Size and Value of Unpaid Family Work in Europe*

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Abstract

This paper estimates the size and value of Unpaid domestic Work (UPW) and Unpaid Family Care Work (UFCW) at the European level. While at the country level several studies are available, a comprehensive evaluation for Europe as a whole is still missing, mainly due to data limitations. We try to fill this gap by combining the information present in the last harmonized income survey, the European Union Statistics on Income and Living Conditions relative to 2006 by EUROSTAT (EU-SILC), with that of the Harmonized European Time Use Surveys (HETUS). We apply both the opportunity cost and the market replacement approaches to evaluate UPW and UFCW. For Europe as a whole, we find that the value of UPW and UFCW taken together ranges between 27.1% and 36.8% of GDP, depending on the applied methodology. Finally, we discuss the estimated values of UPW and UFCW at a country level, pointing out the different contribution that domestic and family care work would provide to each national economy if included in the national accounts and the reasons for which these differences emerge.

Keywords: Unpaid Domestic Work, Gender Inequality, Family Care Work.

JEL classification: D19, J16, R20

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1 Introduction

Unpaid family 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 relevant share of their time in performing care activities, sometimes for their own choice and some other times 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 size relative to all other activities performed in a society.

Once their size is known, the following questions to be addressed concern the value to be attributed to these activities, a problem which is relevant at least under two respects. First, knowing the value of unpaid family care work would help making this work "economically" visible, namely, 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 help employing cost benefit analysis to choose the most efficient and less costly way to provide them. For example, it would help deciding what is the best strategy to supply unpaid family care work, either through the market or through the State or through a combination of them; or if it is better that households take the burden of it, and, if so, if household's income should be adequately supported by the State.

The distribution of time across different activities gives a first general picture of the daily share of time spent in domestic work. Despite of the variability which can be observed among European countries, especially if one focuses on the gender dimension of the phenomenon, we focus on the European size of the analysis. For example, Figure 1 shows that looking at the whole sample (males plus females), labour[1] and domestic work amount to around 200 minutes on average, while leisure takes the largest share in the distribution of time reaching a mean value of 320 minutes per day.

European women spend 257 minutes of their daily time in domestic work, versus 147 minutes of men. Labour occupies just less than three hours per day, while men work four hours and a half per day. Figure 1 shows that child care work, compared to total domestic work, is a small share, especially the part carried out by fathers (13 versus 33 minutes of mothers). Child care take small values both because this type of analysis takes into consideration only primary activities[2] and because the average values include also households without children. This is confirmed by Figure 2 in which the time spent on childcare by "on leave" persons is much larger than the average.

From these pictures it emerges that house and family care seem to remain a woman's responsibility, following the traditional division of activities within the household. Thus, European women are characterized by a heavier load of domestic work and child care work, even if there are differences in relation to household income, household size and level of education. EU-SILC data confirm this idea in Table 1. The table shows the country/gender distribution of people

[1] In this paper we use the word "labour" for market work.

[2] See Section 4.1 for an extensive discussion on this point.

working less than 30 hours per week because of the necessity to engage in domestic activities. At the European level up to 96.84% of individuals with this constraint are women. However the figures vary among countries: men reach the 11.56% only in Hungary where probably the socialist heritage of universal women participation in the labour market still influence labour market after transition to a market economy.

With these figures in mind, the aim of this study is to provide a methodology to analyse the size and value of unpaid domestic work (UPW from here onward) and unpaid family care work (UFCW) at the EU level. While at the country level several studies are on hand, a comprehensive evaluation for the whole Europe is still missing, mainly due to data limitations. We try to fill this gap by combining the information present in the last harmonized income survey, the European Union Statistics on Income and Living Conditions relative to 2006 by EUROSTAT (EU-SILC), with that of the Harmonized European Time Use Surveys (HETUS).

EU-SILC 2006 is a European household survey for 24 EU member States 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 harmonized time use surveys, it provides exactly the information which is missing in EU-SILC.

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 UPW and UFCW . 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 UPW and UFCW. Nonetheless, the magnitude of the phenomenon that emerges from the study is significant and can possibly be considered as useful information by the policy maker when implementing family support instruments.

Our evaluation strategy consists of assigning to each person observed in EU-SILC an imputed amount of time dedicated to UPW and UFCW derived from HETUS. Then, we propose indicators of the values of UPW and UFCW based on the opportunity cost approach (Gronau, 1973) and on the market replacement approach (Pagnossis-Aligisakis, 1999). It is to be noted that different estimated values can be obtained according to the technique used for evaluation and the assumptions used in assigning time use values. For this reason we compare the results deriving from each technique, giving a range of values within which it is reasonable to place the "real" values of UPW and UFCW.

The paper is organized as follows. In section 2 we provide a description of the use of time in Europe, considered as a unique entity. Section 3 deals with the estimation of the values of UPW and UFCW through the integration of HETUS and EU-SILC. Section 4 concludes, summarizing the most relevant results and suggesting the necessary improvements in data collection for

conducting a more robust analysis at the European level.

2 Data preparation

The problem of evaluating unpaid domestic work in general, and unpaid family care work in particular, is in large part a problem of missing data.

The EU-SILC variable that can be exploited to indirectly estimate the value of unpaid domestic work is weekly hours of labour (by means of the following subtraction: non labour time=total time – labour time). Clearly, this is not sufficient to determine the time spent in unpaid domestic or childcare work, since, as the above evidence shows, time spent in leisure is usually larger than time spent in domestic activities. A value of UPW estimated using non-labour time only would largely overestimate its true value, whatever criterion is chosen. Hence, to implement the analysis, we combine HETUS and EU-SILC data.

The main difficulty of using jointly information collected from different surveys is that the interviewed individuals are not the same. This means that individual x in EU-SILC cannot be found in HETUS and individual y in HETUS cannot be found if EU-SILC. 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 necessary condition for this to be feasible is the availability in both dataset of a common set of individual, household and environmental characteristics capable of predicting adequately the sought variable.

Once this common set of characteristics is chosen and properly coded (it must be identically structured in both data sources), a variety of techniques could be used in order to perform the matching. Among them we find regression based matching, propensity score matching and stochastic matching (often referred to as "Hotdeck matching" techniques). The choice of the technique to be applied is often related to the kind of information that is matched, but in our case there is not a real option of choice. In fact, despite of the availability of an on-line application which can generate personalized tables of average time devoted to a broad range of activities, we could not have access to HETUS micro data[3]. Hence, the only chance to perform a matching of time use information into EU-SILC was to generate a table of average time spent into activities by the individuals over few characteristics available in the web application that we have found the most useful to explain data variability. Moreover, HETUS covers only a part of the countries present in EU-SILC, further limiting the possibility of performing a good matching.

The chosen strategy to overcome these issues is the following. In order to maintain the highest degree of heterogeneity at the end of the matching process we have decided to use the already available information on non labour time in EU-SILC. In HETUS, we aggregated time spent into activities in 4 categories: labour, domestic work, childcare, leisure and other activities. We have calculated the share of total time devoted to each of these categories excluding labour,

[3]The reason is that HETUS is a harmonized collection of independent national time-use surveys. To have access to the whole dataset we should have arranged single agreements with each statistical institute involved.

calculating, say, how a person allocate his/her time into non-labour activities. These shares are the variables which are actually matched into EU-SILC[4]. The multiplication of these shares for the non labour time of each individual in EU-SILC generates the actual amount of time devoted to domestic work, childcare work, leisure and other activities.

