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Values and Labor Force Participation in the Nordic Countries

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# Values and Labor Force Participation in the Nordic Countries<sup>\*</sup>

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## Abstract

The Nordic countries are known for their success in combining an extensive welfare state with high labor force participation. This is explained by the origins of their welfare states that can be traced to a unique set of values and beliefs that emphasize the right of women to participate in the labor market. These values are currently shared by individuals born in other European countries of Nordic parents. Some possible causal explanations are proposed.

**JEL classification:** J21, J22

**Keywords:** Values, employment, taxes, beliefs.

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## **1. Introduction**

This paper is about culture in the Nordic countries of Denmark, Finland, Iceland, Norway and Sweden, in particular aspects of culture that have to do with the participation of women in the economy outside their home. The roots of the values and beliefs discussed in this paper lie deep in history. A vivid demonstration is to be found at the end of Henrik Ibsen's play *The Doll's House* that premiered in 1879, when the character Nora tells her husband that she is going to leave him and the children because she is a human being before she is a wife and a mother, and that she owes it to herself to explore her personality, ambitions and beliefs. This conflict between the two roles of a woman, as a housewife and as someone participating in the labor market, was later explicitly addressed in the creation of the Nordic welfare states and resolved by enabling working women to become mothers. We will argue that the Nordic countries have managed to attain a better trade-off between efficiency and equity by developing a system of values, taxes and government spending that promotes the participation of mothers of young children in the labor force.

We begin by reviewing previous work on the importance of culture in the economy. In order to demonstrate the importance of culture we then assume identical preferences, for the sake of the argument, and use a standard representative agent model to predict labor supply in several countries based on differences in tax rates. The results show that labor supply in the Nordic countries is higher than such a model predicts; a finding that can be explained by cultural variables. A brief history of the Nordic welfare state and a description of the unique values found in these countries follow. These values and beliefs regard women's labor force participation and are shared by individuals born in other European countries of Nordic parentage and can possibly be traced to religious factors.

## **2. Culture**

Following tradition, we define culture as a system of beliefs and values that social groups transmit from one generation to another. Beliefs are the basis for making decisions in which people lack previous experience, such as which school to attend, whether to maintain labor force attachment following childbirth and which profession to choose. But culture also affects the values of individuals as described by a utility function.

Although the study of culture in economics has a history back to Adam Smith in his *Theory of Moral Sentiments* and Max Weber (1905) on the role of religion in economic development, the economics profession has until quite recently paid scant attention to the importance of culture for economic outcomes. While non-economists such as Putnam (1993) and Landes (1998), found culture to be important for economic performance, economists typically treated values and norms as resulting from optimization by groups.<sup>1</sup> However, recent years have seen a revival of interest by economists in culture. Knack and Keefer (1997) discuss differences in the level of trust between individuals across countries. Knowles and Postlewait (2005) find that children of high-saving parents also demonstrate high-saving behavior. Blanchard (2004) claims that (continental) Europeans have a stronger preference for leisure, which makes them take advantage of increased productivity by enjoying greater leisure rather than having higher income while Americans have done the opposite. Greif (1994) traces the success of the city state of Genova in the middle ages in comparison to Maghreb traders to differences in religion where Christianity in Genova fostered individualism while the Maghreb traders were influenced by Islam. Guiso et al. (2006) traces differences in the level of trust among Americans to their ethnic origin and found that individuals of Scandinavian origin have higher levels of trust, reflecting the higher level of trust in their countries of origin.

Scholars working in diverse disciplines have tended to agree that there are cultural differences in beliefs about the role of women in the home and in the labor market between countries, even between countries at similar stages of development.<sup>2</sup> There are also cultural differences in voting patterns when it comes to taxes and spending intended to facilitate the labor force participation of women and there are differences between countries in how much individuals value equal rights in the labor market. Ingelhart and Norris (2005) argue that perceptions of the right division of labor in the home and in paid employment are shaped by the predominant culture, which they define as the social norms, beliefs and values existing in society, and that these in turn depend on the degree of modernization of the economy and religious traditions. Rich societies tend to have secular rather than traditional values and what they term self-expression values rather

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<sup>1</sup> Such as Coleman (1990).

