family care work reduces the time spent in paid work. This method aims to evaluate the opportunity cost, that is, the value of the next best alternative forgone as a result of making the decision to spend time in unpaid family care work.

The alternative method is based on the assumption that households save money by performing family care work by themselves instead of buying the services on the market or hiring someone to do it. This method is known as the Market Replacement cost method. Even if conceptually different, both methods require the imputation of a wage for each unit of time spent in unpaid family care work.

This implies that an ideal source for the purpose of the evaluation of the unpaid family care work would be a survey including both the use of time and individual wages. This would enable the imputation of a wage to people who are not at work for the time they spend in unpaid work. Unfortunately it is quite rare that these two pieces of information are both present in the same data set. The Multipurpose (Multiscopo) Italian time use survey collected by the Italian Institute for Statistical ISTAT in 2002/2003, provides detailed information on adult care activities (disabled, sick) and child care activities. However, the main drawback of this survey is that it does not collect information on household earnings and income.

To overcome this limit we match the Multipurpose 2002/2003 data set with the Italian EU-SILC 2006 dataset. They are both the most recent data sets of this type available for Italy. The Annex to Chapter 5 describes the statistical techniques used to match the two data sets.

The value of unpaid family care work in Italy with the opportunity cost method

To impute the wages for the opportunity cost method, working men and working women observed in the Multipurpose survey are matched with working men and working women observed in EU-SILC controlling for all their relevant observable background characteristics. For these two sub-samples we also control for job characteristics in order to match individuals who perform "similar" jobs in "similar" conditions (e.g. same sector, same type

of contract). In this way it is possible to impute the value of unobserved labour incomes to people at work sampled in the Multipurpose survey. These labour incomes will be used as a proxy of the opportunity cost of the time spent in unpaid family care work for workers sampled in the Multipurpose survey.

For non-working men and non-working women, for whom labour incomes are obviously not observed, the sub-samples of non-working men and non-working women in the Multipurpose survey are matched with the sub-samples of working men and working women with similar characteristics in EU-SILC. The matching procedure is the same as the one used for the previous two sub-samples but the set of covariates used and the output obtained are different. Here, only the background characteristics (and not job-related variables) can be used as covariates for the match and the imputed labour income is the potential labour income of non-working people. The imputed income is then used as opportunity cost for individuals who are non-working. The method adopted for the matching is the Propensity Score Matching using the “Nearest neighbours matching” procedure. The intuition behind this procedure is to assign to each individual who performs unpaid care work in the Multipurpose survey the labour income of the individual observed in the EU-SILC survey with the closest characteristics (i.e. age, marital status, education, etc.)⁴¹.

Table 14 reports the value of child care in one year obtained multiplying the estimated value of each unit of unpaid work by the time spent in child care and by the number of people who perform child care in the country. In the same way, the value of adult care is obtained multiplying the estimated value of each unit of unpaid work by the time spent in adult care and by the number of people who perform adult care in the country. The total value of unpaid family care work estimated using the opportunity cost approach is 91.5 billion Euros. Using the opportunity cost approach, child care accounts for 78.1 per cent of the total value of unpaid family care work. Therefore, adult care, which is often ignored in the study on family care, with 21.9 per cent, represents a not insignificant proportion of the total value of unpaid family care.

⁴¹ For a more formal discussion see the Annex to Chapter 5.

Table 14 Estimated value of unpaid family care work with the opportunity cost approach (reference population: age 18-74; billions of Euros) - Italy

	Working Women	Non-Working Women	Working Men	Non-Working Men	All Women	All Men	Total	Percentage of GDP (%)
<i>Value of child care in one year</i>	24.0	27.2	16.9	3.4	51.2	20.3	71.5	4.8
<i>Value of adult care in one year</i>	3.6	7.7	3.2	5.5	11.3	8.7	20.0	1.3
<i>Total value of care in one year*</i>	27.6	34.9	20.1	8.9	62.5	29.0	91.5	6.1

Note: The method adopted for estimation is propensity score matching

*Total daily amount of care (sum of all minutes of care performed by the whole population in one day) multiplied by sample weights, by the average hourly net labour income (Euro), and by 365. The GDP used for the computation of the percentage is the Italian Gross domestic product at market prices in 2006 equal to 1485.3773 billions of Euros (<http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/>). Due to rounding, the percentage of the total value of care on GDP obtained summing the percentage of the value of child care and the percentage of the value of adult care on GDP is slightly different with respect to that obtained computing the percentage directly on the total value of care.

Source: EU-SILC 2006 and Multipurpose 2002/2003, authors' elaborations.

The value of unpaid family care work in Italy with the generalist market replacement method

The generalist market replacement method assigns as the unit value of unpaid family care work the hourly wages of unskilled workers in the service sector. In this study the wages of "Sales and services elementary occupation" (ISCO-88 code 91) which includes, among other similar workers, the category "Domestic and related helpers, cleaners and launderers" is used as proxy of the wage of a generalist domestic worker. Consistently with Chapter 4, here the average wage for domestic workers is computed separately for men and women.

The value estimated with the generalist market replacement method is, as expected⁴², lower than the value estimated using the opportunity cost method. Moreover, the proportion of the value of adult care on the total value of unpaid family care work is roughly the same as that derived with the opportunity cost approach.

⁴² This is expected since differently from Chapter 4, here both the opportunity cost approach and the replacement cost approach have the same reference population aged 18-74 so the difference in the estimate values are exclusively due to the assumption of the two methods. As discussed in Chapter 2 the literature shows that the opportunity cost approach can overestimate the value of unpaid work. See Chapter 2 for more details.

Table 15 Estimated value of unpaid family care work with the generalist market replacement approach (reference population: age 18-74; billions of Euros) - Italy

	Women working	Women Non-Working	Men working	Men Non-Working	All women	All men	Total	Percentage of GDP (%)
Average net hourly income of people in occupation ISCO-88 code 91								
<i>Value of child care in one year</i>	19.9	26.2	13.3	2.9	46.1	16.2	62.3	4.2
<i>Value of adult care in one year</i>	3.0	7.4	2.5	4.4	10.4	6.9	17.3	1.2
<i>Total value of care in one year*</i>	22.9	33.6	15.8	7.3	56.5	23.1	79.6	5.4

*Total daily amount of care (sum of all minutes of care performed by the whole population in one day) multiplied by sample weights, by the average hourly net labour income (Euro), and by 365. The GDP used for the computation of the percentage is the Italian Gross domestic product at market prices in 2006 equal to 1485.3773 billions Euros. (<http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/>).

Source: EU-SILC 2006 and Multipurpose 2002/2003, authors' elaborations.

The value of unpaid family care work in Italy with the specialist market replacement method

Detailed information on time use in the Multipurpose surveys enables the deepening of the analysis of the market replacement approach, applying the Specialist Market Replacement method. In fact, rather than imputing the wage of a generalist domestic worker, it is possible to assign to each activity related to child care and adult care its own market wage. The Multipurpose survey collects information on the following child care activities: "Physical care", "Supervision of child"; "Help children for homework"; "Play, read, talk with child"; "Transport of children"; and the following adult care activities: "Physical care", "Company" "Transport" and "Other" adult care activities. Each of these categories of care is matched with an ISCO-88 occupation classification code reported in EU-SILC. The codes used are: 51 (Personal and protective services workers) for child physical care, supervision of a child, and adult physical care; 23 (Teaching professionals) for helping children with homework; 83 (Drivers and mobile plant operators) for transporting a child or an adult; 91 (Sales and services elementary occupation) for residual care activities and care performed outside the household.

Table 16 shows the estimated value of unpaid family care work matching by occupation. The estimated value is in line with that estimated with the opportunity cost method and the generalist replacement cost method. The proportion of the value of adult care on the total value of unpaid family care work is, using the specialist replacement method, slightly lower than those observed using the opportunity cost method and the generalist replacement method (approximately 19 per cent against 21 per cent).

Table 16: Estimated value of unpaid family care work with the specialist market replacement approach (reference population: age 18-74) - Italy

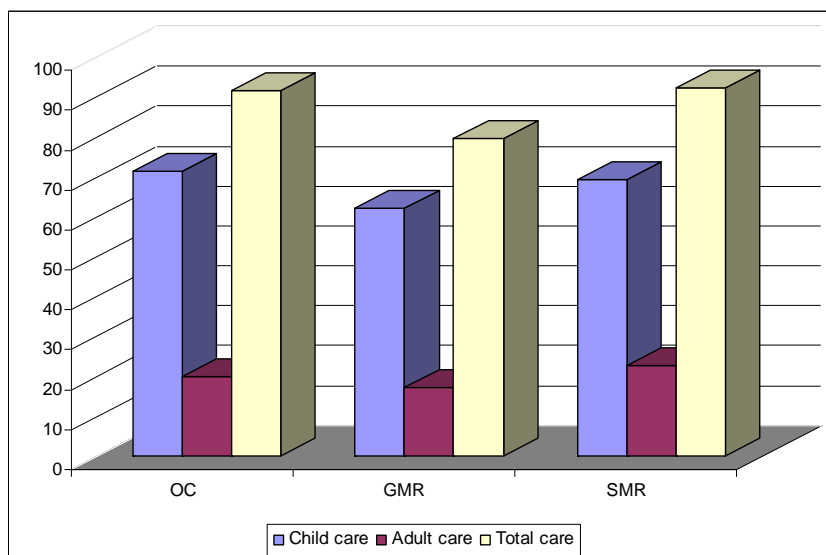
	Women working	Women Non-Working	Men working	Men Non-Working	All women	All men	Total	Percent age of GDP (%)
<i>Average net hourly income of people in occupation by ISCO-88 codes 91-51-23-83</i>								
<i>Value of child care in one year (billions)</i>	22.1	29.4	14.8	3.2	51.5	18.0	69.5	4.7
<i>Value of adult care in one year (billions)</i>	3.4	8.2	4.0	7.3	11.6	11.3	22.9	1.5
<i>Value of care in one year (billions)*</i>	25.5	37.6	18.8	10.5	63.1	29.3	92.4	6.2

*Total daily amount of care (sum of all minutes of care performed by the whole population in one day) multiplied by sample weights, by the average hourly net labour income (Euro), and by 365. The GDP used for the computation of the percentage is the Italian Gross domestic product at market prices in 2006 equal to 1485.3773 billions Euros. (<http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/>).

Source: EU-SILC 2006 and Multipurpose 2002/2003, authors' elaborations.

Figure 7 presents all estimates of the unpaid family work. They all are quite consistent and estimate the value of unpaid family care work in a range of 79 – 90 billions of Euros. All estimates confirm not only the net value of child care estimated using net labour incomes which account for about 5 per cent of the national GDP but also that the value of adult care is not negligible accounting for more than 1 per cent of the GDP.

Figure 7 Estimated value of unpaid family care work in the EU. Billions of Euros - Italy



Note: opportunity cost approach (OC), generalist market replacement approach (GMR), specialist market replacement approach (SMR). Reference population: age 18-74

Source: EU-SILC 2006 and Multipurpose 2002/2003, authors' elaborations

5.3 Poland

5.3.1 Unpaid family care work in Poland

The increase in rates of participation in the labour market is definitely one of the highest priorities of Polish economic and social policy. The employment rate in Poland is among the lowest in the EU countries (with the employment rate for women being the fourth lowest after Malta, Italy and Greece) - a considerable distance from the Lisbon Strategy targets. At the same time fertility rates in Poland are relatively low (below replacement rate) and the proportion of elderly people is growing. As a result Poland faces a complex problem of reconciliation of both economic and family activity and public policy in this area becomes a real challenge.

In Polish society is observed the coexistence of two family economic models: the traditional model, with the economic activity of women being subordinated to phases of family life and family duties, men being the breadwinners and women taking care of housework and children; and the partnership model, with equal responsibility between men and women in providing income and taking care of children. Although the partnership model is receiving growing support, particularly among well-educated women from urban areas, there is still strong support for the traditional model. However, even among young and educated women there is a strong conviction that the problem of reconciliation of professional and family life is a purely female problem.

The need for care is a common problem of most Polish households; two groups particularly burdened with care activities are women aged 30-39 (and men aged 35-44) and persons at pre-retirement age (caring for their parents and for grandchildren). In the households where care is needed, it is usually provided within the household: in the case of child care needs it is estimated to be provided by household members in three-quarters of cases; proportions for adult care are even higher and exceed 80 per cent. Generally the support from unrelated persons and institutional assistance is marginal; however patterns of childcare and care for adults clearly differ between the countryside and cities, particularly big ones.

The care provided within the household is a domain of women. Bobrowicz (2007) estimates the total weekly time spent on care to be equal to 10.5 hours for women and 4.7 hours for men. In spite of the fact that the main burden of care activity lies with women, the share of women who choose to reconcile work and taking care of children at pre-school age is quite substantial. Grotkowska and Sztanderska (2007) estimate this share to be equal to 40 per cent in the case of women bringing up a child aged three or less and almost 50 per cent for women with children aged 4-6.

Key problems indicated as obstacles for the reconciliation of economic and family life are work organisation (lack of flexible working time arrangements, taking time off, home-working, part-time working etc.) and the lack of access to high-quality care institutions. Institutional care for children is underdeveloped with an insufficient supply of places in public institutions and limited access to private sector institutions (with relatively high prices). An even more severe situation is observed in the sector of adult care where the care is often only provided by hospitals leading to inefficient resource allocation.

The level of women's economic activity is determined by the characteristics of their family and their need for care. The model of the family, uneven share of family and household duties, lack of institutions providing care, difficulties in re-entering the labour market after

a maternity-related break are all determinants in women's participation in the labour market. Relatively long times devoted by women to work are partly a result of the low average level of wages in Poland; it increases pressure on particularly low-educated women to undertake a professional activity since, due to low wages, they are unable to afford housework and care services on the market. As a result it is a group characterised with the highest average total working time. The wage elasticity of women's labour supply is lower than in the case of men (Haan, Myck 2008).

This section estimates the size and value of unpaid family care work in Poland with particular attention to differences in engagement in care activity related to gender and labour market status. Our data source is the Time Use Survey from 2003/04, carried out by the Polish Central Statistical Office. The key feature of the survey is that it combines data on time allocation, the labour market situation and income (personal and household). A short description of the Polish survey may be found in the Annex to Chapter 5.

The Time Use Survey shows lower participation in the labour market for women than for men (29.1 per cent against 43.8 per cent in the population aged 18-74 years). However, women always report a higher participation in unpaid work than men. Almost all women (98.6 per cent) are engaged in domestic work, and many of them are engaged in child and adult care (30.6 per cent in child care and 4.1 per cent in adult care). Men participate in unpaid work less often than women. Their participation rate in domestic work equals to 83.9 per cent, 21.7 per cent are engaged in child care and 2.7 per cent participate in adult care. Both men and women tend to perform paid work more during week days than during weekends (with men engaged in weekend jobs more often than women). Domestic and care activities are rather equally spread among all the days of the week for women (with slightly lower participation on Sundays). However men are more often engaged in unpaid activities on weekends.

Gender inequality is evident not only in the participation rates but also in time devoted to each activity. Men spend about 70 per cent more time on paid work than women (average time devoted to paid work equals to 3 hours 40 minutes for men and 2 hours and 10 minutes for women), with an even larger difference at weekends (men work more than twice as long as women on Saturdays and almost twice as long on Sundays). Women spend more than 100 per cent more time than men on unpaid work (domestic and care activities), and they are definitely more burdened with work: they spend 13.7 per cent more time on total work than men (on average total time devoted to work – both paid and unpaid – equals to 6 hours and 46 minutes for women and 5 hours 57 minutes for men). The difference in total time devoted to work (paid and unpaid) between men and women grows in particular at weekends and it is equal to 23 per cent on Saturdays and 44 per cent on Sundays) – it allows men to spend about 20 per cent more time on leisure (at weekends the difference rises to more than 25 per cent). All these figures are reported in Table 17.

Table 17 Participation (%) and average minutes per day spent in primary activities, by day of the week and gender (people aged 18-74) - Poland

Primary daily activities	PARTICIPATION (%)				MINUTES			
	WD	Sa.	Su.	Total	WD	Sa.	Su.	Total
	Women				Women			
Employment	40.7	21.2	15.1	29.1	162.6	66.6	33.1	130.4
Study	9.8	7.4	7.8	8.6	29.1	16.3	14.9	25.2
Domestic work	97.8	98.2	96.7	98.6	245	277	167.1	238.4
Child care	32.3	28.9	28.6	30.6	37.7	34.2	30.1	36.1
Adult care	4.0	4.2	4.1	4.1	1.1	1.1	1.2	1.1
Unpaid work for organisations, etc. ⁴³	14.8	19.1	66.4	29.5	8.3	13.1	50.1	15.0
Work for other households	12.3	13.1	11.5	12.3	14.9	14.6	9.6	14.1
Leisure	98.0	98.6	9.5	98.6	223.3	267.7	325.4	244.2
Transport and others	90.9	87.3	90.7	89.9	76.5	72	74.9	75.6
	Men				Men			
Employment	58.5	37.7	22.7	43.8	267.6	144.7	61.1	220.5
Study	9.6	7.4	7.2	8.4	30.2	17.5	14.6	26.2
Domestic work	84.5	87.7	79.3	83.9	125.6	145.5	79.5	121.9
Child care	20.1	21.5	23.6	21.7	13.1	16.8	19.3	14.5
Adult care	2.8	2.5	2.8	2.7	0.8	0.5	0.7	0.7
Unpaid work for organisations, etc.	7.3	11.5	54.6	20.9	4.3	9.6	39.5	10.1
Work for other households	11.4	14.7	7.61	11.2	16.9	22.2	6.8	16.2
Leisure	97.8	98.4	99.4	98.4	259.8	335	407.5	291.6
Transport and others	92.5	90.4	90.8	91.5	99.7	91.4	83.1	96.1
	Total				Total			
Employment	48.3	28.3	18.3	35.4	213.5	104.5	46.7	174.1
Study	9.7	7.4	7.6	8.6	29.6	16.9	14.7	25.7
Domestic work	92.1	93.7	89.2	91.2	187.2	213.2	124.5	182.0
Child care	28.2	24.9	26.1	22	25.8	25.8	24.8	25.7
Adult care	3.6	3.6	3.8	3.8	0.9	0.8	1	0.9
Unpaid work for organisations, etc.	11.6	15.8	61.3	25.8	6.4	11.4	45	12.6
Work for other households	11.9	13.8	9.8	11.8	15.9	18.4	8.2	15.2
Leisure	97	98.5	99.4	98.5	240	300.3	365.3	266.5
Transport and others	91.6	88.6	90.8	90.6	87.8	81.4	78.9	85.6

Note: Average minutes are computed on total population; WD= weekdays, Sa =Saturday, Su= Sunday.

