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**Can Family-Support Policies Help Explain Differences in
Working Hours Across Countries?**

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Abstract

It has been suggested in the literature that taxes and subsidies play an important role in explaining the differences in working hours across countries. In this paper I test whether public programmes for family support play a role in explaining this variation. I analyse two types of policies: childcare subsidies and family cash benefits. I distinguish between people with children and people without children. Childcare subsidies should increase working hours in the economy and these effects should differ between people with children and people without children. Public support to families is also expected to decrease the amount of time people spend in childcare at home. I test this using household data for a set of European countries and the US. Empirical analysis, however, does not support the family-policy explanation. The effects of the policies on working hours are weak and insignificant. In regressions with time spent caring for children as a dependent variable, the estimates of the effects contradict the predictions of the theory. Furthermore, I don't find evidence for the expected differences in effects between parents and nonparents. I conclude that family policies are not helpful in explaining the variation in working hours across countries.

Keywords: Working hours, household behavior, taxation, subsidies, fiscal policies, child care, time allocation, labor supply

JEL Classifications: D1, H20, H31, I38, J13, J18, J22

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1 Introduction

There are large differences across countries in the actual hours worked per person. According to OECD data, working hours per person are on average about 40% higher in the US than in Belgium, Germany or France. Even within Europe itself, differences are substantial; an average person in the UK or Scandinavia works almost 30% more than the average person in continental Europe. There is large body of research that has tried to explain this variation. One branch of the literature explains the “hours divide” with differences in tax rates. Prescott (2004) relies on calibration techniques and argues that such a big US-EU gap in working hours can be explained almost completely by the higher taxes prevalent in Europe. Olovsson (2004) similarly finds that much of the gap between the US and Sweden can be explained by differences in tax rates. Estimates in Davis & Henrekson (2004) provide evidence that taxes significantly reduce the hours worked. However, while the tax story is plausible when comparing the US with European countries, it cannot accommodate the variation in hours *within* Europe. More specifically, it fails to explain the fact that in Scandinavia, despite facing higher taxes, people on average work more than in continental Europe.

In response to this, Ragan (2005) and Rogerson (2007) propose an extension of the simple tax story. They argue that it is not only important how big the tax burden is, but also how the government uses its tax proceeds. While in the model of Prescott (2004) all taxes are returned into the economy as a lump sum subsidy, in reality policies are more complicated in ways that are important for the working-hours variation. If taxes are used to support disabled people who cannot work, for example, this would increase the differences in hours worked. On the other hand, if taxes are used to subsidise day care for children of parents who work, this would dampen the effect of taxes on work-hours differences. This extension can thus be used to better explain the variation in working hours with respect to Scandinavia, where high taxes coincide with a generous system of public provision of family services¹. Ragan (2005) and Rogerson (2007) expand the model to allow for the service sector that produces childcare and other home care services. By means of calibration and simulation they show that accounting for stylised

¹ Rosen (1996) discusses the Swedish case.

differences in public policies, including the public provision for household services (i.e. childcare), they can much better fit the data on working hours across countries².

The purpose of my paper is to identify the role of family policies in explaining working-hours variation across countries. Prescott (2004), Ragan (2005) and Rogerson (2007) focus on simulations of calibrated macroeconomic models with a representative agent. However, there is an underlying logic behind the aggregate effects that they consider. For example, higher childcare policies increase aggregate working hours. But the underlying reason for this is that with higher childcare support parents are stimulated to work more, therefore they are the ones for which we should observe large increases in working hours. In my approach I thus take one step back, and look at the underlying logic of the models proposed in the macroeconomic literature. I ask who and how is affected by the family policies, and whether evidence of this can be found in the data rather than by means of simulation and calibration.

First, I focus on comparisons of two groups, people with children (*parents*) and people without children (*nonparents*). Intuitively, family policies should have most of their effects concentrated on the recipients: people with (young) children. Second, I focus my attention on two types of policies: provision of childcare services by the government (*childcare subsidies*) and direct cash transfers to families (*cash benefits*). I develop a simple labour supply model with taxes, childcare subsidies and family cash transfers and with two types of households: parents and nonparents. The two types differ in their utility towards childcare and in their budget constraints due to differences in policy receipts. I show that, holding taxes fixed, one would expect a positive effect of childcare subsidies and a negative effect of cash benefits on aggregate hours worked in the market. Furthermore, effects of each policy on working hours of parents should be stronger than effects on working hours of nonparents. Another interesting prediction from the model is regarding the effects of family policies on the time spent on childcare at home. Childcare

² A similar story is offered in Ngai and Pissarides (2008). They examine the implications of tax and subsidy policies for employment in three stylized worlds of welfare: a world with low taxation and low regulation of market work (i.e. UK and the US), a world with higher taxation and regulation (i.e. France and Italy), and a world with high taxation and regulation, but also with high public support of market services connected with childcare (i.e. Sweden). They claim that taxes and subsidies have different effects on market activity in different sectors of the economy, depending on how close a substitute the product of a particular sector is to home production. They argue that in this way they can explain quite well the differences in employment rates in different sectors between the three worlds of welfare.

subsidies are expected to decrease aggregate childcare at home, while family cash benefits should increase it; the effects are again expected to be stronger for parents.

If the family-policy explanation of working-hours variation across countries is correct, then the above listed predictions should show up empirically. I obtain data on family support policies across countries from the OECD Social Expenditure database. In order to distinguish between people with children and people without children I use individual level data from the European Household Panel (EHP) and the US CPS, available for the years 1998 - 2001. Due to a short time period of available data and due to low variation in policy variables over time, I mostly exploit cross-country variation in my analysis.

Results do not support the idea that family support policies can help explain differences in working hours in the economy. In preferred specifications with working hours as a dependent variable, the estimated effects for the parents are statistically insignificant and close to zero. Whereas in countries with higher childcare subsidies participation in the labour force is higher, working hours *conditional on working* are lower, bringing the aggregate effect of policies to zero. In regressions with time spent in childcare at home on the left hand side, the effects of policy variables contradict the theory. Analysis performed on the sample of people older than 55 years, for which family policy should not matter much, gives rise to evidence that in countries with stronger family policies, time spent in childcare of older people is shorter. One possible explanation for this is that public childcare support actually substitutes for the childcare by older people, rather than for the time spent in childcare of the prime-age group. As majority of older people do not participate in the labour market, family support thus cannot have a strong impact on working hours.

There could be important cultural differences across countries that my analysis does not capture. Therefore I include into the analysis also two measures of “culture”: average number of adults in the household and the incidence of part-time work in the country. After controlling for culture, aggregate effects of childcare subsidies on working hours become positive and significant; however the effects on parents are still weaker than the effects on nonparents. Furthermore, results from the analysis on the time in childcare spent at home still contradict the theory.

Before turning to the paper, it is fair to mention that story of taxes and family-policy is not the only story that has been put forward as an explanation of cross-country differences in working

hours; on the contrary, the literature is quite large. Faggio & Nickell (2007) have a good statistical survey of the differences in working time across countries and they review and discuss various explanations. Alesina et al. (2005) rely on the Blanchard & Wolfers (2003) explanation that different institutional settings result in different reactions to adverse shocks; i.e. in Europe unionisation and labour market regulation increased sharply after the shocks of the 1970s and 1980s. The shocks resulted in the so called “work-sharing” policies, which can be used to explain the low hours worked in Europe. Bell & Freeman (1994, 2001), Freeman & Schettkat (2001a) and Schettkat (2003) relate working-hours variation to earnings inequality, where earnings inequality increases work effort due to higher incentives. Bowles & Park (2005) also focus on inequality, but claim that the positive relationship stems from the fact that social comparisons work upwards and hence the poor want to imitate the rich in their consumption. Freeman & Schettkat (2001b, 2005) explain the differences between the US and Europe by the marketisation hypothesis, stating that households in Europe produce more goods at home than the US.

Another branch of literature that looks more at the macroeconomic aspect of the issue finds explanations for differences in working hours across countries and over time in factors such as differences in technologies, growth rates and structural transformation (Rogerson (2008, 2006), Pissarides (2007)). Related literature focuses on explaining the trends in the US data (McGrattan & Rogerson (2004), Greenwood & Vandenbroucke (2005), Aguiar & Hurst (2006), Francis & Ramey (2006), Ngai & Pissarides (2007)). Attanasio et al. (2008) try to explain changes in female labour force participation in the US within the framework of a life-cycle model. They argue that female participation has increased for recent cohorts due to reduced cost of childcare and due to rising wages.

Finally, there is also an extensive literature seeking to assess the microeconomic impacts of family-support policies (free/subsidized childcare) on labour market outcomes of families, mainly mothers with pre-school children. However, empirical estimates of the effects of these policies on the labour supply of mothers have a wide range, from large to insignificant. For some examples of this literature refer to Baker et al. (2008), Lefebvre and Merrigan (2008), Gelbach (2002), Blau (2000) or Anderson & Levine (1999).

The structure of this paper is as follows. In section 2 I introduce a simple theoretical model and discuss its implications. Section 3 and section 4 show the variation in working hours and the variation in public family policies across countries, respectively. In section 5 I undertake empirical analysis of the effects of family policies on working hours, distinguishing between people with children and people without children. In section 6 I analyze the effects of family policies on the time spent in childcare at home. In section 7 I include into the analysis two country-level measures of culture and section 8 concludes.

2 Simple theoretical discussion

2.1 Basic set-up

In the theoretical section I show the underlying channels through which family policies affect aggregate working hours in the economy. I recognize that public policies treat groups of households differently, therefore their contribution to changes in working hours are expected to differ too. The model built here is not a general model and the results are specific to the assumptions made here, but the exercise is interesting and empirically relevant.

I introduce a simple model with two types of households and with a government policy that supports families. Consider a static economy with two types of households: parents (P) and nonparents (N). They are both assumed to have a log-utility function over the consumption of a market good (c^m), household good (c^h) and leisure (l). The market good refers to a composite good bought in the market and the household good represents the amount of childcare. Utility functions and budget constraints are as follows.

Parents maximise:

$$\alpha \ln c_p^m + \beta \ln c_p^h + (1 - \alpha - \beta) \ln l_p \quad (1)$$

subject to

$$c_p^m = (1 - \tau)h_p + T + s \quad (2)$$

$$c_p^h = H_p + g \quad (3)$$

$$l_p = 1 - h_p - H_p \quad (4)$$

Nonparents maximise:

$$\alpha \ln c_N^m + \gamma \ln c_N^h + (1 - \alpha - \gamma) \ln l_N \quad (5)$$

subject to

$$c_N^m = (1 - \tau)h_N + T \quad (6)$$

$$c_N^h = H_N \quad (7)$$

$$l_N = 1 - h_N - H_N \quad (8)$$

Where

$$\beta > \gamma. \quad (9)$$

τ represents tax wedge³, T is a lump sum subsidy, s represents cash transfers from the government to parents and g is public provision of childcare. h represents time worked in the market, and H is time spent in childcare at home. α and β are utility parameters on consumption and childcare, respectively. All parameters and variables are assumed to be nonnegative and also $0 < \alpha < 1$, $0 < \beta < 1$ and $0 \leq \gamma < 1$.

As seen from expressions (1)-(9) parents and nonparents differ in certain important aspects. One such difference is in the public policy parameters. Parents receive a cash-transfer s from the government (equations (2) and (6)) capturing child allowances and other direct transfers to parents that exist in many countries. Time constraints (3) and (7) on c^h assume that parents also receive a childcare subsidy g from the government. This is assumed to be a perfect substitute for home provision of childcare and is provided to the households directly, in kind. There is no doubt that this is a simplistic way of entering government support of childcare programmes into the model; it assumes that government simply gives each parental household a certain “amount” g of childcare. In this model, households have no cost of childcare other than the opportunity cost of time, i.e. they don't need to pay for childcare provided in the market (external day care).

³ Following Nickell (2004) tax wedge τ incorporates three types of taxes: payroll tax t_1 , direct taxes on income t_2 and indirect taxes on consumption t_3 . This follows from defining a budget constraint for market good as $(1 + t_3)c^m = (1 - t_2)(1 - t_1)h$, hence $\tau = 1 - \frac{(1 - t_1)(1 - t_2)}{(1 + t_3)}$. Although I focus only on the labour supply I incorporate the payroll tax t_1 in order to capture potentially important effects of this tax on the demand for labour.

For alternative specifications, look for example at Ragan (2005) and Rogerson (2007). In their models, childcare can be produced either at home or in the market, with these two inputs being strong substitutes for each other. When the government subsidizes childcare provided in the market, its relative price goes down, and as a consequence individuals spend less time in childcare at home and more time at work and in leisure. In my specification, on the other hand, I assume that there is no market for childcare. Yet the main mechanism is very similar; with the government subsidy g , government takes care of the children instead of the parents, hence they are able to work more and enjoy more leisure. While my model is simpler with regards to the specification of the government policies, it is more involved in the way that it introduces two types of households: parents and nonparents. In aggregate, the main results of the model presented here and of the models in Rogerson (2007) and Ragan (2005) go in the same direction⁴.

Another important difference between nonparents and parents is in their preferences. Condition (9) states that parents derive higher utility from consuming c^h , which is based on a plausible assumption that parents need to spend more time to care for the children. On the other hand, I assume that the utility coefficient α on c^m is the same for both types of households. This is done for two reasons. First, complicating the model by allowing different utility coefficients on market consumption would not add much to answering the questions of interest in this paper. Second, note that empirically it is not clear whether parents work more or less than nonparents; in some countries they work more while in other countries they work less⁵. From the assumptions made here it therefore follows that differences in *working time* between parents and nonparents exist solely due to differences in treatment of the two groups at the hands of public policy rather than due to differences in preferences.

Households maximise utility with respect to hours of work h and hours in childcare at home H , subject to budget and time constraints. See Appendix for first order conditions. Assuming an interior solution, the supply of labour is as follows,

⁴ I outline an alternative set up with the market for childcare at the end of the Appendix.

⁵ Data on this will be presented later in the paper; see Table 10. Couples normally decide to have children in their prime working age and for this reason they tend to work more than other groups. But even if one compares parents and nonparents of the same age, while for women it is true that on average those with young children work less, most men with children in fact work more.

$$h_p = \alpha(1+g) - \frac{(1-\alpha)(T+s)}{(1-\tau)}, \quad (10)$$

$$h_N = \alpha - \frac{(1-\alpha)T}{(1-\tau)}. \quad (11)$$

Assume that everybody works: $h > 0$; this is sensible if we imagine parents and nonparents as households, rather than individuals.

Now I turn to the public sector. Government is assumed to have a balanced budget. Denote the percentage of parental households as δ . A government budget constraint can be written as:

$$\tau(\delta h_p + (1-\delta)h_N) = T + \delta(g+s). \quad (12)$$

The left hand side of (12) represents government tax revenues and the right hand side is government expenditure on a lump sum subsidy and family policies. The lump sum subsidy T will be treated as endogenous, and by combining (10), (11) and (12) can be written as:

$$T = \frac{\alpha(1-\tau)\tau}{(1-\alpha\tau)} - g\delta(1-\tau) - s\delta. \quad (13)$$

From the expression (13) above it is clear that the more government spends on family support policies, given the tax rate, the less remains for the lump sum subsidy. If governments spend larger share of their expenditures on family services they do not only support young parents to go to work, but they further increase the incentives for work, indirectly, by spending less on the lump sum subsidy.

2.2 Effects of family policy on working hours

By combining equation (13) with equations (10) and (11) we can get the labour supplies in reduced form.

Labour supply of parents:

$$h_p = \frac{\alpha(1-\tau)}{(1-\alpha\tau)} + g(\alpha + \delta(1-\alpha)) - s \frac{(1-\alpha)(1-\delta)}{(1-\tau)}. \quad (14)$$

Labour supply of nonparents:

$$h_N = \frac{\alpha(1-\tau)}{(1-\alpha\tau)} + g\delta(1-\alpha) + s\frac{(1-\alpha)\delta}{(1-\tau)}. \quad (15)$$

In this model only the supply side of the labour market matters and demand for labour is assumed to be perfectly elastic. Therefore, expressions (14) and (15) are the building blocks of the discussion about how hours of work (labour supply) react to changes in policy parameters. It is also useful to look at the expression for aggregate working hours:

$$h = \delta h_p + (1-\delta)h_N = \frac{\alpha(1-\tau)}{(1-\alpha\tau)} + g\delta. \quad (16)$$

From (14)-(16) it is clear what determines working hours of households in this model: preferences, taxes, childcare subsidies, cash transfers and the share of people with children in population. Assume that preferences and population structure remain constant⁶. It can be easily shown that the aggregate labour supply (16) and the labour supply of parents (14) decrease with the tax rate⁷. The same goes for the labour supply of nonparents (15) under plausible conditions. The underlying argument behind this result is that higher taxes reduce the marginal benefit from working so that households reduce their hours supplied to the market.