<sup>2</sup> See Nussbaum and Glover (1995), Pasternak, Ember and Ember (1997), and Harrison and Huntington (2000), Nanda (2000),

than survival values. An emphasis on the right of women to work is part of the self-expression values. But the value system is also affected by countries' historical and cultural heritage. In particular, Protestant societies rank higher on both the secular and the self-expression dimension than do Roman Catholic societies. Thus the richer and the more Protestant is society, the greater the emphasis on women's rights to participate in the labor market.

According to Oskarson (1995), Nordic women tend to be more left-leaning in politics than women in other parts of the world. Ingelhart and Norris (2003) attribute this gender gap in voting behavior to culture, in particular women have moved to the left ideologically because of a process of shifting towards more egalitarian attitudes. Krogstrup and Wälti (2011) discover that women in Switzerland have different economic preferences than men. In particular, they investigate whether female enfranchisement affects government budget deficits. The results of a difference-in-differences regression for Swiss cantonal panel data demonstrate that the inclusion of women in the electorate has reduced budget deficits. Cultural factors may explain why women are better represented in the parliaments of the Nordic countries than in most other countries. Ingelhart (1981) find that there is a strong positive relationship between the proportion of women in parliament and a scale that measures traditional versus modern values, indicating that differences in values explain differences in the political participation of women. In Fortin (2005), secular trends in gender role attitudes explain the recent leveling-off in female labor force participation in the OECD countries. Moreover, because women anticipate shorter and interrupted spells of employment they invest less in human capital, which produces flatter earnings profiles as shown by Mincer and Polachek (1974). Francis Vella (1994) used Australian microeconomic dataset to study the relationship between the gender role perceptions of women and labor market behavior and found that the attitudes of women towards working women are developed in their youth. Cornelia W. Reimers (1985) showed how married black women in the United States have a higher propensity to participate in the labour market than women belonging to other ethnic groups after adjusting for variables such as age, the number of children, education, location and wages and attributed this to cultural differences rooted in the historical experience of blacks in America. Heather Antecol (2000) studied male and

female labour force participation by ethnic group in the U.S. and found a positive correlation between the gender wage gaps of first generation immigrants and wage gaps in the countries of origin and concluded that cultural factors mattered, in addition to human capital and institutional factors, in explaining why some women earn more compared to men. The Nordic attitudes towards gender equality are also found in individuals of Nordic ancestry brought up in the U.S. and therefore facing the same institutions as their compatriots of other ancestry. Fernández and Fogli (2009) examined work and fertility behaviour of second-generation American women in 1970 and related this to values in their fathers' country of origin. These values are exogenous in that they differ between individuals who are all raised in the same country and face the same institutions and economic opportunities. Women of Scandinavian origin were also found to have higher employment levels. In an earlier paper, Fernandez (2007) found that female labor force participation in 1990 in a woman's country of origin had explanatory power for her work outcomes in the United States in 1970.

### 3. If everyone was alike, except for taxes

In this section we follow Prescott (2004) to demonstrate the failure of the simple representative agent framework to predict employment in the Nordic countries, France and the U.S. when using tax rates alone as an explanatory variable. Following Prescott, we take France as an example of a country having an extensive welfare state with a different structure from the Nordic welfare states and the United States as a country with a welfare state that is very limited in scope.

Assume that the production function takes the following form;

$$y_t = k_t^\theta (A_t h_t)^{1-\theta}. \quad (1)$$

The representative firm maximizes output net of wage costs  $wh$  giving the first-order condition

$$w_t = (1-\theta) \frac{y_t}{h_t}. \quad (2)$$

The labor supply decision is modeled by describing the consumption/labor supply decision of the representative household where preferences over consumption ( $c$ ) and hours worked ( $h$ ) now and in the future are described as

$$E \left\{ \sum_{t=0}^{\infty} \beta^t \left[ \log(c_t) + \alpha \frac{(1-h_t)^{1-\gamma}}{1-\gamma} \right] \right\} \quad (3)$$