Source: Polish Time Use Survey 2003/2004, authors' elaborations.

⁴³ Unpaid work for organisations includes all sorts of activities in all type organisations (cultural, religious etc) or informal groups that are not being remunerated.

5.3.2 Average size of unpaid family care work in Poland

The Polish Time Use Survey from 2003/04 gives insights into the way men and women engage in unpaid family care work in Poland (see Table 18). Firstly, for both genders the participation in child care activity depends on age. It is highest for people aged 31-40 (both for primary and secondary child care). Within this age group more than 60 per cent of women and almost 48 per cent of men declare being engaged in child care as a primary activity. It is also the age group where the difference between genders in participation in care activity is the lowest (and equal to about 25 percentage points). For both genders, participation in child care activity falls with age. There is no evidence on the growth of engagement in child care of persons of pre-retirement and retirement age, as it is often argued in popular discourse.

Secondly, being employed influences participation in care activities. Working women usually declare lower participation in child care than those who do not work (with the exception of the youngest group, i.e. women aged 18-30). The difference between the two groups (working versus non-working) is the lowest for women aged 31-40 who are most often engaged in care. However, there is an apparent paradox evident for men's participation in child care: it is generally higher for those who work. This evidence is consistent with evidence shown for Italy in Section 5.2 and with other research that indicates a positive correlation between men's professional activity and the presence of children in their households which is result of the coincidence of both family and professional life cycles. Entrance to the labour market coincides with setting up families and having small children while leaving labour market usually takes place when children have already left the household or do not require care.

Thirdly, for both genders the participation in adult care is much smaller than in child care. It is equal to 4.1 per cent for women and 2.7 per cent for men. For women, labour market status does not have an impact on the engagement in adult care. However in the case of men, those who do not work are more engaged in helping adults. For both genders, participation in adult care grows with age to reach the maximum in the group aged 41-50 and then falls for persons aged 50 and more. This result may be associated with the possible need for assistance from elderly parents.

Table 18 Participation (%) in child and adult care (primary and secondary) by gender, age groups and work status (people aged 18-74) - Poland

	18-30	31-40	41-50	51-65	60-74	Total	18-30	31-40	41-50	51-65	66-74	Total
	Women Non-Working						Men Non-Working					
Primary child care	32	68	35.8	27.2	19.1	29.6	8.4	38.8	23.5	17.4	13.71	16.7
Secondary child care	16.9	33.6	15.1	11.1	6.5	12.1	13.6	14.2	8.1	6.1	2.7	4.5
Primary adult care	2.8	2.9	7.2	6.2	4.3	4.1	2	3.2	4	4.7	3.8	3.2
Secondary adult care	0.3	0.2	0.6	0.7	0.5	0.4	0	1.6	0	0.3	0.2	0.2
	Women Working						Men Working					
Primary child care	37.8	57.6	24.3	20.6	19.1	35.2	26.9	49.2	18.6	14.8	14.8	27.8
Secondary child care	20.2	26	9.1	7.3	5.1	15.5	8.5	18.3	7	3.4	2.9	9.5
Primary adult care	2.3	2.7	5.1	6.3	5.3	4.1	1.1	2	2.6	3.9	2.7	2.3
Secondary adult care	0	0.1	0.3	0.7	0	0.3	0	0.3	0.3	0.2	0	0.2
	All Women						All Men					
Primary child care	34.4	61	27.9	25	19.1	30.6	18.9	47.9	19.6	16.1	13.9	21.7
Secondary child care	18.3	28.5	11	10	6.3	13.6	6.4	17.8	7.2	4.8	2.7	7.4
Primary adult care	2.6	2.8	5.8	6.2	4.4	4.1	1.5	2.2	2.8	4.3	3.6	2.7
Secondary adult care	0.2	0.1	0.4	0.7	0.4	0.3	0	0.4	0.3	0.3	0.2	0.2

Source: Polish Time Use Survey 2003/2004, authors' elaborations.

Women who participate in care activity spend on average more than 3 hours and 20 minutes per day in care activities (see Table 19). For men, their average time is equal to 2 hours and 20 minutes. Total time devoted to care depends on age: for women it falls with age, while for men the opposite relationship is observed.

The structure of time spent on care differs between genders as well. Men divide the time they spend taking care of others almost equally between caring for children and adults. Women instead spend more time on child care (70 per cent of their time is spent on child care). Non-working women generally spend much more time on child care than those who are active in the labour market. The difference is particularly high in the second age group (31-40 years old), where it exceeds 50 per cent. It is also worthy of notice that in the last age group (60-74 years old) there are non-working women who devote more time to child care. These are retired women who live in their child's house and take care of grandchildren. By taking into account that often care is given while performing other activities (a mother goes shopping with her child for example), time spent on child care significantly increase: for women it reach almost 5 and a half hours per day, for men 3 and a quarter hours. Time spent on other activities in the presence of children is particularly high for young non-working women.

Table 19 Average minutes per day of child and adult care (primary and secondary) by gender, age groups, and work status (people aged 18-74 years) - Poland

Age band	18-30	31-40	41-50	51-65	60-74	Total	18-30	31-40	41-50	51-65	66-74	Total
	Non-Working Women						Non-Working Men					
Primary child care	210.4	175.6	131.5	90.4	85.4	145.4	132.38	131.62	88.36	59	64.68	89.2
Secondary child care	53.4	66.4	57.7	50.5	51.4	55.3	31.2	45.2	19.7	35.8	26.5	32.9
Primary adult care	24.8	29.5	42.8	47.4	49.8	41.5	25.1	51.9	50.3	47.6	50.3	46.2
Secondary adult care	12	21.4	85.6	11.9	16	23.7	0	8.1	0	49.9	33.9	28.5
Time in presence of children	219.2	240	209.6	132.2	124.8	197.7	122.6	167.4	130.7	121	122.8	127.1
	Working Women						Working Men					
Primary child care	139.1	113.8	82.0	64.7	89.9	108.5	87.1	83.6	69.6	39.6	75.8	73.6
Secondary child care	47.6	41.8	44.1	31.8	61.6	43.8	20.6	24.9	23.5	33.1	7.1	23.8
Primary adult care	25.5	34.9	30.8	33.9	37.2	31.9	37.6	32.1	26.2	29.3	31.4	30.3
Secondary adult care	0	14.3	22.5	17.9	0	17.7	0	12.7	39.7	1.4	0	23
Time in presence of children	166.7	175.2	147.2	128	108.4	164	111.4	128.3	112.7	99.2	92.5	118.3
	All Women						All Men					
Primary child care	178.9	142.1	104.7	82.3	85.0	129.9	84.0	87.9	74.2	50.0	67.0	77.9
Secondary child care	50.8	51.4	50.1	46	52.6	50	23.3	27.1	22.6	34.8	22.2	26.2
Primary adult care	25	33	35.6	42.9	47.7	37.6	30.1	36	33.3	39.3	47.3	38.6
Secondary adult care	12	18.1	53.7	13.8	16	22	0	10.6	39.7	29.4	33.9	25.5
In presence of children*	195.6	198.3	171.6	113.1	120.4	180.7	114.1	132	115.6	110	104.7	120.2

Note: mean minutes are computed on the population performing care.

*Children less than 9 years old.

Source: Polish Time Use Survey 2003/2004, authors' elaborations.

Access to micro data in the time use survey allows for more detailed analysis of the care activity (see Table 20). The Polish time use survey collects information on the following child care activities: physical care and supervision of children, helping children with homework; playing, reading, speaking to children going out with children and other types of activity. Concerning physical care and supervision of children: both for women and men, a U-shape relationship between age groups and time devoted to this activity is observed; for both genders, the maximum is reached in the youngest group (18-30 years old), then the average time spent on physical care falls and increases again in the last age group (which might be related to taking care of grandchildren). A similar relationship is observed for helping with homework, but reaches its maximum at the consecutive age group (31-40 years old), where parents of school-aged children are concentrated (the mean age of women at the birth of the first child is 25.8 years, OECD 2009). However, time spent on this type of care is rather short (10 minutes on average for women and 4 minutes for men). For both genders aged 31 or more a monotonic increase of time devoted to child care in other households is observed: in the oldest age group (61-74 years old for women

and 66-74 years old for men) the average time devoted to this kind of activity reaches 56 minutes a day for women and 35 minutes a day for men.

Table 20 Average minutes per day of primary child care, by type of child care, gender, age group and work status (people aged 18-74 years) - Poland

Age group	18-30	31-40	41-50	51-60	61-74	Total	18-30	31-40	41-50	51-65	66-74	Total
Non-working women						Non-working men						
Physical care and supervision of child	85.7	54.9	22.8	8.3	9.5	42.2	31.1	25.8	13.1	4.3	2.5	13.7
Help children with homework	5.9	21.6	15.6	2.3	0.7	8.8	2.6	9.7	9.5	1.7	1.1	4.3
Play, read, speak to a child	49	37	16.2	10.4	7.7	27.1	32.8	47.4	15.5	11.6	6.1	20.9
Going out with children and transportation of children	61.5	60	55.5	13.5	9.0	42.0	49.7	42.3	35.0	9.2	12.9	27.6
Care of children in other household	8.3	2.1	21.4	55.9	58.5	25.3	16.2	6.4	15.3	32.2	42.1	22.7
Total primary child care	210.4	175.6	131.5	90.4	85.4	145.4	132.4	131.6	88.4	59.0	64.7	89.2
Participation to children care in other household (%)	4.8	2.2	9.1	20.0	15.1	10.3	2.3	4.4	6.2	13.4	11.2	7.2
Working women						Working men						
Physical care and supervision of child	70.3	34.9	15.5	14.6	28.3	38	19.6	14.8	7.5	3	14.8	13.6
Help children with homework	4.8	17.5	13.5	2.6	0	11.5	0.7	4.8	6.9	2.1	0.0	3.8
Play, read, speak to a child	33.9	20.3	11.6	12.6	20.3	21.3	30.8	27.7	15.5	8	19.5	24.4
Going out with children and transportation of children	26.9	40.3	32.0	1.0	0.0	31.0	33.5	35.3	35.3	8.8	26.4	28.2
Care of children in other household	3.2	0.8	9.4	33.9	41.3	6.7	2.5	1.0	4.4	17.7	15.1	3.6
Total primary child care	139.1	113.8	82.0	64.7	89.9	108.5	87.1	83.6	69.6	39.6	75.8	73.6
Participation to children care in other household (%)	4.3	1.8	4.7	12.1	12.0	5.4	1.9	1.5	2.0	8.1	6.7	3.2
Total women						Total men						
Physical care and supervision of child	78.7	42.2	18.5	10	12.1	40.2	21.9	16.0	8.9	3.7	5.2	13.7
Help children with homework	5.4	19	14.4	2	0.6	10.1	1.1	5.3	7.5	1.9	0.9	4
Play, read, speak to a child	42.2	26.4	13.5	11	9.5	24.4	31.2	30	15.6	10	9.1	23.4
Going out with children and transportation of children	46.6	53.2	43.9	9.3	6.7	38.6	24.5	35.0	35.0	8.8	15.8	28.0
Care of children in other household	6.0	1.3	14.4	50.0	56.1	16.6	5.3	1.6	7.2	25.6	36.0	8.8
Total primary child care	178.9	142.1	104.7	82.3	85.0	129.9	84.0	87.9	74.2	50.0	67.0	77.9
Participation to children care in other household (%)	5.5	2.0	7.1	17.3	14.7	8.2	2.1	1.9	2.8	10.7	10.3	4.9

Note: mean minutes are computed on the population performing care.

Source: Polish Time Use Survey 2003/2004, authors' elaborations.

The activities of adult care are generally described in a less detailed way in a time use survey on which the analysis is based (no data on particular activities). Adult care is reported to be very low (see Table 21): the participation rate varies from 1.1 per cent for working men to 2.5 per cent for non-working women in the case of intra-household care. Rates for performing help in other households are higher. Similarly time devoted to adults' care (by those who declare being engaged in this kind of activity) are much smaller than in the case of childcare.

Table 21 Average minutes of primary adult care, population aged 18-74, by type of adult care, gender and work status (people aged 18-74 years) - Poland

	Women			Men			Total		
	Non-Working	Working	Total	Non-Working	Working	Total	Non-Working	Working	Total
PARTICIPATION (%)									
Care for adult	2.5	1.9	2.2	2.0	1.1	1.5	2.3	1.5	1.9
Care for adult in other household	2.3	2.3	2.3	1.6	1.3	1.4	2	1.8	1.9
MINUTES									
Care for adult	21	16	19	28.7	17.3	23.2	23.7	16.5	20.6
Care for adult in other household	20.5	15.9	18.6	17.5	13	15.3	19.5	14.7	17.4

Note: mean minutes are computed on the population performing care

Source: Polish Time Use Survey 2003/2004, authors' elaborations.

5.3.3 The value of unpaid family care work in Poland

In order to estimate the value of unpaid family care work, once its size is estimated, it is necessary to estimate the unitary value of unpaid family care work (i.e. the value of one hour spent in care). As was mentioned in the previous section, the total value of unpaid family care work at national level depends on the number of people who perform it, the amount of time that each person devotes to this activity and on the value attributed to each unit of time. The amount of time spent in child and adult care in Poland and the participation rate for each group has been discussed in previous sections. In the next part the estimation of the value of care activity of Polish society is presented. Table 22 summarises the participation rate in child and adult care and reports the Polish population's involvement in the two activities. The total population was estimated using the dataset on time use survey containing weights that allowed the production of results generalised to the total Polish population.

Table 22 Participation rates (%) and average minutes per day in child and adult care, by gender and work status of the population aged 18-74. Poland

	Participation rate in child care	Number of people who perform child care (millions)	Average time spent on primary child care (minutes per day)	Participation rate in adult care	Number of people who perform adult care (millions)	Average time spent on primary adult care (minutes per day)
Working Women	35.2	2.02	108.5	4.2	0.24	31.9
Non-Working Women	29.6	2.01	145.4	4.8	0.33	41.5
Working Men	27.8	2.03	73.6	2.4	0.18	30.3
Non-Working Men	16.7	0.74	89.2	3.4	0.15	46.2

Source: Polish Time Use Survey 2003/2004, authors' elaborations

Similarly to the analysis carried out for Italy in Section 5.3, here two methods are used to attributing a value to unpaid family care work: the opportunity cost method and the Market Replacement Cost method⁴⁴. In order to make the results for Italy and Poland as comparable as possible the analysis carried out for Poland follows the general approach used for Italian data. However, since in the Polish Time Use Survey, differently from the Italian time use data, data on wages and incomes was also collected, for Poland there is no need to use the matching procedure that was necessary in the case of the Italian analysis in order to match data on use of time and income.

Opportunity cost

The opportunity cost approach relies on the assumption that each hour devoted to domestic activities could be sold on the labour market. Such a hypothesis implies that each hour devoted to care activities should be evaluated at the wage that individuals who perform care activity could have got if they decided to sell their time on the labour market instead of spending it on care. For working people the value imputed to unpaid work is equal to the wage they obtain for their work in the labour market. For the non-working population, we have to estimate their potential wage. We dealt with the problem using the Heckman Selection (HS) model (Heckman, 1979), separately for men and women. The model estimates two equations. The first equation determines the probability of working according to a set of individual, household and environmental characteristics. The second equation estimates the (net) wage⁴⁵ given the probability of working. The variables used as predictors in the wage equations are: age, age squared, education level, occupation group, status of health, *województwo* (NUTS2 units) and living in a rural or urban area.

Table 23 summarises the results of the estimation. The total yearly value of unpaid family work equals to 8.29 billions of Euros (that is about 4.3 per cent of the Polish GDP of the reported period). More than 95 per cent of the estimated care value may be attributed to childcare. Almost three-quarters is a result of women's activity.

⁴⁴ See Section 5.2 for a short description of the two methods and Chapter 2 for a more detailed discussion and the relative literature.

⁴⁵ Only net wages are available in the time use survey. In the application of the Heckman Selection model the natural logarithm of hourly net wages has been used.

Table 23 Estimated Value of unpaid family care work with the opportunity cost approach (reference population: age 18-74; billions of Euros) - Poland

	Women working	Women not working	Men working	Men not working	All women	All men	Total	% of GDP
Value of child care in one year (billions) ⁴⁶	2.36	3.06	1.77	0.73	5.42	2.50	7.92	4.1
Value of adult care in one year (billions)	0.08	0.14	0.06	0.08	0.23	0.14	0.37	0.2
Value of care in one year (billions)	2.44	3.20	1.83	0.81	5.65	2.64	8.29	4.3

Note: The method adopted for estimation is Heckman Selection (HS) model (Heckman, 1979)

*The GDP used for the computation of the percentage is the Polish Gross domestic product at market prices in 2003 equal to 191.6438 billions of Euros. (<http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/>). This percentage is not comparable with that in Chapter 4 since there the unpaid family care work value is computed on gross wages.

Source: Polish Time Use Survey 2003/2004, authors' elaborations

Market replacement cost

As for the market replacement cost method two procedures has been used: The general market replacement cost method and the specialist market replacement method. As was already mentioned, the generalist market replacement approach aims at assigning a general household worker wage to each hour of unpaid household work. The reference salary is exogenously assigned independently of the specific characteristics of households and individuals. As in Chapter 4 and in Section 5.2 in this chapter, the wages of "Sales and services elementary occupation" (ISCO-88 code 91) has been used for Poland as proxy of the wage of general household worker. It includes, among other similar workers, the category "Domestic and related helpers, cleaners and launderers". Consistently with the Italian analysis we use the average wage for household workers computed separately for men and women.

As might be expected, the total value of unpaid family work is significantly lower when estimated with the generalist market replacement method with respect to the opportunity cost method (the difference is equal to 16 per cent).

⁴⁶ All values expressed in Euros were calculated with an average Euro nominal exchange rate from the period of collection of the survey (1.06.2003-31.05.2004), i.e. 4.6149 PLN per Euro.

Table 24 Estimated value of unpaid family care work with the generalist market replacement approach (reference population: age 18-74; billions of Euros) - Poland

	Women working	Women not working	Men working	Men not working	All women	All men	Total	% of GDP
<i>Imputation of the average income of people in occupation ISCO-88 code 91,</i>								
Value of child care in one year (billions)	1.89	2.52	1.65	0.73	4.42	2.37	6.79	3.5
Value of adult care in one year (billions)	0.07	0.12	0.06	0.08	0.18	0.14	0.32	0.2
Value of care in one year (billions)	1.96	2.64	1.71	0.81	4.60	2.51	7.11	3.7

*The GDP used for the computation of the percentage is the Polish Gross domestic product at market prices in 2003 equal to 191.6438 billions of Euros (<http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/>). This percentage is not comparable with that in chapter 4 since there the unpaid family care work value is computed on gross wages.