Labour supply is increasing in the amount of childcare subsidy g in all three expressions (14)-(16), keeping the tax rate constant. It is also straightforward to see from (14) and (15) that the effect of the childcare subsidy is stronger for parents. The labour supply of parents increases because a higher childcare subsidy g results in more spare time that can be supplied to the market. Another channel through which the childcare subsidy g affects working hours is through its effect on the lump sum subsidy T . This is also the mechanism through which the childcare subsidy affects labour supply of nonparents (15). The government budget constraint (13) dictates that the more money government spends on childcare subsidies the less of it is spent on the lump

⁶ In this paper I will for most part assume that the share of parents in population is exogenous. However, it is easy to argue that it is not exogenous. Cohen et al. (2007) for example report evidence that the introduction of child subsidies in Israel increased the fertility of married women with two or more children. In this paper I will not take a stand on the direction of causality, hence I will simply report associations between a crude measure of fertility and other variables of interest. I will also implicitly assume that the share of parents in population is constant over time and across countries. It is indeed slow-moving over time, so the first part does not necessarily generate a huge problem, but it is definitely not constant across countries. However, due to endogeneity problems I will leave it out of my empirical analysis. Lack of an appropriate instrument leads me to leave this issue for future research.

⁷ Appendix shows this analytically.

sums subsidy T , which in turn reduces the non-earned income of households and encourages them to work.

Cash benefits to families s have a negative effect on labour supply of parents (14), but a positive effect on labour supply of nonparents (15). The reason for this discrepancy is that, while cash benefits *increase* the non-earned income of parents, they *decrease* the non-earned income of nonparents by lowering the lump sum subsidy T . The latter effect influences both types of households but the direct effect of cash benefits dominates for parents. At the aggregate level (equation (16)) cash benefits don't have any effect on the labour supply; the direct effects on the labour supply of parents are exactly offset by the indirect effects on the labour supply of both groups through the effect on the lump sum subsidy. Effectively, family cash benefit is just a redistribution of a subsidy from one group to another, which in aggregate has no effect on working hours.

Another interesting way in which we can look at these results is to compare the working hours of parents and nonparents. The expression for the difference is:

$$h_p - h_N = \alpha g - s \frac{(1 - \alpha)}{(1 - \tau)}. \quad (17)$$

From equation (17) it can be nicely seen that increasing the childcare subsidy while holding the tax rate constant increases the working hours of parents relative to the working hours of nonparents, and vice versa for the family cash benefits. The tax wedge reduces the work of parents relative to nonparents. Now this is a simple model, but it can be intuitively generalised to the real economies. In countries with different family policies, this should be reflected when comparing the hours worked for parents and nonparents. Suppose we add a stochastic component to the above equation (17). In practice, if childcare subsidies g vary across countries more than cash benefits s and more than taxes τ , and if in addition s and g are not too strongly correlated, then g dominates expression (17). This implies that in the data one would expect to see a positive relationship between childcare subsidies and the difference in hours worked between parents and nonparents. In countries with high taxes and high childcare subsidies, nonparents are discouraged from working due to high taxes, while parents are encouraged to work more due to generous childcare subsidies. Hence, according to the model, in such countries, parents should work a lot when compared to nonparents.

Let me summarize this section. According to the model outlined in this paper, we would expect: 1) a positive effect of childcare subsidies on aggregate working hours, 2) positive for both parents and nonparents, but 3) stronger for parents. There should be 4) no aggregate effects of family cash benefits on working hours, 5) the effect should be negative for parents, and 6) positive for nonparents.

2.3 Effects of family policy on childcare at home

Here I consider the effects of family policies on another use of time – childcare at home. I assume that households *without* children also spend some time in childcare at home, depending on the parameter γ . In this way I capture the fact that nonparents also look after children; i.e. they spend some time looking after grandchildren, nephews and nieces⁸. In fact, the time in childcare at home of parents and nonparents could also be correlated. If parents go to work while members of a nonparent household (i.e. grandparents) look after the children, the time in childcare at home of parents is substituted for the time in childcare of nonparents. This kind of substitution however is not introduced in my model. The increase in childcare subsidies relieves both types of households from childcare. But the effect on nonparents in this model comes solely through the effect of the lump sum subsidy T rather than through any direct relationship between the time spent in childcare of parents and nonparents.

In the same way as before we can find reduced form childcare “supply” for parents, nonparents and in aggregate.

Time spent in childcare at home for parents:

$$H_p = \frac{\beta}{(1-\alpha\tau)} - g(1-\beta(1-\delta)) + s \frac{\beta(1-\delta)}{(1-\tau)}. \quad (18)$$

⁸ In the year 2000 in Europe, for example, individuals with children of age 0-15 in the household on average spent 21.6 hours per week looking after children, while individuals with no children of age 0-15 in household spent 1.4 hours per week. The calculation is based on the European Household Panel data for individuals of 16 years of age or more.

Time spent in childcare at home for nonparents:

$$H_N = \frac{\gamma}{(1-\alpha\tau)} - g\gamma\delta - s\frac{\gamma\delta}{(1-\tau)}. \quad (19)$$

Aggregate time in childcare at home:

$$H = \frac{\alpha\beta + \gamma(1-\delta)}{(1-\alpha\tau)} - g\delta(1-(\beta-\gamma)(1-\delta)) + s\frac{(\beta-\gamma)\delta(1-\delta)}{(1-\tau)}. \quad (20)$$

The results for the time spent in childcare at home basically go in the opposite direction from the results for labour supply. All three increase in the tax rate⁹ as the tax rate reduces the opportunity cost of non-work. The childcare subsidy g reduces childcare in all the three expressions (18)-(20). The cash benefits to families s increase the childcare for parents (18) and in the aggregate (20), since by increasing the non-earned income of parents they discourage them from working in the market. The cash benefits s , on the other hand, have a negative impact on the childcare of nonparents (19), via their effect on the lump sum subsidy T . These effects are naturally stronger for parents than for nonparents.

To summarize, there is 1) a negative effect of childcare subsidies on aggregate time spent in childcare at home, 2) negative for both parents and nonparents, but 3) stronger for parents. There should be 4) a positive aggregate effect of family cash benefits on childcare time, 5) the effect should be positive for parents, and 6) negative for nonparents.

3 Working hours across countries

I am interested in explaining the variation of working hours across countries, so it is natural to start the empirical investigation by showing what this variation looks like. First I turn to the OECD data on total working hours for population of age 15-64. My main analysis is not done with the OECD data, but this is the most common source used to report cross-country differences in working hours, therefore I report it here. In Table 1 I show hours worked per person per week in the year 2000, which I further illustrate in Figure 1. Countries with the highest hours are the US (27.1), Canada (24.4) and UK (24.1). Scandinavian countries are mostly in the top half, Sweden (23.6), Denmark (23.0) and Finland (22.7); only Norway (21.0) is in the lower half.

⁹ Childcare of nonparents decreases with taxes under plausible conditions. See Appendix.

Countries with the lowest hours of work are Belgium (18.2), Germany (18.7) and France (18.8). Differences across countries are quite large; the difference between the US at the top and Belgium at the bottom is nearly 9 hours per week.

Statistically, differences in working hours can be decomposed into differences in the employment rates and differences in the length of the working week for employed persons¹⁰. The length of the working week takes into account the average hours worked in a week by an employed person as well as vacations, public holidays and absences from work. See columns (2) and (3) of the Table 1. The employment rates (column (3)) vary from 0.55 in Italy, to 0.79 in Norway, a very large difference. Countries like Italy (0.55), Greece (0.57) and Spain (0.58) have very low employment rates. This is for most part due to the low participation of women in the labour force. The Scandinavian countries, Norway (0.79), Denmark (0.77) and Sweden (0.76), the US (0.76) and UK (0.73), on the other hand, have high employment rates. There are also big differences in hours worked per week by employed persons (column (2)). Interestingly, hours worked per week for employed workers are highest in Greece (40.0), Italy (35.7), the US (35.4) and Spain (34.9). For the three southern European countries this is a consequence of the fact that due to the low participation of women and older workers, employed persons are mostly prime-aged males. Hence the statistic on hours worked is based on a sample where most of the subjects work full-time, whereas in other countries this statistic is reduced by including many part-time employed women and older workers. Countries with lowest hours worked by employed persons are Germany (28.2), Belgium (29.7), Denmark (29.9) and France (30.6). The difference between the top and the bottom is large: 10 hours per week. In the remainder of the paper I will mainly focus on the overall hours worked per person, however in some instances I will also distinguish between the employment decision and hours of work decision.

I now turn to the micro level data obtained from the European Community Household Panel (ECHP). I combine this with the US March Current Population Survey (CPS) from the IPUMS CPS (King et. al. (2004)). Data is available at the individual level for people older than 15 years of age at time of survey. To measure working hours I use the variable pe005: Total number of hours worked per week (in main + additional jobs). This variable is based on the following two survey questions: “How many hours per week do you work in your main job, including paid

¹⁰ For more thorough analysis see Faggio & Nickell (2007).

overtime if any?” and “About how many hours per week did you work in your additional job or business? Please give an average figure for the last 4 working weeks.” As this variable is only reported for employed individuals, for the rest of the population I assume that they work 0 hours. From the US CPS data I use the variable UHRSWORK: Usual hours worked per week (last year). This variable reports the number of hours per week that respondents usually worked if they worked during the previous calendar year. Individuals were asked this question if they reported working at a job or business at any time during the previous year or if they acknowledged doing "any temporary, part-time, or seasonal work even for a few days" during the previous year.

These two combined variables capture the “usual” amount of hours worked per week for an individual. In this sense they capture whether someone actively participates in the labour market or not, and how much this person works in the usual working week. They do not, however, incorporate the number of holidays, vacations and days off work. In Figure 2 I show average working hours per week for individuals of age 16-64 from this data. I choose the age restriction 16-64 in order to be comparable with the OECD data on total working hours reported in Table 1. Working hours on average appear higher than in the OECD data, the reason being that days off work are not counted. Ranking of countries differs from Table 1, but correlation between the ranks from the OECD and here is 0.69. Countries with biggest differences in ranks from one data set to another are Greece (7 places lower), Belgium, Germany (both 6 places lower) and Spain (5 places higher)¹¹.

4 Family support policies across countries

4.1 Cash benefits and childcare subsidies

In this section I present data on family support policies. OECD Social Expenditure Data (SOCX) provides data on public expenditure on various programmes: old age, survivors, incapacity-related benefits, health, family, active labour market programmes, unemployment, housing and other social policy areas. In what follows I focus on public expenditure under the family

¹¹ I don't explore the reasons behind such differences, but I conjecture that they cannot be fully explained by the differences in holidays, vacations and days off work. There must be some important differences in data methodology.

programme. More details about the OECD SOCX can be found in OECD (2007) and in the OECD Family Database.

In Table 2 I show family expenditures as % in GDP across countries for the year 2000. Public spending on family benefits can be divided into three groups. First, *child related cash transfers* to families with children, column (1). These include items such as child allowances, public income support during parental leave, income support for sole parent families and public childcare support through payments to parents. The second group in column (2) is *public spending on services for families* with children. These comprise of direct financing and subsidising of providers of childcare and early education facilities, public assistance for young people and residential facilities and public spending on family services (centre-based services and home help for families in need). The third group shown in column (3) is *public support for families provided through the tax system*, such as tax exemptions, child tax allowances and child tax credits.

For the purposes of the analysis and to be consistent with the model presented in section 2 I group these expenditures into two groups: *cash benefits* and *childcare subsidies*, shown on the right hand side of Table 2. Cash benefits capture those transfers from the government that directly increase the non-earned income of households with children. To obtain a measure of cash benefits I combine cash transfers (1) with tax support to families (3). Tax breaks result in the reduction of the amount households have to pay in taxes to the government hence they can be understood as a cash transfer to families. This is important to recognise, because looking only at the cash transfers in column (1) could overstate the actual variation across countries in family cash benefits. In the US, for example, direct cash transfers to families are very low, but the tax system provides certain benefits to families. On the other hand, in Scandinavian countries there is an extensive support to families via cash transfers, but tax reliefs are relatively low.

However, it is not always clear that tax breaks fall into the category of cash benefits. In some countries tax deductions can only be claimed based on the family's expenses for external childcare. In such cases these should perhaps be treated as childcare benefits. With available data it is not possible to make such a distinction. Nevertheless, as argued in Immervoll & Barber (2005), page 17, support through the tax system blurs the perceived link between childcare expenses and support payments. Whereas parents need to pay for childcare today, they get

reimbursed through the tax system only after the end of the tax year. Therefore the perceived link between expenses and benefits is weakened and tax benefit when received by the family may be seen as a windfall rather than a consequence of their childcare choices. The data on tax breaks for families is only available for the year 2003, therefore I assume that the ratio of tax breaks over cash transfers remains constant over time in a given country¹².

Childcare subsidies capture transfers from the government that provide services to parents and effectively act as a substitute for the childcare of parents. Childcare subsidies include public spending on pre-primary education which for most countries is available only from the year 1998. Data on childcare subsidies before that are not comparable across countries. Another issue with the reported measure of public support for services to families (column (2) of Table 2) is that it includes items such as assistance for pupils and youths, youth centres, family accommodation benefits, transport subsidies, holidays for schoolchildren and school meals. These do not represent a substitute for the childcare of parents. As much as the information in the OECD SOCX dataset allows, I exclude these items from the measure of childcare benefits. I consider the new measure of childcare subsidies as a more appropriate one and I use it in the analysis that follows. My results are similar regardless of which of the two measures I choose. Note also that the correlation coefficient between the two measures is 0.97.

Let me now turn to the information contained in Table 2. From the last two columns we can see that the variation in childcare subsidies is considerably higher than the variation in cash benefits. Figure 3 and Figure 4 further illustrate the variation in public child support across countries. Childcare subsidies (Figure 3) tend to be especially high in the Scandinavian countries: Denmark (2.05%), Norway (1.43%), Sweden (1.30%) and Finland (1.19%)¹³. Share of childcare subsidies in GDP is also very high in France (1.19%). Countries with the lowest share of childcare subsidies in the GDP are Ireland (0.00%), Greece (0.15%) and Canada (0.20%). In Figure 4 I show family cash benefits, which are the highest in Luxembourg (2.74%), Austria (2.39%) and Belgium (2.31%), and the lowest in Spain (0.36%), Italy (0.54%) and Greece (0.74%).

I now turn my attention to the relationship of the two family support policies with each other. Figure 5 plots a scatter diagram of cash benefits and childcare subsidies. There is a weak positive

¹² Time variation in these measures is in general low hence the error thus committed should not be too large.

¹³ This empirical observation was the basis of discussion in the papers by Ragan (2005) and Rogerson (2007).

correlation (0.21), not significantly different from zero. Countries can be divided roughly in three groups according to the combination of childcare subsidies and cash benefits. The first group consists of countries with high childcare subsidies and medium to high level of cash benefits. This group comprises of Scandinavian countries (Denmark, Norway, Sweden, and Finland) and France. The second group consists of countries with low childcare subsidies but relatively high cash benefits: Luxembourg, Belgium, Austria, UK, Germany and Ireland. And lastly, the third group consists of countries with low subsidies and low cash benefits: Spain, Italy, Greece, US, Portugal, Canada and the Netherlands.

Another important policy variable in the model presented above is the tax rate. In Figure 6 and Figure 7 I therefore show scatter plots of family support policies against the tax wedge. The average tax wedge is calculated as explained in the footnote 3, based on the CEP-OECD data on labour institutions described in William Nickell (2006). As Greece is not included in the CEP-OECD data, I calculated the tax wedge directly from the OECD data as explained in Nickell (2006). Figure 6 reveals a strong positive relationship between taxes and childcare subsidies across countries; the correlation coefficient is 0.66 and statistically significant. Scandinavian countries and France stand out as having both high tax rates and high childcare subsidies. The US and UK have low tax rates and medium levels of childcare subsidies. On the other hand, Figure 7 shows that there is no significantly positive correlation between taxes and family cash benefits. In terms of cash benefits, the Scandinavian countries do not stand out. Together these two figures suggest a potential for family policies to dampen the effect of taxes on working hours.