The matching is performed over average shares of time use categories defined by country, gender and life-cycle[5]. This means, for example that to an Italian man in his first phase of life-cycle, working 8 hours per day (i.e. 16 hours of non labour time) observed in EU-SILC are assigned the corresponding average shares of domestic work, childcare, leisure and other activities observed in HETUS. If these shares are 35% of domestic work, 0% of childcare, 25% of leisure and 45% of other activities, the time devoted to each of them would be

Domestic work:	16 * 0.30 = 4.8 hours per day
Childcare work:	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 labour time observed for each individual of EU-SILC.

However, 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, we impute the values of time use shares using a set of individual, household and environmental characteristics. We have used a large set of predictors in order to catch, at least in part, country specific behaviours. This may seem rather difficult, but it should be noted that even though it is true that in Europe each country has its own peculiar characteristics, the observed variability of time spent in domestic and child care activities is much lower than, for example, the variability observed for earnings.

For this reason the imputation of time use information is conducted using a simple regression technique on the natural logarithm of time use shares[6]. We decided to impute time use shares rather that time use values directly in order to exploit the individual heterogeneity of non-labour time from EU-SILC. The average values of time spent in domestic work, child care, leisure and other activities before and after imputation are reported in Table 2.

The Opportunity Cost (OC) and the Market Replacement (MR) approaches are then used as evaluation strategies for computing the values of UPW and UFCW for all European countries using the imputed time use categories. Each of these approaches has its own pros and cons, and needs further data preparation in order to be applied. This is discussed in the next section.

[4]For countries comparability reasons HETUS reports people aged 20-74 only. Hence, we drop from EU-SILC people younger than 20 and older than 74.

[5]Life-cycle is a composite variable that defines the life cycle of individuals according to their age, living with parents, being married and having children. A total of 11 possible stages of life-cycle are recorded in HETUS and are reconstructed in EU-SILC.

[6]The choice to use logarithms is driven by the preference for a predictive method which avoids negative predicted shares. Also, being shares naturally bounded between 0 and 1, the use of a logarithmic transformation increases the variability of the dependent variables, improving the goodness of fit of the regression.

3 Wages estimation

3.1 Imputing wages for the OC

The OC approach relies on the assumption that each hour devoted to domestic activities could be productively employed in the labour market. Such hypothesis implies that each hour devoted to domestic activities should be evaluated at the 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.

The evaluation of UPW and UFCW for actual workers presents no particular difficulties, since wages are actually observed in the data. However, some difficulties arise from the incomplete harmonization of income data between countries. Some countries record only gross yearly wages, others record net wages and others both of them[7]. We have chosen to use gross wages whenever available and net wages as a proxy for gross wages when they are not available[8]. This could lead to an underestimation of the values of UPW and UFCW for these countries, but taking into account that the differential is usually around 30% and that these countries are only four, the overall effect on the European values should be small.

For potential workers two further problems arise: the identification of the set itself and the estimation of the potential wage to be attached to any potential worker. We define as potential workers all non working individuals older than 20 and younger than 65[9] 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 Europe, while workers for which a salary is actually observed in the data are 158 millions.

We deal with the problem of the wage estimation for potential workers using a Heckman Selection model (Heckman, 1979), separately for men and women[10]. The model takes into account that potential workers may have different characteristics from the workers, which represent a "selected" group.

The model estimates 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.

In order to estimate wages, we compute the natural logarithm of hourly wages. This choice improves the fitting power of the estimates and allows avoiding by construction negative predicted salaries. 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, pc and washing machine, some economic difficulty indicators,

[7] Such a problem should be completely eliminated starting from the 2007 wave of EU-SILC.
[8] Gross wages are not available for Greece, Italy, Latvia and Poland.
[9] This value is chosen for consistency with HETUS tables, which include people aged 20-74.
[10] See the Appendix for details.

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 the Appendix). We tried to separate those variables which are more likely to explain participation from those which are likely to explain the wage level.

Once estimated the Heckman Selection model, it is possible to predict a salary for potential workers. The distributions of the observed and predicted potential wages for men and women are presented in Figure 3. 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 structure the sample of potential workers which includes people "fulfilling domestic tasks" (mostly women) 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. This implies that female potential workers include more than 23000 individuals, on a number of female workers of almost 86000. On the other side, male potential workers are just 7000, over 95000 actual workers[11]. This is why the wage equation for men is estimated more precisely than that for women.

Table 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 UPW and UFCW with the opportunity cost approach.

3.2 Computing wages for the Generalist MR (GMR)

The GMR 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 like in the OC case, but also retired people[12]; 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 MR approach leads us to expect that the MR value of unpaid work could also be larger than its OC value[13].

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, hence maintaining the country heterogeneity naturally observed in the data. We assume the wage of generalist domestic worker to be the

[11]These figures refer to the actual sample unit individuals and are not reported to the actual European population. For instance, when we say 7000 potential workers, we mean than in the sample there are 7000 observations of individuals which are potential workers. In real population terms this value would rise to several millions.

[12]Obviously, we can not assign an OC to retired people, since they are receiving a pension anyway.

[13]In the literature concerning the comparison between the two approaches it turns out that the OC value of unpaid work is bigger than the MR value (because the average OC 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 this work is, for comparative purposes, of the same size. Since our task is to estimate the value of unpaid work in Europe, with the MR approach we can also take account of the value of unpaid work supplied by retirees.

ISCO-88 code 91 occupation (Sales and services elementary occupation), which include, among other similar workers, the category "Domestic and related helpers, cleaners and launderers". Table 4 resumes the values (in euros per hour) of the generalist domestic worker wage for each country. These are indeed the values used to compute each evaluation when using the market replacement approach. The extreme variability between these figures is the reason why we prefer to avoid adopting a unique European wage.

3.3 Computing wages for the Specialist MR (SMR)

The detailed information about time use categories present in HETUS allows us 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 time devoted to UFCW, it is possible to assign to each activity related to child care a specific wage[14]. 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. The codes we decided to use are 51 - Personal and protective services workers - for Physical care, supervision of a child; 23 - Teaching professionals - for Teaching, reading, talking with a child[15]; 83 - Drivers and mobile plant operators - for Transporting a child.

The observed and imputed time devoted to disaggregated child care activities is presented in Table 5. Table 6 reports country and gender specific average wages used to compute the value of UFCW with the SMR approach.

3.4 Computing wages for outsourced child care estimation

Finally, we take into account the value of childcare which is outsourced to other family members (e.g. grandparents). 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 7 shows the country average time spent in outsourced childcare[16].

The evaluation of outsourced child care is performed to compensate the results of the OC approach. Since the MR approach includes in the evaluation also the time spent by individuals not included in the labour force, as elderly people, the evaluation of outsourced child care compensates the OC evaluation of UFCW for this aspect. This value should not be added

[14]Instead, for UPW, 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. Hence, this would not improve the analysis in this respect.

[15]We could have chosen code 33 (Teaching assistant professionals), because this code would avoid including university professors which may overestimated the average parent teaching ability, but code 33 has too few observation in the data producing poorly significant country/gender averages, such that for Greek and Ireland men there were no observations.

[16]EU-SILC has a detailed section on hours of child care spent by children in different types of formal and informal care. Therefore, we are able 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.

to the MR estimates, unless in the case in which only the active population is used in the computations.

4 Results

4.1 The values of UPW and UFCW in the EU

This section presents the values of unpaid domestic work and unpaid family care work estimated with the OC and the MR approaches, both generalist and specialist, for Europe as a whole[17]. The absolute values together with their percentage on the EU GDP are presented by estimation methodology.

With the OC approach, the values of UPW and UFCW are 2655 and 470 billion Euros respectively, summing up to 3125 billion Euros for the whole European domestic activities. This value correspond to 27.1% of the 2006 EU GDP (11543 billion Euros – Source: Eurostat 2006). On the other hand, the values estimated with the GMR approach are 3570 and 458 billion Euros. They sum up to 4028 billion Euros, which represents 34.9% of the EU GDP.