Source: Polish Time Use Survey 2003/2004 authors' elaborations

The detailed information on care activities available in the Polish time use survey allows us to deepen the analysis of the market replacement method by applying the Specialist Market Replacement method. Instead of attributing the wage of a general household worker, with this method it is possible to disaggregate total time spent on child activity into specific activities of different kinds. Childcare activity is described in a relatively detailed manner (physical care and supervision, helping children with homework, playing, reading, speaking to a child, going out with children, and other types of activity). Unfortunately, the Polish time use survey does not allow for disaggregation of activities related to adult care – there is only general information on intra and extra- household activity. However, since adult care has a rather marginal share in time allocation of the Polish population it does not seem to be a major drawback.

Each of the categories of care was matched with an ISCO-88 occupation classification code reported in the time use survey. The codes used are 51 (personal and protective services workers) for physical care and supervision of a child, and adult physical care; 23 (teaching professionals) for helping children with homework; 83 (drivers and mobile plant operators) for going out with children and 91 (sales and services elementary occupation) for other child care and child and adult care performed inside and outside the household. As for the generalist market replacement method and even for the specialist market replacement method we can impute the average wage of each occupation to the matched care activity.

Table 25 Estimated value of unpaid family care work with the specialist market replacement approach (reference population: age 18-74) - Poland

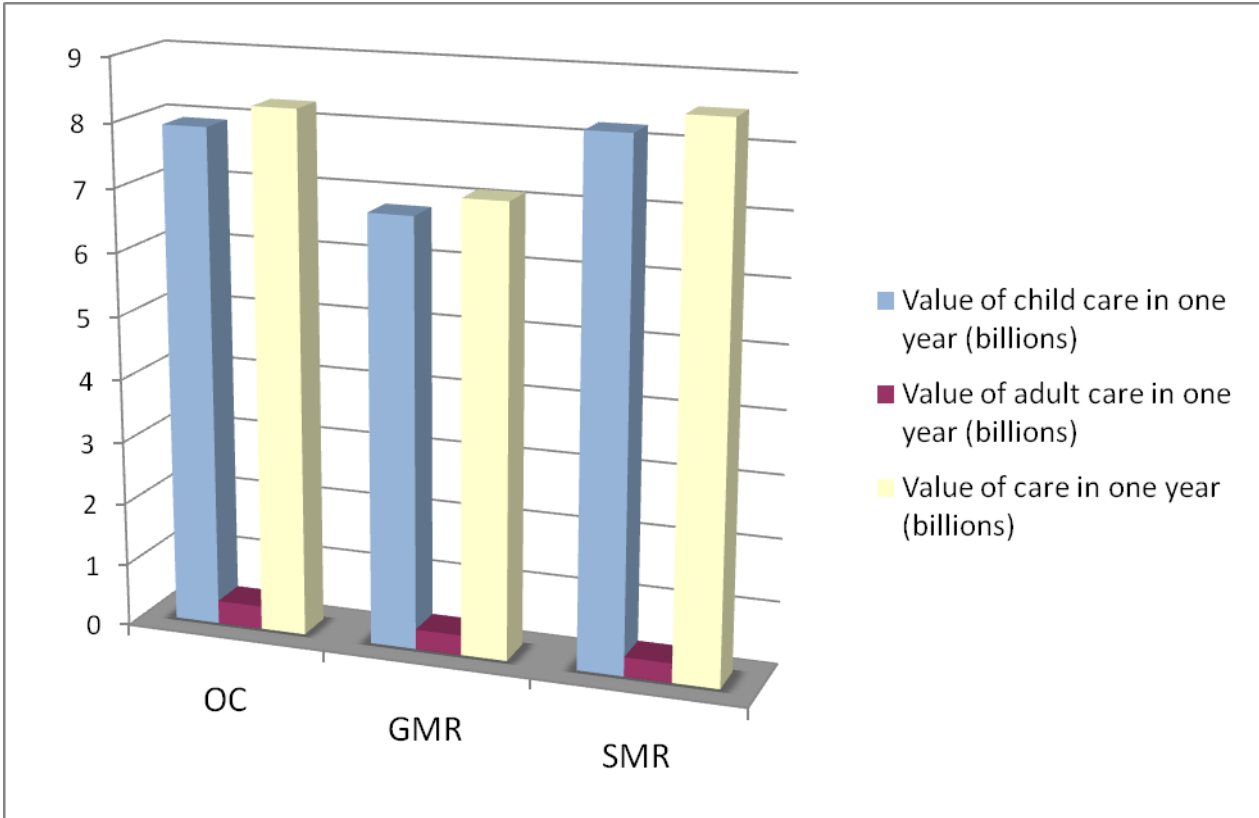
	Women working	Women not working	Men working	Men not working	All women	All men	Total	% of GDP
	<i>Average net hourly labour income (Euro)</i>							
Value of child care in one year (billions)	2.46	3.23	1.76	0.77	5.69	2.53	8.22	4.2
Value of adult care in one year (billions)	0.06	0.11	0.06	0.08	0.17	0.14	0.31	0.2
Value of care in one year (billions)	2.52	3.34	1.82	0.85	5.86	2.67	8.53	4.5

*The GDP used for the computation of the percentage is the Polish Gross domestic product at market prices in 2003 equal to 191.6438 billions of Euros (<http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/>). This percentage is not comparable with that in chapter 4 since there the unpaid family care work value is computed on gross wages.

Source: Polish Time Use Survey 2003/2004 authors' elaborations

Taking into account the differences in wages between different categories of workers that potentially could replace home-based care activity significantly increases the estimated value of unpaid family work. The child care dominates in the total value of unpaid care work with 96 per cent share in total value. Similarly to earlier estimations, the unpaid work undertaken by women is estimated to be of significantly higher value than in the case of men.

Figure 8 Estimated value of unpaid family care work in Billions of Euros - Poland



Note: opportunity cost approach (OC), generalist market replacement approach (GMR), specialist market replacement approach (SMR). Reference population: age 18-74
 Source: Polish Time Use Survey 2003/2004, authors' elaborations

Figure 8 presents all estimates of the unpaid family work. They all are quite consistent and estimate the value of unpaid family care work (in net terms) in a range of 7.1 – 8.5 billion Euros. All estimates confirm a marginal role of adult care activity in Poland, which question remains open and requires further studies.

5.4 Concluding comparative remarks

The following remarks concern three aspects of the analysis presented in this chapter. First, the methodological difference with respect to the analysis conducted at the EU level, second the differences in the values of unpaid family care estimated for the two countries and third the comparison of the results obtained for Italy and Poland in Chapter 4 with those presented in the previous sections of this chapter.

Regarding the comparison of the methodology adopted at country level and at EU level, the advantages of the micro-data analysis conducted in this chapter, compared to that presented in Chapter 4, are that using micro data it is possible to:

- better identify the population contributing to unpaid family care work (that is, by age, work status, day of the week, household characteristics);
- know precisely the time devoted to *child care* and *elderly care*. This last component is particularly important because not only the data and method adopted in Chapter 4 do not allow taking it into account, but also because, as seen in Chapter 2, there is growing interest in elderly care and no studies that estimate its value;
- better identify the value of each unit of unpaid family care work (hourly labour income) supplied by the population contributing to unpaid family care;
- use more sophisticated techniques to impute labour income to individuals observed in time use surveys (the so called "matching" of different surveys) in order to derive more reliable estimates.

Turning to the interpretation of the values estimated in Chapter 4 and Chapter 5, it is worth remarking that the determinants of the values of unpaid family care work are: (i) the number of people who spend time in unpaid family care, (ii) the time individuals devote to it, (iii) the value of each unit of time devoted to it. For simplicity here, all comparisons are based on the specialist market replacement method, since it represents an accurate way for evaluation, when data on labour income by occupation are available.

The comparison of the use of time in the two countries has shown that Italians participate somewhat less than Poles in child care, but substantially more in elderly care (around three times more). This has a demographic explanation, since the Polish population is younger than the Italian population⁴⁷.

However, since Italy has a higher total population than Poland⁴⁸, the number of people performing both child and elderly care in Italy is higher. Given the higher female participation in child care the difference in the number of people performing child care in the two countries is mainly due to women: females performing care are 5.62 million in Italy and 4.03 million in Poland whereas males are 3.47 million in Italy and 2.77 in Poland. The figure is similar for the number of people performing adult care: females performing adult care are 2.55 million in Italy and 0.57 in Poland and males are 1.84 million in Italy and 0.33 million men in Poland.

As to the distribution of time of people who perform these activities, there are not significant differences in time spent in primary child care for both males and females (around two hours a day on average for females and one hour for males). As to elderly

⁴⁷ The fertility rate in Poland in 2006 was 1.27, while in 1995 it was 2.04 and 1970 it was 2.20. In Italy it had already dropped during the '90s: in 2006 it was 1.35, in 1995 it was 1.33 while in 1970 it was 2.42.

⁴⁸ Poland has a population of over 38 million people and Italy has a population of nearly 60 million people (in 2008).

care, Poles spend around forty per cent less than Italians in this activity. However, since the average time allocated to elderly care activities is generally much lower than child care in both countries, there are not large differences in time allocated to total unpaid family care.

Finally, an important determinant of the total value of care is the value of each unit of care. The discrepancy in the hourly wages between Italy and Poland represents probably the main explanation of the difference in the value of unpaid family care work in the two countries. The average Polish wages are about one fifth of Italian wages. Understanding the determinants of this discrepancy is beyond the aim of this study. However, the different years of analysis (2003 for Poland, 2006 for Italy), the different purchasing power of the two currencies and the use of an exchange rate to convert the Polish value in Euros are probably among the main explanations of this discrepancy.

Taking into account these remarks, a mere comparison between the absolute values of unpaid family care work in Italy and Poland is meaningless not only because of the different population sizes, but also because the data on labour incomes in the two countries refer to two different years, 2003 for Poland and 2006 for Italy. Considering these caveats, it is useful to report the value of unpaid family work obtained with micro-data in percentage of GDP. The percentage of the unpaid family care work (net of taxation) on GDP is around 6.2 per cent in Italy and 4.5 per cent in Poland.

As to the comparison between the results of Chapters 4 and 5, this is problematic in the case of Poland. The first reason is that income from labour refers to different years, 2006 and 2003 respectively, and in 2004 Poland had become a member of the EU. Average nominal wages have increased between 2003 and 2006 by 11-12 per cent and the exchange rate has changed from 4.61 PLN per Euro in 2003/04 to 3.89 in 2006.

The second reason is that in Chapter 4 wages are gross (EU-SILC provides them gross of labour taxes), while in Chapter 5 wages drawn from the time use survey are net. To make results in Chapter 4 and Chapter 5 comparable it is useful to report the net value of unpaid family care work obtained with micro-data in gross value and compute its percentage on GDP. The percentage of the unpaid family care work (gross of taxation) on GDP for elderly care is around 0.3 per cent and for child care is around 6 per cent⁴⁹. Since the figure for child care estimated at the EU level is 8.5 per cent, *the analysis at the EU level overestimates the value of unpaid family child care work for Poland.*

For Italy, the comparison is less problematic, since data on income are drawn from the same source. The estimates in billions of Euros differ by around ten billion Euros (69.5 vs 81 in Chapter 4). Moreover, the analysis at the EU level has not allowed taking elderly care into account. Once elderly care is included, the value of family care work increases by around 23 billion Euros. In terms of GDP, child care (net of labour taxation) is around 4.7 per cent and elderly care around 1.5 per cent. The net value of child care on GDP estimated in Chapter 4 is equal to 5.5 per cent. Given the higher precision of the estimated values with micro data, it may be concluded that *the analysis at the EU level overestimates the total value of unpaid family child care in Italy.*

Two final considerations might be added to this discussion. The first one is about the fact that data and methods adopted in this analysis have allowed the taking into account of the

⁴⁹ This percentage is not comparable with that in Table 25. In fact, since hourly labour income in Chapter 5 is expressed in net terms in Table 23-25 this percentage is computed as unpaid family care work estimated using net incomes on GDP.

weight of elderly care in the value of unpaid family work. This is particularly important in ageing societies. In fact, family elderly care is quite relevant in Italy, a country with a relatively old population compared to the rest of Europe. In Poland, elderly care turns out to be less prominent, also because of the younger population. Since the two countries are quite similar in terms of family care regimes (as shown in Chapter 2), the estimated value of unpaid family elderly care should represent two similar regimes at different stages of ageing. This means that *in perspective, all EU countries should place more attention on collecting data on elderly care, both paid and unpaid.*

The second consideration is an assessment on the validity of the EU level analysis of Chapter 4. Taking for granted that estimates on micro data are more precise, the comparison with results obtained with the micro-data analysis has shown that the *EU level estimated value of child care is not so far from the value obtained here* for the two countries studied, for Italy in particular. It might then be inferred, keeping in mind all caveats, that *the EU level technique might be adopted with a certain degree of confidence.* The allocation of time is a structural phenomenon, exhibiting very slow changes. For this reason, even if the time use surveys employed in the estimation refer to different years across countries, this should not represent a problem. The main element of variability is introduced by monetary values, like labour incomes. Using income surveys of the same year is, under this respect, fundamental for the country comparisons at a point in time, since many countries, like Poland, have experienced substantial economic growth rates, rapid changes in wages and in exchange rates, especially in the process of entering the EU,ⁿ

6. GENERAL CONCLUSIONS

Domestic work and family care work make up a big part of working time and their values represent a large share in the GDP, both in the EU as a whole and in each member country. This study has been focused on unpaid family care work. The proposed methodology to evaluate unpaid family care work has yielded a detailed account of the phenomenon, both at the EU-level and at the country level. This activity shows significant differences with respect to domestic work. One example is that domestic work decreases as the level of education increases, while child care work increases in all countries with the level of education. Although gender gaps are confirmed in all countries analysed, there are some significant differences in their dimensions and tendencies with respect to the level of education.

The review of the literature has shown that child care is mainly a task performed by women all over Europe. The evidence seems to suggest a negative relation between care activity and female participation in the labour market, the degree of which depends on the types of child care regimes available in their variegated forms in the individual countries. Even if there is no unique way of choosing the mix of care services and labour market policies, two measures are widely recognised to increase female participation to the labour market all over Europe: part-time contracts and child care services.

The literature review has also shown that elderly care too is predominantly the women's task. As to its relation to participation in the labour market, the results are rather mixed, also due to the fact that time dedicated to elderly care activity is much less than that dedicated to child care. As to the effect of different elderly care regimes, the only general result seems to be that formal and unpaid family care are not so easily substitutable, the latter being an effective substitute for formal care as long as the care needs of the elderly are low and require an unskilled type of care.

The review of the methods used to measure unpaid family care work has revealed that methods currently used for evaluation follow the "input approach". According to these methods, the value of care work is calculated by multiplying hours spent in caring activities by a wage rate imputed to the care giver. The most appropriate method seems to be that of the specialist market replacement, according to which hours spent in care are multiplied by the wage of a worker performing similar tasks in the market.

One of the main tasks of the study has been to devise a methodology to estimate a monetary value of unpaid domestic work and unpaid family care work at the EU level. The analysis has been done for the EU25 countries (except Malta), both for comparative reasons and to provide an indication of the value that unpaid domestic work has in each European economy. Several problems arise with regard to the available data. The main obstacle that had to be overcome was that the European harmonised income survey (EU-SILC) did not include time-use information, implying the necessity to integrate it with the European harmonised survey on the use of time (HETUS). As a consequence, some simplifying assumptions had to be made in order to obtain sensible estimates. It is for this reason that the value has been estimated following all available methods of the "input approach", in order to estimate a range of variation, more than a precise value. Another problem of these data sources has been that they do not contain information on unpaid family care of the elderly, which limits the analysis to child care work.

The results show that in the EU as a whole, the value of unpaid family care work ranges between a minimum of around 3 per cent to a maximum of around 6 per cent of GDP, depending on the applied methodology. These figures may appear large, but it is not surprising considering, as shown in the study, time devoted to child care is a significant portion of the total working time.

The analysis at European level also reports the value of unpaid family care work at a country level, thus showing the different contributions that family child care work would give to each economy if included in the national accounts. This contribution varies from the lowest values found for Latvia, the Czech Republic, Slovakia and Estonia (2 to 3 per cent) to the highest values found for Poland, Germany, Cyprus, the Netherlands and the United Kingdom (over 6 per cent).

The disaggregation by gender shows that the contribution of women to the value of unpaid family care work is large and in several countries it is more than two times the contribution of men. This is expected, since the average time women devote to childcare is two and a half times the time devoted by men. In this case the gender time gap is too large to be offset by the gender pay gap.

Looking at the role of each Member State, the results show that the larger an economy is, the bigger its contribution is to the overall EU values of unpaid domestic work and unpaid family care work. However, this is due to the combination of larger populations with higher salaries, and not due to a higher amount of time devoted to domestic activities in these countries.

The other important aim of the study has been to conduct the analysis on the original time use data for Italy and Poland. This has added detailed information on the specific activities of child care, and it has introduced elderly care into the analysis. The detailed description has allowed building up a more precise picture of unpaid family care work in these two countries as compared to the one obtained from the EU level analysis.

The comparison of the use of time in the two countries has shown that Italians participate somewhat less than Poles in child care, but substantially more in elderly care (around three times more). As to the distribution of time of people who perform these activities, there are no significant differences in time spent in primary child care for both males and females (around two hours a day on average for females and one hour for males). As to elderly care, Poles spend around forty percent less than Italians in this activity. However, the average time allocated to elderly care activities is much lower than child care in both countries.

Moreover, due to unavailability of data, the analysis at the EU level has not been able to take into account elderly care. Once elderly care is included, the value of family care would further increase by a substantial amount in Italy. It has been shown that this is not the case in Poland, for a number of reasons. The main one is that the weight of elderly care becomes more important in an ageing society, like the Italian. So, the estimated value of unpaid family elderly care may be representative of two similar regimes at different stages of ageing. This means that in perspective, all EU countries should place more attention on collecting data on elderly care, both paid and unpaid.

Both for Poland and Italy, the estimated values of unpaid family child care are somewhat less than those estimated at the EU level. It may be then concluded that the analysis at the EU level overestimates the total value of unpaid family child care in Poland and Italy.

However, assuming that estimates on micro data are more precise, the comparison with results obtained with the micro-data analysis has shown that the EU level estimated value of child care is not so far from the value obtained for the two countries studied, for Italy in particular. It might then be inferred, keeping in mind all limitations, that the EU level technique might be adopted with a certain degree of confidence.