4.2 Children in formal care

In this section I look at the percentage of children enrolled in external childcare and relate it to family policies. I do this in order to see whether family policies have effects that one would intuitively expect and also to get a feeling whether empirical measures used in this paper are informative at all. Childcare subsidies for example directly affect the demand (subsidising fees households pay for external care) and the supply of external childcare (public provision of childcare-centres or subsidies to childcare providers). Thus childcare subsidies are expected to have a strong impact on the proportion of children enrolled in some type of external care.

In Table 3 I present data on the use of external childcare, and in Figure 8 I plot the relationship between external childcare and childcare subsidies across countries. The first two columns in Table 3 show the enrolment rates of children under six in childcare and early education services. Data is obtained from the OECD Family Database. Enrolment rates for 0-2 years old concern primarily formal childcare arrangements such as group care in childcare centres, registered childminders based in their own homes and care provided by a carer at home who is not a family member. Enrolment rates for 3-5 years old concern those enrolled in formal pre-school services, and, in some countries, 4 and 5 years old in primary schools. Where children are enrolled in more than one part-time programme, the issue of double counting arises. This leads to overestimated enrolment rates. As a result reported enrolment in some countries can exceed 100% and the data needs to be interpreted with caution.

Differences in enrolment rates across countries are large. For 0-2 year olds, enrolment rates range from 6.3% in Italy to 61.7% in Denmark. Variation in the enrolment of 3-5 year olds is much lower, mainly due to the fact that most children of this age are in some form of pre-school service. The lowest enrolment is in Finland (46.1%) and the highest in France (101.9%). The data, however, does not account for other important differences in childcare patterns. For example, the number of hours children typically spend in formal care varies across countries. According to Immervoll & Barber (2005), in some cases, having such information would further amplify the observed variation across countries. There are other issues with comparability of the data across countries (see OECD Family Database (PF11)). Enrolment rates suffer from underreporting in countries where childcare and early education is to a large extent provided by the local government (Canada, Ireland and the US); there are also important differences in parental leave arrangements across countries (included in the family cash benefits), which influence the extent to which children are cared for by external institutions. Countries also differ in the availability of informal care by other family members (i.e. grandparents).

In the last column of Table 3 I report the % of households with at least one child aged 0-11 that have their children looked after on a regular basis. Data is based on the ECHP survey question: “Are any of the children (0-11) in this household looked after on a regular basis by someone other than their parent or guardian, whether at home or outside such as at a crèche or kindergarten?” Variation is again very large, ranging from 19.2% of households in Ireland to

78.2% of households in Denmark. It is not clear, however, whether the question refers to formal or informal child care; answers most probably take into account both types of childcare.

Figure 8 shows a scatter plot of formal use of childcare versus childcare subsidies. I use two different measures of formal use of childcare: enrolment of 0-2 year olds based on the OECD data and the % of households with children cared for based on the ECHP. There is a clear positive correlation between childcare subsidies and use of external childcare (see also bottom of Table 3). Note, however that the use of childcare for children of age 3-5 years is not significantly correlated with childcare subsidies. Since in many countries most of the 3-5 year olds are enrolled in some form of external care, it is possible that a high share of the observed variation for this group is due to measurement error. On the other hand, parents of older children in general participate in the labour force more than parents of young children. Hence, intuitively, what should matter for the explanation of the hours worked across countries with respect to public family policies are the employment and work decisions of parents with very small children.

So far the analysis of the use of external childcare across countries has been descriptive. Therefore, in Table 4 I report results from regressing each of the three measures of the use of formal childcare on the childcare benefits and the cash benefits. Coefficients in the regression with the % of 3-5 years old in formal care (column (2)) are not significant. However, the results from regressions with the % of 0-2 year olds in formal care (column (1)) and the % of households with children looked after (column (3)) show that the childcare subsidies have a strong positive effect on the use of formal childcare. The effects of family cash benefits, on the other hand, are not statistically significant. To sum up the discussion in this section, I conclude that there is evidence that my measure of childcare subsidies is capturing something sensible, and that childcare subsidies have a significant effect on the behaviour of households.

5 Effects of family support policies on working hours

5.1 Model calibrations: What is the magnitude of the effects?

In light of the data on family policies presented above, it would be interesting to check the magnitudes of the effects on working hours implied by the model from section 2. The country with the highest childcare subsidies, Denmark, devotes 2.05% of its GDP for this measure. Is this

high enough to result in a significant effect on aggregate working hours? What about other countries, with smaller share of family policies in their GDP? If the implied effects on working hours are found to be small, then it is hard to argue that family policies can contribute much to explaining differences in working hours across countries.

Results of this exercise are presented in Table 5. I use the OECD data on working hours and the OECD SOCX data on childcare subsidies and cash benefits in order to obtain corresponding values for h , τ , g and s (columns (1)-(4)). I use equation (16) with the US data in order to calibrate the model for the value of a utility parameter $\alpha = 0.35$. I use this value for all countries. I also use value $\delta = 0.39$ based on the US CPS data for all countries. Columns (5)-(9) of Table 5 report the % change in working hours implied by the introduction of family policies, based on equations (18)-(20). Changes are computed by comparing working hours in two settings: in the first setting I set the family policy parameters equal to their actual values, whereas in the second setting I set them equal to zero. I report results for 6 cases choosing two countries from each group based on Figure 5. Sweden and Denmark represent the high subsidy - high cash benefits group, Belgium and UK represent the low subsidy - high cash benefits group, and Italy and US represent the low subsidy - low cash benefits group. Note that in all cases, one of the two countries has relatively high tax rates and the other one relatively low tax rates.

On aggregate (column (5)), family policies don't seem to have a very strong effect on working hours. The biggest effect, as expected, is in Scandinavia, where family policy variables increase working hours for 2.25% in Denmark and 1.68% in Sweden compared to the situation with no family policies, but keeping tax rates constant. In contrast, Ragan (2005) in Tables 1, 5 and 6, evaluates corresponding effects to be equal to 16.7% and 25.0%, respectively. Rogerson (2007) in Table 6, evaluates that public provision of family services increases working hours by 8.2% for Scandinavian levels of policy parameters. Their models, no doubt, are more complex, however, they don't recognise that family policies *directly* influence only a certain proportion of the population¹⁴. Furthermore, in their measure of public support to family services they include subsidies for elderly care services; this is not justified and overstates the effect of public subsidies on working hours. ECHP data for the year 2000 reveal that in Europe persons of age

¹⁴ Ragan (2005) and Rogerson (2006) models also don't account for the effects of cash benefits. However, in aggregate cash benefits don't have any effect in my model either, as they just redistribute a cash subsidy from one group to another.

16-55 on average spend 0.7 hours per week looking after a person with special needs without pay, while persons older than 55 years spend 1.6 hours per week. Hence this activity does not take much time for an average person and furthermore it is concentrated among older people, who for most part do not participate in the labour market regardless of public support for families.

In columns (6) and (7) of Table 5 I show effects of family policies on parents. According to my model, on average family policies actually reduce working time of parents due to the negative effect of cash benefits. This becomes clear after inspecting column (7), where cash benefits are set to zero and only the effect of childcare subsidies is considered; the effect on working time is positive, especially so for Scandinavian countries. Columns (8) and (9) report effects for nonparents. The total effect on this group is quite large, as both subsidies and cash benefits work in the same direction (via reducing the lump sum subsidy). However, as expected, when looking at the effects of childcare subsidies only, the effects are smaller than for parents. To summarise, in the aggregate childcare policies do not seem to have very strong effects on working hours. Even for countries with generous public policies such as Scandinavian countries, effects on working hours are only around 2%. This does not seem large enough to contribute greatly to the explanation of working-hours differences across countries.

5.2 OECD total working hours and family policy

I now turn to the empirical analysis of the question whether family policies can explain the variation in working hours across countries and whether the effects are in accordance with the theory outlined in Section 2. In Table 6 I report regressions of OECD working hours on family policy variables and other controls. Due to low variation of policy variables over the short period of time, I use cross-sectional variation, with 16 countries included in the analysis. However, to increase precision I use a pooled OLS regression over the period 1998-2003; reported standard errors are clustered by country. I report three specifications. In column (1) I report a specification with childcare subsidies, family cash benefits and the tax wedge on the right hand side only. This specification refers to the argument by Prescott (2004) augmented by public policy arguments of Ragan (2005) and Rogerson (2007). In the second specification I add the aggregate unemployment rate, which accounts for any involuntary unemployment. In the third specification, following the empirical analysis in Alesina et al. (2005), Tables 9-10, and Faggio

& Nickell (2007), Table 16, I include additional institutional indicators from the CEP-OECD dataset: the union density and the employment protection. They control for differences in the rigidity and nature of labour markets across countries. Regression analysis throughout this paper will be based on these three specifications.

In column (1) of Table 6 the direction of the coefficients is more or less consistent with the theory; childcare subsidies have a significant positive effect, cash benefits have an insignificant (negative) effect and taxes have a negative though insignificant effect. However, after including more controls in columns (2) and (3) results become by and large insignificant and inconsistent with the theory. After including the aggregate unemployment rate, positive effect of childcare subsidies becomes insignificant, whereas the negative coefficient in front of cash benefits becomes statistically significant. After including union density and employment protection measures, all three policy variables are insignificant. The effect of childcare subsidies is close to zero, the effect of family cash benefits is negative but insignificant, and the effect of tax wedge is negative, but too imprecisely measured, hence insignificant. Also all three included controls have statistically insignificant coefficient. It appears, therefore, that the OECD data does not have enough power to give rise to any firm conclusions on family policies and their role in explaining working-hours differences across countries.

5.3 Regressions of working hours on policy variables

Let me now turn to the micro level data where I will focus on comparisons of two groups: people with children and people with no children. For this I combine data from various sources. Data on hours worked together with personal and household characteristics are obtained from the European Community Household Panel (ECHP) and the US March Current Population Survey (CPS). The data set includes 15 EU countries and the US. The period of analysis will mainly be for the years 1998-2001, where policy variables and household panel data is consistently available. Into this individual level data I include country level variables measuring family-support policies from the OECD Social Expenditure Data (SOCX) and measures of taxes and labour market institutions from the CEP-OECD Institutions Dataset (William Nickell (2006)).

First let me briefly discuss the regression set up. I pool together the whole available period 1998-2001 in order to increase efficiency. To be on the conservative side, however I cluster standard errors by country, despite having multiple observations over time for each country. Main

variation exploited in this analysis is thus cross-country variation, with 14 countries¹⁵. Due to a short period of time and due to slow movement of policy variables over time, I don't rely on fixed effects regressions. I report weighted regressions, using weights as provided in the original data sets. However, in order for each country to have the same weight, regardless of the sample size, I convert the weights in a way such that summation of weights equals to 1.0 for each country in each year.

In Table 7 I show results from regressing individual working hours on policy variables for individuals older than 15 years. All regressions control for age and age squared of the individual. Column (1) includes the main three fiscal policy parameters only: the childcare subsidies, the family cash benefits and the tax wedge. The results are consistent with the theory. Childcare subsidies have a significant positive effect and the tax wedge has a significant and negative effect. Family cash benefits have an insignificant effect on working hours. These coefficients, however, get knocked down after including the aggregate unemployment rate, as reported in column (2). The effects of childcare subsidies still remain statistically significant and positive, but the magnitude of the effect is reduced. In column (3) I report my preferred specification with unemployment rate and the two measures of the rigidity of labour market institutions. Coefficients in front of childcare subsidies and cash benefits are both insignificant. The tax wedge has statistically significant negative effect, as expected. The same goes for aggregate unemployment rate, which raises my confidence in this specification. Union density has a significant positive effect, found also in Faggio and Nickell (2007) and Bowles and Park (2005). The effect of employment protection is not statistically different from zero.

To understand better what is behind this result, I decompose working hours into two components: first, the decision whether to participate or not in the labour market, and second, how many hours to work per week conditional on participating in the labour market. In Table 8 I report three different specifications. "Total effects" specification, where everyone is included in the sample, active as well as inactive people, and where working hours are on the left hand side, is reported in columns (1) and (4). Results of this specification are equivalent to the results reported in columns (1) and (3) of Table 7. In columns (2) and (5) of the Table 8 I report

¹⁵ Only 14 instead of 16 countries are included in the regression analysis because data on tax rates for Ireland and Luxembourg are not available.

regressions with hours worked conditional on working on the left hand side. Hence, only employed people are included. The last specification, in columns (3) and (6), estimates the probability of working, with a categorical variable indicating whether an individual is employed (= 1) or not (= 0) on the left hand side. Marginal effects from probit regressions are reported.

An interesting result appears in Table 8. It seems that childcare subsidies are positively correlated with participation in the labour market across countries, however, conditional on working, in countries with higher childcare subsidies people tend to work shorter weeks. Therefore, these two effects cancel each other out, and the total effect of childcare subsidies on working hours in column (4), after controlling for other institutional factors, is close to zero and statistically insignificant. In the preferred specification of the Table 8 (columns (4) – (6)) the effects of family cash benefits are statistically insignificant. While the positive effect of childcare subsidies on participation in column (6) is supportive of the theory, the negative effect on working hours of employed people in column (5) is inconsistent with the theory. One possible explanation is, of course that I am not controlling for other country level characteristics. It is possible, for example that in countries with higher childcare subsidies there is higher incidence of part-time work, for some unobservable reasons, and that the measure of childcare subsidies is simply picking up the effect of this. Another possible explanation is that in countries with higher childcare subsidies people tend to work shorter hours due to some unobserved country-level characteristic such as culture. I will explore this in more detail in section 7.

In Table 9 I report analogous analysis, but separately for men and women. Intuitively, one would expect that family support policies would have their effects mostly concentrated on women, since women are still taking most of the childcare responsibilities within the household. For both groups total effects of childcare subsidies on working hours are statistically insignificant, as reported in columns (1) and (4). In both cases, again, the effects on hours worked of employed people are negative and statistically significant for men, columns (2) and (5), and the effects on participation for both groups are positive and statistically significant, columns (3) and (6). Effects of family cash benefits are mostly insignificant, except in column (6), where they seem to have significantly positive effect on participation of women. Tax wedge has significantly

negative effects in regressions for men, but it is too imprecisely measured in the case of women¹⁶.

From the results so far I tentatively conclude that there is weak or no evidence that childcare subsidies have an effect on working hours in the economy as predicted by the theory. In the next section I turn my attention to comparisons of people with and without children.

5.4 Comparisons of people with and without children

It is good to first get an idea of the difference in working hours and labour market participation between people with children and people without children. I split people into two groups: the first group includes people living in households with at least one child of age 0-15 present and the second group includes all the rest. Table 10 reports differences across countries between parents and nonparents in their working hours and employment rates. It is based on the sample of age 16-55. As seen from the table, parents on average work 0.4 hours per week more than nonparents, however, there is considerable variation in the differences across countries. In the UK, for example, parents work 5.9 hours less than nonparents, while in Sweden they work 6.7 hours *more*. Similar conclusions can be inferred from the data on the employment rates, calculated from the ECHP and the US CPS data. Again, on average, the employment rate is 2.2 % points higher for parents. However, in Luxembourg and the UK it is 8.9 and 8.2 % points lower, respectively, whereas in Sweden it is 17.0 % points higher.

I now turn to the regression analysis. Recall from section 2, that we expect positive effects of childcare subsidies on working hours of both parents and nonparents, and that these effects are expected to be stronger for parents. Similarly, cash benefits are supposed to reduce working hours of parents, and increase working hours for nonparents. In absolute value effects of cash benefits are expected to be stronger for parents. I report the results in Table 11. In order to capture possible differences in the effects of family policies on parents and nonparents I include dummy variables (and corresponding interactions) indicating whether children are present in the household. In this way I recognize the potential for heterogeneity in the effects of public policies across groups of individuals; I allow for heterogeneity in the effects of childcare subsidies, cash

¹⁶ In order to account for a large number of zeroes among the observed hours of work I did the analysis above also using Tobit specification. Results were similar.

benefits and tax wedge. In columns (1) and (2) of the Table 11 I split people into two groups: first group includes everyone with children of age 0-15 in the household, and the second group includes everyone else. I report two different specifications, one with policy variables only (family policies and taxes) and one with other institutional controls included (unemployment rate and labour market rigidities).

The results in Table 11 do not support the theoretical predictions. Let me focus on my preferred specification in column (2). Effects of childcare subsidies for both parents and nonparents are insignificant. If anything, effects are stronger for nonparents (as in column (1)). Effects of cash benefits are also insignificant. Effects of tax wedge are negative, but statistically significant only for nonparents. Intuitively, we would expect the results to be strongest for parents with small children. Therefore, in columns (3) and (4) of Table 11 I further split parents into two groups: parents with small children (children of age 0-6 in household) and parents with older children (children of age 7-15 in household and no younger children). The group with no children is the same as in columns (1) and (2). The results are again inconsistent with the theory. Effects of family policies in column (4) are small and statistically insignificant for all groups.