These results may seem in contrast with the general findings in the economic literature, in which OC 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 OC and MR approaches. MR values are computed on a much larger population share than OC, which instead excludes all retired persons from the computation. If the reference population was the same, MR values would drop to 1910 and 335 billion Euros for UPW and UFCW respectively, hence smaller than those found with the OC 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 the daily time constraint 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 important.

The second reason for these small values of UFCW is that not every person 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.

[17]The following results refer only to the 24 EU countries of EU-SILC, hence do not include Malta.

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 specialized salary could be attached to different activities of childcare (SMR approach)[18]. 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.

The value of unpaid family care work computed with the SMR approach is 674 billion Euros, which is 49% larger than that computed with the generalist market replacement and represent 5.8% 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% of EU GDP.

Table 8 summarizes 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 8 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 taking into account 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 specialized workers. For the lower bound, the values of unpaid domestic work and unpaid family care work sum up to 20.1% of the EU GDP. On the other hand, for the upper bound, the value rises to 36.8% 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.

4.2 UPW and UFCW in the European Countries

In this section we present the results concerning the values of UPW and UFCW for each single country, in order to provide evidence on the variability among EU Member States and trying to give a reasonable explanation for this variability through some cross-country comparisons[19]. In this section, for simplicity, we focus on the values estimated with the OC and SMR approaches.

UPW values presented in Table 9 account for nearly all Member States: if European Satellite Accounts with household productive activities would be constructed, GDP level and the distribution across countries would result very different from the standard National Accounts.

As already said, the computed values of UPW highly depend on the national labour market features and wage (and potential wages) levels. The relation between market replacement results and opportunity cost estimates is not constant in all the State. As explained in the previous section, GMR show higher values with respect to OC because of a larger population base over which the index is calculated. For instance, in Austria UPW estimated with opportunity cost accounts for 21.8% of GDP, while with market replacement only for 28.6%. For some countries,

[18]The salary of a professional childcare worker is usually higher that of a domestic worker.

[19]The estimated values presented in this section come from the matching procedures extensively described in Section 2 and in the Appendix. Original data on time use are used for the 14 HETUS countries, while time use data for the countries not included in HETUS but included in EU-SILC are statistically imputed.

however, this is not the case and the two values are very close. This happens mostly for former socialist countries where the role of women in the labour market is traditionally more important. The higher wages of potential workers, in these countries, compensate for the smaller population base used to compute the value.

Looking at the differences among Member States (Table 9), Germany and Belgium have the highest values for unpaid domestic work in terms of GDP percentage, whatever the estimation approach. On the contrary, smaller values are recorded for Baltic States, Iceland and Czech Republic. In absolute terms, the main contributions to European unpaid work value is given by largest countries, as Germany, UK, France and Italy, characterized by rather high wage levels and large populations.

Table 10 gives the values of unpaid family care work with both methods: in this case market replacement approach is computed using specialist method, and is portioned in teaching, physical care and transportation, using the specialist salaries for the estimation of final values.

Results show that UFCW values are rather close in all countries - at least in GDP percentage terms - showing a smaller variability with respect to the estimates of UPW. On the other side the absolute values consistently show that few countries contributes for the most part of the European value of UFCW (see Figure 4). The main contribution is again given by the "old" Member States, while in percentage of GDP Poland has the largest share in EU (SMR), together with Cyprus, Germany and United Kingdom. Lowest values of family child care are again in the Baltic States.

Looking both at Table 9 and Table 10 from a gender perspective, we see that the difference is less than expected.The time devoted to domestic activities by women is significantly larger than that of men. Nonetheless, men contribute to the values of UPW and UFCW almost as much as women do (at least for some countries). This is mainly due to the salary gap which still exists in Europe, which results in 16% higher salaries for men.

To deepen the comparative analysis and understand why these differences emerge, it is necessary to look at how the monetary values UPW and UFCW are composed. The underlying relation which determines the country values can be decomposed as *country population* times the *average time devoted unpaid activities* times the *value of this time* (in our cases some hourly wage). Given that country population can be considered a purely exogenous factor for a policy planner (at least in the short term), we concentrate on the relation between time and value in order to identify groups of homogeneous countries with similar characteristics. The choice of concentrating on these aspect is motivated by the fact that time spent in domestic activities can be associated to the traditional culture of a country and the average salary to its economic development.

Hence we compare the average time devoted to UPW and UFCW and the average salary of each country of the study. A graphical analysis of UPW (Figure 5) shows that at least three groups can be identified. A first group characterized by small salaries and small amounts of time devoted to UPW composed by Croatia, Greece, Hungary, Latvia, Portugal and Slovakia. A second group, characterized by large salaries and rather small amounts of UPW time, is composed by Austria, Belgium, Denmark, Finland, France, Ireland, Luxembourg, Sweden and the United Kingdom. Finally a third group, characterized by low wages and large UPW time

amounts can be identified, and is composed by Estonia, Lithuania, Poland and Slovenia. Other countries, such as Cyprus, Germany, Italy and Spain seem not belong to other groups. Germany shows a combination of a large amount of time devoted to domestic work and a high average salary. Considering these three groups, it is possible to see that group one and two have similar amounts of domestic work times while the economic development is much higher for the second group. We could say that the per-capita value of UPW is higher in this group of nations because of higher salaries. On the other hand, group three has a similar level of economic development as the first group, but the traditional structure of families implies that group three devotes much more time to domestic work. Here the appearance that economic development reduces the time spent in domestic activities may be misleading since a rather large group of less developed countries spend the same amount of time in domestic work as the group of developed countries. Traditions seem to be more important than economic development.

The same analysis for UFCW (Figure 6) reveals that 4 groups of countries could be identified. A first group composed by Croatia, Estonia, Greece, Hungary, Latvia, Lithuania, Portugal, Slovakia, which is characterized by low average salaries and scarce time devoted to UFCW; a second group composed by Ireland, Sweden and the United Kingdom, characterized by high salaries and large amounts of time devoted to UFCW; a third group composed by Cyprus, France, Italy and Spain, characterized by average salaries and average time devoted to UFCW; and a fourth group composed by Austria, Belgium, Denmark, Finland, Germany, Luxembourg and the Netherlands, which is characterized by high salaries and small amounts of time devoted to UFCW. Finally there is Poland which seems to be an outlier, characterized by a low salary level and a very large amount of time devoted to UFCW. The groups distinctions about childcare activities is slightly more articulated. The first and fourth groups show similar childcare attitudes, but group four is economically much more developed. The third group is more economically developed and dedicates more time to children with respect to group one. In turn, the second group shows higher economic development and childcare time than the third. This seems to suggest that a positive relation between economic development and the time spent with children, with the exception of a group of developed countries which happen to be composed mostly by countries with a continental welfare state.

We try to confirm these intuitions by conducting a hierarchical cluster analysis on the same two dimensions (time and value) for UPW and UFCW[20]. The results are presented in two cluster dendrograms (Figures 7 and 8).

The groups that emerge are slightly different respect to the graphical analysis of Figures 5 and 6. As regards UPW (Figure 7), three groups seems to emerge: a first with Estonia, Germany, Italy Lithuania, Poland and Slovenia; a second with Austria, Croatia, Finland, Greece, Hungary, Ireland, Latvia, Portugal, Slovakia, Spain and Sweden; and a third with Belgium, Denmark, France, Luxembourg, the Netherlands and the United Kingdom. Cyprus seems to be an outlier.

Looking at UFCW (Figure 8), it is possible to see that two big groups are present, plus one small group, composed by Denmark and Luxembourg, and Poland alone. The first group is

[20]The single linkage is distance measure used to present the results. Dendrograms which use other distances are available upon request.

composed by Croatia, Cyprus, Estonia, Greece, Hungary, Italy, Latvia, Lithuania, Portugal, Slovakia, Slovenia and Spain. The second group contains Austria, Belgium, Finland, France, Germany, Ireland, the Netherlands, Sweden and the United Kingdom.