The allocation of time is a structural phenomenon, exhibiting very slow changes. For this reason, even if the time use surveys employed in the estimation refer to different years across countries, it should not present a problem. The main element of variability is introduced by monetary values, like labour incomes. Using income surveys of the same year is, under this respect, fundamental for the country comparisons at a point in time, since many countries, like Poland, have experienced substantial economic growth rates, rapid changes in wages and in exchange rates, especially in the process of entering the EU.

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ANNEXES

A3 Annex to chapter 3

A3.1 Definitions of Non-Market Production in the National Accounts (EUROSTAT, 2003)

Household

The System of National Accounts defines a household as a small group of persons who share the same living accommodation, who pool some or all of their income and wealth and who consume certain types of goods and services collectively, mainly housing and food. The individual members of multi-person households are not treated as separate institutional units, because many assets are owned and liabilities incurred jointly. Moreover, many expenditure decisions, e.g. relating to the consumption of food or housing, may be made collectively. This is why the household must be treated as an institutional unit. A person living alone may also constitute a household.

Households may be of any size and they may assume a wide variety of different forms. Paid domestic employees who live on the same premises as their employer do not form part of their employer's household even though they may be provided with accommodation and meals as remuneration in kind.

Household sector

In national accounts the household sector consists of all resident households. These include institutional households made up of persons living in hospitals, retirement homes, convents, prisons, etc. for long periods of time. Institutional households may cause problems in the household satellite accounts, because data on their productive activities are not usually available. Therefore, for practical reasons, it is proposed not to cover institutional households in the household satellite accounts. This will not cause a serious bias in the results because the amount of household production or voluntary work done in these institutions is unlikely to be significant. (Schäfer and Schwarz 1994).

Household production

Household production can be measured using physical units such as time used for productive activities, or number and type of goods and services produced, or it can be measured by imputing monetary values to services produced. It is possible to go further and produce a full sequence of accounts where household production is integrated with the market production. An option may be chosen according to the purposes of the satellite account.

Physical data in the household satellite accounts system

Key elements of household non-market production (output, labour input) can only be observed in physical units, because there are no underlying market transactions to provide monetary value. This means that the first step has to be a measurement in physical terms even if eventually monetary valuation is intended. Measurement of output in physical terms must necessarily be based on a variety of measurement units: for example, the number of meals prepared, transportation distance, the volume of the laundry, and the work time a

service is provided (e.g. hours of childcare). However, these measures are not commensurable. The labour input, on the other hand, is measured mostly by the work time. For the other inputs to the production process (e.g. intermediate consumption, fixed capital) measurement in physical units is not common but is, in most cases, feasible.

A3.2 Harmonised European Time Use Surveys (HETUS)

At the European level, EUROSTAT (2000, 2009) has proposed guidelines for the harmonisation of time use surveys. The purpose of the guidelines is to provide a solid methodological basis for countries intending to carry out time use surveys, which will ensure that the results are comparable between countries and therefore greatly increase the value of the data obtained. The chosen harmonisation approach is a mix of input and output harmonisation. On the input side, a diary format, some procedures for the data collection and a common activity coding list are strongly recommended. The time diary is self-administered with fixed 10-15 minute intervals to be filled in during randomly designated diary days. The respondents record the activities in their own words. Furthermore, a set of common questions are recommended for the interview questionnaires to make possible the breakdown of the national populations into the same domains for analysis of time use. Table A3.1 summarises the main information present in the data base.

Table A3.1 Summarised Information on National Time Use Surveys included in the HETUS database

	<i>Fieldwork period</i>	<i>Age of population covered</i>	<i>Sample size (Number of respondents)</i>	<i>Size of population in 1000</i>	<i>Comments</i>
Belgium (BE) Statistics Belgium and Vrije Universiteit Brussel	January 2005 till January 2006 (the first week)	12 -	12824	8800	
Bulgaria (BG)	October 15 2001 - October 15 2002	7 -	7603	19010	
Estonia (EE) Statistical Office of Estonia	April 1999 - March 2000	10 -	5728	1290	
Finland (FI) Statistics Finland	March 1999 - March 2000	10 -	5332	4451	
France (FR) INSEE	February 1998 - February 1999 except 4-18 August and 21 December - 4 January	15 -	15441	47231	One diary day
Germany (DE) Federal Statistical Office Germany	April 2001 - end of March 2002 (May2002)	10 -	12655	73641	2 weekdays-one weekend day.
Italy (IT) Istituto Nazionale di Statistica	April 2002 - March 2003	3 -	55760	56805	One day was surveyed.
Latvia (LV) Central Statistical Bureau of Latvia	February - August 2003 October - November 2003	10 -	3804	2115	
Lithuania (LT) Statistics Lithuania	January-December 2003	10 -	4768	3454	
Norway (NO) Statistics Norway	February 2000 - February 2001	9 -	793211	3674	Two consecutive days
Poland (PL) Central Statistical Office	1.06.2003-31.05.2004	15 -	20264	30904	
Slovenia (SI) Statistical Office of the Republic of Slovenia	April 2000 - March 2001	10 -	6190	1990	
Spain (ES) Instituto Nacional de Estadística	October 2002 - September 2003	10 -	46774	37636	One day was surveyed.
Sweden (SE) Statistics Sweden	October 2000 - September 2001	20 - 84	3998	6538	
United Kingdom (UK) – Office for National Statistics	June 2000 - September 2001	8 -	10366	53016	

Source: <https://www.testh2.scb.se/tus/tus/doc/Metadata.pdf>, Statistics Finland, 2009

A3.3 ECHP and EU SILC

The European Community Household Panel (ECHP) was a multiple-purpose panel survey coordinated and funded by Eurostat. Individuals were interviewed each year on a wide range of topics concerning living conditions. The survey also included a range of information relevant for the research such as detailed information on individuals' and households' characteristics, working life, income and financial situation.

The ECHP covered totally eight waves from 1994 to 2001 however some countries joined the survey later than 1994. The advantage of the ECHP was that it was strictly comparable among European countries. In addition the ECHP was a longitudinal survey enabling research to follow the same household over time.

The European Survey of Income and Living Conditions (EU-SILC), was started in 1999 since, the European Directors of Social Statistics decided to replace, after 2002, the ECHP. The EU-SILC is an instrument anchored in the European Statistical System with the scope to collect comparable cross-sectional and longitudinal multidimensional micro-data on income, poverty, social exclusion and living conditions. It aims to provide cross-sectional data as well as longitudinal data. Both include variables on income, poverty, social exclusion and other living conditions. Some of these variables are collected at individual level for those individuals aged 16 and over (i.e. variables on work, education, and health), while others (i.e. social exclusion and housing condition information) are collected at household level.

The EU-SILC was launched in 2004 in 13 Member States (BE, DK, EE, EL, ES, FR, IE, IT, LU, AT, PT, FI and SE). EU-SILC reached its full scale extension with the 25 Member States in 2005. Later it was completed by TR, RO, BG and CH.

A4 Annex to Chapter 4

The following sections provide some details regarding the data preparation and estimation techniques used in Chapter 4. For the sake of clarity, several parts of the main text are reported also here. The following sections complement the information of the main text in order to put the reader in the conditions to properly replicate the results presented in Chapter 4.

A4.1 Data matching

EU-SILC 2006 is a European household survey for 24 EU member States⁵⁰ plus Norway and Iceland, which are not included in the study. The dataset is rich in information on several household and individual variables, such as work status and characteristics, income, taxes and benefits, family composition, health and education. EU-SILC, on the other hand, does not collect information on the use of time. Using this survey alone, the task of assigning a value to unpaid domestic work without information on time spent in unpaid family activities is possible, but extremely imprecise. In fact, one should assume arbitrary values for non-work activities, with the actual risk of strongly overestimating or underestimating the time dedicated to domestic activities, and hence its value⁵¹. Moreover, EU-SILC is still in a preliminary version. This means that not all variables are recorded in all countries and even when this is the case, the information contained may not be exactly the same for all

⁵⁰ Malta is not included in EU-SILC 2006.

⁵¹ For example, if it is observed that one individual in EU-SILC works 42 hours per week, one can assume that on average he works 6 hours per day (for 7 days) and that he sleeps 7 hours per day. The remaining 11 hours should be assigned arbitrarily between leisure and unpaid family work and hence will strongly depend on the choice made.

countries. This is taken into account in the analysis signalling when the information differs for some countries, as in the case of gross and net wages.

On the other hand, HETUS does not contain detailed information on wages and incomes, but, being a collection of harmonised time use surveys, it provides exactly the information which is missing in EU-SILC. Hence, it is necessary to provide a method for combining the information of the two sources.

As reported in Chapter 4 (p. 49), HETUS is not accessible in the form of micro-data and covers only a part of the countries present in EU-SILC, implying a four steps strategy, which is recalled here:

- 1) Use the labour time information present in EU-SILC to compute non-market work time for each person;
- 2) Calculate (by country, gender and other personal characteristics) from HETUS the average shares of non-market work time spent in domestic work, childcare work, leisure and other activities⁵²;
- 3) Impute the non-market work time shares to EU-SILC, including the countries not present in HETUS;
- 4) Calculate time devoted to each activity multiplying HETUS shares by the non-market work time of each person in EU-SILC according to country, gender and personal characteristics.

Each of these steps is described below.

1) Computing non-market work time for each person in EU-SILC

This step is straightforward since EU-SILC collects the information of the weekly hours of work in the labour market for each person. These hours are subtracted from the total hours of a week ($24 \times 7 = 168$) and divided by 7, in order to have the average hours not devoted to market work for each day. For practical reasons, this value is transposed in minutes since HETUS tables report the average minutes per day that a person dedicates to each activity.

2) Calculating shares of activities from HETUS

This step is also straightforward. First it is necessary to calculate the amount of non-market work time in HETUS as well. This is simple, since the time use survey records the time spent in each activity, including time spent market work⁵³. Then the shares of other activities defined in table A.4.1 are calculated (with respect to non-market work time).

⁵² The detailed composition of each time-use category is reported Table A.4.1.

⁵³ We do not include the time spent in travelling to work, because it would not be consistent with EU-SILC definition of market work time.

Table A.4.1 Construction of time-use categories

Domestic work:	Food preparation; Dish washing; Cleaning dwelling; Other household upkeep; Laundry; Ironing; Handicraft; Gardening; Tending domestic animals; Caring for pets; Walking the dog; Construction and repairs; Shopping and services; Other domestic work; Travel related to shopping; Other domestic travel.
Childcare:	Physical care, supervision of child; Teaching, reading, talking with child; Transporting a child.
Leisure:	Organisational work; Informal help to other households; Participatory activities; Visits and feasts; Other social life; Entertainment and culture; Resting; Walking and hiking; Other sports, outdoor activities; Computer and video games; Other computing; Other hobbies and games; Reading books; Other reading; TV and video; Radio and music; Unspecified leisure; Travel related to leisure.
Other activities:	Sleep; Eating; Other personal care; Main and second job; Activities related to employment; School and university; Homework; Freetime study; Travel to/from work; Travel related to study; Unspecified travel; Unspecified time use.

Source: HETUS

3) Imputing HETUS time shares to EU-SILC

These shares computed in step 2) are the variables which are actually matched into EU-SILC. The multiplication of these shares for the non-work time of each individual generates the actual amount of time devoted by each individuals of EU-SILC⁵⁴ into domestic work, childcare, leisure and other activities. The matching is performed over average shares of time use categories defined by country, gender and life-cycle (an intuitive example of this procedure is already reported in Chapter 4, p. 50).

As already mentioned, HETUS collects time use information only for some of the countries in EU-SILC. For those countries for which time use information is not available, the values of time use shares are imputed using a set of individual, household and environmental characteristics. The choice is to use a large set of predictors in order to catch, at least in part, also country specific behaviours. This may seem a difficult result to achieve, but it should be noted that even though it is true that member states have very peculiar characteristics, the observed variability of the average share of time spent in domestic and child care activities between counties is much lower than, for example, the observed variability in wages. Hence, personal characteristics turn out to be much more important than country specific characteristics in determining time-use behaviour of the individuals. For this reason the imputation of time use information to the countries not covered by HETUS is conducted using a simple regression technique on the natural logarithm of time use shares⁵⁵ previously imputed for the countries present in both datasets.

⁵⁴ Since HETUS provides information for people aged 20-74 only, the same condition has been applied to EU-SILC.

⁵⁵ The choice to use logarithms is driven by the preference for a predictive method which avoids negative predicted shares and at the same time improves the goodness of fit of the regression.

5) Calculating time spent in each time-use category for each person in EU-SILC

This is simply done by multiplying non-market work time calculate in step 1) by the shared of domestic work, child care, leisure and other activities calculated and imputed according to steps 2) and 3).

The results of the imputation, i.e. the average values of time spent in domestic work, child care, leisure and other activities before and after imputation are reported in Table A.4.2.

Table A.4.2 Observed and imputed time use categories in the EU (minutes per day)

Time use activity	Observed	Imputed
Domestic work	200.7	198.1
Childcare	25.9	26.0
Leisure	323.4	322.2
Other Activities	714.4	714.4

Source: HETUS

The opportunity cost and the market replacement approaches are then used as evaluation strategies for computing the values of unpaid domestic work and unpaid family care work for all European countries using these imputed time-use categories.

A4.2 Computing wages to be used with the opportunity cost approach

The opportunity cost approach relies on the assumption that each hour devoted to domestic activities could be productively employed in the labour market. Such a hypothesis implies that each hour devoted to domestic activities should be evaluated at the (potential) wage of the individual involved in domestic activities. This implicitly defines the set of individuals that should be taken into account, namely, the potential and actual workers. In fact inactive people, by definition, could not actually work, and hence their unpaid domestic work is not taken into account. However, for the aims of the work, also housewives, which are usually accounted as inactive population in official statistics, are included in the sample of potential workers.

The evaluation of unpaid domestic work and unpaid family care work for actual workers presents no particular difficulties since wages are actually observed in the data. However, some difficulties arise from the incomplete harmonisation of income data between countries. In EU-SILC, some countries record only gross yearly wages, others record only net wages and others both of them⁵⁶. We have chosen to use gross wages whenever available and net wages as a proxy for gross wages when these last are not available, i.e. for Greece, Italy, Latvia and Portugal. This could lead to an underestimation of the values of unpaid family care work and unpaid family care work for these countries, but the overall effect should be small.

For potential workers two further problems arise, namely, the identification of the set itself and the estimation of the potential wage to be attached to any potential worker. Potential workers are defined as all non working individuals older than 20 and younger than 65 who have no health limitation, are not in education and self-report as being unemployed or fulfilling domestic tasks. With this definition, potential workers are 30 millions in the EU, while workers for which a salary is actually observed in the data are 158 millions, with a corresponding adult (20-74 years old) population of 326 millions.

⁵⁶ Such a problem should not be present starting from the 2007 wave of EU-SILC, which at the time of writing is not yet available.

The wage estimation for potential workers is conducted using a Heckman Selection model (Heckman, 1979), separately for men and women. The model takes into account that potential workers may have on average different characteristics from the workers, which represent a “selected” group estimating two equations. The first equation determines the probability to participate to the labour market according to a set of individual, household and environmental characteristics. The second equation estimates the wage level given the probability to participate to the labour market, hence correcting for the possible estimation bias⁵⁷.

To improve the estimation of potential wages, the procedure is applied to the natural logarithm of hourly wages. This choice largely improves the fitting power of the estimates and allows avoiding by construction negative predicted salaries⁵⁸. Among the variables used as predictors in the Heckman Selection model we have included: country and region of living, birth outside EU, achieved education level, health status, age, family size, being married, presence of children of various age, presence of parents living in the household, ownership of car, ownership of a pc, some economic difficulty indicators, dwelling characteristics, living in rural or urban area, paying a mortgage, and so on (the details, as well as the estimated coefficient are reported in section A4.6).

Once estimated the Heckman Selection model, it is possible to predict an hourly wage for all potential workers. While the distribution of predicted wages closely follows that of the observed ones for men, except for a slight shift toward smaller values which is expected, for women the difference is larger. This is due to the fact that the sample of potential workers includes people “fulfilling domestic tasks”, mostly women, which are usually considered as non active population. Beside the fact that they may not be actually searching for a job, according to our definitions and objectives, they could well be part of the hypothetical labour force.

Table A4.3 shows observed and imputed wages for man and women in each country. These values are close and the depicted distributions are sensible, hence we use the predicted salaries for evaluation of unpaid domestic work and unpaid family care work with the opportunity cost approach.

A4.3 Computing wages to be used with the generalist market replacement approach

The generalist market replacement approach aims at assigning a generalist domestic worker wage to each hour of unpaid domestic work. This approach has two practical implications: the first is that the total population should be included in the analysis, not only workers and potential workers as in the opportunity cost case, but also retired people⁵⁹; the second is that the reference salary is exogenously assigned independently of the specific characteristics of households and individuals. The larger reference population used in the market replacement approach leads to expect larger values of unpaid domestic work and unpaid family care work respect to the opportunity cost⁶⁰.

⁵⁷ See Section A.4.6 for further details.

⁵⁸ The predicted hourly wage are calculated as the exponential of the predicted logarithms of wage and the result of an exponential function is always positive.

⁵⁹ Obviously, it is not correct to assign an opportunity cost to retired people, since they could not choose to go to the labour market anyway. Moreover, it is likely that the estimation of their potential salaries would be biased, since for those people there are no observations of workers. This would lead to a complete selection of the sub-sample which would probably not be completely corrected by the Heckman procedure.

⁶⁰ In the literature concerning the comparison between the two approaches it turns out that the opportunity cost value of unpaid work is bigger than the market replacement value (because the average opportunity cost is generally higher than the “domestic worker” wage used as general wage to apply to domestic work). This is so because the reference population performing these works is, for comparative purposes, the same.