and  $t$  denotes time,  $\beta$  is the discount factor reflecting the pure rate of time preference,  $\alpha$  is the parameter describing the intensity of the disutility from working,  $\tau$  is the employment tax rate,  $\gamma$  is the inverse of the coefficient of inter-temporal substitution, and  $E$  is the expectations operator. The per-period time endowment is normalized to one. This means that if on average the working-age population works 25 hours a week, then  $h = 0.25$  as there are about 100 hours of non-sleeping time a week. We let the parameter  $\alpha$  capture the effect of cultural variables such as attitudes towards the labor force participation of women. The optimization is done subject to a constraint;

$$(1 + \tau_c)c_t + (1 + \tau_i)i_t = (1 - \tau_h)w_t h_t + (1 - \tau_k)(r_t - \delta)k_t + \delta k_t + T_t, \quad (4)$$

where  $\tau_c$  is the tax on consumption,  $\tau_i$  the tax on investment,  $\tau_h$  the marginal tax rate on labor income,  $\tau_k$  the tax rate on net capital income,  $w_t$  the real wage,  $r_t$  the rental price of capital,  $\delta$  the rate of depreciation and  $T_t$  denotes transfers as before.

Solving equation (4) for consumption and inputting into equation (3) gives one equation in hours worked. The first order condition becomes

$$\frac{\left( \frac{1 - \tau_h}{1 + \tau_c} \right) w}{c} = \alpha (1 - h)^{-\gamma} \quad (5)$$

where

$$c = \frac{1 - \tau_h}{1 + \tau_c} w h + \frac{1 - \tau_k}{1 + \tau_c} (r - \delta) k + \frac{\delta}{1 + \tau_c} k - \frac{1 - \tau_i}{1 + \tau_c} i + \frac{1}{1 + \tau_c} T.$$

The left-hand side of equation (5) shows the marginal benefit of working longer hours  $h$  in terms of higher consumption while the right-hand side has the marginal cost of longer hours due to the disutility of working.

Labor and consumption taxes can be combined into a redefined employment tax rate, which is the *effective marginal tax rate on labor income*  $\tau$ . It is the fraction of additional labor income that is taken in the form of taxes



$$(1 - \tau) = \frac{1 - \tau_h}{1 + \tau_c} \quad (6)$$

where  $(1 - \tau)$  is the amount of consumption a worker can get net of taxes from a unit earned. This gives an equation for the effective marginal tax rate on labor income

$$\tau = \frac{\tau_h + \tau_c}{1 + \tau_c} \quad (7)$$

Then assuming that  $\gamma=1$  gives<sup>3</sup>

$$\frac{1 - \tau}{c} w = \alpha (1 - h)^{-1} \quad (8)$$

where the left-hand side has the marginal rate of substitution between consumption and leisure and the right-hand side the marginal rate of transformation. Inserting the solution for  $w$  in equation (2) into equation (8) gives

$$\frac{h}{1 - h} = \frac{(1 - \tau)(1 - \theta)y}{\alpha c} \quad (9)$$

which yields an equation for hours worked:

$$h_t = \frac{1 - \theta}{1 - \theta + \frac{c_t}{y_t} \frac{\alpha}{1 - \tau_t}} \quad (10)$$

This expression gives current labor supply as a function of the current value of the fraction of gross income consumed,  $c_t/y_t$ , the current tax rate  $\tau_t$  and the values parameter  $\alpha$ . The variable  $c_t/y_t$  captures the inter-temporal effect of taxes and other factors on labor supply, whereas the variable  $(1 - \tau_t)$  captures the intra-temporal distortion to the relative prices of consumption and leisure. The inter-temporal effects can be explained as follows. Expectations of higher wages after taxes – due to higher productivity, more capital or lower taxes – will make  $c/y$  rise and hours worked fall. In this way workers respond to expected changes. Holding the future constant, lower taxes today will not affect  $c/y$  and will have the direct effect of raising hours worked. This is the intra-temporal effect.

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<sup>3</sup> The function  $\frac{(1-h)^{1-\gamma}}{1-\gamma}$  becomes equal to  $\log(1 - h)$  when  $\gamma = 1$ .