Finally, I report results separately from men and women. I also consider the participation decision and working hours' decision separately. Results are reported in Table 12; I include all other institutional controls. Looking at total effects in columns (1) for men, there is evidence of a negative and significant effect of childcare subsidies on working hours for male parents and a close to zero effect for nonparents. In both cases, participation in the labour market increases with the childcare subsidy (column (3)), whereas hours conditional on working decrease with childcare subsidies (column (2)). Comparing male parents to male nonparents, the difference in the total effects goes in completely wrong direction, as we would expect the effect for parents to be more strongly positive. Positive effect of childcare subsidies on participation in column (3) is encouraging, but this effect is smaller for male parents than for male nonparents. Total effects of cash subsidies for men in column (1) go in the wrong direction; we would expect negative effects for parents and positive effects for nonparents but the effects go in the opposite direction.

Let us now turn to the effects on women. Here the direction of effects is more consistent with the theory, but coefficients are very imprecisely measured, hence they are in most cases statistically insignificant. Total effects of childcare subsidies in column (4) are positive and stronger for

parents, however they are insignificant. For women too, there is a positive effect on participation and negative effect on hours worked conditional on working. Effects of childcare subsidies on participation (column (6)) are positive and significant, with no real differences between parents and nonparents. Total effects of cash benefits for women, column (4) are insignificant, but effects at least go in the direction expected in theory: there is a negative effect on working hours of female parents.

To sum up, there is no evidence to support the idea that family policies can help explain differences in working hours across countries. In aggregate the effects do not show up empirically. There is evidence that childcare subsidies increase participation in the labour market, yet in countries with higher childcare subsidies, people who work tend to work fewer hours. When comparing parents and nonparents expected differences in effects and magnitudes also do not show up. Effects on parents do not seem stronger and in many cases go in the wrong direction. If anything, there is some evidence that effects go in the expected direction for females. However, these effects are very imprecisely measured and are cancelled out by the effects on men. Therefore, they are not enough to be able to explain *aggregate* differences in working hours across countries.

6 Effects of family-support policies on childcare at home

It is important to further explore the effects of family support policies. According to the model there is another prediction that can be tested in the data. In the way that public support has an effect on working hours it also has an effect on the time parents spend in childcare at home. In other words, if a mother is encouraged to take up a job, she will likely reduce her time spent in childcare. This happens either because the child is put in some form of formal external childcare institution, or the child is taken care of informally, by grandparents for example. Hence, in theory, a childcare subsidy should reduce the time spent in childcare at home for parents. On the other hand, cash benefits should *increase* the time spent in childcare of parents, as by increasing the non-earned income of parents the policy encourages them to stay at home. For people without children the effects on childcare are slightly different. Both, childcare subsidies and cash benefits are expected to decrease their time spent in childcare at home. This happens via the government budget constraint (13); by increasing the support to families, government is reducing

the amount of money it awards as a lump sum subsidy, hence nonparents are induced to work more and spend less time in other activities.

Information on the time spent in childcare is based on the ECHP variable pr007: Number of hours (per week) spent looking after children. This variable is based on two related survey questions: “Do your present daily activities include looking after children, whether your own or other, without pay?” and if the answer to this question is yes, “Roughly how many hours per week do you spend looking after children?” This variable is reported for those who did spend some time looking after children. For the rest (if applicable) I assume they spend 0 hours looking after children. This variable is not available for the US and also not for Germany, Sweden, the UK and Luxembourg. In Table 13 I show a comparison between childcare at home for people with and without a child of age 0-15 in household. There exists a very large variation across countries in the time spent in childcare at home and there is also large variation in the differences in childcare time between the two types of individuals. People with children spend 31.4 hours looking after children in Denmark, but only 13.9 hours in Portugal. On the other hand, people without children spend 0.7 hours per week looking after children in Denmark, France or Spain and 3.22 hours in Italy. On average parents spend 20.2 hours more in childcare at home than people without children. This difference is highest in Denmark (30.7), Netherlands (28.9) and Ireland (27.9) and lowest in Portugal (13.0), Italy (15.7), Greece (16.0) and France (16.1) In general, south European countries such as Portugal, Greece and Italy tend to have low differences, indicating that there may be a lot of informal care for children going on, i.e. by grandparents.

In Table 14 I report regression results from regressing the hours looking after children on the policy variables. As for quite a few countries the data on childcare is not available, only 10 countries are left for this analysis. Because of this the results of this section cannot be directly comparable to the results from the previous section, where I analysed the effects of policies on working hours. Let’s first look at the results reported in columns (1) and (2) of Table 14 where I report regression on the whole sample with institutional controls either excluded or included, respectively. In aggregate, childcare subsidies are expected to *decrease* time in childcare at home, whereas cash benefits are expected to *increase* time in childcare. The empirical results however, are not consistent with this. In the specification with other controls included, column (2), effect of childcare subsidies is statistically insignificant, but positive. Effect of cash benefits

on the other hand is significantly negative. In columns (3) and (4) I do analogous analysis, but allowing for differential effects between parents and nonparents. Recall that effect of childcare subsidies is expected to be more negative for parents, whereas the effect of family cash benefits is supposed to be positive for parents and negative for nonparents. This is not the case in my results. Effects of childcare subsidies on parents are in fact positive and significant, whereas for nonparents they are negative and significant. This means that in countries with higher childcare subsidies parents appear to take more care of children at home! The only statistically significant effect that goes in the right direction is the effect of cash subsidies on nonparents in column (4). Finally, in columns (5) and (6) I split the sample by gender, and again results are inconsistent with the theory for both males and females.

In order to better understand what is behind these results I next split the sample by age. Into one group I put people of age 16-55 and in the second group I put people that are older than 55 years. I choose the 55 years cut-off, because this is about the average age at which people become grandparents. I report the results in Table 15. In columns (1) and (2) I report results for the sample of age 16-55. Similarly as before, there is a puzzling positive effect of childcare subsidies on time in childcare activities at home and a negative effect of cash benefits, column (1); both these effects are inconsistent with the predictions of the theory. Comparing parents and nonparents, effects of childcare subsidies are strongly positive for parents, which is also puzzling. Moving to column (3) where I show results from the analysis on people of age 56 or more, we can see significant and negative effects of both types of family policy on their time in childcare at home. There seems to be some indication that family policies do not have expected effects on the prime-age group, or on parents, but there seem to be strong and significant effects on old people, for example grandparents. One potential explanation for this would be that if family policies are not relieving the childcare burden of parents, perhaps they are merely relieving the childcare burden of grandparents. Therefore, since grandparents are often not active in the labour market, effects on working hours cannot be large. However, there may be certain cultural or institutional unobservables that are correlated with family policy variables and thus contaminating the results. I try to look into that in the next section.

7 Controlling for the effects of “culture”

In a cross-country analysis there is always a risk of unobservable country level variables that are correlated with observed regressors contaminating the results. My analysis is very much prone to this kind of bias. I have discussed above that it is possible that cultural aspects affect my results and bias the coefficients on family policy variables. For example, in section 5.3 I report that conditional on working, childcare subsidies have a negative effect on working hours. However, it could as well be the case that in countries with high public childcare support part-time work is more prevalent. Furthermore, I also find that childcare subsidies have positive effect on time in childcare at home by parents. This result, however could be caused by the fact that in countries with lower childcare subsidies such as southern Europe, parents take less time to care for their children, because to them using informal care by other family members is more readily available and more acceptable. The reported effect could thus appear merely due to differences in culture across countries that are correlated with the measure of childcare subsidies.

In order to assess the impact of these two effects I include into the analysis two more variables. First is measuring the prevalence of part time work in a country, and the second is measuring the average number of adults in a household. Both variables are calculated from the information available in the ECHP and the US CPS. In Table 16 I show these two variables across countries for the year 2000. Share of part-time workers measures the percentage of employed people that are employed part-time. The share of part-time workers is partly determined by institutional arrangements in the labour market, and partly by preferences of consumers/households. As seen from Table 16, 13% of workers are on average employed part-time¹⁷, but differences across countries are very large. In Netherlands, for example 31.2% employed people work part-time. This is followed by Ireland (19.1%) and the US (17.5%). At the bottom end of the spectrum are southern European countries, Greece (5.5%), Italy (6.9%) and Portugal (7.8%).

Another variable is measuring the average number of adults of age 18 or more in a household. With this measure I am trying to capture cultural differences across countries regarding the family size, living arrangements and proximity of a potential informal care for children. Unweighted average of the number of adults in the household across countries is equal to 2.0. As

¹⁷ Based on unweighted cross-country average.

expected, the biggest size of households is observed in southern Europe: Spain (2.6), Portugal (2.5), Greece and Italy (both 2.3). Ireland also has a high average number of adults (2.3) in a household. At the lower end of the scale are countries such as Sweden (1.6), Finland (1.7), Netherlands (1.8) and the UK (1.8).

The first set of regression results is reported in Table 17. I repeat the analysis from before, only that now I include also the two new measures of “culture”. Let me first briefly talk about the effects of variables measuring culture. They seem to have significant effects in most of the specifications. Incidence of part time work enters with a negative and significant coefficient in all six specifications, as expected. Similarly, the average number of adults has a negative and significant effect in 4 out of 6 cases, also something in line with the intuition. In countries with larger families, people tend to work less on average, mainly due to lower participation in the labour market.

Columns (1)-(3) of Table 17 are analogous to the columns (4)-(6) in Table 8. They analyse the aggregate effects of family policies on working hours in the economy, decomposed into the participation and hours of work decision. First, with culture included in the regression there is a positive and significant total effect of childcare subsidies on working hours, column (1). In column (2), despite including the measure of the incidence of part-time work into the regression, there is still a significantly negative, but smaller than before, effect of childcare subsidies on working hours conditional on working. Hence, this effect seems to be quite robust. In column (3) the effect of childcare subsidies on participation is more or less the same as before. The effects of cash benefits on working hours are insignificant on aggregate. These results tend to be supportive of the theory, and hence indicate a possibility that after controlling for differences in household size and incidence of part-time work, family policies have a scope to explain differences in working hours across countries.

However, when comparing parents with nonparents differences remain puzzling, and contradict the theory. Columns (4)-(6) in Table 17 show the results of this exercise. Effects of childcare subsidies tend to be stronger for nonparents rather than parents, and the effects of cash benefits are all insignificant. Results remain inconsistent with the theory also when analysing the time in childcare at home, reported in Table 18 (analogous to results reported in Table 15). One can see that incidence of part-time work and the size of households have strong and significant positive

effects on childcare at home, however, this does not prevent coefficients on family policies from being “wrong”. On aggregate, in column (1), childcare subsidies still tend to have a positive and significant effect on childcare at home. When comparing parents and nonparents in column (2), the difference in coefficients is still counterintuitive, as the effect on parents is, contrary to expectations, significantly positive. And when analysing effects on old people, the negative effects of childcare subsidies and cash benefits are reduced after the inclusion of the measures of culture, but remain negative and highly statistically significant. This confirms the idea that family policies relieve the childcare burden of nonparents rather than parents.

8 Conclusion

In this paper I test whether fiscal family-support policies can help explain the differences in working-hours across countries. This has been suggested in the literature by Rogerson (2007) and Ragan (2005), but has so far relied on simulations of stylised macroeconomic models with a representative agent. However, the proposed explanations imply some important effects at a more disaggregated level. I therefore focus on differences between people with children and people without children.

I consider two types of public family policies: childcare subsidies and family cash benefits. With a simple theoretical model I show that we would expect 1) a positive effect of childcare subsidies on aggregate working hours, 2) positive for both parents and nonparents, but 3) stronger for parents. There should be 4) no aggregate effects of family cash benefits on working hours, but 5) the effects should be negative for parents, and 6) positive for nonparents. Effects of family policies are also expected to have effect on the time in childcare within a household. According to the model outlined in this paper there is 1) a negative effect of childcare subsidies on aggregate time spent in childcare at home, 2) negative for both parents and nonparents, but 3) stronger for parents. There should be 4) positive aggregate effects of family cash benefits on childcare time, 5) the effects should be positive for parents, and 6) negative for nonparents.

I test these predictions using cross country variation from European Household Panel and the US CPS data. In the aggregate setting there is no supportive evidence for the idea that family policies help explain differences in working hours across countries. In preferred specifications with other controls included, effects are close to zero and insignificant. In countries with higher

childcare subsidies, participation in the labour force is indeed higher, but working hours *conditional on working* are lower, bringing the aggregate effect of policies to zero. When comparing the effects of parents and nonparents, the differences in the coefficients are counterintuitive. There is an indication that results go in the right direction for females, but are cancelled out by the counter effects on males, hence, in the aggregate setting, family policy do not have the expected effect on working hours.

Furthermore, in regressions with the time spent in childcare at home on the left hand side, the effects of policy variables contradict the theory. Childcare subsidies, for example, seem to increase the time in childcare at home and this effect seems to be, counter-intuitively, strongest for parents. Analysis performed on the sample of people older than 55 years, for which family policy should not matter much, seems to indicate that family policies tend to reduce the time in childcare for this group. One possible explanation for this is that public childcare support actually relieves grandparents from childcare, rather than parents. But, since older people do not participate in the labour market very much, family support cannot have a strong impact on working hours. Finally, I include into the analysis two measures of “culture”: average number of adults in the household and the incidence of part-time work in the country. After controlling for these two variables, aggregate effects of childcare subsidies on working hours become positive and significant; however the effects on parents are still weaker than the effects on nonparents and results from the analysis on the time in childcare spent at home still contradict the theory.

The lack of empirical evidence in support of the idea that family policies can help explain the differences in working hours across countries is striking. The family policy story can perhaps be used narrowly to explain the differences between Sweden and the US, but it does not bear the inclusion of a greater set of countries and a greater set of controls. Nor does it bear the separation of effects for parents and nonparents. I hence conclude that the family policy story contributes little to the explanation of the differences in working hours across countries.

Table 1: Working hours per week per person 15-64 (year 2000)

Country	(1) = (2)*(3) Hours per week per person	(2) Hours per week (employed)	(3) Employment rate
Austria	21.58	31.38	0.69
Belgium	18.22	29.71	0.61
Canada	24.43	33.97	0.72
Denmark	23.01	29.88	0.77
Finland	22.68	33.64	0.67
France	18.82	30.62	0.61
Germany	18.70	28.23	0.66
Greece	22.96	40.00	0.57
Ireland	21.36	32.46	0.66
Italy	19.52	35.67	0.55
Luxembourg	19.87	31.52	0.63
Netherlands	19.11	26.31	0.73
Norway	21.01	26.54	0.79
Portugal	23.64	32.52	0.73
Spain	20.18	34.91	0.58
Sweden	23.62	31.24	0.76
United Kingdom	24.11	32.85	0.73
United States	27.06	35.40	0.76

Data sources: OECD data on total working hours. Data are for the population of 15-64 years of age. Working hours per week per person (1) is the product of employment rate (3) and weekly hours of employed persons (2). Weekly hours of employed take into account the length of the working week as well as holidays and other days off work.

Table 2: Public family spending, % GDP (year 2000)

	(1)	(2)	(3)	= (1) + (3)	≈* (2)
country	Cash	Services	Tax breaks	Cash benefits	Childcare subsidies
Austria	2.37	0.56	0.02	2.39	0.34
Belgium	1.76	0.83	0.55	2.31	0.59
Canada	0.77	0.20	0.08	0.85	0.20
Denmark	1.49	2.19	0.00	1.49	2.05
Finland	1.70	1.35	0.00	1.70	1.19
France	1.47	1.54	0.77	2.24	1.19
Germany	1.16	0.78	1.01	2.16	0.40
Greece	0.74	0.39	0.00	0.74	0.15
Ireland	1.64	0.19	0.07	1.71	0.00
Italy	0.54	0.61	0.00	0.54	0.55
Luxembourg	2.74	0.48	0.00	2.74	0.47
Netherlands	0.72	0.73	0.44	1.17	0.73
Norway	1.87	1.93	0.12	1.99	1.43
Portugal	0.65	0.43	0.17	0.83	0.31
Spain	0.30	0.56	0.06	0.36	0.40
Sweden	1.52	1.74	0.00	1.52	1.30
United Kingdom	1.87	0.71	0.31	2.18	0.56
United States	0.11	0.63	0.83	0.94	0.38
Average	1.30	0.88	0.25	1.55	0.68
Coefficient of variation	0.56	0.67	1.32	0.47	0.79

Data sources: OECD Social Expenditure database (SOCX 1980-2003) and OECD Family Database (PF1). Columns (1)-(3) are as reported in the data sources; columns on the right hand side are as shown. *Cash transfers* to families (1) include items such as child allowances, public income support during parental leave, income support for sole parent families and public childcare support through payments to parents. *Services* (2) comprise of direct financing and subsidising of providers of childcare and early education facilities, public assistance for young people and residential facilities, public spending on family services (centre based services and home help for families in need). *Tax breaks* (3) represent tax exemptions, child tax allowances and child tax credits.