Table A4.3 Observed and imputed salaries by country and gender

Country code	Men		Women		Country code	Men		Women	
	Obs.	Imp.	Obs.	Imp.		Obs.	Imp.	Obs.	Imp.
BE	19.57	19.61	18.41	18.27	LT	2.66	2.64	2.42	2.39
CZ	3.96	3.94	3.1	3.1	LU	26.62	26.59	22.74	22.55
DK	24.44	24.56	22.47	22.71	HU	3.52	3.48	3.18	3.13
DE	18.78	18.79	15.54	15.47	NL	22.69	22.76	17.62	17.7
EE	3.72	3.71	2.8	2.8	AT	17.14	17.17	14	13.99
IE	20.59	20.49	18.52	17.8	PL	3.54	3.48	3.48	3.33
EL*	7.95	7.99	7.39	7.05	PT*	5.62	5.66	5.21	5.08
ES	10.7	10.71	9.62	9.31	SI	8.05	8.07	7.77	7.76
FR	15.12	15.19	14.01	13.9	SK	2.6	2.59	2.19	2.19
IT*	10.45	10.44	10.41	10.01	FI	18.62	18.62	15.86	15.94
CY	11.53	11.56	9.074	8.88	SE	17.59	17.61	14.96	14.98
LV*	2.03	2.03	1.57	1.55	UK	20.57	20.48	16.98	16.72

* Indicates countries which report only net wages

Source: EU-SILC

In principle the use of an exogenous generalist domestic work wage is not an issue at a national level, but EU-SILC, for its own nature, collects data from countries which have very different levels of welfare, labour markets and public policies. This implies that it would be completely meaningless to use the same wage value for all EU countries. Our chosen strategy is to compute a country average wage for domestic workers for men and women, hence maintaining gender and country heterogeneity naturally observed in the data. The chosen wage of a generalist domestic worker is the ISCO-88 occupation code 91 (Sales and services elementary occupation), which include, among other similar workers, the category "Domestic and related helpers, cleaners and launderers".

Table A.4.4 resumes the values (in €/h) of the generalist domestic worker wage for each country and gender as observed in EU-SILC. These are indeed the values used to compute each evaluation when using the market replacement approach.

The values are computed as weighted average salaries selecting population with ISCO code 91 by country and gender.

Table A4.4 Average domestic worker salaries by country and gender (€/h, 2006)

Country code	Men	Country code	Men
BE	14.4	LT	1.5
CZ	2.1	LU	12.0
DK	20.1	HU	2.3
DE	12.7	NL	13.8
EE	1.6	AT	10.5
IE	11.5	PL	2.1
EL*	5.0	PT*	3.5
ES	7.2	SI	5.1
FR	10.3	SK	1.7
IT*	8.0	FI	12.6
CY	5.0	SE	11.7
LV*	0.9	UK	12.0

* Indicates countries which report only net wages

Source: EU-SILC

A4.4 Computing wages for the specialist market replacement approach

The detailed information about time use categories present in HETUS allows to deepen the analysis of the market replacement approach. In fact, rather than considering the wage of a generalist domestic worker to be assigned to the value of unpaid family care work, it is possible to assign to each activity related to child care a specific wage⁶¹. To this regard, HETUS collects information on the following child care activities: Physical care, supervision of child; Teaching, reading, talking with child; Transporting a child. For each of these three categories of child care activities EU-SILC collects ISCO-88 codes of occupation classification. For each of these three categories of childcare activities EU-SILC collects ISCO-88 codes of occupation classification. In particular, the chosen codes are 51 (Personal and protective services workers) for Physical care, supervision of a child; 23 (Teaching professionals) for Teaching, reading, talking with a child⁶²; 83 (Drivers and mobile plant operators) for Transporting a child. The observed and imputed time devoted to disaggregated child care activities are presented in Table A4.5.

Table A4.5 Observed and imputed child care categories (minutes per day)

Time use activity	Observed	Imputed
Physical Care	13.74	13.73
Teaching	8.11	8.52
Transporting	3.97	4.34

Source: HETUS

⁶¹ Instead, for unpaid domestic work, HETUS detailed information is indeed available (as time devoted to ironing, washing, cleaning the house and so on) but it would not match with any occupational ISCO-88 code other than 91.

⁶² An alternative could have been code 33 (Teaching assistant professionals). This code would avoid including university professors which may overestimate the average parent teaching ability, but code 33 has too few observations in the data and produces poor country/gender averages, so much that for Greek and Irish men there are no observations.

Table A4.6 reports country and gender specific average wages used to compute the value of unpaid family care work with the specialist market replacement approach.

Table A4.6: Hourly wages related to specialised childcare activities (€/h, 2006)

Country	Physical		Teaching		Transport	
	male	female	male	Female	male	female
BE	16.60	15.64	24.06	22.64	16.34	14.23
CZ	3.38	2.28	5.18	4.08	3.18	2.78
DK	22.55	19.71	28.26	25.56	21.19	15.69
DE	18.40	12.64	28.99	27.77	17.19	10.72
EE	2.61	1.91	4.25	3.48	3.14	2.38
IE	17.20	13.98	38.52	34.29	15.47	16.34
EL*	6.92	5.16	14.95	12.92	7.31	2.04
ES	9.86	7.70	19.50	17.10	9.17	6.42
FR	13.50	11.51	21.67	20.34	12.00	10.25
IT*	9.58	7.67	17.20	16.95	9.14	9.43
CY	9.49	7.05	22.27	19.88	9.53	5.13
LV*	1.65	1.07	4.25	2.29	1.59	1.62
LT	2.32	1.59	3.93	3.39	2.24	2.65
LU	16.85	13.26	50.70	40.90	16.62	17.41
HU	3.01	2.33	5.19	4.29	2.77	2.89
NL	19.83	14.55	28.82	22.78	17.73	11.32
AT	16.13	12.98	25.29	24.11	14.31	6.93
PL	2.58	2.06	6.58	6.00	2.69	2.87
PT*	5.13	3.31	12.11	13.05	4.23	1.37
SI	6.16	5.32	14.25	11.99	5.82	4.20
SK	2.15	1.65	3.16	2.69	2.26	1.72
FI	14.14	13.21	23.53	19.88	13.45	12.76
SE	15.19	12.73	16.88	15.01	14.37	11.67
UK	16.97	12.21	24.32	23.56	15.09	15.87

* Indicates countries which report only net wages

Source: EU-SILC

A4.5 Computing wages for outsourced child care estimation

Finally, the value of childcare which is outsourced to other family members (e.g. grandparents) is calculated. The estimation of outsourced childcare is performed using the EU-SILC information on time spent by children in child care by grand-parents and other household members and multiplying it by the average country wage of a personal-care worker (ISCO-88 code 51). Table A4.7 shows the country average time spent in outsourced childcare⁶³.

63 EU-SILC has a detailed section on hours of child care spent by children in different types of formal and informal care. Therefore, it is possible to isolate the hours of child care spent by each child with relative or friends living outside the household. These hours are most likely supplied by grandparents.

Table A4.7: Average time spent by a child in outsourced child care (minutes per day) and specialist wage (€/h, 2006)

Country	Time	Wage	Country	Time	Wage
BE	2.75	15.85	LT	3.54	1.79
CZ	2.14	2.76	LU	3.44	14.91
DK	0.06	20.25	HU	7.23	2.6
DE	0.14	13.79	NL	3.66	15.86
EE	3.44	2.01	AT	2.56	14.06
IE	3.43	14.95	PL	6.52	2.26
EL*	7.64	6.08	PT*	5.12	3.87
ES	2.42	8.57	SI	7.42	5.65
FR	3.04	11.93	SK	3.67	1.87
IT*	4.68	8.56	FI	0.59	13.23
CY	9.41	8.36	SE	0.18	12.87
LV*	2.1	1.21	UK	4.23	13.3

* Indicates countries which report only net wages

Source: EU-SILC

This caring activity is provided mostly by inactive people, hence, the estimated value of outsourced child care should be added only if unpaid work is estimated using the opportunity approach. In fact, with the market replacement approach inactive persons are already taken into account and would be counted twice.

The time devoted to outsourced child care activities and the reference wages used to compute the value are presented in Table A.4.6.

A.4.6 Wage estimation for potential workers

In order to estimate the values of unpaid domestic work and unpaid family care work with the cost opportunity approach it is necessary to estimate potential hourly wages for potential workers. To predict these potential salaries Heckman Selection model is used. This model allows the researcher to correct for selection bias. Selection bias is a distortion of evidence or data that arises from the way that the data are collected. Sample selection may involve pre- or post-selecting the samples that may preferentially include or exclude certain kinds of results.

This is exactly the case of wages estimation. In fact, wages are observed only for workers, not for potential workers, and these two groups are not randomly composed. Their composition is likely to be determined by some individual characteristics. For example, highly educated people are generally more unlikely to be unemployed. Since people who choose to work are selected non-randomly from the population, estimating the determinants of wages from the subpopulation that chooses to work may introduce bias.

The Heckman Correction is a two-steps estimation technique in which in the first step the probability of working is estimated through a standard probit regression, as

$$\text{Prob}(D = 1|Z) = \Phi(Z\gamma),$$

where D indicates employment ($D = 1$ if the respondent is employed and $D = 0$ otherwise), Z is a vector of explanatory variables, γ is a vector of unknown parameters, and Φ is the

cumulative distribution function of the standard normal distribution. Estimation of the model yields results that can be used to predict this probability for each individual.

The second stage corrects for self-selection by incorporating a transformation of these predicted individual probabilities as an additional explanatory variable. The wage equation is then specified as

$$w^* = X\beta + \rho\sigma_u\lambda(z\gamma)$$

where ρ is the correlation between unobserved determinants of propensity to work and unobserved determinants of wage offers u , σ_u is the standard deviation of u and λ is the inverse Mills ratio evaluated at $z\gamma$. The wage equation can be estimated by replacing γ with probit estimates from the first stage, constructing the λ term, and including it as an additional explanatory variable in linear regression estimation of the wage equation. Since $\sigma_u > 0$, the coefficient on λ can only be zero if $\rho = 0$, so testing the null that the coefficient on λ is zero is equivalent to testing for sample selectivity.

In the present study, two separate wage equation for men and women are estimated. Observed wages have been replaced by their natural logarithm and the variables used in selection (Z) and wage (X) equations are reported in Table A.4.8 and Table A.4.9 respectively.

The descriptive statistics of the used variables are reported in Table A.4.10 and Table A.4.11, while the estimated parameters for both selection and wage equations for men and women are reported in Table A.4.12, Table A.4.13, Table A.4.14 and Table A.4.15.

The estimates for men include 101918 observations, of which 6934 censored. The sample selection Wald test ($\rho = 0$) reports a $\chi^2(1)$ statistic of 118.35, with a p-value of 0.0000. For women there are 109202 observations, of which 23314 censored. The sample selection test reports a $\chi^2(1)$ value of 7.92, with a p-value of 0.0049. Hence, for both men and women sample selection is confirmed to take place.

The analysis of the results of estimations is beyond the scope of the present work, since the wage estimation is instrumental to the use of the cost opportunity approach. Hence, they are not further commented.

Table A4.8: Variables of the selection equation of the HS model (Z)

variable name	variable description
country_n	country code (included as a series of dummies)
extra_c	Born outside the EU
pe040	Highest ISCED level attained
ph010	General health (included as a series of dummies)
ph020	Suffer from any a chronic (long-standing) illness or condition
hx040	Household size
rx010	Age at the date of interview (scaled)
hs090	Do you have a computer? (included as a series of dummies)
hs100	Do you have a washing machine? (included as a series of dummies)
hs110	Do you have a car? (included as a series of dummies)
hh010	Dwelling type (included as a series of dummies)
hh020	Tenure status (included as a series of dummies)
hh030	Number of rooms available to the household
hh040	Leaking roof, damp walls/floors/foundation, or rot in window frames or floor
child3	Presence of children up to 3 years old
child46	Presence of children from 4 to 6 years old
child717	Presence of children from 7 to 17 years old
couple	Living in a couple
parents	Living with parents
urban	Living in an densely populated area
rural	Living in a scarcely populated area
age_sq	Age squared
rent_inc	Receiving incomes from rents
child_all	Receiving child allowances
mortgage	Paying a mortgage
hs130	Lowest monthly income to make ends meet (normalized by country averages)

Source: EU-SILC

Table A4.9 Variables of the wage equation of the HS model (X)

variable name	variable description
region	region (included as a series of dummies)
extra_c	Born outside the EU
pe040	Highest ISCED level attained
ph010	General health (included as a series of dummies)
hs110	Do you have a car? (included as a series of dummies)
rx010	Age at the date of interview (scaled)
child46	Presence of children up to 3 years old
child3	Presence of children from 4 to 6 years old
child717	Presence of children from 7 to 17 years old
couple	Living in a couple
parents	Living with parents
urban	Living in an densely populated area
rural	Living in a scarcely populated area
age_sq	Age squared
ph020	Suffer from any a chronic (long-standing) illness or condition
hx040	Household size
rent_inc	Receiving incomes from rents
child_all	Receiving child allowances
soc_excl	Dummy for social exclusion condition
house_all	Receiving housing allowances
mortgage	Paying a mortgage
hs130	Lowest monthly income to make ends meet (normalized by country averages)

Source: EU-SILC

Table A4.10 Descriptive statistics for Z variables (for the UE)

Variable	Mean	Std.	Min	Max
country n	13.9461	7.3425	1	26
extra c	0.0619	0.2410	0	1
pe040	3.0403	1.2715	0	5
ph010	2.3755	0.9155	1	5
ph020	0.2452	0.4302	0	1
hx040	3.1660	1.4289	1	16
rx010	4.5831	1.4879	2	7.4
hs090	1.5779	0.8501	1	3
hs100	1.0473	0.2833	1	3
hs110	1.2653	0.6100	1	3
hh010	2.1488	1.2362	0	4
hh020	1.4043	0.8476	1	4
hh030	3.9547	1.4066	1	6
hh040	0.1878	0.3906	0	1
child3	0.1037	0.3049	0	1
child46	0.0591	0.2358	0	1
child717	0.2169	0.4121	0	1
couple	0.6713	0.4697	0	1
parents	0.1661	0.3722	0	1
urban	0.3591	0.4797	0	1
rural	0.3293	0.4700	0	1
age sa	2.3218	1.3901	0.4	5.4
rent inc	0.0589	0.2355	0	1
child all	0.3690	0.4825	0	1
mortgage	0.1978	0.3983	0	1
hs130	1.0000	2.4129	0.0001	814.3

Source: EU-SILC

Table A4.11 Descriptive statistics for X variables (for the UE)

Variable	Mean	Std.	Min	Max
region	63.0735	31.8780	1	98
extra c	0.0619	0.2410	0	1
pe040	3.0403	1.2715	0	5
ph010	2.3755	0.9155	1	5
hs110	1.2653	0.6100	1	3
rx010	4.5831	1.4879	2	7.4
child36	0.0591	0.2358	0	1
child3	0.1037	0.3049	0	1
child717	0.2169	0.4121	0	1
couple	0.6713	0.4697	0	1
parents	0.1661	0.3722	0	1
urban	0.3591	0.4797	0	1
rural	0.3293	0.4700	0	1
age sa	2.3218	1.3901	0.4	5.5
ph020	0.2452	0.4302	0	1
hx040	3.1660	1.4289	1	16
rent inc	0.0589	0.2355	0	1
child all	0.3690	0.4825	0	1
soc excl	0.0493	0.2165	0	1
house all	0.0586	0.2348	0	1
mortgage	0.1978	0.3983	0	1
hs130	1.0000	2.4129	0.0001	814.3

Source: EU-SILC

Table A4.12 Men selection equation estimates (for the UE)

Variable	Coefficie	Std. Err.	z	P>z	[95% Conf. Interval]	
Icountry	-0.3093	0.0687	-4.5000	0.0000	-0.4439	-0.1746
Icountry	0.2277	0.0815	2.7900	0.0050	0.0679	0.3875
Icountry	0.0414	0.0700	0.5900	0.5540	-0.0958	0.1786
Icountry	-0.2657	0.0628	-4.2300	0.0000	-0.3889	-0.1426
Icountry	0.2184	0.1040	2.1000	0.0360	0.0146	0.4221
Icountry	-0.0089	0.0754	-0.1200	0.9060	-0.1567	0.1389
Icountry	-0.1998	0.0682	-2.9300	0.0030	-0.3334	-0.0662
Icountry	-0.0262	0.0751	-0.3500	0.7270	-0.1734	0.1209
Icountry	-0.2870	0.0655	-4.3800	0.0000	-0.4155	-0.1586
Icountry	-0.0961	0.0719	-1.3400	0.1810	-0.2369	0.0447
Icountry	0.0117	0.0680	0.1700	0.8640	-0.1217	0.1450
Icountry	-0.2355	0.0787	-2.9900	0.0030	-0.3898	-0.0812
Icountry	0.7234	0.1486	4.8700	0.0000	0.4322	1.0146
Icountry	-0.2371	0.0601	-3.9500	0.0000	-0.3548	-0.1194
Icountry	-0.0918	0.0799	-1.1500	0.2510	-0.2485	0.0649
Icountry	0.2645	0.0830	3.1900	0.0010	0.1019	0.4271
Icountry	0.2682	0.0783	3.4300	0.0010	0.1148	0.4216
Icountry	0.0655	0.0968	0.6800	0.4990	-0.1242	0.2551
Icountry	0.2663	0.1002	2.6600	0.0080	0.0699	0.4626
Icountry	-0.2138	0.0636	-3.3600	0.0010	-0.3384	-0.0892
Icountry	-0.0749	0.0747	-1.0000	0.3160	-0.2213	0.0716
Icountry	0.1932	0.0801	2.4100	0.0160	0.0361	0.3503
Icountry	0.1966	0.0715	2.7500	0.0060	0.0564	0.3367
Icountry	0.0256	0.0672	0.3800	0.7030	-0.1061	0.1573
Icountry	-0.0087	0.0694	-0.1300	0.9000	-0.1448	0.1274
extra c	-0.0306	0.0516	-0.5900	0.5530	-0.1318	0.0706
pe040	0.0719	0.0102	7.0700	0.0000	0.0520	0.0918
Iph010	-0.0148	0.0270	-0.5500	0.5830	-0.0678	0.0382
Iph010	0.1182	0.0342	3.4500	0.0010	0.0511	0.1852
Iph010	0.2006	0.0765	2.6200	0.0090	0.0507	0.3506
Iph010	0.0659	0.2285	0.2900	0.7730	-0.3820	0.5138
ph020	0.0983	0.0333	2.9500	0.0030	0.0330	0.1636
hx040	-0.0743	0.0111	-6.7000	0.0000	-0.0960	-0.0526
rx010	0.3424	0.0663	5.1700	0.0000	0.2125	0.4723
Ihs090	-0.4173	0.0320	-13.0400	0.0000	-0.4801	-0.3546
Ihs090	-0.1082	0.0299	-3.6100	0.0000	-0.1669	-0.0495
Ihs100	-0.1964	0.0813	-2.4200	0.0160	-0.3557	-0.0371
Ihs100	-0.1065	0.0694	-1.5300	0.1250	-0.2425	0.0295
Ihs110	-0.4751	0.0357	-13.2900	0.0000	-0.5451	-0.4050
Ihs110	-0.2897	0.0389	-7.4500	0.0000	-0.3659	-0.2135
Ihh010	-0.1451	0.0869	-1.6700	0.0950	-0.3154	0.0251
Ihh010	-0.0793	0.0882	-0.9000	0.3680	-0.2522	0.0935
Ihh010	-0.1292	0.0873	-1.4800	0.1390	-0.3003	0.0419
Ihh010	-0.1206	0.0873	-1.3800	0.1670	-0.2916	0.0505
Ihh020	-0.1204	0.0348	-3.4600	0.0010	-0.1886	-0.0522
Ihh020	-0.3869	0.0424	-9.1200	0.0000	-0.4701	-0.3038
Ihh020	-0.0955	0.0364	-2.6200	0.0090	-0.1668	-0.0242
hh030	0.0436	0.0113	3.8400	0.0000	0.0214	0.0658
hh040	-0.1081	0.0259	-4.1800	0.0000	-0.1588	-0.0574
child3	-0.0250	0.0436	-0.5700	0.5660	-0.1105	0.0605
child36	-0.0671	0.0490	-1.3700	0.1710	-0.1630	0.0289
child717	-0.0535	0.0348	-1.5400	0.1240	-0.1217	0.0146
couple	0.2654	0.0361	7.3600	0.0000	0.1947	0.3361
parents	-0.3631	0.0438	-8.3000	0.0000	-0.4489	-0.2774
urban	-0.0521	0.0276	-1.8900	0.0590	-0.1062	0.0021
rural	-0.0895	0.0303	-2.9500	0.0030	-0.1489	-0.0300
age sq	-0.5537	0.0778	-7.1100	0.0000	-0.7063	-0.4011
rent inc	-0.0342	0.0501	-0.6800	0.4950	-0.1324	0.0640

child all	-0.0062	0.0306	-0.2000	0.8390	-0.0662	0.0538
mortgage	0.1499	0.0400	3.7400	0.0000	0.0714	0.2283
hs130	0.4431	0.0333	13.2900	0.0000	0.3777	0.5084
cons	0.9020	0.1754	5.1400	0.0000	0.5582	1.2458
/athrho	-0.3596	0.0331	-10.8800	0.0000	-0.4243	-0.2948
/Insigma	-0.7531	0.0059	-	0.0000	-0.7646	-0.7417
rho	-0.3448	0.0291			-0.4006	-0.2865
sigma	0.4709	0.0028			0.4655	0.4763
lambda	-0.1624	0.0139			-0.1896	-0.1351