Assume that there are no differences in values and set  $\alpha = 1.54$  and  $\theta = 0.30$  (as in Prescott, 2004) for all the countries. This we do to see how well the model predicts employment while maintaining the assumption of identical preferences. Based on the model description, tax rates for all of the countries can be calculated (see Appendix 1 for detailed derivations). The intra-temporal tax wedge defined by equation (7) gives the units of goods a worker pays in labor and consumption taxes per unit earned. Hence  $1 - \tau$  measures the units a worker can consume from a unit earned once taxes have been taken into account. The tax rates are shown in Table 1. Note that the tax wedge is higher in each of the five Nordic countries than in the U.S. and higher in Denmark, Finland and Sweden than it is in France. However, the inter-temporal effect of taxes  $c_t/y_t$  tends to be smaller.

**Table 1.** The intra-temporal tax wedge  $\tau$  and the consumption-output ratio 2001-03

	Denmark	Finland	Iceland	Norway	Sweden	France	U.S.
$\tau_h$	0.62	0.51	0.36	0.39	0.57	0.42	0.31
Social security tax	0.02	0.20	0.05	0.16	0.24	0.27	0.11
Marginal income tax	0.59	0.31	0.30	0.23	0.34	0.16	0.20
$\tau_c$	0.37	0.31	0.30	0.31	0.31	0.20	0.10
$1 - \tau$	0.28	0.38	0.49	0.47	0.32	0.48	0.62
$c/y$	0.69	0.67	0.75	0.61	0.72	0.76	0.81

Source: OECD. Calculations of tax rates are found in Appendix 1.

Equation (10) can then be used to calculate predicted hours and these are compared to hours actually worked in Table 2. In so doing we are testing whether differences in taxes across the countries can explain differences in weekly hours worked while assuming identical preferences. Predicted hours match actual hours for the U.S. and the French are predicted to work less, which they do, but the French work even less than their high tax wedge leads us to predict. In contrast, there is an underestimate for Denmark, Finland, Iceland and Sweden. What needs to be explained is why these nations work more than the model predicts while the French work somewhat less. The prediction error is very small for Norway.

In order to explore how robust the results are to changes in attitudes over time the predicted number of hours was also calculated for the period 1970-1972.

**Table 2.** Actual and predicted hours, 2001-2003, both men and women

	Denmark	Finland	Iceland	Norway	Sweden	France	U.S.
2001-2003							
Hours, h	23.0	22.6	30.6	20.3	23.1	18.6	26.0
Predicted h	15.1	19.9	21.5	21.5	16.5	21.7	25.2
1970-1972							
Hours, h	26.4	26.3	28.4	22.0	23.8	25.3	23.1
Predicted h	19.8	25.5	26.6	20.7	18.2	25.2	27.9

Source: OECD Factbook 2007. Average hours actually worked are measured as hours per week per person in employment.

As in 2001-2003 the Nordic countries have higher labor supplies than their tax rates lead us to predict. The main difference between the 1970-1972 period and the 2001-2003 period lies in France having a smaller labor supply than predicted in 2001-2003 and the same labor supply as predicted in 1970-1972 while the U.S. has somewhat higher labor supply than predicted in 2001-2003 but smaller than predicted in 1970-1972. The correlation between the prediction errors is 0.61 for the whole sample.

We conclude that the representative-agent framework, using taxes as an explanatory variable, cannot account for the high levels of employment in the Nordic counties; differences in the value parameter  $\alpha$  are needed in our framework to account for differences in hours worked between the countries.

These results are consistent with those of Ragan (2006) who also found that Scandinavians should be working more<sup>4</sup> in the market sector than what is implied by their tax rates alone. Instead of reverting to cultural variables this author instead modified the household maximization model so that the public sector subsidizes the provision of a market good that is a substitute for household time in the household services production function, i.e. caring for children. This closes the gap between actual and predicted work for Norway, it closes half the gap for Sweden and Finland and somewhat less for Denmark. An employment subsidy has a similar effect in Ragan's model.<sup>5</sup> However, such a modeling exercise leaves the question unanswered why the Nordic countries have chosen to structure their public expenditures in this way. This brings us back to culture since the history of the Nordic welfare states reveals an important role played by cultural

<sup>4</sup> She found that Scandinavians should be working 20-45% more than her model predicted based on tax rates alone.

<sup>5</sup> See also Rogerson (2007).

influences, distinguished by an emphasis on the right of women to participate in the labor market.