Childcare subsidies exclude those services that do not support childcare; such items include for example assistance for pupils and youths, youth centres, family accommodation benefits, transport subsidies, holidays for schoolchildren, school meals etc.

Table 3: Use of formal childcare

Country	OECD Family Database		ECHP
	Enrolment rates of children under six in childcare and early education services (2003/04)		% of households having their kid looked after on a regular basis (2000)
	0 - 2 years	3 - 5 years	0-11 years
Austria	6.6	74.0	33.0
Belgium	33.6	99.6	43.7
Canada	19	na	na
Denmark	61.7	89.7	77.4
Finland	35	46.1	46.6
France	28	101.9	42.7
Germany	9	80.3	38.1
Greece	7	46.8	21.0
Ireland	15	68.2	19.2
Italy	6.3	100.3	33.8
Luxembourg	14	72.3	55.0
Netherlands	29.5	70.2	29.3
Norway	43.7	85.1	na
Portugal	23.5	77.9	45.7
Spain	20.7	98.6	20.0
Sweden	39.5	86.6	66.4
United Kingdom	25.8	80.5	34.9
United States	35.5	62.0	na
Correlation with childcare subsidies	0.83*	0.28	0.81*

Data sources: OECD Family Database (PF11). Canada and Germany (2001); France (2002); Greece, Luxembourg and Norway (2003); Denmark and the United States (2005). Enrolment rates for 0-2 years old concern primarily formal childcare arrangements such as group care in childcare centres, registered childminders based in their own homes and care provided by a carer at home who is not a family member. Enrolment rates for 3-5 years old concern those enrolled in formal pre-school services, and in some countries 4 and 5 years old in primary schools. Where children are enrolled in more than one part-time programme, the issue of double counting arises. This leads to overestimated enrolment rates (enrolment in some countries > 100%).

ECHP (European Community Household Panel), year 2000. Calculations based on the survey question at the level of household: "Are any of the children (0-11) in this household looked-after on a regular basis by someone other than their parent or guardian, whether at home or outside such as at a crèche or kindergarten?" Based on all households with at least one child aged 0-11.

* denotes significantly different from zero at 5%.

Table 4: Relationship between the use of formal childcare and family policy variables (year 2000)

Dependent variable:	% aged 0-2 in care	% aged 3-5 in care	% households with kids looked after⁺
	(1)	(2)	(3)
Childcare subsidies - % GDP	23.647 (4.022)***	8.748 (8.251)	23.657 (3.268)***
Family cash benefits - % GDP	-2.261 (2.996)	0.430 (6.175)	3.877 (2.502)
Constant	12.628 (5.288)**	71.956 (11.406)***	17.139 (5.508)***
Observations	18	17	59
R-squared	0.70	0.08	0.75

Standard errors in parentheses, ⁺pooled OLS: period 1998-2001, standard errors clustered by country, with 15 clusters. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Calibration of the model: magnitude of the effects of family policies on working hours

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
					Aggregate	Parents	Nonparents		
					effect of including g and s	effect of including g and s	effect of including g only	effect of including g and s	effect of including g only
Country	h	τ	g	s					
Sweden	0.24	0.58	0.0080	0.0094	1.68%	-2.16%	2.61%	4.15%	1.09%
Denmark	0.23	0.50	0.0123	0.0090	2.25%	0.17%	3.49%	3.59%	1.46%
Belgium	0.19	0.49	0.0028	0.0110	0.50%	-3.09%	0.78%	2.81%	0.33%
UK	0.25	0.34	0.0035	0.0137	0.52%	-2.29%	0.81%	2.32%	0.34%
Italy	0.20	0.50	0.0028	0.0028	0.52%	-0.23%	0.80%	1.00%	0.34%
US	0.28	0.30	0.0027	0.0067	0.38%	-0.77%	0.59%	1.13%	0.25%

Time frame for calculations of h is 14 hours a day (as in Ragan (2005) and Prescott (2004)), $h = (\text{OECD working hours}) / (14 * 7)$. Policy parameters are based on data sources described above (OECD, OECD SOCX). In the model h represents the value of the whole economy (= gdp), hence the real value of what government gives for childcare subsidies is $totg = (\text{childcare subsidies as \% GDP}) * h$. This only goes to parents, hence $g = totg / \delta$. s is calculated in the same way.

In calculations I compare values for h in the model where g (and s) is set to their actual values, with h from the model where g and s are set to zero, based on equations (14)-(16). I set $\alpha = 0.35$, calibrated from the US data using equation (16), and $\delta = 0.39$, calculated from the US CPS.

Table 6: OECD total working hours and family policy: regression analysis (1998-2003)

Dependent variable: Working hours per week			
	(1)	(2)	(3)
childcare subsidies - % GDP	1.892 (0.983)*	1.152 (0.836)	0.199 (1.070)
family cash benefits - % GDP	-1.018 (0.784)	-1.414 (0.702)*	-1.344 (0.779)
tax wedge	-17.363 (11.640)	-9.553 (11.364)	-8.080 (11.912)
unemployment rate		-0.295 (0.167)*	-0.200 (0.171)
union density			0.033 (0.039)
employment protection			-3.544 (2.411)
Constant	29.079 (4.907)***	28.874 (5.116)***	29.499 (3.955)***
Observations	82	80	63
No. of clusters/countries	16	15	15
R-squared	0.25	0.34	0.55

Robust standard errors in parentheses (clustered by country), * significant at 10%; ** significant at 5%; *** significant at 1%

Table 7: Working hours and family policy: regressions on the sample of age 16 and more (1998-2001)

Dependent variable: Working hours per week			
	(1)	(2)	(3)
childcare subsidies - % GDP	2.633 (0.972)**	1.443 (0.792)*	0.413 (0.925)
family cash benefits - % GDP	0.664 (0.868)	-0.078 (0.743)	-0.098 (0.566)
tax wedge	-24.792 (9.996)**	-12.232 (8.314)	-29.249 (10.652)**
unemployment rate		-0.450 (0.172)**	-0.297 (0.150)*
union density			0.084 (0.026)***
employment protection			0.190 (2.793)
age	1.779 (0.144)***	1.772 (0.151)***	1.777 (0.151)***
age^2	-0.022 (0.001)***	-0.022 (0.001)***	-0.022 (0.001)***
Constant	3.110 (5.426)	3.082 (5.136)	6.884 (4.807)
Observations	829502	810698	810698
No. of clusters/countries	14	13	13
R-squared	0.26	0.27	0.27

Robust standard errors in parentheses (clustered by country), * significant at 10%; ** significant at 5%; *** significant at 1%

Table 8: Participation, working hours of employed people and family policy: regressions on the sample of age 16 and more (1998-2001)

Dependent variable:	Working hours per week			Employed dummy		
	all		employed	all		employed
	OLS		Probit ⁺	OLS		Probit ⁺
Sample:	(1)	(2)	(3)	(4)	(5)	(6)
childcare subsidies - % GDP	2.633 (0.972)**	-2.711 (0.889)***	0.159 (0.029)***	0.413 (0.925)	-2.412 (1.036)**	0.130 (0.030)***
family cash benefits - % GDP	0.664 (0.868)	-0.462 (0.552)	0.049 (0.024)**	-0.098 (0.566)	-0.063 (0.576)	0.025 (0.016)
tax wedge	-24.792 (9.996)**	12.735 (7.597)	-1.085 (0.256)***	-29.249 (10.652)**	-4.074 (10.387)	-0.526 (0.327)
unemployment rate				-0.297 (0.150)*	0.240 (0.174)	-0.014 (0.003)***
union density				0.084 (0.026)***	0.045 (0.029)	-0.001 (0.001)
employment protection				0.190 (2.793)	0.986 (2.646)	-0.010 (0.070)
age	1.779 (0.144)***	1.042 (0.162)***	0.061 (0.014)***	1.777 (0.151)***	1.046 (0.163)***	0.060 (0.014)***
age ²	-0.022 (0.001)***	-0.012 (0.002)***	-0.001 (0.000)***	-0.022 (0.001)***	-0.012 (0.002)***	-0.001 (0.000)***
Constant	3.110 (5.426)	16.064 (4.708)***		6.884 (4.807)	18.393 (4.763)***	
Observations	829502	515589	842056	810698	507171	823200
No. of clusters/countries	14	14	14	13	13	13
R-squared	0.26	0.04	0.25	0.27	0.04	0.25

Robust standard errors in parentheses (clustered by country), ⁺ Marginal effects reported (evaluated at the mean of the independent variables), * significant at 10%; ** significant at 5%; *** significant at 1%

Table 9: Participation, working hours of employed people and family policy: regressions for males and females on the sample of age 16 and more (1998-2001)

Gender group: Dependent variable: Sample:	Males			Females		
	Working hours per week		Employed dummy	Working hours per week		Employed dummy
	all	employed	all	all	employed	all
	OLS		Probit ⁺	OLS		Probit ⁺
	(1)	(2)	(3)	(4)	(5)	(6)
childcare subsidies - % GDP	-0.429 (0.670)	-2.439 (0.590)***	0.101 (0.013)***	1.228 (1.461)	-2.114 (1.622)	0.150 (0.049)***
family cash benefits - % GDP	-0.176 (0.298)	0.737 (0.419)	0.004 (0.008)	-0.021 (0.891)	-0.932 (0.998)	0.044 (0.023)*
tax wedge	-31.559 (6.366)***	-14.615 (7.737)*	-0.434 (0.148)***	-26.449 (17.501)	6.131 (18.347)	-0.591 (0.516)
unemployment rate	-0.265 (0.109)**	0.192 (0.111)	-0.013 (0.002)***	-0.329 (0.219)	0.253 (0.285)	-0.016 (0.005)***
union density	0.069 (0.015)***	0.057 (0.020)**	-0.001 (0.000)***	0.092 (0.045)*	0.040 (0.052)	-0.000 (0.001)
employment protection	0.673 (1.520)	1.672 (1.508)	-0.009 (0.044)	-0.320 (4.286)	-0.102 (4.732)	-0.011 (0.094)
age	2.621 (0.123)***	1.349 (0.178)***	0.074 (0.013)***	1.084 (0.200)***	0.697 (0.203)***	0.046 (0.014)***
age ²	-0.032 (0.001)***	-0.015 (0.002)***	-0.001 (0.000)***	-0.015 (0.002)***	-0.009 (0.002)***	-0.001 (0.000)***
Constant	-2.408 (3.663)	18.257 (4.646)***		13.401 (6.581)*	19.425 (5.877)***	
Observations	387639	274370	393591	423059	232801	429609
No. of clusters/countries	13	13	13	13	13	13
R-squared	0.34	0.07	0.32	0.23	0.03	0.22

Robust standard errors in parentheses (clustered by country), ⁺ Marginal effects reported (evaluated at the mean of the independent variables), * significant at 10%; ** significant at 5%; *** significant at 1%

Table 10: Comparisons of people with and without children: working hours and employment rates for the sample of age 16-55 (year 2000)

Country	Working hours			% employed		
	Children (0-15) present	No children (0-15) present	Difference	Children (0-15) present	No children (0-15) present	Difference
Austria	31.8	32.9	-1.1	80.6	80.4	0.2
Belgium	30.2	26.4	3.8	77.2	65.8	11.4
Denmark	33.0	31.3	1.7	86.5	85.4	1.2
Finland	33.2	29.4	3.8	80.9	73.2	7.6
France	26.4	24.2	2.3	71.4	65.6	5.8
Germany	28.1	31.6	-3.5	75.6	80.5	-4.9
Greece	29.4	25.2	4.2	66.8	59.1	7.7
Ireland	24.9	27.5	-2.6	66.9	71.6	-4.7
Italy	25.4	23.0	2.4	65.1	58.1	7.0
Luxembourg	27.8	32.2	-4.4	75.9	84.8	-8.9
Netherlands	25.3	28.4	-3.1	79.6	81.4	-1.8
Portugal	33.8	30.2	3.7	79.8	72.1	7.7
Spain	24.6	23.8	0.8	58.7	57.3	1.4
Sweden	33.9	27.1	6.7	85.7	68.7	17.0
United Kingdom	28.2	34.1	-5.9	75.0	83.2	-8.2
United States	31.7	33.7	-2.1	81.0	84.4	-3.4
Average	29.2	28.8	0.4	75.4	73.2	2.2

Data Sources: ECHP and IPUMS CPS (King et. al. (2004)).

Table 11: Working hours and family policy for people with and without children: regressions on the sample of age 16 and more (1998-2001)

Dependent variable: Working hours per week				
	(1)	(2)	(3)	(4)
<i>Effects of childcare subsidies</i>				
people with children 0-15	2.252 (1.437)	0.142 (1.169)		
people with children 0-6			1.724 (1.389)	-0.371 (1.008)
people with children 7-15			2.753 (1.725)	0.673 (1.580)
people without children 0-15	2.827 (0.794)***	0.446 (0.917)	2.827 (0.794)***	0.451 (0.914)
<i>Effects of family cash benefits</i>				
people with children 0-15	0.749 (1.208)	0.025 (0.831)		
people with children 0-6			0.387 (1.252)	-0.206 (0.880)
people with children 7-15			1.025 (1.326)	0.204 (1.036)
people without children 0-15	0.590 (0.763)	-0.236 (0.538)	0.590 (0.763)	-0.234 (0.538)
<i>Effects of tax wedge</i>				
people with children 0-15	-9.361 (12.684)	-12.216 (12.846)		
people with children 0-6			-6.196 (12.128)	-9.433 (12.037)
people with children 7-15			-12.288 (14.611)	-15.068 (15.205)
people without children 0-15	-31.326 (9.762)***	-35.386 (10.631)***	-31.326 (9.762)***	-35.464 (10.562)***
children 0-15 in household dummy	-2.085 (5.734)	0.944 (5.310)		
children 0-6 in household dummy			-2.346 (5.253)	0.547 (4.919)
children 7-15 in household dummy			-1.735 (6.669)	1.455 (6.271)
no 0-15 children in household dummy	5.595 (5.458)	9.659 (4.690)*	5.590 (5.448)	9.675 (4.676)*
age	1.752 (0.136)***	1.751 (0.142)***	1.752 (0.136)***	1.750 (0.142)***
age^2	-0.022 (0.001)***	-0.022 (0.001)***	-0.022 (0.001)***	-0.022 (0.001)***
unemployment rate		-0.302 (0.150)*		-0.300 (0.150)*
union density		0.083 (0.026)***		0.083 (0.026)***
employment protection		0.004 (2.824)		0.012 (2.810)
Observations	829040	810236	829040	810236
No. of clusters/countries	14	13	14	13
R-squared	0.64	0.64	0.64	0.64

Robust standard errors in parentheses (clustered by country), * significant at 10%; ** significant at 5%; *** significant at 1%

Table 12: Participation, working hours of employed people and family policy for people with and without children: regressions for males and females on the sample of age over 16 (1998-2001)

Gender group: Dependent variable	Males			Females		
	Working hours per week	Employed dummy		Working hours per week	Employed dummy	
Sample:	all	employed		all	employed	
	OLS	Probit ⁺		OLS	Probit ⁺	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Effects of childcare subsidies</i>						
people with children 0-15	-1.748 (0.517)***	-2.170 (0.609)***	0.069 (0.016)***	2.178 (1.896)	-1.491 (2.062)	0.147 (0.032)***
people without children 0-15	0.130 (0.658)	-2.617 (0.573)***	0.109 (0.018)***	0.680 (1.574)	-2.629 (1.512)	0.152 (0.065)**
<i>Effects of family cash benefits</i>						
people with children 0-15	0.727 (0.287)**	1.053 (0.354)**	0.009 (0.014)	-0.500 (1.466)	-2.123 (1.486)	0.031 (0.029)
people without children 0-15	-0.601 (0.316)*	0.529 (0.466)	0.001 (0.009)	0.053 (0.840)	-0.291 (0.827)	0.049 (0.027)*
<i>Effects of tax wedge</i>						
people with children 0-15	-15.825 (6.052)**	-18.051 (7.541)**	-0.025 (0.175)	-11.074 (22.287)	12.227 (21.392)	-0.280 (0.544)
people without children 0-15	-36.347 (6.681)***	-12.639 (7.876)	-0.509 (0.166)***	-32.445 (17.284)*	4.071 (18.936)	-0.736 (0.543)
children 0-15 in household dummy	-4.828 (2.950)	19.610 (4.732)***	-0.078 (0.095)	6.300 (8.439)	13.450 (8.310)	-0.199 (0.121)
no 0-15 children in household dummy	-0.284 (3.810)	17.967 (4.668)***		17.384 (6.291)**	18.498 (5.989)***	
unemployment rate	-0.269 (0.101)**	0.194 (0.110)	-0.014 (0.002)***	-0.340 (0.224)	0.226 (0.293)	-0.016 (0.005)***
union density	0.069 (0.014)***	0.057 (0.020)**	-0.001 (0.000)***	0.091 (0.047)*	0.039 (0.055)	-0.001 (0.001)
employment protection	0.438 (1.431)	1.679 (1.491)	-0.015 (0.041)	-0.507 (4.423)	-0.197 (4.998)	-0.014 (0.097)
age	2.523 (0.113)***	1.329 (0.181)***	0.071 (0.012)***	1.084 (0.195)***	0.888 (0.191)***	0.046 (0.014)***
age ²	-0.030 (0.001)***	-0.015 (0.002)***	-0.001 (0.000)***	-0.015 (0.002)***	-0.011 (0.002)***	-0.001 (0.000)***
Observations	387446	274219	393390	422790	232594	429315
R-squared	0.75	0.94		0.56	0.90	

Robust standard errors in parentheses (clustered by countries). There are 13 clusters (countries) in each regression.