Table A4.13 Men wage equation estimates (for the UE)

Variable	Coefficient	Std. Err.	z	P>z	[95% Conf. Interval]	
Iregion 2	0.0486	0.0256	1.9000	0.0580	-0.0016	0.0988
Iregion 3	0.0872	0.0227	3.8500	0.0000	0.0428	0.1316
Iregion 4	0.1652	0.0353	4.6800	0.0000	0.0960	0.2344
Iregion 5	0.0988	0.0204	4.8300	0.0000	0.0588	0.1389
Iregion 6	0.0812	0.0219	3.7100	0.0000	0.0384	0.1241
Iregion 7	-0.3931	0.0206	-19.1100	0.0000	-0.4334	-0.3528
Iregion 8	-1.1700	0.0321	-36.4600	0.0000	-1.2329	-1.1071
Iregion 9	-1.3395	0.0280	-47.8200	0.0000	-1.3944	-1.2846
Iregion 10	-1.3416	0.0262	-51.1200	0.0000	-1.3930	-1.2902
Iregion 11	-1.4034	0.0282	-49.7200	0.0000	-1.4588	-1.3481
Iregion 12	-1.4040	0.0252	-55.7400	0.0000	-1.4534	-1.3547
Iregion 13	-1.4239	0.0259	-54.9900	0.0000	-1.4747	-1.3732
Iregion 14	-1.4755	0.0262	-56.2700	0.0000	-1.5269	-1.4241
Iregion 15	-1.3452	0.0249	-54.1200	0.0000	-1.3939	-1.2965
Iregion 16	0.1595	0.0287	5.5600	0.0000	0.1032	0.2157
Iregion 17	0.1783	0.0267	6.6800	0.0000	0.1260	0.2306
Iregion 18	0.1329	0.0249	5.3500	0.0000	0.0842	0.1817
Iregion 19	0.1173	0.0251	4.6700	0.0000	0.0681	0.1665
Iregion 20	-0.2194	0.0240	-9.1400	0.0000	-0.2665	-0.1723
Iregion 21	0.0949	0.0268	3.5500	0.0000	0.0425	0.1474
Iregion 22	0.3850	0.0209	18.4400	0.0000	0.3441	0.4260
Iregion 23	-1.5007	0.0224	-66.8900	0.0000	-1.5447	-1.4567
Iregion 24	-0.4761	0.0292	-16.3300	0.0000	-0.5332	-0.4189
Iregion 25	-0.3771	0.0395	-9.5600	0.0000	-0.4545	-0.2998
Iregion 26	-0.3496	0.0477	-7.3300	0.0000	-0.4431	-0.2561
Iregion 27	-0.3147	0.0347	-9.0600	0.0000	-0.3827	-0.2466
Iregion 28	-0.1785	0.0454	-3.9300	0.0000	-0.2675	-0.0894
Iregion 29	-0.4286	0.0357	-11.9900	0.0000	-0.4986	-0.3586
Iregion 30	-0.4021	0.0362	-11.1000	0.0000	-0.4731	-0.3311
Iregion 31	-0.3924	0.0335	-11.7200	0.0000	-0.4580	-0.3267
Iregion 32	-0.4034	0.0326	-12.3900	0.0000	-0.4672	-0.3395
Iregion 33	-0.3851	0.0343	-11.2100	0.0000	-0.4524	-0.3177
Iregion 34	-0.5293	0.0369	-14.3600	0.0000	-0.6016	-0.4571
Iregion 35	-0.3168	0.0256	-12.3500	0.0000	-0.3670	-0.2665
Iregion 36	-0.4758	0.0266	-17.8800	0.0000	-0.5279	-0.4236
Iregion 37	-0.3534	0.0484	-7.3000	0.0000	-0.4483	-0.2585
Iregion 38	-0.4584	0.0249	-18.4400	0.0000	-0.5071	-0.4097
Iregion 39	-0.4073	0.0322	-12.6400	0.0000	-0.4704	-0.3441
Iregion 40	-0.3649	0.0490	-7.4400	0.0000	-0.4610	-0.2688
Iregion 41	-0.2016	0.0520	-3.8800	0.0000	-0.3036	-0.0996
Iregion 42	-0.5665	0.0403	-14.0600	0.0000	-0.6455	-0.4875
Iregion 43	0.0202	0.0262	0.7700	0.4400	-0.0312	0.0717
Iregion 44	0.1107	0.0226	4.9100	0.0000	0.0665	0.1549
Iregion 45	0.0413	0.0247	1.6700	0.0940	-0.0071	0.0897
Iregion 46	0.0487	0.0272	1.7900	0.0730	-0.0046	0.1020
Iregion 47	0.0175	0.0248	0.7100	0.4790	-0.0310	0.0661
Iregion 48	-0.1707	0.0492	-3.4700	0.0010	-0.2671	-0.0743
Iregion 49	-0.1165	0.0319	-3.6500	0.0000	-0.1791	-0.0540
Iregion 50	-0.0868	0.0431	-2.0100	0.0440	-0.1713	-0.0023
Iregion 51	-0.1623	0.0343	-4.7400	0.0000	-0.2295	-0.0952
Iregion 52	-0.1002	0.0405	-2.4700	0.0130	-0.1796	-0.0208
Iregion 53	-0.0892	0.0380	-2.3500	0.0190	-0.1637	-0.0147
Iregion 54	-0.1060	0.0293	-3.6100	0.0000	-0.1635	-0.0485
Iregion 55	-0.0803	0.0325	-2.4700	0.0130	-0.1439	-0.0166
Iregion 56	-0.0603	0.0414	-1.4600	0.1450	-0.1414	0.0207
Iregion 57	-0.1835	0.0440	-4.1700	0.0000	-0.2696	-0.0973
Iregion 58	-0.1201	0.0335	-3.5900	0.0000	-0.1857	-0.0545
Iregion 59	-0.1397	0.0319	-4.3800	0.0000	-0.2023	-0.0772

Iregion 60	-0.1649	0.0568	-2.9000	0.0040	-0.2764	-0.0535
Iregion 61	-0.1279	0.0453	-2.8200	0.0050	-0.2167	-0.0391
Iregion 62	-0.1817	0.0442	-4.1100	0.0000	-0.2683	-0.0951
Iregion 63	-0.1964	0.0579	-3.3900	0.0010	-0.3098	-0.0830
Iregion 64	-0.0640	0.0309	-2.0700	0.0380	-0.1246	-0.0034
Iregion 65	-0.2172	0.0697	-3.1200	0.0020	-0.3537	-0.0806
Iregion 66	-0.2058	0.0513	-4.0100	0.0000	-0.3064	-0.1053
Iregion 67	-0.1639	0.0337	-4.8600	0.0000	-0.2299	-0.0978
Iregion 68	-0.2382	0.2263	-1.0500	0.2930	-0.6818	0.2054
Iregion 69	-0.7135	0.0250	-28.5700	0.0000	-0.7624	-0.6645
Iregion 70	-0.7133	0.0291	-24.5400	0.0000	-0.7703	-0.6564
Iregion 71	-0.6821	0.0244	-27.9600	0.0000	-0.7299	-0.6343
Iregion 72	-0.6336	0.0410	-15.4700	0.0000	-0.7139	-0.5533
Iregion 73	-1.4599	0.0284	-51.3800	0.0000	-1.5156	-1.4042
Iregion 74	-1.5340	0.0247	-62.1100	0.0000	-1.5824	-1.4856
Iregion 75	-1.6036	0.0234	-68.6500	0.0000	-1.6494	-1.5578
Iregion 76	0.1891	0.0221	8.5600	0.0000	0.1458	0.2324
Iregion 77	0.4516	0.0235	19.2200	0.0000	0.4056	0.4977
Iregion 78	-0.3675	0.0210	-17.5400	0.0000	-0.4086	-0.3264
Iregion 79	-0.3546	0.0203	-17.4600	0.0000	-0.3944	-0.3147
Iregion 80	-0.3660	0.0224	-16.3200	0.0000	-0.4099	-0.3220
Iregion 81	-0.4606	0.0226	-20.4000	0.0000	-0.5048	-0.4163
Iregion 82	-0.4209	0.0307	-13.7300	0.0000	-0.4810	-0.3608
Iregion 83	-1.8999	0.0245	-77.5400	0.0000	-1.9479	-1.8518
Iregion 84	0.4343	0.0233	18.6100	0.0000	0.3886	0.4801
Iregion 85	-2.0824	0.0248	-84.0400	0.0000	-2.1310	-2.0339
Iregion 86	0.2522	0.0203	12.4000	0.0000	0.2123	0.2920
Iregion 87	0.3756	0.0224	16.8100	0.0000	0.3318	0.4194
Iregion 88	-1.5011	0.0257	-58.3700	0.0000	-1.5515	-1.4507
Iregion 89	-1.4582	0.0240	-60.8800	0.0000	-1.5051	-1.4112
Iregion 90	-1.5543	0.0257	-60.5400	0.0000	-1.6046	-1.5040
Iregion 91	-1.5521	0.0243	-63.7700	0.0000	-1.5998	-1.5044
Iregion 92	-1.4488	0.0307	-47.2300	0.0000	-1.5089	-1.3887
Iregion 93	-1.6071	0.0256	-62.7300	0.0000	-1.6573	-1.5568
Iregion 94	-0.9330	0.0215	-43.3700	0.0000	-0.9751	-0.8908
Iregion 95	-0.0118	0.0207	-0.5700	0.5680	-0.0523	0.0287
Iregion 96	-0.6524	0.0196	-33.2000	0.0000	-0.6909	-0.6139
Iregion 97	-1.7748	0.0199	-89.1600	0.0000	-1.8138	-1.7358
Iregion 98	0.0876	0.0203	4.3100	0.0000	0.0478	0.1275
extra c	-0.1008	0.0145	-6.9600	0.0000	-0.1292	-0.0724
pe040	0.1295	0.0023	55.9300	0.0000	0.1250	0.1341
Iph010 2	-0.0268	0.0066	-4.0700	0.0000	-0.0397	-0.0139
Iph010 3	-0.0580	0.0081	-7.1300	0.0000	-0.0739	-0.0421
Iph010 4	-0.1586	0.0212	-7.4900	0.0000	-0.2001	-0.1171
Iph010 5	-0.2314	0.0496	-4.6700	0.0000	-0.3287	-0.1342
Ihs110 2	-0.1388	0.0128	-10.8400	0.0000	-0.1639	-0.1137
Ihs110 3	-0.0501	0.0133	-3.7700	0.0000	-0.0761	-0.0241
rx010	0.3702	0.0227	16.3000	0.0000	0.3257	0.4148
child36	0.0515	0.0113	4.5700	0.0000	0.0294	0.0736
child3	0.0708	0.0104	6.7800	0.0000	0.0503	0.0912
child717	0.0528	0.0084	6.3100	0.0000	0.0364	0.0692
couple	0.0119	0.0095	1.2500	0.2120	-0.0068	0.0305
parents	-0.1160	0.0127	-9.1500	0.0000	-0.1409	-0.0912
urban	0.0536	0.0065	8.2500	0.0000	0.0409	0.0664
rural	-0.0450	0.0069	-6.5100	0.0000	-0.0585	-0.0314
age sa	-0.3286	0.0271	-12.1400	0.0000	-0.3817	-0.2756
ph020	-0.0202	0.0074	-2.7300	0.0060	-0.0347	-0.0057
hx040	0.0084	0.0031	2.7300	0.0060	0.0024	0.0144
rent inc	0.0721	0.0134	5.3900	0.0000	0.0459	0.0983
child all	-0.0396	0.0078	-5.0500	0.0000	-0.0549	-0.0242
soc excl	-0.1826	0.0193	-9.4400	0.0000	-0.2205	-0.1447

house all	-0.1552	0.0133	-11.6800	0.0000	-0.1813	-0.1292
mortgage	0.0723	0.0075	9.6900	0.0000	0.0577	0.0869
hs130	0.0032	0.0021	1.5600	0.1180	-0.0008	0.0073
cons	1.3551	0.0492	27.5500	0.0000	1.2587	1.4515

Table A4.14 Women selection equation estimates (for the UE)

Variable	Coefficient	Std.	z	P>z	Γ95%	Conf.
Icountry~ 2	-0.1827	0.0477	-3.8300	0.0000	-0.2761	-0.0892
Icountry~ 3	0.1316	0.0448	2.9400	0.0030	0.0438	0.2195
Icountry~ 4	0.1437	0.0429	3.3500	0.0010	0.0597	0.2277
Icountry~ 5	-0.0026	0.0365	-0.0700	0.9420	-0.0742	0.0689
Icountry~ 6	0.8726	0.0788	11.0700	0.0000	0.7181	1.0270
Icountry~ 7	0.3599	0.0499	7.2200	0.0000	0.2622	0.4577
Icountry~ 8	-0.3531	0.0391	-9.0400	0.0000	-0.4296	-0.2765
Icountry~ 9	0.6046	0.0510	11.8600	0.0000	0.5047	0.7045
Icountry~10	0.1756	0.0401	4.3700	0.0000	0.0969	0.2543
Icountry~11	-0.5875	0.0428	-13.7200	0.0000	-0.6715	-0.5036
Icountry~12	0.2371	0.0433	5.4800	0.0000	0.1523	0.3219
Icountry~13	-0.0267	0.0471	-0.5700	0.5710	-0.1190	0.0656
Icountry~14	1.1578	0.0849	13.6400	0.0000	0.9915	1.3241
Icountry~15	-0.4556	0.0347	-13.1500	0.0000	-0.5235	-0.3877
Icountry~16	0.3107	0.0619	5.0200	0.0000	0.1895	0.4319
Icountry~17	-0.0447	0.0558	-0.8000	0.4230	-0.1540	0.0647
Icountry~18	0.4665	0.0565	8.2600	0.0000	0.3558	0.5771
Icountry~19	0.2686	0.0547	4.9100	0.0000	0.1613	0.3758
Icountry~20	0.8983	0.0943	9.5200	0.0000	0.7134	1.0832
Icountry~21	0.0329	0.0389	0.8500	0.3980	-0.0434	0.1093
Icountry~22	0.3987	0.0502	7.9400	0.0000	0.3003	0.4970
Icountry~23	0.9977	0.0735	13.5700	0.0000	0.8535	1.1418
Icountry~24	0.9408	0.0477	19.7100	0.0000	0.8472	1.0344
Icountry~25	0.6377	0.0464	13.7300	0.0000	0.5466	0.7287
Icountry~26	0.1490	0.0455	3.2700	0.0010	0.0597	0.2382
extra c	-0.1463	0.0340	-4.3100	0.0000	-0.2129	-0.0798
pe040	0.2218	0.0088	25.3000	0.0000	0.2046	0.2390
Iph010 2	0.0382	0.0193	1.9800	0.0480	0.0004	0.0761
Iph010 3	0.1903	0.0248	7.6700	0.0000	0.1416	0.2389
Iph010 4	0.4444	0.0635	7.0000	0.0000	0.3200	0.5687
Iph010 5	0.8435	0.1779	4.7400	0.0000	0.4948	1.1921
ph020	0.1824	0.0230	7.9400	0.0000	0.1374	0.2275
hx040	-0.1319	0.0105	-12.5900	0.0000	-0.1524	-0.1113
rx010	0.7664	0.0604	12.6800	0.0000	0.6479	0.8849
Ihs090 2	-0.3067	0.0266	-11.5200	0.0000	-0.3588	-0.2545
Ihs090 3	-0.1594	0.0210	-7.5900	0.0000	-0.2005	-0.1182
Ihs100 2	-0.2983	0.0896	-3.3300	0.0010	-0.4739	-0.1227
Ihs100 3	0.0457	0.0901	0.5100	0.6120	-0.1309	0.2223
Ihs110 2	-0.3046	0.0337	-9.0300	0.0000	-0.3707	-0.2384
Ihs110 3	-0.2580	0.0329	-7.8400	0.0000	-0.3225	-0.1935
Ihh010 1	-0.0178	0.0625	-0.2900	0.7750	-0.1404	0.1047
Ihh010 2	0.0618	0.0628	0.9800	0.3250	-0.0612	0.1849
Ihh010 3	0.0441	0.0627	0.7000	0.4830	-0.0789	0.1670
Ihh010 4	0.0818	0.0630	1.3000	0.1940	-0.0416	0.2053
Ihh020 2	-0.0333	0.0245	-1.3600	0.1740	-0.0814	0.0147
Ihh020 3	-0.2108	0.0334	-6.3000	0.0000	-0.2764	-0.1453
Ihh020 4	-0.0397	0.0279	-1.4200	0.1550	-0.0944	0.0150
hh030	0.0034	0.0082	0.4200	0.6750	-0.0126	0.0195
hh040	-0.0623	0.0194	-3.2200	0.0010	-0.1002	-0.0244
child3	-0.6797	0.0303	-22.4200	0.0000	-0.7392	-0.6203
child36	-0.3059	0.0321	-9.5200	0.0000	-0.3688	-0.2429
child717	-0.0358	0.0229	-1.5600	0.1180	-0.0806	0.0091
couple	-0.3484	0.0242	-14.4200	0.0000	-0.3958	-0.3011
parents	-0.0336	0.0326	-1.0300	0.3020	-0.0975	0.0303
urban	0.0238	0.0193	1.2400	0.2160	-0.0140	0.0616
rural	-0.0362	0.0205	-1.7700	0.0770	-0.0763	0.0039
age sq	-1.1071	0.0715	-15.4700	0.0000	-1.2474	-0.9669
rent inc	-0.0892	0.0318	-2.8000	0.0050	-0.1516	-0.0268

child all	-0.1930	0.0213	-9.0700	0.0000	-0.2347	-0.1513
mortgage	0.2834	0.0298	9.4900	0.0000	0.2249	0.3419
hs130	0.1358	0.0767	1.7700	0.0770	-0.0146	0.2862
cons	-0.3892	0.1348	-2.8900	0.0040	-0.6534	-0.1249
/athrho	-0.2670	0.0949	-2.8100	0.0050	-0.4529	-0.0810
/lnsigma	-0.6132	0.0098	-62.5200	0.0000	-0.6324	-0.5940
rho	-0.2608	0.0884			-0.4243	-0.0809
sigma	0.5416	0.0053			0.5313	0.5521
lambda	-0.1413	0.0490			-0.2373	-0.0452