The groups obtained with the cluster analysis are to some extent different from the groups identified with the graphical analysis. Figures 9 and 10 summarize these differences and show how a cluster analysis, which uses statistical tools alone, may be insufficient when trying to extrapolate economic meaning from the data. Look for example at Figure 8: the group identified by small amounts of domestic work times and low salaries with the cluster analysis is extended up to include Ireland, which has almost 10 times the average salary of Latvia. Still they are included in the same group. Similarly, looking at Figure 9, Spain is in the same group of Greece, even though Spanish people on average spend 50% more time in childcare activities.

5 Summary and Conclusions

The present paper presents the methodology and the results of a comprehensive evaluation of unpaid family work in Europe, separating unpaid domestic work (such as cleaning, ironing, cooking, and so on) from unpaid family care work (mostly childcare).

A descriptive analysis shows, consistently with the literature, the persistence in Europe of gender specific roles within the family. Men spend more time than women working in the labour market and much less in domestic work, while women allocate less time than they would like to labour because of domestic and childcare activities.

The main task of the paper is to devise a methodology to build a monetary value to unpaid domestic work (UPW) and unpaid family care work (UFCW) at the EU level. The analysis is conducted for all the EU25 countries except Malta, both for comparative reasons and to give some indications about the weight that unpaid domestic work has in each European economy.

Both the opportunity cost and the market replacement approaches are applied, finding, for the EU as a whole, that the comprehensive value of unpaid family work (UPW plus UFCW) ranges between a minimum of 27.1% and a maximum of 36.8% of GDP. Unpaid family care work alone ranges from a minimum of 3.9% and a maximum of 5.8% of European GDP, depending on the applied methodology. These figures may appear large, but, as shown in Figure 1, 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 paper discusses the values of UPW and UFCW at a country level, pointing out the different contribution that unpaid family work would provide to its own economy if included in the national accounts. This contribution varies from 9.9% of GDP in Latvia to 42% of GDP in Germany (Table 9). The disaggregation by gender shows that the difference in the value of unpaid domestic work between men and women is smaller than expected (see Table 9 and 10). This is in part due to the gender pay gap, which is still important in the EU, and in

part to the lower salaries of potential workers, which are mostly women. Consequently, one hour of domestic work of men is valued much more than that of women.

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, and not to a higher amount of time devoted to domestic activities in these countries. In fact, countries with large average time devoted to UPW (the most relevant domestic activity in terms of % of GDP) have also small average salaries.

The cross-country analysis of UPW and UFCW by their time and salary components reveal two important stylized facts: the first is that economic development is not the cause of a reduced amount of time devoted to unpaid domestic work (traditions seem to be more important), the second is that the more a country is economically developed the more time is devoted to childcare, probably because it is considered a valuable activity, similarly to leisure time. This is not true for a group of countries which belongs to the bismarckian continental welfare state regimes, in which the services provided by the state for childcare are widespread and the culture of women labour force participation is highly developed.

The last consideration is a demand for better data. If on the one side many of the harmonization 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 harmonized 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.

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Figures

Figure 1: Different categories of time use (minutes per day), males and females aged 20-74. (Source: HETUS)

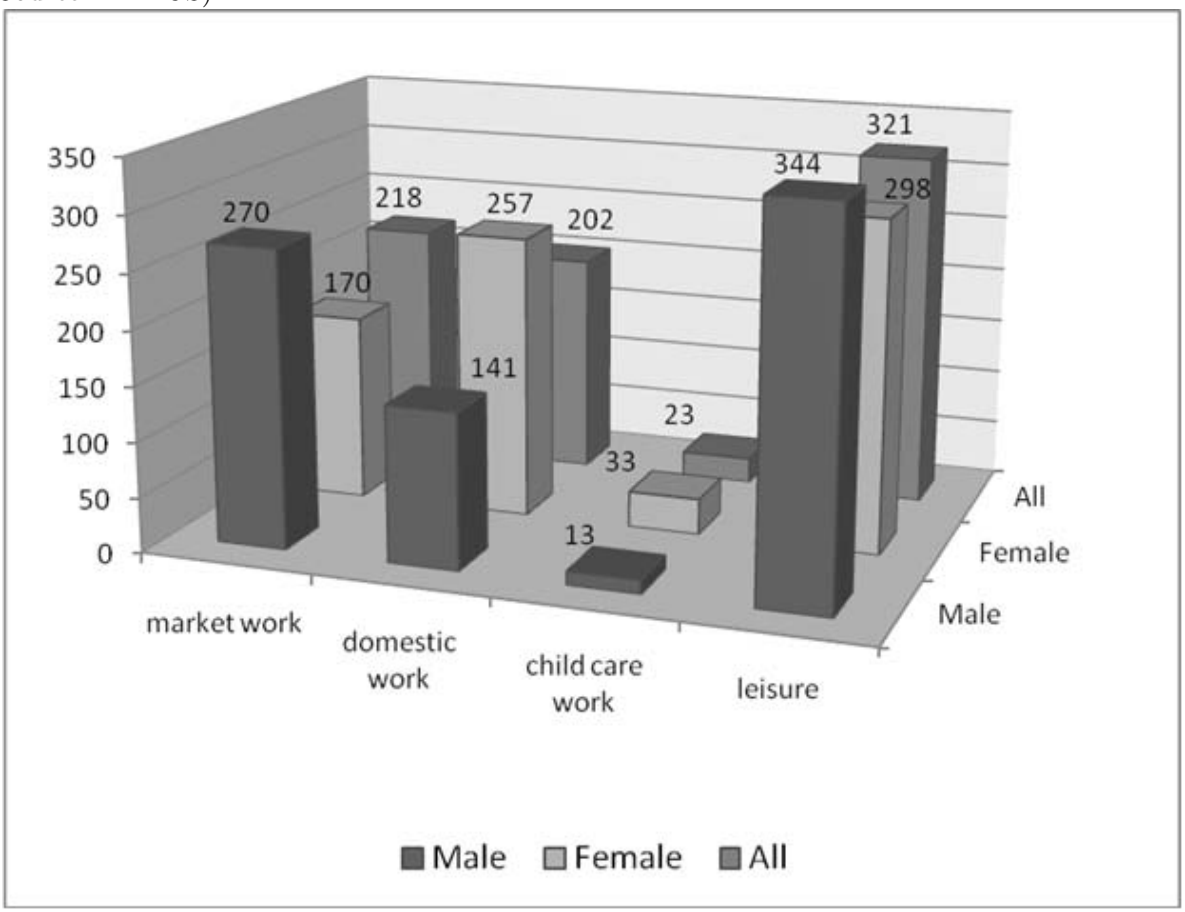


Figure 2: Distribution of time by employment status, males and females aged 20-74 (Source: HETUS)