⁺ Marginal effects reported (evaluated at the mean of the independent variables), in case of dummy variables effects are computed for discrete change of dummy variable from 0 to 1, * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 13: Time spent in childcare at home for people with and without children, sample of age 16 and more (year 2000)

Country	Children (0-15) present	No children (0-15) present	Difference
Austria	18.4	0.9	17.5
Belgium	21.9	1.9	20.1
Denmark	31.4	0.7	30.7
Finland	19.4	0.8	18.6
France	16.8	0.7	16.1
Greece	17.7	1.7	16.0
Ireland	29.0	1.1	27.9
Italy	18.9	3.2	15.7
Netherlands	31.1	2.3	28.9
Portugal	13.9	0.9	13.0
Spain	18.3	0.7	17.5
Average	21.5	1.4	20.2

Data Sources: ECHP. Time spent in childcare is based on ECHP variable pr007: Number of hours (per week) spent looking after children. This variable is based on two related survey questions: “Do your present daily activities include looking after children, whether your own or other, without pay?” and if the answer to this question is yes, “Roughly how many hours per week do you spend looking after children?” This variable is reported for those who did spend some time looking after children. For the rest (if applicable) I assumed they spend 0 hours looking after children.

Table 14: Childcare at home and family policy for people with and without children: regressions on the sample of age over 16 (1998-2001)

Dependent variable: Hours per week looking after children						
Sample:	all	all	all	all	males	females
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Effects of childcare subsidies</i>						
aggregate	2.189 (0.922)**	0.719 (0.543)				
people with children 0-15			9.523 (2.324)***	7.705 (1.719)***	9.533 (1.036)***	5.819 (2.501)**
people without children 0-15			-1.018 (0.498)*	-2.790 (0.708)***	-1.465 (0.567)**	-4.044 (0.910)***
<i>Effects of family cash benefits</i>						
aggregate	-0.434 (0.645)	-1.022 (0.449)*				
people with children 0-15			-0.254 (1.618)	-1.034 (1.290)	-0.861 (0.879)	-1.339 (1.878)
people without children 0-15			-0.492 (0.414)	-1.118 (0.449)**	-0.493 (0.386)	-1.650 (0.587)**
<i>Effects of tax wedge</i>						
aggregate	-11.019 (13.376)	-5.962 (5.060)				
people with children 0-15			-54.434 (38.202)	-50.417 (27.113)	-33.063 (18.205)	-63.657 (37.790)
people without children 0-15			9.941 (8.893)	17.262 (6.808)**	3.931 (4.459)	27.329 (10.927)**
children 0-15 in household dummy			29.152 (16.264)	40.080 (12.735)**	18.175 (8.112)*	58.554 (18.421)**
no 0-15 children in household dummy			-10.237 (4.570)*	-1.278 (4.161)	0.300 (2.122)	-3.061 (6.865)
unemployment rate		-0.052 (0.057)		-0.054 (0.070)	-0.053 (0.038)	-0.026 (0.106)
union density		-0.026 (0.019)		-0.030 (0.016)*	0.006 (0.007)	-0.062 (0.026)**
employment protection		-8.152 (1.026)***		-10.034 (1.373)***	-5.285 (0.880)***	-14.917 (2.032)***
age	0.639 (0.107)***	0.636 (0.112)***	0.431 (0.097)***	0.424 (0.102)***	0.236 (0.041)***	0.656 (0.166)***
age^2	-0.008 (0.001)***	-0.008 (0.001)***	-0.004 (0.001)***	-0.004 (0.001)***	-0.002 (0.000)***	-0.007 (0.002)***
Constant	2.075 (6.346)	10.190 (4.004)**				
Observations	333447	314620	333385	314558	151885	162673
No. of clusters/countries	10	9	10	9	9	9
R-squared	0.06	0.06	0.38	0.39	0.32	0.52

Robust standard errors in parentheses (clustered by countries); * significant at 10%; ** significant at 5%; *** significant at 1%

Table 15: Childcare at home and family policy for people with and without children: regressions on the samples of age 16-55 and over 55 (1998-2001)

Dependent variable: Hours per week looking after children			
Age group:	16-55		>55
	(1)	(2)	(3)
<i>Effects of childcare subsidies</i>			
aggregate	1.942 (0.584)**		-1.875 (0.327)***
people with children 0-15		6.581 (1.373)***	
people without children 0-15		-2.769 (0.896)**	
<i>Effects of family cash benefits</i>			
aggregate	-0.953 (0.479)*		-1.088 (0.263)***
people with children 0-15		-1.381 (1.080)	
people without children 0-15		-0.888 (0.616)	
<i>Effects of tax wedge</i>			
aggregate	-22.950 (5.586)***		23.768 (2.818)***
people with children 0-15		-54.580 (21.538)**	
people without children 0-15		7.074 (8.207)	
children 0-15 in household dummy		15.526 (9.572)	
no 0-15 children in household dummy		-24.102 (6.934)***	
unemployment rate	0.019 (0.064)	0.008 (0.072)	-0.123 (0.031)***
union density	-0.012 (0.021)	-0.020 (0.016)	-0.019 (0.011)
employment protection	-9.819 (1.087)***	-12.289 (1.358)***	-1.193 (0.618)*
age	4.062 (0.404)***	2.215 (0.217)***	-0.083 (0.060)
age^2	-0.056 (0.006)***	-0.030 (0.003)***	-0.000 (0.000)
Constant	-38.294 (6.266)***		3.443 (2.353)
Observations	217131	217077	97489
R-squared	0.10	0.42	0.03

Robust standard errors in parentheses (clustered by countries). There are 9 clusters (countries) in each regression. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 16: Measures of “culture” across countries: Incidence of part-time work and the average number of adults in the household (2000)

Country	% of part-time workers	average number of adults in household (>18)
Austria	13.2	2.0
Belgium	15.5	2.0
Denmark	15.3	1.9
Finland	9.7	1.7
France	8.9	2.0
Germany	16.9	1.9
Greece	5.5	2.3
Ireland	19.1	2.3
Italy	6.9	2.3
Luxembourg	na	1.9
Netherlands	31.2	1.8
Portugal	7.8	2.5
Spain	8.9	2.6
Sweden	9.0	1.6
UK	10.0	1.8
US	17.5	1.9
Average	13.0	2.0

Data Sources: ECHP and IPUMS CPS (King et. al. (2004)).

Table 17: Impact of “culture” – the average number of adults in the household and the incidence of part-time work: Working hours regressions on the sample of age over 16 (1998-2001)

Dependent variable:	Working hours per week			Employed dummy	Working hours per week			Employed dummy
	all	employed	all		all	employed	all	
	OLS			Probit+	OLS			Probit+
Sample:	(1)	(2)	(3)	(4)	(5)	(6)		
<i>Effects of childcare subsidies</i>								
aggregate	1.220 (0.405)**	-1.142 (0.450)**	0.135 (0.018)***					
people with children 0-15				0.975 (0.764)	-0.809 (0.600)	0.117 (0.031)***		
people without children 0-15				1.208 (0.405)**	-1.337 (0.483)**	0.141 (0.023)***		
<i>Effects of family cash benefits</i>								
aggregate	-0.251 (0.392)	0.392 (0.376)	0.004 (0.011)					
people with children 0-15				-0.142 (0.701)	0.113 (0.513)	-0.003 (0.021)		
people without children 0-15				-0.442 (0.358)	0.574 (0.345)	0.004 (0.011)		
<i>Effects of tax wedge</i>								
aggregate	-45.602 (10.289)***	-14.183 (9.461)	-1.040 (0.278)***					
people with children 0-15				-28.710 (13.724)*	-12.565 (11.210)	-0.630 (0.331)*		
people without children 0-15				-52.186 (9.813)***	-14.857 (9.546)	-1.210 (0.290)***		
share of part-time workers	-30.326 (7.026)***	-28.809 (4.790)***	-0.758 (0.208)***	-30.512 (7.229)***	-29.190 (5.030)***	-0.767 (0.214)***		
average number of adults (>18) in household	-2.932 (1.148)**	1.270 (1.003)	-0.180 (0.038)***	-3.187 (1.197)**	1.439 (1.049)	-0.186 (0.038)***		
children 0-15 in household dummy				17.493 (6.875)**	20.906 (6.523)***	-0.204 (0.097)**		
no 0-15 children in household dummy				26.539 (5.659)***	22.977 (5.378)***			
unemployment rate	-0.410 (0.052)***	0.041 (0.048)	-0.015 (0.001)***	-0.412 (0.054)***	0.029 (0.050)	-0.015 (0.002)***		
union density	0.082 (0.013)***	0.039 (0.012)***	-0.001 (0.000)**	0.082 (0.014)***	0.038 (0.013)***	-0.001 (0.000)*		
employment protection	2.181 (1.507)	0.698 (1.218)	0.092 (0.045)**	2.127 (1.579)	0.625 (1.293)	0.090 (0.046)*		
age	1.785 (0.149)***	1.088 (0.166)***	0.060 (0.014)***	1.759 (0.140)***	1.168 (0.178)***	0.060 (0.014)***		
age^2	-0.022 (0.001)***	-0.013 (0.002)***	-0.001 (0.000)***	-0.022 (0.001)***	-0.014 (0.002)***	-0.001 (0.000)***		
Constant	23.001 (5.800)***	23.696 (5.387)***						
Observations	810698	507171	823200	810236	506813	822705		
R-squared	0.27	0.06	0.26	0.65	0.91	0.26		

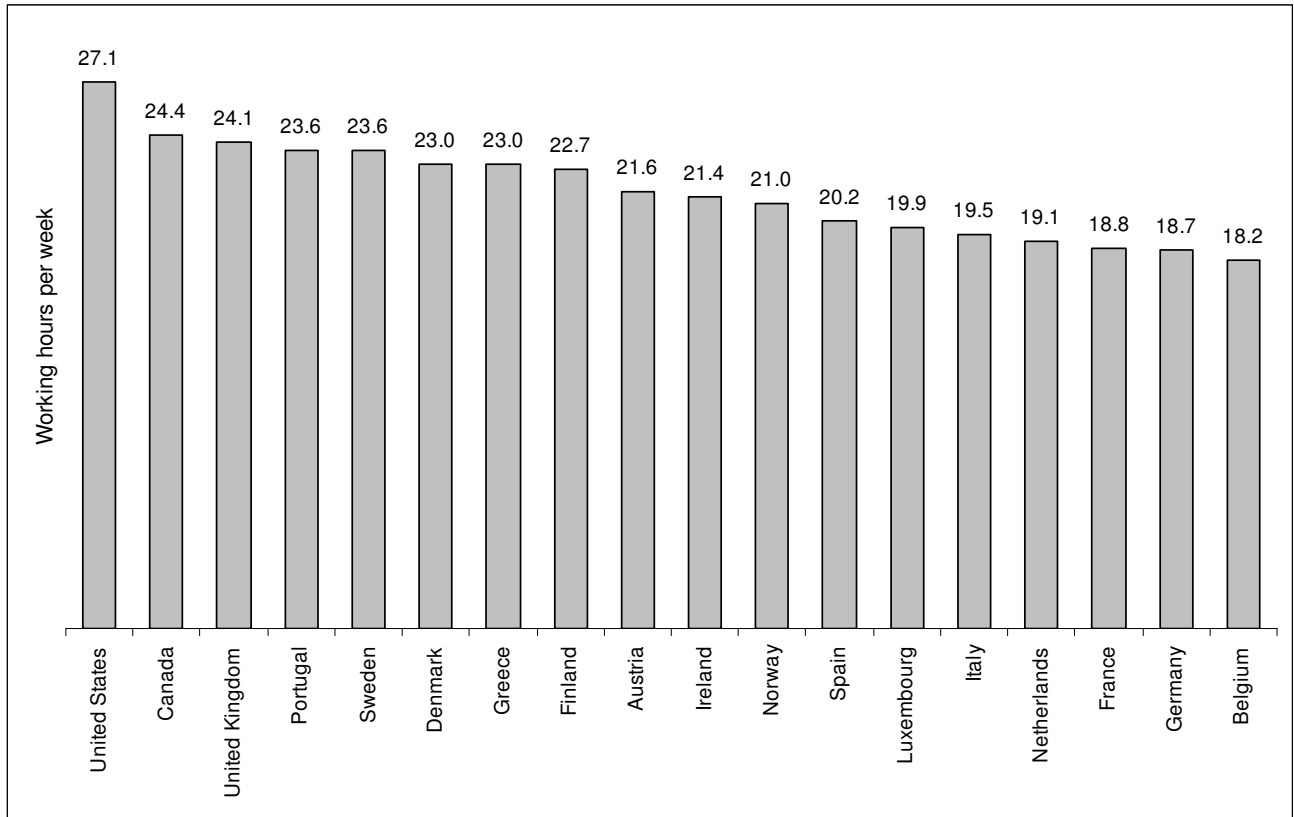
Robust standard errors in parentheses (clustered by countries). There are 13 clusters (countries) in each regression. † Marginal effects reported (evaluated at the mean of the independent variables), in case of dummy variables effects are computed for discrete change of dummy variable from 0 to 1; z values in parentheses (test of the underlying coefficient being 0), * significant at 10%; ** significant at 5%; *** significant at 1%

Table 18: Impact of “culture” – the average number of adults in the household and the incidence of part-time work: Childcare at home regressions on the sample of age over 16 (1998-2001)

Dependent variable: Hours per week looking after children			
Age group:	16-55		>55
	(1)	(2)	(3)
<i>Effects of childcare subsidies</i>			
aggregate	2.210 (0.351)***		-1.659 (0.106)***
people with children 0-15		6.429 (1.184)***	
people without children 0-15		-2.941 (0.546)***	
<i>Effects of family cash benefits</i>			
aggregate	-0.317 (0.228)		-0.666 (0.085)***
people with children 0-15		-1.036 (0.884)	
people without children 0-15		-0.603 (0.503)	
<i>Effects of tax wedge</i>			
aggregate	2.943 (7.397)		38.828 (2.657)***
people with children 0-15		-20.228 (17.191)	
people without children 0-15		43.024 (12.158)***	
share of part-time workers	27.399 (4.728)***	36.989 (4.370)***	15.975 (1.371)***
average number of adults (>18) in household	6.237 (1.459)***	5.119 (1.219)***	3.964 (0.426)***
children 0-15 in household dummy		-21.316 (7.281)**	
no 0-15 children in household dummy		-61.655 (9.384)***	
unemployment rate	0.009 (0.042)	0.030 (0.040)	-0.132 (0.013)***
union density	0.004 (0.008)	0.004 (0.008)	-0.011 (0.003)***
employment protection	-7.330 (1.069)***	-7.001 (1.022)***	0.080 (0.259)
age	4.055 (0.405)***	2.198 (0.217)***	-0.092 (0.063)
age^2	-0.056 (0.006)***	-0.030 (0.003)***	-0.000 (0.000)
Constant	-70.510 (9.103)***		-15.690 (3.854)***
Observations	217131	217077	97489
R-squared	0.11	0.42	0.03