Table A4.15 Women wage equation estimates (for the UE)

Variable	Coefficient	Std. Err.	z	P>z	[95% Conf. Interval]
Iregion 2	0.0332	0.0316	1.0500	0.2940	-0.0288 0.0952
Iregion 3	0.0580	0.0289	2.0100	0.0440	0.0014 0.1146
Iregion 4	0.2298	0.0385	5.9700	0.0000	0.1544 0.3052
Iregion 5	0.1924	0.0261	7.3700	0.0000	0.1412 0.2436
Iregion 6	0.2251	0.0293	7.6900	0.0000	0.1677 0.2825
Iregion 7	-0.4857	0.0262	-18.5300	0.0000	-0.5371 -0.4343
Iregion 8	-1.2538	0.0325	-38.5700	0.0000	-1.3175 -1.1901
Iregion 9	-1.3587	0.0341	-39.8000	0.0000	-1.4256 -1.2918
Iregion 10	-1.3653	0.0306	-44.6200	0.0000	-1.4252 -1.3053
Iregion 11	-1.4556	0.0348	-41.8000	0.0000	-1.5239 -1.3874
Iregion 12	-1.4154	0.0310	-45.6700	0.0000	-1.4761 -1.3546
Iregion 13	-1.4155	0.0288	-49.1700	0.0000	-1.4720 -1.3591
Iregion 14	-1.4867	0.0312	-47.6400	0.0000	-1.5478 -1.4255
Iregion 15	-1.4495	0.0311	-46.6300	0.0000	-1.5104 -1.3886
Iregion 16	0.0762	0.0350	2.1800	0.0300	0.0076 0.1448
Iregion 17	0.0950	0.0345	2.7500	0.0060	0.0273 0.1626
Iregion 18	0.0487	0.0310	1.5700	0.1170	-0.0122 0.1096
Iregion 19	0.0775	0.0317	2.4400	0.0150	0.0153 0.1396
Iregion 20	-0.1215	0.0293	-4.1400	0.0000	-0.1790 -0.0640
Iregion 21	0.0341	0.0329	1.0400	0.2990	-0.0303 0.0986
Iregion 22	0.4641	0.0277	16.7300	0.0000	0.4097 0.5184
Iregion 23	-1.6614	0.0269	-61.8500	0.0000	-1.7140 -1.6087
Iregion 24	-0.4481	0.0431	-10.3900	0.0000	-0.5326 -0.3635
Iregion 25	-0.3914	0.0487	-8.0300	0.0000	-0.4869 -0.2959
Iregion 26	-0.2886	0.0871	-3.3100	0.0010	-0.4593 -0.1179
Iregion 27	-0.3449	0.0415	-8.3100	0.0000	-0.4263 -0.2635
Iregion 28	-0.2655	0.0527	-5.0400	0.0000	-0.3689 -0.1622
Iregion 29	-0.4260	0.0597	-7.1400	0.0000	-0.5430 -0.3090
Iregion 30	-0.3380	0.0432	-7.8200	0.0000	-0.4227 -0.2533
Iregion 31	-0.3474	0.0454	-7.6500	0.0000	-0.4365 -0.2584
Iregion 32	-0.3956	0.0433	-9.1300	0.0000	-0.4805 -0.3106
Iregion 33	-0.3201	0.0538	-5.9500	0.0000	-0.4255 -0.2147
Iregion 34	-0.3816	0.0542	-7.0400	0.0000	-0.4879 -0.2753
Iregion 35	-0.3432	0.0310	-11.0700	0.0000	-0.4040 -0.2825
Iregion 36	-0.4463	0.0352	-12.6700	0.0000	-0.5153 -0.3772
Iregion 37	-0.2375	0.0447	-5.3100	0.0000	-0.3251 -0.1499
Iregion 38	-0.4119	0.0381	-10.8100	0.0000	-0.4866 -0.3372
Iregion 39	-0.3658	0.0498	-7.3500	0.0000	-0.4633 -0.2683
Iregion 40	-0.1996	0.0901	-2.2100	0.0270	-0.3763 -0.0230
Iregion 41	-0.1376	0.0843	-1.6300	0.1030	-0.3029 0.0277
Iregion 42	-0.4799	0.0534	-8.9800	0.0000	-0.5846 -0.3752
Iregion 43	0.0132	0.0335	0.3900	0.6930	-0.0525 0.0789
Iregion 44	0.1085	0.0267	4.0700	0.0000	0.0563 0.1608
Iregion 45	0.0308	0.0298	1.0300	0.3010	-0.0275 0.0891
Iregion 46	0.0725	0.0361	2.0100	0.0450	0.0018 0.1433
Iregion 47	0.0335	0.0296	1.1300	0.2570	-0.0244 0.0915
Iregion 48	0.1144	0.1163	0.9800	0.3250	-0.1135 0.3422
Iregion 49	-0.1321	0.0542	-2.4400	0.0150	-0.2383 -0.0258
Iregion 50	0.0211	0.0844	0.2500	0.8030	-0.1443 0.1865
Iregion 51	-0.1048	0.0368	-2.8400	0.0040	-0.1770 -0.0325
Iregion 52	-0.0331	0.0520	-0.6400	0.5240	-0.1351 0.0689
Iregion 53	-0.0208	0.0490	-0.4200	0.6720	-0.1168 0.0753
Iregion 54	-0.1322	0.0425	-3.1100	0.0020	-0.2155 -0.0489
Iregion 55	-0.0874	0.0463	-1.8900	0.0590	-0.1780 0.0033
Iregion 56	0.0131	0.0622	0.2100	0.8340	-0.1088 0.1350
Iregion 57	-0.1428	0.0797	-1.7900	0.0730	-0.2990 0.0135
Iregion 58	-0.0770	0.0346	-2.2300	0.0260	-0.1448 -0.0092
Iregion 59	-0.0783	0.0416	-1.8800	0.0590	-0.1598 0.0031

Iregion 60	-0.1000	0.0480	-2.0800	0.0370	-0.1940	-0.0059
Iregion 61	-0.1038	0.0459	-2.2600	0.0240	-0.1939	-0.0137
Iregion 62	-0.0223	0.0519	-0.4300	0.6680	-0.1240	0.0795
Iregion 63	-0.0682	0.0792	-0.8600	0.3900	-0.2234	0.0871
Iregion 64	-0.0606	0.0404	-1.5000	0.1340	-0.1397	0.0186
Iregion 65	-0.0407	0.0753	-0.5400	0.5890	-0.1882	0.1069
Iregion 66	-0.0280	0.0546	-0.5100	0.6090	-0.1350	0.0791
Iregion 67	-0.0804	0.0413	-1.9500	0.0520	-0.1614	0.0006
Iregion 68	-0.2215	0.1182	-1.8700	0.0610	-0.4533	0.0102
Iregion 69	-0.6546	0.0379	-17.2700	0.0000	-0.7289	-0.5803
Iregion 70	-0.5962	0.0442	-13.4800	0.0000	-0.6829	-0.5095
Iregion 71	-0.6183	0.0326	-18.9900	0.0000	-0.6822	-0.5545
Iregion 72	-0.6127	0.0575	-10.6500	0.0000	-0.7255	-0.4999
Iregion 73	-1.3473	0.0299	-45.0700	0.0000	-1.4059	-1.2887
Iregion 74	-1.4802	0.0274	-54.0900	0.0000	-1.5338	-1.4265
Iregion 75	-1.4780	0.0273	-54.0800	0.0000	-1.5316	-1.4245
Iregion 76	0.2262	0.0270	8.3700	0.0000	0.1732	0.2791
Iregion 77	0.4667	0.0315	14.8200	0.0000	0.4050	0.5284
Iregion 78	-0.2233	0.0282	-7.9200	0.0000	-0.2786	-0.1681
Iregion 79	-0.2262	0.0278	-8.1300	0.0000	-0.2807	-0.1717
Iregion 80	-0.2299	0.0318	-7.2400	0.0000	-0.2921	-0.1677
Iregion 81	-0.2905	0.0333	-8.7200	0.0000	-0.3558	-0.2251
Iregion 82	-0.3236	0.0454	-7.1300	0.0000	-0.4126	-0.2347
Iregion 83	-1.8946	0.0288	-65.8200	0.0000	-1.9511	-1.8382
Iregion 84	0.5003	0.0308	16.2500	0.0000	0.4400	0.5607
Iregion 85	-2.2004	0.0274	-80.3800	0.0000	-2.2540	-2.1467
Iregion 86	0.2293	0.0260	8.8300	0.0000	0.1784	0.2802
Iregion 87	0.2893	0.0280	10.3500	0.0000	0.2346	0.3441
Iregion 88	-1.3211	0.0310	-42.6500	0.0000	-1.3818	-1.2603
Iregion 89	-1.4393	0.0285	-50.4400	0.0000	-1.4952	-1.3834
Iregion 90	-1.3957	0.0307	-45.4800	0.0000	-1.4559	-1.3356
Iregion 91	-1.4959	0.0297	-50.3100	0.0000	-1.5541	-1.4376
Iregion 92	-1.4281	0.0337	-42.3900	0.0000	-1.4941	-1.3621
Iregion 93	-1.4890	0.0313	-47.5500	0.0000	-1.5504	-1.4276
Iregion 94	-0.8939	0.0272	-32.8200	0.0000	-0.9473	-0.8405
Iregion 95	-0.0778	0.0284	-2.7300	0.0060	-0.1335	-0.0220
Iregion 96	-0.5343	0.0279	-19.1700	0.0000	-0.5889	-0.4797
Iregion 97	-1.7447	0.0264	-66.1700	0.0000	-1.7964	-1.6930
Iregion 98	0.0405	0.0248	1.6300	0.1030	-0.0081	0.0891
extra c	-0.0890	0.0162	-5.4900	0.0000	-0.1207	-0.0572
pe040	0.1442	0.0051	28.4500	0.0000	0.1343	0.1541
Iph010 2	-0.0295	0.0083	-3.5700	0.0000	-0.0457	-0.0133
Iph010 3	-0.0589	0.0102	-5.7400	0.0000	-0.0790	-0.0388
Iph010 4	-0.1211	0.0251	-4.8200	0.0000	-0.1703	-0.0719
Iph010 5	-0.1091	0.0482	-2.2600	0.0240	-0.2036	-0.0146
Ihs110 2	-0.1263	0.0151	-8.3600	0.0000	-0.1559	-0.0967
Ihs110 3	-0.0796	0.0142	-5.6200	0.0000	-0.1074	-0.0519
rx010	0.2893	0.0301	9.6000	0.0000	0.2302	0.3484
child36	0.0643	0.0153	4.1900	0.0000	0.0342	0.0944
child3	0.1552	0.0199	7.8100	0.0000	0.1163	0.1942
child717	0.0341	0.0099	3.4300	0.0010	0.0146	0.0535
couple	-0.0565	0.0096	-5.8700	0.0000	-0.0753	-0.0376
parents	-0.0905	0.0134	-6.7700	0.0000	-0.1167	-0.0643
urban	0.0678	0.0081	8.3700	0.0000	0.0519	0.0837
rural	-0.0346	0.0092	-3.7600	0.0000	-0.0526	-0.0166
age sa	-0.2592	0.0380	-6.8300	0.0000	-0.3336	-0.1848
ph020	-0.0174	0.0091	-1.9000	0.0570	-0.0353	0.0005
hx040	-0.0240	0.0044	-5.4800	0.0000	-0.0326	-0.0154
rent inc	0.0776	0.0151	5.1300	0.0000	0.0479	0.1072
child all	-0.0680	0.0100	-6.8300	0.0000	-0.0875	-0.0485
soc excl	-0.1051	0.0201	-5.2400	0.0000	-0.1444	-0.0658

house all	-0.1497	0.0173	-8.6400	0.0000	-0.1836	-0.1157
mortgage	0.0730	0.0102	7.1900	0.0000	0.0531	0.0929
hs130	0.0028	0.0015	1.8500	0.0640	-0.0002	0.0057
cons	1.4646	0.0722	20.3000	0.0000	1.3231	1.6060

A5 Annex to Chapter 5

Table A5.1 Participation and average minutes of primary child care for households with children aged 0-5 in the population, by gender and work status -ITALY

	Female		Male		All	
	Non-Working	Working	Non-Working	Working	Non-Working	Working
	Participation					
Primary child care	8	2	8	7	9	4
Secondary child care	9	6	5	9	0	7
	Minutes in primary child care					
Physical care and supervision of children	105.1	85.8	17.9	19.0	94.2	42.7
Help children for homework	7.1	4.0	1.6	1.1	6.5	2.1
Play, read and speak with children	37.7	41.5	29.4	32.7	36.6	35.8
To take children to school	28.0	24.9	12.6	8.6	26.1	14.4
Other child care activities	0.5	0.1	0.0	0.0	0.4	0.1
Care of children in other household	0.3	0.2	1.8	0.3	0.5	0.3
<i>Total primary child care</i>	<i>178.6</i>	<i>156.6</i>	<i>63.4</i>	<i>61.6</i>	<i>164.3</i>	<i>95.3</i>

Source: Multipurpose 2002/2003

Table A5.2 Average minutes of primary child care for those who perform care in households with children 0-5, by gender and days of the week -ITALY

	Women			Men			All		
	WD	Sa.	Su.	WD	Sa.	Su.	WD	Sa.	Su.
Physical care and supervision of children	101.9	92.9	109.2	23.9	30.9	39.9	68.5	67.4	77.5
Help children for homework	6.5	5.6	3.0	1.2	3.0	2.3	4.2	4.6	2.7
Play, read and speak with children	44.2	36.5	38.2	43.0	51.0	60.0	43.7	42.4	48.2
To take children to school	33.8	16.2	8.4	13.2	15.1	7.7	25.0	15.8	8.1
Other child care activities	0.4	0.2	0.1	0.0	0.1	0.1	0.2	0.1	0.1
Care of children in other household	0.2	0.8	0.4	0.4	0.7	1.4	0.3	0.8	0.8

Source: Multipurpose 2002/2003 WD=Weekdays, Sa=Saturday, Su=Sunday

Table A5.3 Average minutes of primary adult care for those who perform adult care in households with adult members with health problems - ITALY

	Women			Men		
	Not at work	At work	All	Not at work	At work	All
	Household with elderly aged 75 or more					
Participation in primary adult care (%)	23.5	19.2	22.4	28.7	7.8	16.1
Participation in adult care outside the household (%)	3.3	3.0	3.2	3.0	0.4	1.4
Physical care	67.4	44.2	62.1	46.5	31.5	42.1
Company	19.4	1.3	15.2	3.4	5.7	4.1
Transport	5.5	11.8	7.0	28.4	23.6	27.0
Other	1.1	0.1	0.9	11.1	18.3	13.2
Adult care outside the household	14.2	11.9	13.7	10.3	3.4	8.2
Total primary care	107.7	69.3	98.8	99.7	82.6	94.7
	Household with at least one member with very bad health					
Participation in primary adult care (%)	38.4	32.1	36.8	25.0	18.9	22.8
Participation in adult care outside the household (%)	0.8	7.8	2.5	0.9	4.3	2.2
Physical care	107.3	44.8	94.0	73.0	59.0	68.8
Company	16.6	23.2	18.0	3.0	10.3	5.2
Transport	10.1	9.4	10.0	23.3	15.6	21.0
Other	1.1	0.0	0.8	26.8	1.8	19.2
Adult care outside the household	1.2	26.0	6.5	14.9	13.2	14.4
Total primary care	136.2	103.3	129.2	141.1	99.9	128.6
	Household with at least one member disable					
Participation in primary adult care (%)	25.8	37.1	17.7	8.5	21.8	18.6
Participation in adult care outside the household (%)	4.0	0.0	3.3	1.1	0.0	0.8
Physical care	73.4	27.0	62.2	39.4	36.2	38.9
Company	9.4	18.8	11.6	19.3	16.2	18.8
Transport	10.0	11.5	10.4	30.0	16.7	27.8
Other	0.5	0.3	0.5	8.8	1.0	7.6
Adult care outside the household	12.2	0.0	9.2	2.6	0.0	2.2
Total primary care	105.5	57.5	93.9	100.1	70.0	95.2

Source: Multipurpose 2002/2003

A5.1 Description of Italian time use and EU SILC surveys

The Multipurpose 2002/2003 survey is composed of three data sets based on different questionnaires: 1) the individuals' data set based on the individuals' questionnaire, the households' questionnaire, a questionnaire with questions related to the compilation of the daily questionnaire, and some created variables 2) the episodes' data set based on the daily questionnaire and 3) the weekly day data set based on the weekly diary.

The individuals' data set contains records for 51,206 individuals but the daily diaries collected are 51,206 (91.81 per cent). We have no information about how the 8.19 per cent of the individuals' sampled use their time. 16.48 per cent of the total available diaries have been collected in on a "particular day". "Particular days" are self defined by respondents and include holidays (18 per cent), travelling (15 per cent), personal or family health problems (10 per cent), unusual work or study engagement (8 per cent) and others.