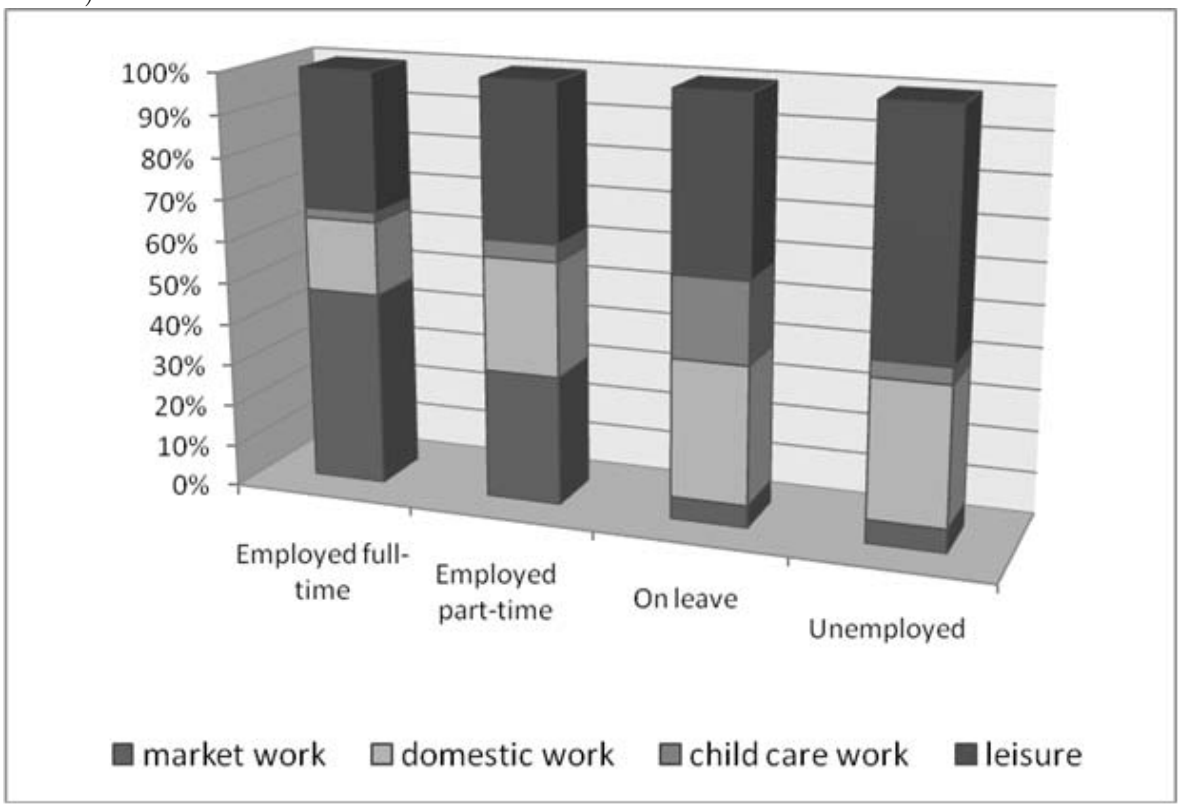


Figure 3: Observed and imputed potential wages for men and women (Estimates on EU-SILC 2006, values in logs of €/h)

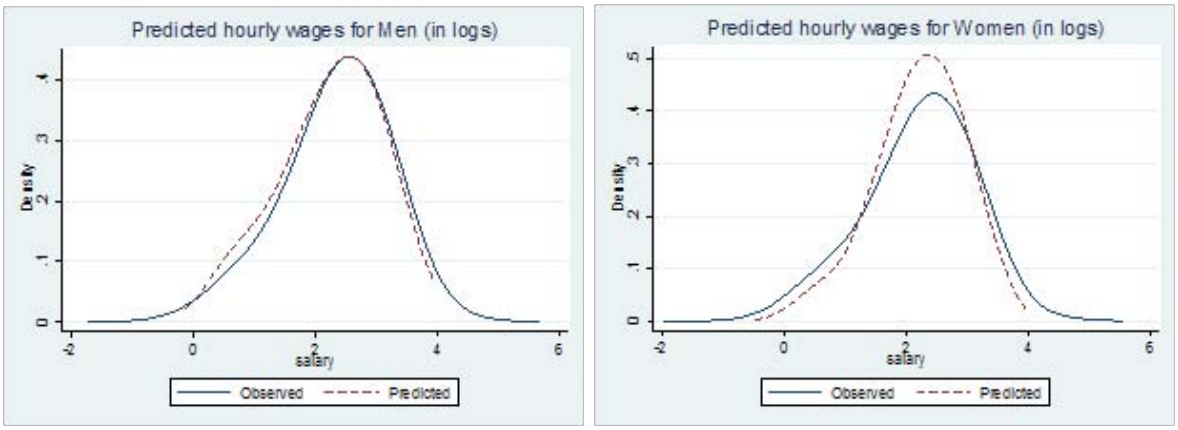


Figure 4: Member states' contribution to UFCW in Europe

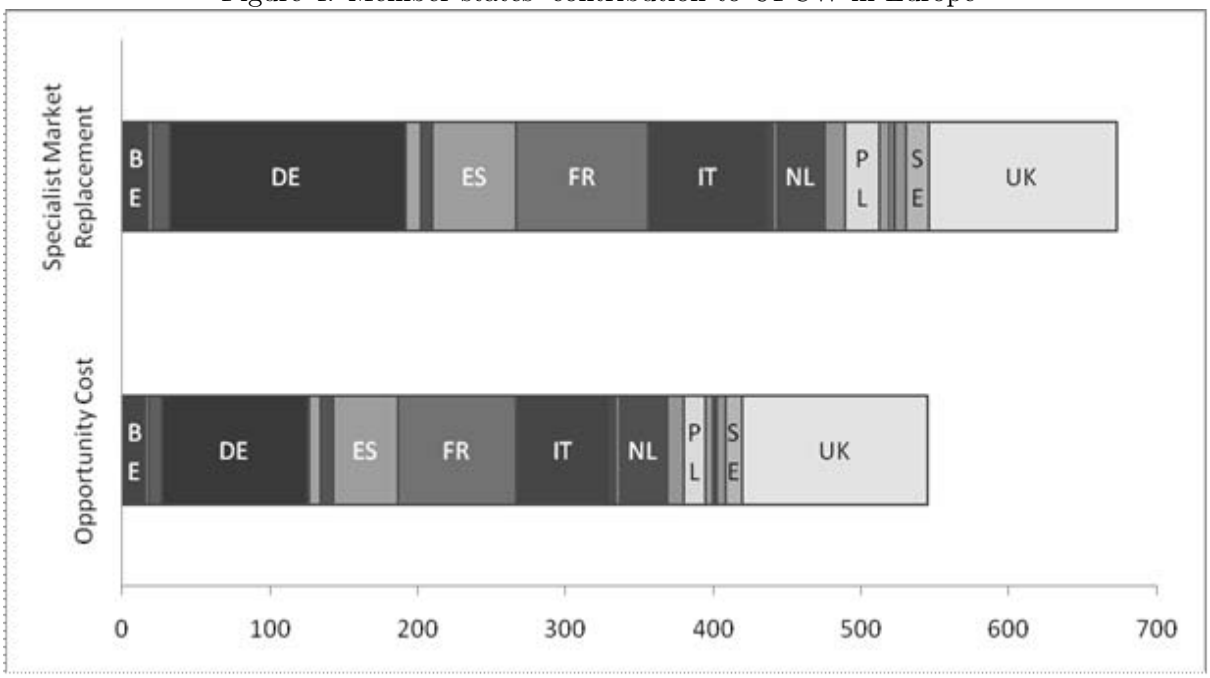


Figure 5: Average domestic work time and salary by country (in minutes per day and euros/h)