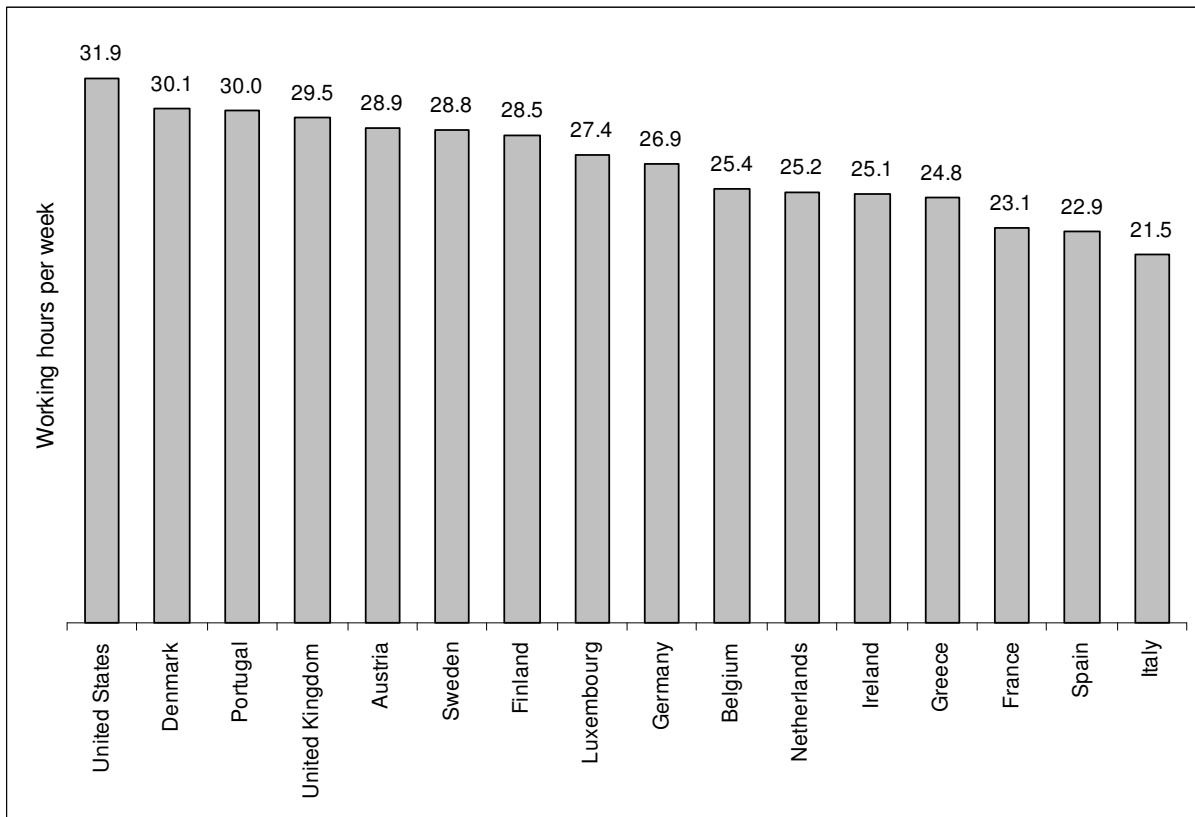
Robust standard errors in parentheses (clustered by countries). There are clusters (countries) in each regression.
 * significant at 10%; ** significant at 5%; *** significant at 1%

Figure 1: Working hours per week per person 15-64 (year 2000)



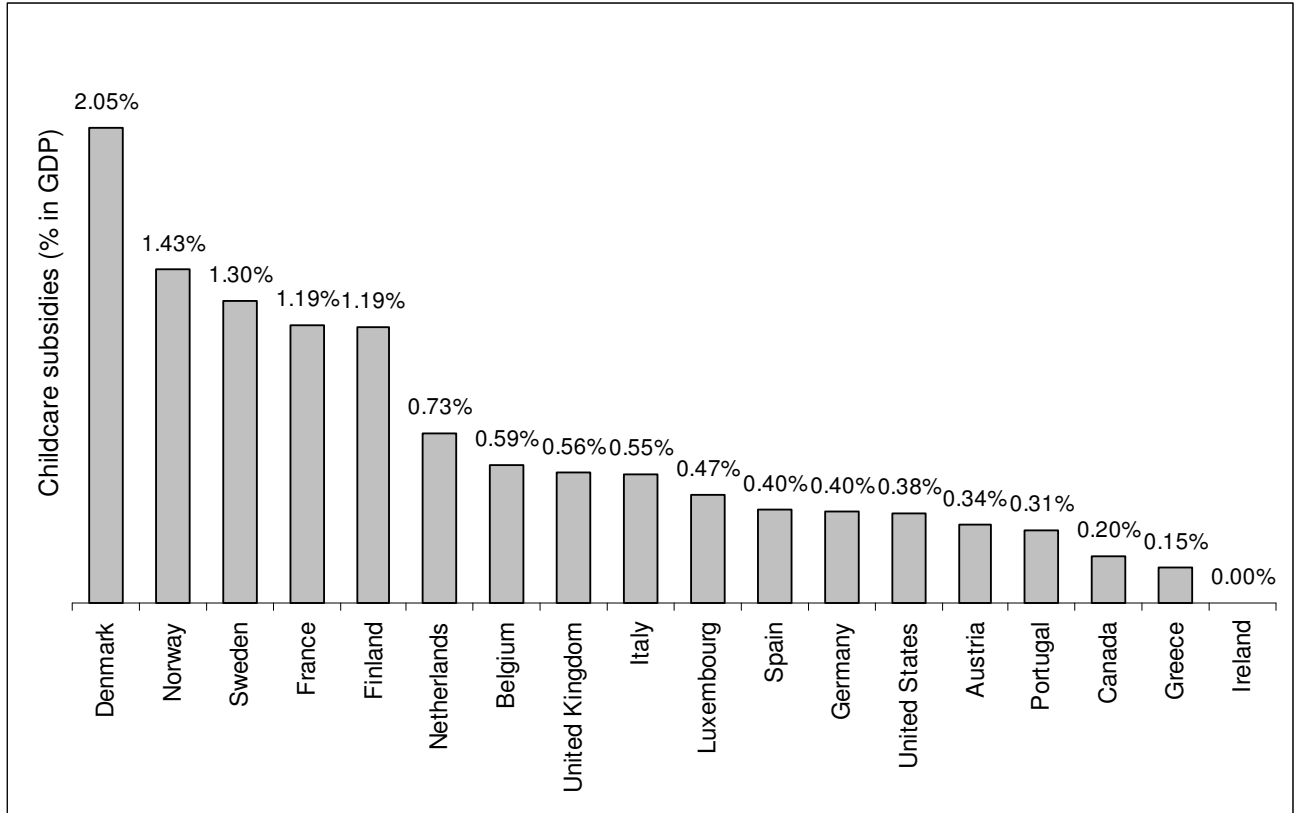
Data sources: OECD data on total working hours. For more details see Table 1.

Figure 2: Working hours per week per person 16-64 from the micro data (year 2000)



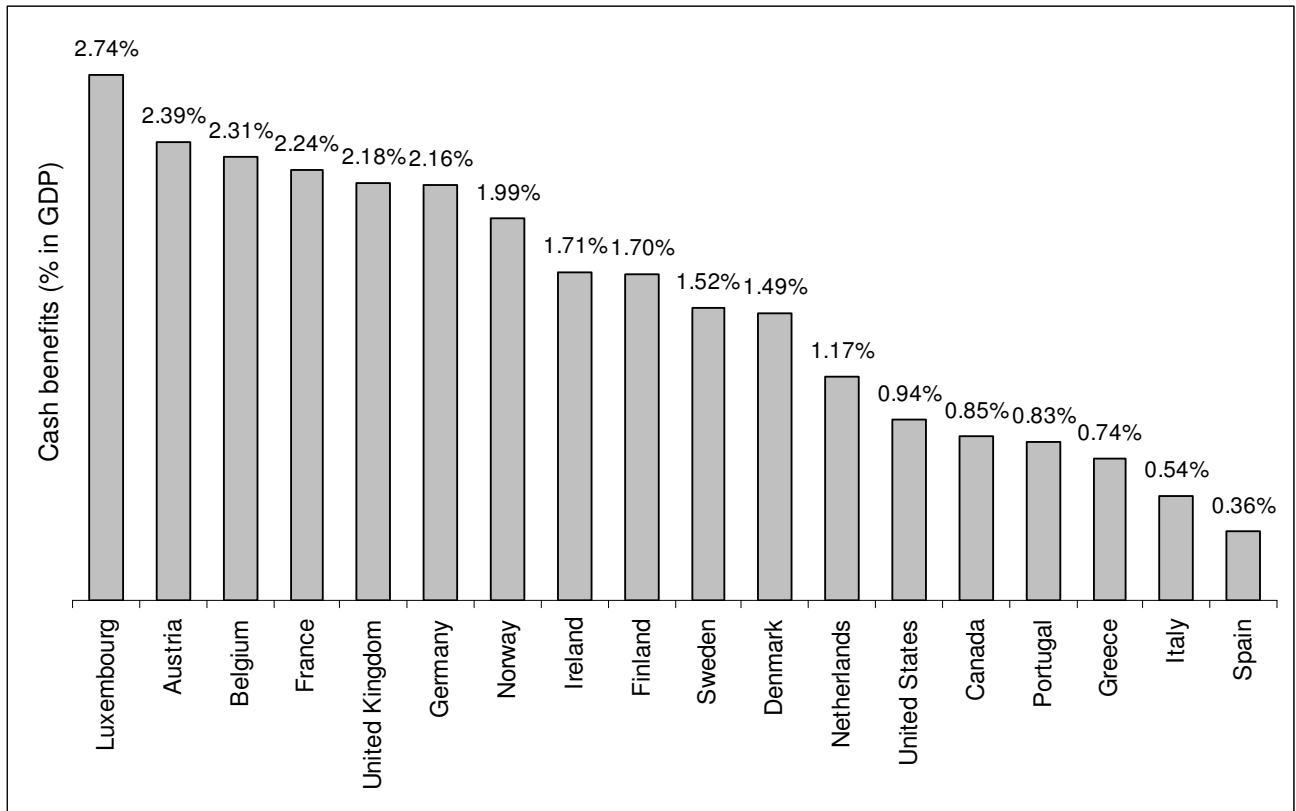
Data Sources: European data is from the European Community Household Panel (ECHP). As a measure of working hours I use the variable pe005: Total number of hours worked per week (in main + additional jobs). This variable is based on the following two survey questions: "How many hours per week do you work in your main job, including paid overtime if any?" and "About how many hours per week did you work in your additional job or business? Please give an average figure for the last 4 working weeks." It is only reported for individuals active in the labour market, hence for the rest I assume that they work 0 hours. The US data is from the US March Current Population Survey (CPS) from IPUMS CPS (King et. al. (2004)). For the US I use variable UHRSWORK: Usual hours worked per week (last year). It reports the number of hours per week that respondents usually worked if they worked during the previous calendar year. Individuals were asked this question if they reported working at a job or business at any time during the previous year or if they acknowledged doing "any temporary, part-time, or seasonal work even for a few days" during the previous year. Data is for the year 2000 (wave 7 of the ECHP).

Figure 3: Childcare subsidies, % in GDP (year 2000)



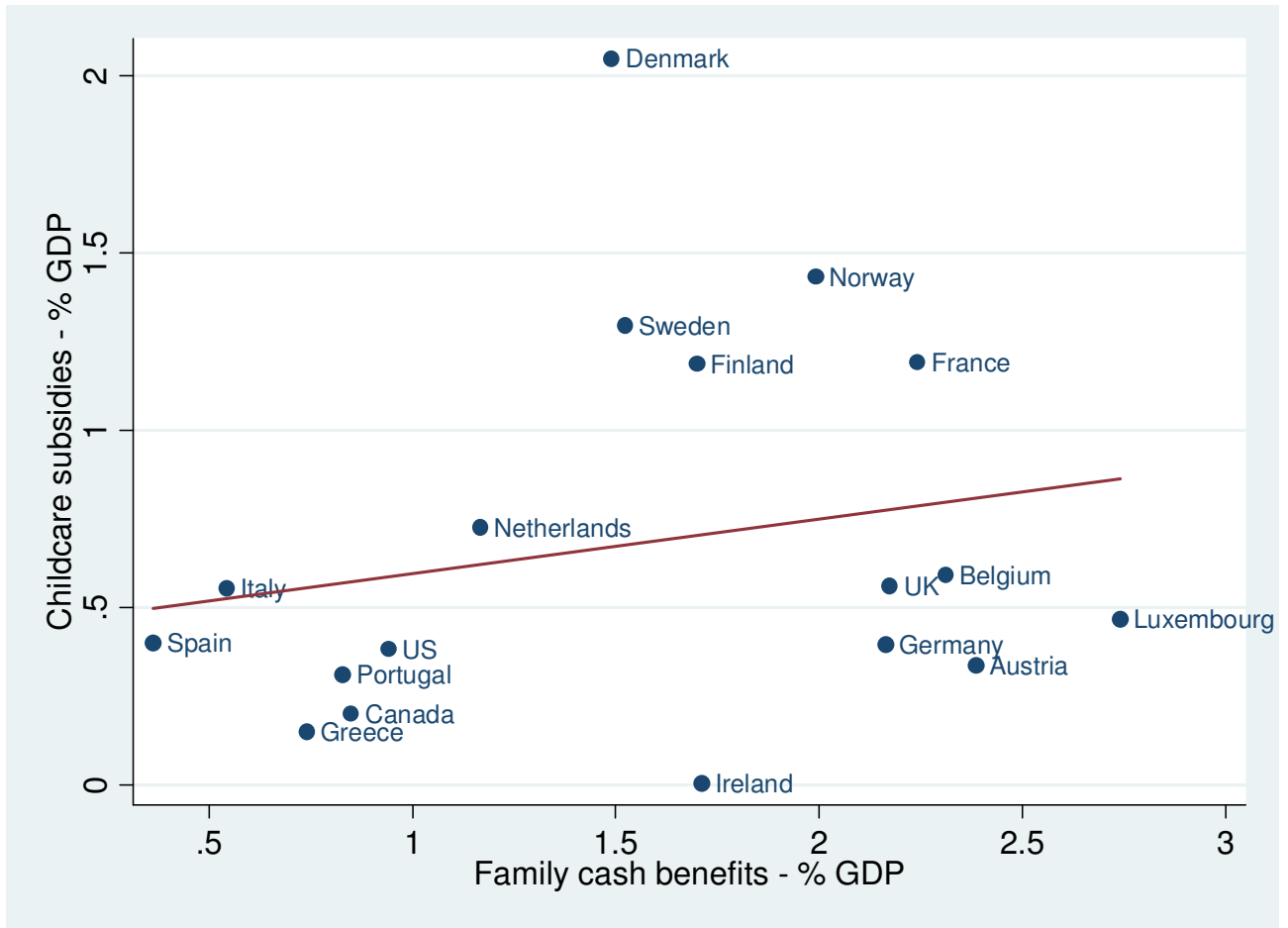
Data sources: OECD Social Expenditure database (SOCX 1980-2003) and OECD Family Database (PF1).