Since the aim of this study is the evaluation of the unpaid family care work at national level in a certain interval of time (i.e. one year) we decided to keep "particular day" in order to have in our sample an average of time spent in unpaid family care work computed on all the possible types of days that can occur in one year. The "particular days" in the sample, in fact, occurred randomly and should not bias our analysis.

Each individual filled in the diary during weekdays or on Saturday or on Sunday. In order to obtain an individual estimation representative for the all Italian population and for the average weekly day it is necessary to multiply the weights by 5/7 for individuals who filled in the diary on a weekday and by 1/7 for those who filled in the diary on Saturday or on Sunday.

A5.2 Statistical Matching for Italian data sets

To estimate the value of unpaid family care work the ideal source is a data set with both the hours devoted to unpaid family care work and the wages necessary to estimate its value. To overcome the lack of information on wages of the Multipurpose 2002/2003 survey we decided to match the Multipurpose 2002/2003 survey with the EU-SILC 2006 survey. The main difficulty of using information collected from different surveys jointly is that the interviewed individuals are not the same. The usual strategy to overcome this problem is to match the two datasets assigning to each individual in one dataset the information of the other dataset according to a series of characteristics which are believed to be relevant to explain (part of) the observed heterogeneity.

The purpose of this section is to explain how the statistical matching is performed. To make matching feasible two conditions must hold: (i) the two surveys must be random samples of the same population (ii) there must be a common set of conditioning variables in the recipient and in the donor dataset. In our cases the first condition is satisfied since both Multipurpose and EU-SILC data sets are randomly selected from the Italian population. The second condition is also satisfied after some recoding of the common information in the data sets.

The EU-SILC 2006 contains detailed information on the wages, income and wealth of family members, labour market activities, and socio-demographic characteristics of the household but not information on child care. On the other hand the Multipurpose 2003/2003 survey collects information on family structure, past and present working experiences, use of social services and use of child care.

Once this common set of characteristics is chosen and properly coded we created a new data set "appending" at the Multipurpose survey data set the EU-SILC 2006 survey data set. The Multipurpose 2002/2003 sample includes 21075 households for a total of 55773 individuals. The EU-SILC 2006 sample contains observation for 61542 individuals.

The new data set are then divided into four sub-samples: 1) men at work 2) women at work 3) men not at work 4) women not at work. This is motivated by two reasons. First, in this way more homogeneous samples are obtained before proceeding with the imputations of wages. Second, the creation of sub-samples for people at work enables the inclusion in the match of sub-samples 1) and 2) a larger set of variables. In fact, for much of these samples we can take into account all the variables related to the job activities (e.g. occupation, sector, full-time or part-time job, and so on).

However, behind the decision of dividing the sample between people at work and people who are not at work there is also a theoretical motivation. For people at work in Multipurpose the wage is unobserved because the questionnaire does not include questions on wages and earnings. However, even if unobserved they have a wage and the imputed wage will represent the estimated value of the not-reported wage. On the contrary, people not at work could not report their wages even in the presence of the question in the Multipurpose questionnaire. For them the imputed wage represents a potential wage. The evaluation of unpaid family care work presents a problem of missing data. The aim is to have the multipurpose data set completed for the n observations with an additional column for the imputed wages for people who perform unpaid family care work.

A variety of techniques could be used in order to perform imputation. The choice of the technique is subject to the missing mechanism. When the missing data are a random sample of observable data the missing mechanism is called MCAT (Missing Completely At Random). In this case the missing data is not dependent on observed or missing data. If the probability of an observation to be missing depends only on observable data but not on unobservable missing data the missing mechanism is called MAR (Missing At Random). The MCAT is the best scenario and enables one to obtain unbiased results even with simple approaches. The MAT scenario can also enable one to obtain unbiased results but only if more advanced approaches are applied. When the missing values are generated by a "non answer process" it is quite difficult to establish the missing mechanism. However, in some cases the researcher can be confident that the missing mechanism is a MCAT (Schafer, 1997). This is when information is not available because the question was not introduced in the questionnaire; in this case the missing mechanism depends on the sampling design. This is our case. In fact, the questions on earnings are not in the Multipurpose sample and so the missing values in earnings depend on the sampling design that is random for the Italian population. Once we established that the missing mechanism is a MCAR we can use different techniques which rely on this assumption. The analysis on Italy in Chapter 5 is conducted using the Propensity Score Matching (PSM) for the opportunity cost method and the hot deck imputation for the replacement market cost method.

Imputation based on Propensity Score Matching (PSM)

The propensity score is defined as the conditional probability to be assigned at a treatment given a vector of observable covariates (Rosenbaum and Rubin 1983). In the imputation context the PS estimates the "likelihood/probability" of "having the outcome observed" for any subject with a similar background measured by the independent variables. Subjects with close propensity scores are considered "similar" and will be matched together. We used this procedure for the opportunity cost approach. The descriptive statistics of the variables used for the matching are shown in Table A5.4

Hot deck imputation

The hot deck procedure replaces the variables in the 'missing lines' with the corresponding values in the 'complete lines' stratifying the sample by selected variables. This imputation applies the Approximate Bayesian Bootstrap Imputation (ABBI) method of Rubin and Schenker (1986). In a multiple imputation hot deck can be used several times in order to impute missing values stochastically rather than deterministically. A major assumption with the hot deck procedure is that the missing data are either missing completely at random (MCAR) or are missing at random (MAR), this is not a restrictive assumption in our case. However, in Chapter 5 we utilized the hot deck command in STATA software just to impute

the average income compute in EU-SILC for each relevant ISCO-88 category to people who perform care activities in Multipurpose using as stratifying variables the ISCO-88 categories

Table A5.4: Descriptive statistics of variables used for the matching procedure - ITALY

Variable	Men working EU-SILC (12010 obs)		Men working Multipurpose (13368 obs.)		Men Non-Working Multipurpose (6398 obs.)		Women working EU-SILC (8129 obs.)		Women working Multipurpose (8780 obs.)		Women Non-Working Multipurpose (11933 obs.)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
<i>less than 30 years</i>	17.2	0.4	20.7	0.4	24.6	0.4	18.8	0.4	23.7	0.4	20.0	0.4
31-40 years	29.7	0.5	29.4	0.5	3.9	0.2	31.2	0.5	32.0	0.5	14.0	0.3
41-50 yrs	29.8	0.5	27.9	0.4	3.7	0.2	30.2	0.5	27.3	0.4	13.1	0.3
51-65 years*	22.0	0.4	20.6	0.4	36.3	0.5	17.7	0.4	14.8	0.4	19.1	0.4
more than 65 years*	1.4	0.1	1.4	0.1	31.5	0.5	2.0	0.1	2.2	0.1	33.8	0.5
							0.0		0.0		0.0	
<i>Never married</i>	32.0	0.5	30.2	0.5	32.4	0.5	30.1	0.5	28.7	0.5	20.8	0.4
Married	63.5	0.5	64.5	0.5	60.9	0.5	59.8	0.5	60.3	0.5	63.9	0.5
Sep/Div	3.8	0.2	4.6	0.2	3.0	0.2	7.1	0.3	8.1	0.3	3.4	0.2
Widowed	0.7	0.1	0.7	0.1	3.7	0.2	3.0	0.2	2.9	0.2	12.0	0.3
<i>pre-primary edu.</i>	0.5	0.1	0.6	0.1	5.4	0.2	0.3	0.1	0.4	0.1	6.8	0.3
primary edu.	8.0	0.3	10.0	0.3	33.5	0.5	6.4	0.2	7.7	0.3	32.5	0.5
lower secondary edu.	32.4	0.5	36.7	0.5	29.2	0.5	23.2	0.4	27.1	0.4	30.1	0.5
(upper) secondary edu.	38.7	0.5	41.8	0.5	27.7	0.4	40.2	0.5	49.8	0.5	27.0	0.4
post-secondary.	7.8	0.3	0.8	0.1	0.4	0.1	11.2	0.3	1.9	0.1	0.4	0.1
tertiary education	12.6	0.3	10.1	0.3	3.9	0.2	18.8	0.4	13.2	0.3	3.2	0.2
							0.0		0.0			
nace1	5.2	0.2	7.7	0.3			4.2	0.2	5.2	0.2		
nace2	27.8	0.4	24.1	0.4			17.6	0.4	15.4	0.4		
nace3	12.2	0.3	11.3	0.3			1.5	0.1	1.1	0.1		
nace4	13.6	0.3	12.8	0.3			14.8	0.4	16.8	0.4		
nace5	2.5	0.2	2.6	0.2			4.6	0.2	4.4	0.2		
nace6	6.3	0.2	6.1	0.2			2.4	0.2	1.8	0.1		
nace7	2.7	0.2	2.3	0.1			3.3	0.2	2.2	0.1		
nace8	7.5	0.3	4.7	0.2			8.4	0.3	4.8	0.2		
nace9	8.6	0.3	9.6	0.3			7.3	0.3	8.7	0.3		
nace10	3.0	0.2	3.2	0.2			13.8	0.3	13.7	0.3		
nace11	4.4	0.2	4.6	0.2			11.7	0.3	11.3	0.3		
nace12	6.2	0.2	11.1	0.3			10.4	0.3	14.7	0.4		
isco1	3.0	0.2	2.4	0.2			1.2	0.1	1.2	0.1		
isco2	5.7	0.2	4.1	0.2			5.3	0.2	2.3	0.2		
isco3	2.4	0.2	1.8	0.1			1.1	0.1	0.9	0.1		
isco4	1.8	0.1	1.8	0.1			2.1	0.1	1.5	0.1		
isco5	2.3	0.2	1.7	0.1			11.4	0.3	4.1	0.2		
isco6	3.4	0.2	3.0	0.2			3.4	0.2	3.2	0.2		
isco7	7.0	0.3	6.8	0.3			1.5	0.1	1.6	0.1		
isco8	1.4	0.1	1.4	0.1			5.4	0.2	4.4	0.2		
isco9	8.8	0.3	8.7	0.3			14.3	0.3	16.7	0.4		

isco10	9.3	0.3	8.7	0.3			16.9	0.4	20.2	0.4		
isco11	7.0	0.3	12.3	0.3			14.9	0.4	20.4	0.4		
isco12	3.2	0.2	3.7	0.2			2.0	0.1	2.4	0.2		
isco13	10.4	0.3	9.1	0.3			1.1	0.1	0.2	0.0		
isco14	7.9	0.3	9.8	0.3			0.7	0.1	1.7	0.1		
isco15	5.1	0.2	5.7	0.2			4.5	0.2	5.3	0.2		
isco16	12.6	0.3	10.7	0.3			4.9	0.2	3.0	0.2		
isco17	3.6	0.2	5.3	0.2			7.1	0.3	9.4	0.3		
isco18	3.2	0.2	1.7	0.1			2.1	0.1	1.4	0.1		
full time job	95.5	0.2	1.0	0.2			0.8	0.4	0.8	0.4		
month unemployed in the last year	0.1	0.5	0.0	0.2			0.1	0.5	0.1	0.4		
second job	0.0	0.2	0.0	0.2			0.0	0.2	0.0	0.2		
household size	3.3	1.3	3.4	1.2	3.0	1.2	3.1	1.2	3.2	1.2	3.1	1.3
2 adults, no dep. children, both with less than 65 years	12.8	0.3	12.2	0.3	12.3	0.3	15.3	0.4	14.6	0.4	10.3	0.3
2 adults, no dependent. Children, at least one 65 years or more	2.9	0.2	2.6	0.2	19.7	0.4	2.7	0.2	2.1	0.1	15.2	0.4
Other household without dependent children	22.8	0.4	25.0	0.4	29.7	0.5	21.2	0.4	24.0	0.4	23.1	0.4
Single parent household, one or more dependent children	0.6	0.1	0.5	0.1	1.8	0.1	4.9	0.2	2.1	0.1	1.8	0.1
2 adults, one dependent children	15.7	0.4	15.6	0.4	6.5	0.2	16.3	0.4	16.1	0.4	9.3	0.3
2 adults, two dependent children	18.6	0.4	19.0	0.4	7.9	0.3	16.5	0.4	16.3	0.4	13.6	0.3
2 adults, three or more dependent children	4.0	0.2	4.6	0.2	2.5	0.2	2.6	0.2	3.0	0.2	4.5	0.2
Other household with dependent children	13.2	0.3	13.4	0.3	11.9	0.3	11.1	0.3	14.1	0.3	12.6	0.3
n. of disabled in the household	0.0	0.1	0.0	0.1	0.1	0.2	0.0	0.1	0.0	0.1	0.0	0.2
n. of individuals with bad health in the household	0.0	0.1	0.0	0.1	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.2
number of adults in education	0.2	0.5	0.2	0.5	0.3	0.6	0.2	0.5	0.3	0.6	0.3	0.6
house owner	74.3	0.4	74.1	0.4	80.0	0.4	75.9	0.4	75.5	0.4	75.1	0.4
house tenant or subtenants	11.6	0.3	17.4	0.4	14.5	0.4	10.2	0.3	16.4	0.4	17.3	0.4
house provide free	9.8	0.3	6.3	0.2	3.6	0.2	9.9	0.3	6.0	0.2	5.2	0.2
other	4.3	0.2	2.1	0.1	1.9	0.1	4.0	0.2	2.1	0.1	2.5	0.2
n. of rooms	3.6	1.1	4.4	1.2	4.3	1.2	3.6	1.1	4.5	1.2	4.3	1.2
<i>Piem,V.d'Aosta,Liguria,Lomb</i>	22.9	0.4	26.8	0.4	25.8	0.4	25.8	0.4	31.4	0.5	22.9	0.4
Bolz,Trento,Veneto,FVGiulia,Emil-Rom	25.8	0.4	20.4	0.4	16.4	0.4	27.1	0.4	23.2	0.4	16.0	0.4
Tosc,Umb,Marc,Lazio	24.2	0.4	18.2	0.4	17.9	0.4	25.8	0.4	19.6	0.4	17.1	0.4
Abr,Mol,Camp,Pugl,Basil,Cal	19.6	0.4	25.4	0.4	29.0	0.5	16.0	0.4	19.0	0.4	31.9	0.5
Sard,Sic	7.5	0.3	9.2	0.3	10.9	0.3	5.4	0.2	6.8	0.3	12.1	0.3

*51-60 years and more than 60 years for women

Source: EU-SILC 2006 and Multipurpose 2002/2003

A5.3 Description of Polish time use and EU SILC surveys

The Polish time use survey is a cyclical survey carried out by The Central Statistical Office. It is based on the representative sample of the households indicative of 6 socio-economic groups (employees, employees with access to agricultural farm, farmers, self-employed, old-age and disability pensioners and persons living on non-working sources of income). The most recent survey was carried out in 2003-2004 and consisted of three parts: a household questionnaire (filled in by a head of the household), a personal questionnaire and a time use diary.

The household questionnaire referred to all household members, irrespective of their age and was filled in by the head of the household. It consisted of 33 questions regarding the composition of the household (with information on gender, age, family relationship and economic activity of each household member), living conditions (type of building, size and fittings of the dwelling, access to the internet), the household's activity regarding growing plants and keeping animals, income of the household (main source of income and its level), assistance obtained and use of different external services.

The personal questionnaire was addressed to all household members aged 15 and above. It consisted of 53 questions grouped in modules regarding different groups of enquired household members. Groups were defined by the type of economic activity. Persons that declared working in the week preceding the survey answered questions concerning the type of organisation they worked for, its ownership, size, sector, type of occupation, type of job, type of contract, time of work, income, second job. Persons that didn't work in the week preceding the survey were asked standard questions allowing for the assessment of their activity (forms of looking for work, readiness to undertake a job for two weeks). All persons filling in the questionnaire were asked to answer questions concerning their education career (past and present), voluntary work and community service, assistance offered to persons from outside their household and some information on their health status (illness and disability).

The third questionnaire was a time-use diary – a booklet concerning a list of all activities carried out during a 24-hour span (from 4 AM to 4 AM) divided into 10-minute intervals (144 intervals per day). The diary included information on the main and secondary activity during each span (parallel activity), persons accompanying a surveyed person during a given activity (four categories: alone, with children under 9 from a given household, with another person from a given household and with persons from outside the household) and location of a given activity (or transport mode in case of activity connected with moving). There was also some additional information concerning completing the diary (where it was completed, if it was a special or unusual day, if enquired persons were travelling during that day, where he/she was at the beginning of the record and at the end of the record). All activities were grouped in ten groups: physiological needs, professional work, education activity, household activities, voluntary work in organisations and beyond, social life and entertainment, sport and recreation activities, personal hobbies, using mass-media, time spent on moving and transportation. The instruction for enquirers listed 198 different activities. The time use diary was filled in twice: once on a week day (Monday-Friday) and once on a weekend day (Saturday or Sunday).

The survey on time-use offered a unique data source on the scale of unpaid family work, both related to housework and care work (for children and adults). As for the latter aspect it included the following information:

- the number of minutes spent on childcare (with the possibility of determining the exact time of the day and the day of the week) as a primary and secondary activity (accompanying other activity);
- the detailed characteristics of the type of child care activity including physical care and supervision of children, helping children with homework etc., reading, playing and speaking with children, going out with children and other child care activities;
- the possibility of determining the participation of children in other activities (particularly of a housework nature), which allows for wide definition of child care used in advanced research on time allocation;
- frequency and intensity of child care services received from other households;
- frequency and intensity of child care services paid to other households (in detail for a day when a time-use diary is filled in and in general based on the personal questionnaire);
- the number of minutes spent on care for adult member of the household and other adult persons;
- the frequency and intensity of adult care services received from other households.

Moreover all the above information may be determined with various cross-sections including personal characteristics (gender, age, education level, economic activity and its characteristics, marital status, health status etc.) and household characteristics (size, type, number of children, place of residence, region).

One of the most important advantages of the dataset offered by the survey on time use is information on income – both personal (in the case of the working population) and household. Out of 10,256 households that were asked the question on its average income, 6,468 answered the question directly, 1,325 indicated a range of income and 2,463 (24 per cent of the total number) refused to answer the question. Concerning personal income: out of 20,264 persons being enquired, 9,994 were found to be working (with 7,032 employees and 2,049 self-employed). As for net wage/income question in the group of employed: 4,617 persons indicated a precise sum, 950 persons – a range of earnings and 1,465 (21 per cent) persons refused to answer the question. In the group of the self-employed, 937 persons indicated an exact amount, 181 persons - a range and 931 (45,4 per cent) persons refused to answer the question on income. The rate of refusals does not seem to differ from other similar surveys. It requires care in drawing conclusions on average income etc, but it is possible within the dataset. The sample is large enough to allow for the drawing of some conclusions on regional differences in family work.

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