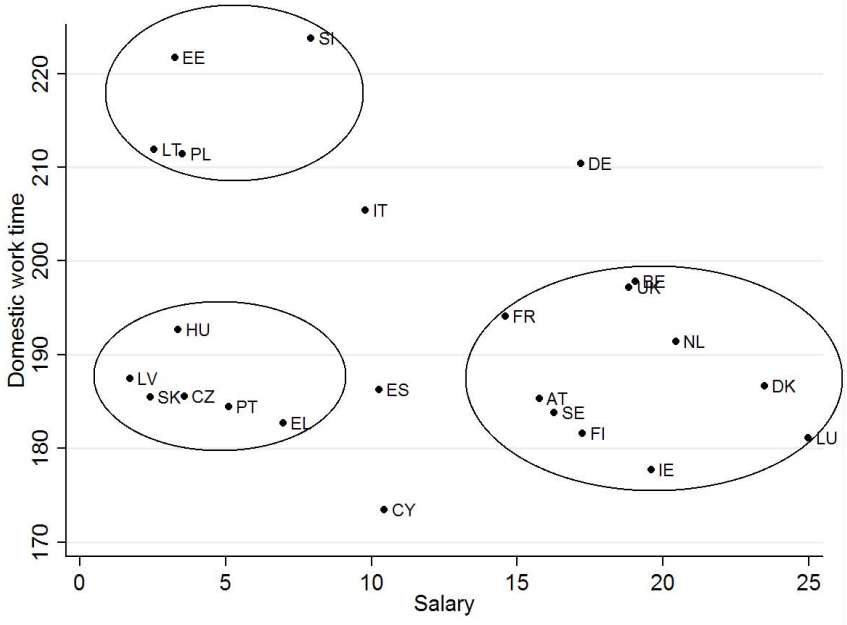


Figure 6: Average childcare work time and salary by country (in minutes per day and euros/h).

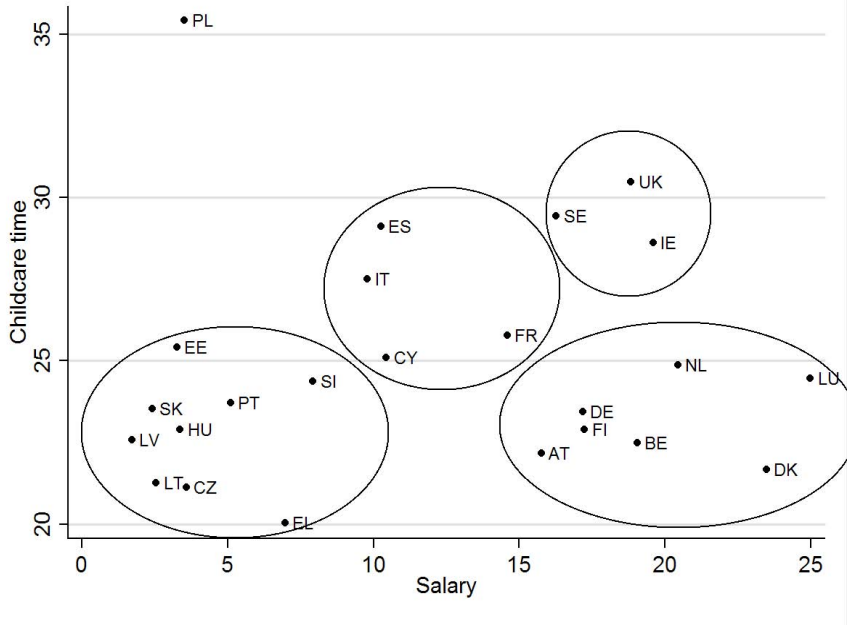


Figure 7: Cluster dendrogram of domestic work time and salary (single linkage).

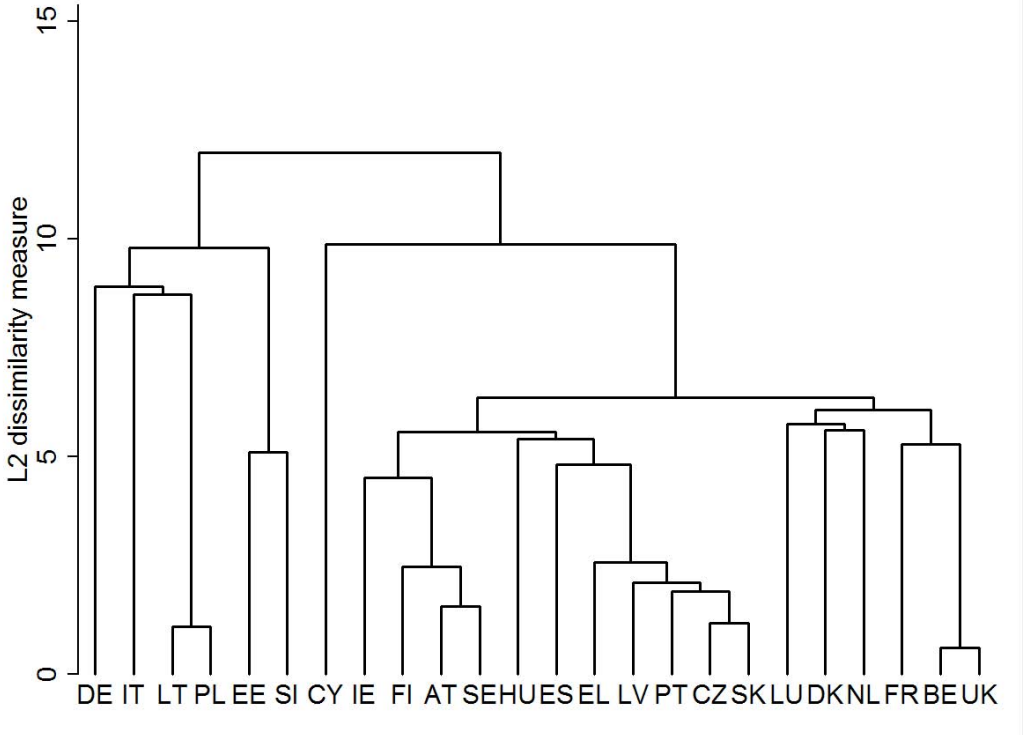


Figure 8: Cluster dendrogram of childcare work time and salary (single linkage).

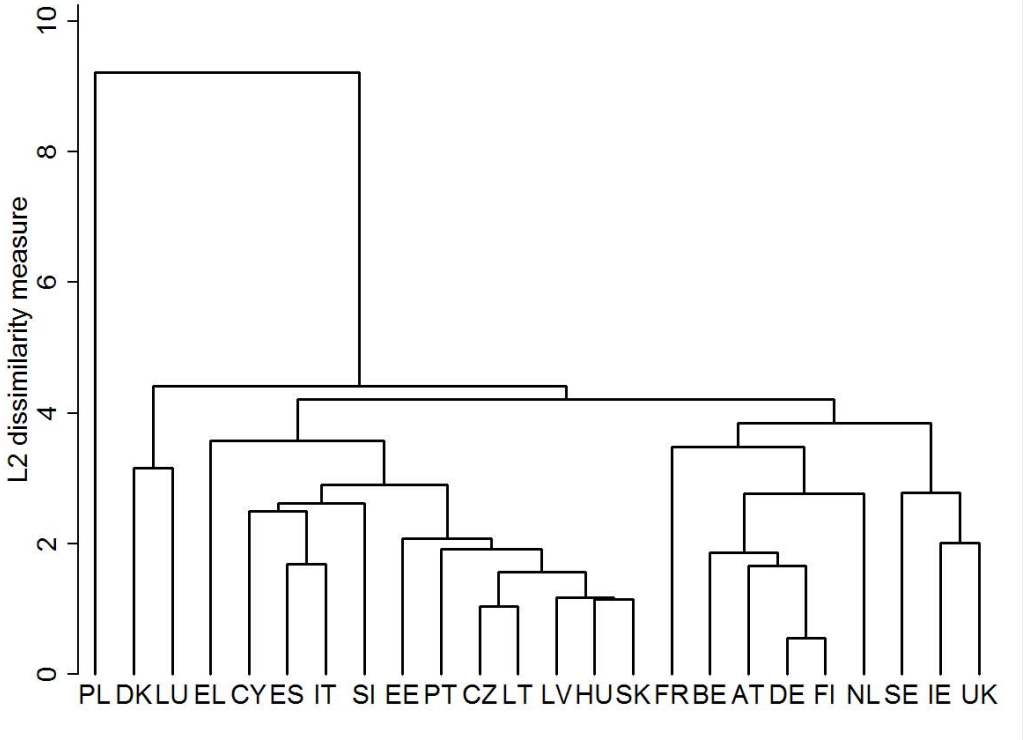


Figure 9: Country groups for unpaid domestic work - graphical and cluster analysis