Figure 4: Family cash benefits, % in GDP (year 2000)



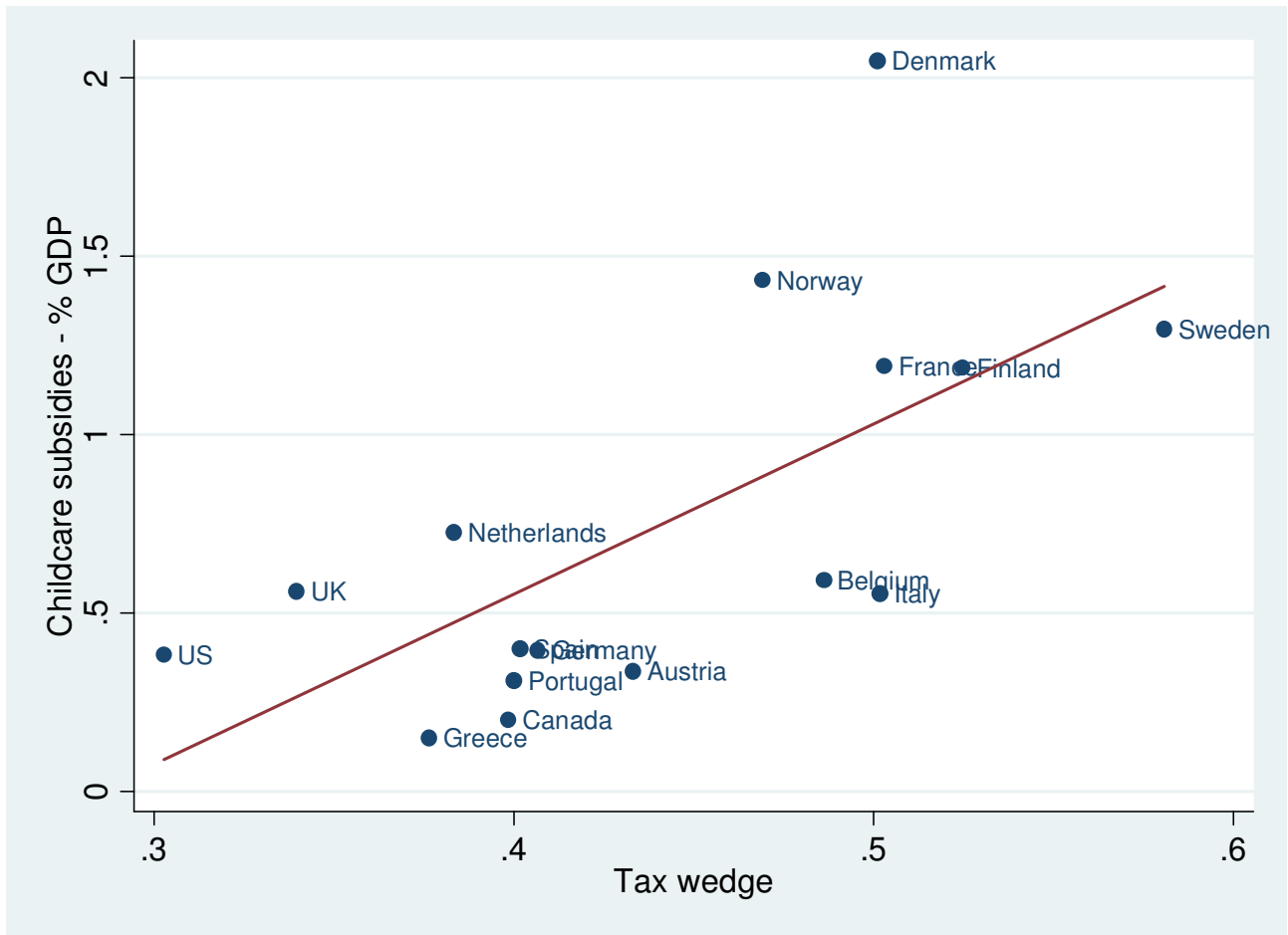
Data sources: OECD Social Expenditure database (SOCX 1980-2003) and OECD Family Database (PF1).

Figure 5: Childcare subsidies and family cash benefits, % in GDP (year 2000)



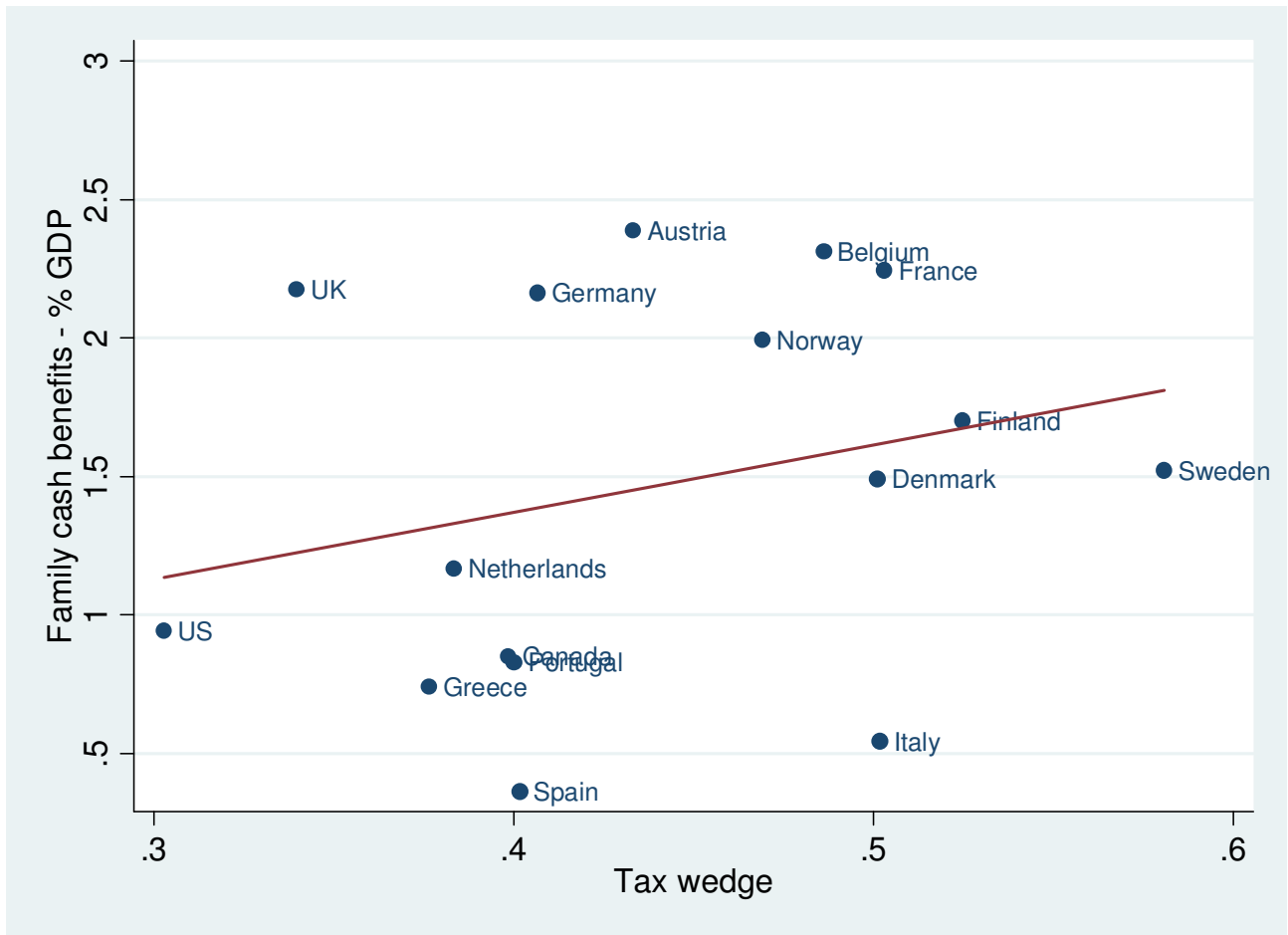
Data sources: OECD Social Expenditure database (SOCX 1980-2003) and OECD Family Database (PF1). There is a positive correlation (0.21), not significantly different from zero.

Figure 6: Childcare subsidies (% in GDP) and tax wedge (year 2000)



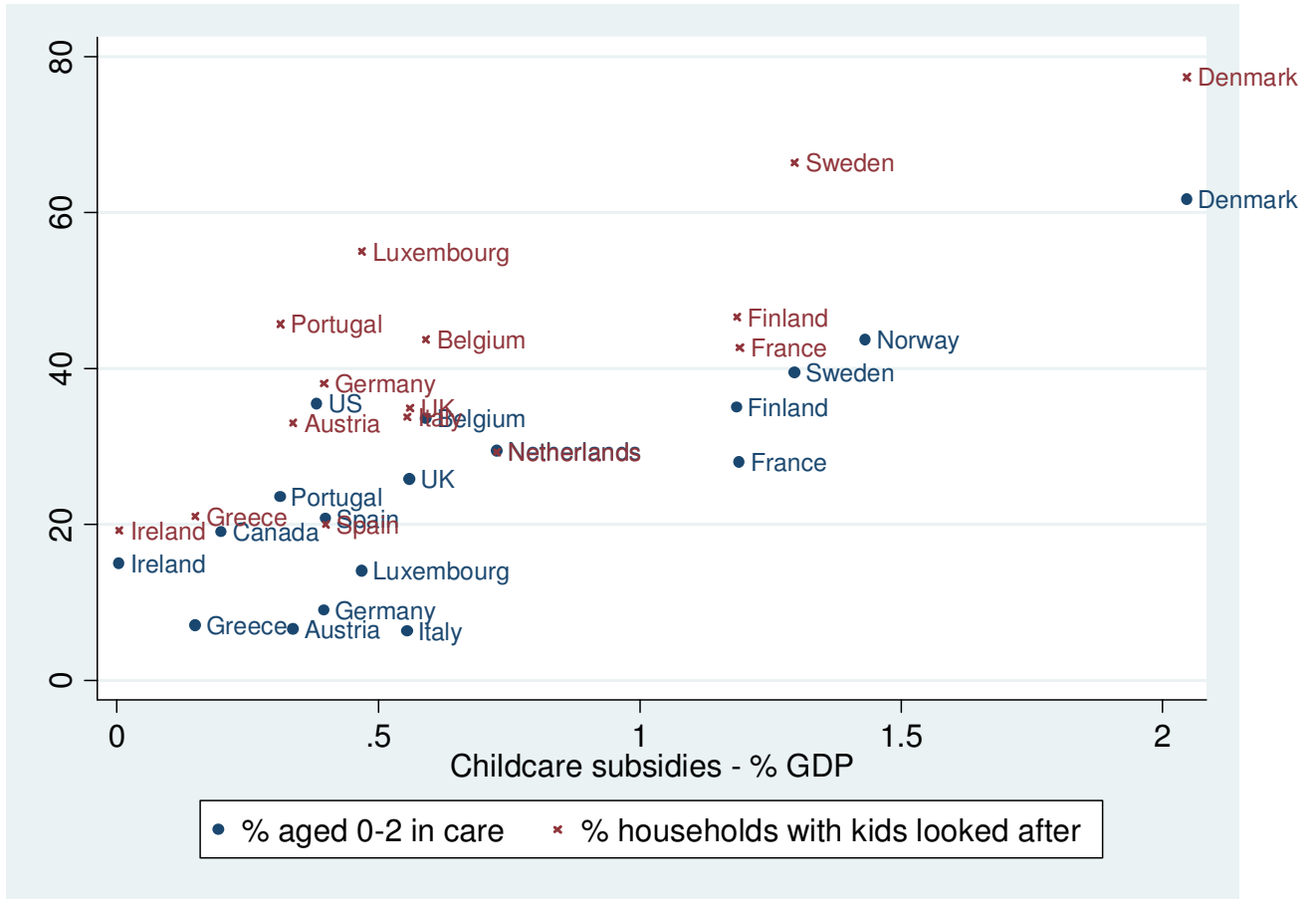
Data sources: OECD Social Expenditure database (SOCX 1980-2003) and OECD Family Database (PF1). Taxes are obtained from the CEP-OECD dataset, described in William Nickell (2006). There is a statistically significant positive correlation (0.66).

Figure 7: Family cash benefits (% in GDP) and tax wedge (year 2000)



Data sources: OECD Social Expenditure database (SOCX 1980-2003) and OECD Family Database (PF1). Taxes are obtained from the CEP-OECD dataset, described in William Nickell (2006). There is a positive correlation (0.26), not significantly different from zero.

Figure 8: Use of formal childcare and childcare subsidies (% in GDP)



Data sources: OECD Family Database, ECHP (European Community Household Panel) and OECD Social Expenditure database (SOCX 1980-2003). For more details see notes under Table 3.

Appendix

Here I show some results from the Section 2 analytically.

First order conditions

For completeness I state first order conditions for maximising utility subject to specified constraints.

Parents FOC (based on equations (1) – (4)):

$$\frac{\partial L}{\partial h_p} : \frac{\alpha(1-\tau)}{(1-\tau)h_p + T + s} = \frac{1-\alpha-\beta}{1-h_p-H_p}$$
$$\frac{\partial L}{\partial H_p} : \frac{\beta}{H_p + g} = \frac{1-\alpha-\beta}{1-h_p-H_p}$$

Nonparents FOC (based on equations (5) – (8)):

$$\frac{\partial L}{\partial h_N} : \frac{\alpha(1-\tau)}{(1-\tau)h_N + T} = \frac{1-\alpha-\gamma}{1-h_N-H_N}$$
$$\frac{\partial L}{\partial H_N} : \frac{\gamma}{H} = \frac{1-\alpha-\gamma}{1-h_N-H_N}$$

The effects of taxes on labour supply

Aggregate labour supply and labour supply of parents unambiguously decrease with taxes:

$$\frac{dh}{d\tau} = -\frac{(1-\alpha^2)}{(1-\alpha\tau)^2} < 0$$
$$\frac{dh_p}{d\tau} = -\frac{(1-\alpha^2)}{(1-\alpha\tau)^2} - s\frac{(1-\alpha)(1-\delta)}{(1-\tau)^2} < 0$$

For labour supply of nonparents:

$$\frac{dh_N}{d\tau} = -\frac{(1-\alpha^2)}{(1-\alpha\tau)^2} + s\frac{(1-\alpha)\delta}{(1-\tau)^2} < 0, \text{ IFF } \frac{(1+\alpha)}{(1-\alpha\tau)^2} > s\frac{\delta}{(1-\tau)^2}$$

Under plausible conditions, s and δ are much smaller than 1, hence this condition will be satisfied. See “Realistic example” below.

The effects on childcare at home

Childcare from FOC:

$$H_P = \frac{\beta - g(1 - \alpha - \beta)}{1 - \alpha} - \frac{\beta}{1 - \alpha} h_P,$$

$$H_N = \frac{\gamma}{1 - \alpha} - \frac{\gamma}{1 - \alpha} h_N.$$

Effects of taxes on childcare:

$$\frac{dH}{d\tau} = \frac{\alpha(\alpha\beta + (1 - \delta)\gamma)}{(1 - \alpha\tau)^2} + s \frac{(\beta - \gamma)\delta(1 - \delta)}{(1 - \tau)^2} > 0$$

$$\frac{dH_P}{d\tau} = \frac{\alpha\beta}{(1 - \alpha\tau)^2} + s \frac{\beta(1 - \delta)}{(1 - \tau)^2} > 0$$

And,

$$\frac{dH_N}{d\tau} = \frac{\alpha\gamma}{(1 - \alpha\tau)^2} - s \frac{\gamma\delta}{(1 - \tau)^2} > 0, \text{ IFF } \frac{\alpha}{(1 - \alpha\tau)^2} > s \frac{\delta}{(1 - \tau)^2}.$$

The effect on childcare of nonparents is ambiguous, although again, in realistic cases, s should be much smaller than α and the condition for a positive sign would hold.

“Realistic example”

Suppose $\alpha = 0.4$, $\tau = 0.4$, $\delta = 0.4$ and $g = 0$; then $h \approx 0.2857$. If government gives 10% of the GDP (deliberate overestimate) for family cash benefits then $s = 0.0714$. Then both conditions above hold by a wide margin. One can think of an exhaustive range of “realistic examples” where the above conditions would always hold.

Alternative set up for the government subsidy g with the market for childcare

Alternatively, utility maximisation problem of parents could look like this:

$$\alpha \ln c_p^m + \beta \ln c_p^h + (1 - \alpha - \beta) \ln l_p$$

subject to

$$c_p^m + (1 - g)C = (1 - \tau)h_p + T + s$$

$$c_p^h = (H_p^\rho + C^\rho)^{1/\rho}$$

$$l_p = 1 - h_p - H_p,$$

where C represents the “amount” of childcare that parents buy on the market and ρ determines the elasticity of substitution between childcare at home and childcare provided on the market. In this set up, government pays for a share g of the childcare C that household buys on the market. Government hence implicitly reduces the price of childcare on the market relative to the self provision of childcare at home.

Utility maximisation problem of nonparent households remains unchanged.

Resulting in FOC for parents:

$$\begin{aligned} \frac{\partial L}{\partial h_p} &: \frac{\alpha(1-\tau)}{(1-\tau)h_p + T - (1-g)C} = \frac{1-\alpha-\beta}{1-h_p-H_p} \\ \frac{\partial L}{\partial H_p} &: \frac{\beta H_p^{\rho-1}}{H_p^\rho + C^\rho} = \frac{1-\alpha-\beta}{1-h_p-H_p} \\ \frac{\partial L}{\partial C} &: \frac{\alpha(1-g)}{(1-\tau)h_p + T - (1-g)C} = \frac{\beta C^{\rho-1}}{H_p^\rho + C^\rho} \end{aligned}$$

Closed-form solutions are complicated in this kind of set up. It turns out, however, that as long as market and domestically provided childcare are close substitutes (elasticity of substitution is greater than 1), which is plausible, the government subsidy g positively affects working hours h .

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