#### **4. Values in the history of the Nordic welfare state**

The roots of the Scandinavian welfare system go to the first half of the 20<sup>th</sup> century when urbanization had made women increasingly employed outside the household with factory jobs being most common. The first pieces of legislation in these countries on maternity leave were passed at the beginning of the 20<sup>th</sup> century. The aim of the legislation was to protect the health of mothers and infants. Concerns over falling population numbers also became important. Sweden suffered from emigration and falling birthrates due to economic hardship. In response to the population challenge, the sociologist and author Alva Myrdal argued that women should be encouraged and enabled to combine work and motherhood. She, in collaboration with her husband Gunnar Myrdal (1934), managed to change the ideas of the ruling Swedish socialists and reframed the debate from the one on the right of women to work to the right of women to have children. Committees were established in Sweden, as well as in Denmark, Finland and Norway, in the 1930s with the aim of finding a way of preventing the paid employment of women from reducing their fertility. One option was to restrict the access of women to the labor market, the alternative being to make it possible for them to combine work and motherhood.<sup>6</sup> This policy change called for public programs in terms of family planning, child care and the division of labor within the family. In Sweden, many of the ideas proposed by the Myrdals were formalized by the Government Committee on Women's Work, on which Alva Myrdal served as secretary, from 1935 to 1938.

Alva Myrdal's writings on the Swedish welfare state reveal how values affected the choice of institutions. In a book published in 1941,<sup>7</sup> following up on her earlier book with Gunnar Myrdal,<sup>8</sup> she developed two tenets that shaped her argument.<sup>9</sup> The first tenet is that family policy has to be an objective of all social programs, that is to say cannot be assigned to any one social program. The second is that the design of institutions requires knowledge of values as well as of facts. Thus social values deserve the same rigorous

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<sup>6</sup> See Bjornson and Haavet (1994).

<sup>7</sup> Alva Myrdal (1941), *Nation and Family*.

<sup>8</sup> Alva Myrdal, and Gunnar Myrdal (1934), *Kris i befolkningsfragan*.

<sup>9</sup> See introduction to Myrdal (1941) by Daniel P. Moynihan.

analysis as observable facts and should not be considered to be any less important. The question of the appropriate family policy in Sweden should then be based on answers to such questions as how Swedes felt about one another, about children, about government. Values were the foundation on which institutions and social policies should be constructed. In Sweden these values included an emphasis on women's right to work and to combine family and paid work. There are also values that emphasize equality; that the gap between the rich and the poor should be limited and that living standards should not be sacrificed by having children. A family policy should promote equality. Most importantly, Swedes placed a high valuation on children, family and marriage. This leads us to the important question which is whether values in Sweden – and other Nordic countries – differed from those in the other countries included in this study. A partial answer to this question can be found in Myrdal's book. In a homogeneous country, such as Sweden, the values of society could be better established than in larger countries with heterogeneous populations. Being a small, developed country, the quality of national statistics was also good making it possible to base decisions on public policy on both values and facts.

Myrdal documents that childlessness was on about three times more frequent among wives who had been fully employed for the whole duration of their marriages as among those who had never had outside work according to Swedish data from 1935 and 1936.<sup>10</sup> Moreover, she described a consensus on resolving the conflict between employment and motherhood by enabling working women to have children rather than by getting mothers out of work. Thus the Swedish Committee on Women's Work "opposed any and every effort to prevent married women by law from keeping or seeking gainful employment outside the home."<sup>11</sup> Instead the institutions of society should be constructed so as to help women adjust to the demands of husband and children and invest in vocational training. In this way "This disharmony in the relation between marriage and gainful employment is at the bottom of many of women's problems. How life shall be planned so as to reconcile

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<sup>10</sup> Myrdal (1941), page 408.

<sup>11</sup> Myrdal (1941), page 410.

these two factors?” writes Myrdal<sup>12</sup> and expresses the hope that the reforms being implemented in Sweden will help women better combine motherhood and paid work.