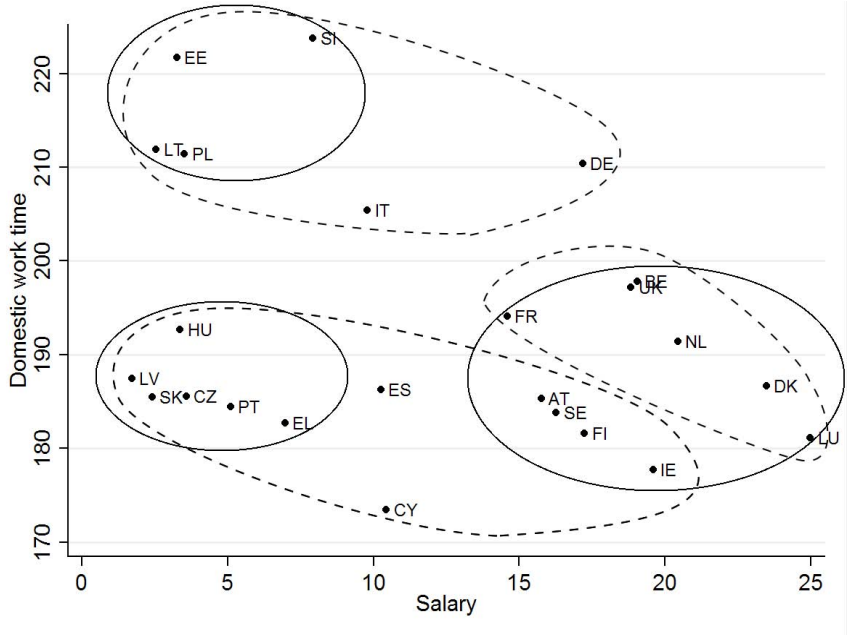
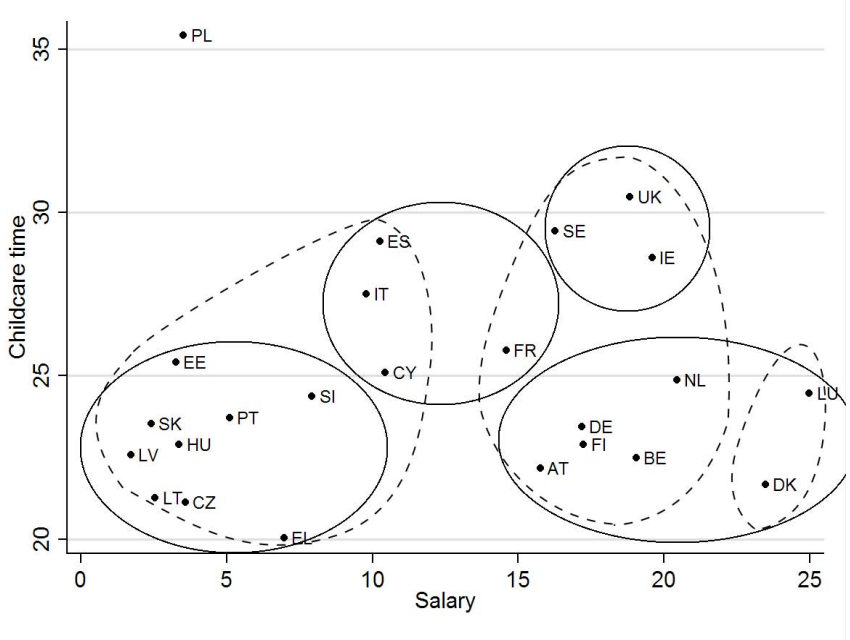


Figure 10: Country groups for unpaid childcare work - graphical and cluster analysis



Tables

Table 1: Employees working less than 30 hours because of domestic work

country	men	women	country	men	women
BE	1.4%	98.6%	LT	1.0%	99.0%
CZ	4.2%	95.8%	LU	1.7%	98.4%
DK	6.5%	93.5%	HU	11.6%	88.4%
DE	3.3%	96.7%	NL	1.2%	98.8%
EE	1.6%	98.4%	AT	1.5%	98.5%
IE	3.3%	96.7%	PL	2.8%	97.2%
EL	4.8%	95.2%	PT	1.3%	98.7%
ES	2.1%	97.9%	SI	2.8%	97.2%
FR	5.2%	94.8%	SK	4.5%	95.5%
IT	3.1%	96.9%	FI	- *	- *
CY	1.4%	98.6%	SE	8.9%	91.1%
LV	6.0%	94.0%	UK	3.2%	96.8%
EU	3.2%	96.8%			

* Information not collected

Source: EU-SILC 2006

Table 2: Observed and imputed time use categories (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

Table 3: Observed and imputed salaries by country and gender

	Men		Women			Men		Women	
Country code	Obs.	Imp.	Obs.	Imp.	Country code	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

Table 4: Average domestic worker salaries by country (euro/h, 2006)

Country code	Wage	Country code	Wage
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

Table 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

Table 6: Hourly wages related to specialized childcare activities (euro/h, 2006)

Country	Physical care		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

Table 7: Average time spent by a child in outsourced child care (minutes per day) and specialist wage (euro/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

Table 8: Values of UPW and UFCW in billions of Euros, including child care outsourced to relatives (% of GDP in parentheses)

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 9: UPW in EU Member States in 2006

Country	GDP	Opportunity Cost				Specialist Market Replacement			
		male	female	Total	% of 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

Table 10: UFCW in EU Member States in 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

Appendix: Wage estimation for potential workers

In order to estimate the values of UPW and UFCW with the cost opportunity approach it is necessary to estimate potential hourly wages for potential workers. To predict these potential salaries we use the Heckman Correction model, which allow 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. These two groups are not randomly composed. Their composition, in fact, 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

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

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 our application, we estimated two separate wage equation for men and women. Observed wages have been replaced by their natural logarithm and the variables used in selection (Z) and wage (X) equations are reported in Table 11 and Table 12 respectively. The descriptive statistics of the used variables are reported in Table 13 and Table 14, while the estimated parameters for both selection and wage equations for men and women are reported in Table 15, Table 16, Table 17 and Table 18. 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 χ^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 will not be further commented.

Table 11: Variables of the selection equation (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 12: Variables of the wage equation (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 13: Descriptive statistics for Z variables

Variable	Mean	Std. Dev.	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_sq	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 14: Descriptive statistics for X variables

Variable	Mean	Std. Dev.	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_sq	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 15: Men selection equation estimates

Variable	Coefficient	Std. Err.	z	P>z	[95% Conf.	Interval]
_Icountry~_2	-0.3093	0.0687	-4.5000	0.0000	-0.4439	-0.1746
_Icountry~_3	0.2277	0.0815	2.7900	0.0050	0.0679	0.3875
_Icountry~_4	0.0414	0.0700	0.5900	0.5540	-0.0958	0.1786
_Icountry~_5	-0.2657	0.0628	-4.2300	0.0000	-0.3889	-0.1426
_Icountry~_6	0.2184	0.1040	2.1000	0.0360	0.0146	0.4221
_Icountry~_7	-0.0089	0.0754	-0.1200	0.9060	-0.1567	0.1389
_Icountry~_8	-0.1998	0.0682	-2.9300	0.0030	-0.3334	-0.0662
_Icountry~_9	-0.0262	0.0751	-0.3500	0.7270	-0.1734	0.1209
_Icountry~10	-0.2870	0.0655	-4.3800	0.0000	-0.4155	-0.1586
_Icountry~11	-0.0961	0.0719	-1.3400	0.1810	-0.2369	0.0447
_Icountry~12	0.0117	0.0680	0.1700	0.8640	-0.1217	0.1450
_Icountry~13	-0.2355	0.0787	-2.9900	0.0030	-0.3898	-0.0812
_Icountry~14	0.7234	0.1486	4.8700	0.0000	0.4322	1.0146
_Icountry~15	-0.2371	0.0601	-3.9500	0.0000	-0.3548	-0.1194
_Icountry~16	-0.0918	0.0799	-1.1500	0.2510	-0.2485	0.0649
_Icountry~17	0.2645	0.0830	3.1900	0.0010	0.1019	0.4271
_Icountry~18	0.2682	0.0783	3.4300	0.0010	0.1148	0.4216

_Icountry~19	0.0655	0.0968	0.6800	0.4990	-0.1242	0.2551
_Icountry~20	0.2663	0.1002	2.6600	0.0080	0.0699	0.4626
_Icountry~21	-0.2138	0.0636	-3.3600	0.0010	-0.3384	-0.0892
_Icountry~22	-0.0749	0.0747	-1.0000	0.3160	-0.2213	0.0716
_Icountry~23	0.1932	0.0801	2.4100	0.0160	0.0361	0.3503
_Icountry~24	0.1966	0.0715	2.7500	0.0060	0.0564	0.3367
_Icountry~25	0.0256	0.0672	0.3800	0.7030	-0.1061	0.1573
_Icountry~26	-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_2	-0.0148	0.0270	-0.5500	0.5830	-0.0678	0.0382
_Iph010_3	0.1182	0.0342	3.4500	0.0010	0.0511	0.1852
_Iph010_4	0.2006	0.0765	2.6200	0.0090	0.0507	0.3506
_Iph010_5	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_2	-0.4173	0.0320	-13.0400	0.0000	-0.4801	-0.3546
_Ihs090_3	-0.1082	0.0299	-3.6100	0.0000	-0.1669	-0.0495
_Ihs100_2	-0.1964	0.0813	-2.4200	0.0160	-0.3557	-0.0371
_Ihs100_3	-0.1065	0.0694	-1.5300	0.1250	-0.2425	0.0295
_Ihs110_2	-0.4751	0.0357	-13.2900	0.0000	-0.5451	-0.4050
_Ihs110_3	-0.2897	0.0389	-7.4500	0.0000	-0.3659	-0.2135
_Ihh010_1	-0.1451	0.0869	-1.6700	0.0950	-0.3154	0.0251
_Ihh010_2	-0.0793	0.0882	-0.9000	0.3680	-0.2522	0.0935
_Ihh010_3	-0.1292	0.0873	-1.4800	0.1390	-0.3003	0.0419
_Ihh010_4	-0.1206	0.0873	-1.3800	0.1670	-0.2916	0.0505
_Ihh020_2	-0.1204	0.0348	-3.4600	0.0010	-0.1886	-0.0522
_Ihh020_3	-0.3869	0.0424	-9.1200	0.0000	-0.4701	-0.3038
_Ihh020_4	-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
/lnsigma	-0.7531	0.0059	-128.6200	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 16: Men wage equation estimates

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_sq	-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 17: Women selection equation estimates

Variable	Coefficient	Std. Err.	z	P>z	[95% Conf.	Interval]
_Icountry~_2	-0.3093	0.0687	-4.5000	0.0000	-0.4439	-0.1746
_Icountry~_3	0.2277	0.0815	2.7900	0.0050	0.0679	0.3875
_Icountry~_4	0.0414	0.0700	0.5900	0.5540	-0.0958	0.1786
_Icountry~_5	-0.2657	0.0628	-4.2300	0.0000	-0.3889	-0.1426
_Icountry~_6	0.2184	0.1040	2.1000	0.0360	0.0146	0.4221
_Icountry~_7	-0.0089	0.0754	-0.1200	0.9060	-0.1567	0.1389
_Icountry~_8	-0.1998	0.0682	-2.9300	0.0030	-0.3334	-0.0662
_Icountry~_9	-0.0262	0.0751	-0.3500	0.7270	-0.1734	0.1209
_Icountry~10	-0.2870	0.0655	-4.3800	0.0000	-0.4155	-0.1586
_Icountry~11	-0.0961	0.0719	-1.3400	0.1810	-0.2369	0.0447
_Icountry~12	0.0117	0.0680	0.1700	0.8640	-0.1217	0.1450
_Icountry~13	-0.2355	0.0787	-2.9900	0.0030	-0.3898	-0.0812
_Icountry~14	0.7234	0.1486	4.8700	0.0000	0.4322	1.0146
_Icountry~15	-0.2371	0.0601	-3.9500	0.0000	-0.3548	-0.1194
_Icountry~16	-0.0918	0.0799	-1.1500	0.2510	-0.2485	0.0649
_Icountry~17	0.2645	0.0830	3.1900	0.0010	0.1019	0.4271
_Icountry~18	0.2682	0.0783	3.4300	0.0010	0.1148	0.4216
_Icountry~19	0.0655	0.0968	0.6800	0.4990	-0.1242	0.2551
_Icountry~20	0.2663	0.1002	2.6600	0.0080	0.0699	0.4626
_Icountry~21	-0.2138	0.0636	-3.3600	0.0010	-0.3384	-0.0892
_Icountry~22	-0.0749	0.0747	-1.0000	0.3160	-0.2213	0.0716
_Icountry~23	0.1932	0.0801	2.4100	0.0160	0.0361	0.3503
_Icountry~24	0.1966	0.0715	2.7500	0.0060	0.0564	0.3367

_Icountry~25	0.0256	0.0672	0.3800	0.7030	-0.1061	0.1573
_Icountry~26	-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_2	-0.0148	0.0270	-0.5500	0.5830	-0.0678	0.0382
_Iph010_3	0.1182	0.0342	3.4500	0.0010	0.0511	0.1852
_Iph010_4	0.2006	0.0765	2.6200	0.0090	0.0507	0.3506
_Iph010_5	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_2	-0.4173	0.0320	-13.0400	0.0000	-0.4801	-0.3546
_Ihs090_3	-0.1082	0.0299	-3.6100	0.0000	-0.1669	-0.0495
_Ihs100_2	-0.1964	0.0813	-2.4200	0.0160	-0.3557	-0.0371
_Ihs100_3	-0.1065	0.0694	-1.5300	0.1250	-0.2425	0.0295
_Ihs110_2	-0.4751	0.0357	-13.2900	0.0000	-0.5451	-0.4050
_Ihs110_3	-0.2897	0.0389	-7.4500	0.0000	-0.3659	-0.2135
_Ihh010_1	-0.1451	0.0869	-1.6700	0.0950	-0.3154	0.0251
_Ihh010_2	-0.0793	0.0882	-0.9000	0.3680	-0.2522	0.0935
_Ihh010_3	-0.1292	0.0873	-1.4800	0.1390	-0.3003	0.0419
_Ihh010_4	-0.1206	0.0873	-1.3800	0.1670	-0.2916	0.0505
_Ihh020_2	-0.1204	0.0348	-3.4600	0.0010	-0.1886	-0.0522
_Ihh020_3	-0.3869	0.0424	-9.1200	0.0000	-0.4701	-0.3038
_Ihh020_4	-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
/lnsigma	-0.7531	0.0059	-128.6200	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 18: Women wage equation estimates

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_sq	-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