## 5. Values and institutions

The values described by Alva Myrdal and used to formulate a family policy as an important ingredient of the Swedish welfare state can be found in values surveys of the current generation of the Nordic nations. Here we use the *World Values Survey*<sup>13</sup> to measure attitudes towards the participation of women with children in the labor market by using responses to questions about the right of women to a job, attitudes towards the effect on pre-school children of having working mothers and attitudes towards being a housewife. We start with a statement that is used to measure views on the sexes having equal rights to a job: *When jobs are scarce, men should have more right to a job than women* (% disagreeing). There follow two statements that are used to measure views on the impact on children of having working mothers: *A pre-school child is likely to suffer if his or her mother works* (% disagreeing or disagreeing strongly), and: *A working mother can establish just as warm and secure a relationship with her children as a mother who does not work* (% agreeing or agreeing strongly). The final question measures views on the role of the housewife: *Being a housewife is just as fulfilling as working for pay* (% disagreeing or disagreeing strongly).

The responses are shown in Table 3. The answers to the first question show that Nordic respondents are much more supportive of equal rights to a job than their French counterparts. Also, most of the Nordic countries are more in favor of women’s rights to work than the average U.S. respondent. Iceland and Sweden are at the top of the list, while Norway is just below the U.S. while well ahead of France. Responses to the second question are not available for Norway and the U.S. but show that, compared to France, a much higher proportion of respondents in Denmark, Finland, Iceland and Sweden disagree with the statement that pre-school children suffer with working mothers. They also agree more with the statement in the third question that working mothers can establish warm and secure relationships with her children (Norway being the exception).

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<sup>12</sup> Myrdal (1941), page 420.

<sup>13</sup> See <http://www.worldvaluessurvey.org>. The *World Values Survey* is organised as a network of social scientists coordinated by a central body, the World Values Survey Association.

**Table 3.** Attitudes towards women participating in the labor market

	Denmark	Finland	Iceland	Norway	Sweden	France	U.S.
Men should have more right to a job than women – % disagree <sup>*)</sup>	87.7	82.2	93.5	79.4	93.1	67.6	81.3
Pre-school child suffers with working mother – % disagree or strongly dis.	78.4	56.2	63.5	-	59.9	42.3	-
Working mother establishing a warm and secure relationship with her children – % agree or strongly agree	86.4	94.7	85.9	71.0	84.0	77.3	78.7
Being a housewife is just as fulfilling as working for pay – % disagree or strongly disagree	45.8	19.1	35.5	-	49.4	37.5	20.0

Period: 1999, except Finland and Norway for which the data from 2000 and 1996 are used respectively. Source: *World Values Survey* (<http://www.worldvaluessurvey.org>). The numbers refer to all individuals in survey. <sup>\*)</sup> Respondents did not have the option to strongly disagree with this statement as they could in the case of the other three.

Finally, in the last question Danes and Swedes disagree most with the statement that being a housewife is just as fulfilling as working for pay while Finns disagree least frequently.<sup>14</sup> Note that Norwegians appear not to share the values of the other four Nordic countries when it comes to two of the statements in the table.

Values and attitudes regarding the participation of labor force participation of mothers are reflected in the structure of the Nordic welfare state. The main difference between the structure of government spending in the Nordic countries and the continental European countries is the higher portion of spending going to the provision of public services in the Nordics and the lower share of cash transfers (see Sachs, 2011). Moreover, when it comes to cash transfers, social support for the working-age population is contingent on individuals being either employed or actively searching for a job. Thus, benefits are to a great extent contingent on participation in the labor market. Mjøset (2001) describes how the Nordic welfare states developed differently from the continental welfare states. While the latter remained transfer states, the Nordic welfare states produced services allowing citizens, especially women, to join the labor market. According to Mjøset, the Nordic approach created a segmented labor market where men were concentrated in private business and women in the public sector, often in part-time jobs.

There are policies that encourage labor force participation of women such as the neutral tax treatment of second earners relative to single individuals, childcare subsidies and paid parental leave; see Jarnoutte (2003) and OECD (2004). Immervoll and Barber (2006) show that the cost of child care as a ratio to average wages is much lower in the five Nordic countries than in France, and especially in the United States.<sup>15</sup> The subsidized child care in Scandinavia is but one manifestation of the employment-promoting structure of government expenditures and taxation. In addition, the system of taxes and benefits that form the welfare system is internalized by labor unions and taken into account during

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<sup>14</sup> Comparable data, reported by Jaumotte (2003), for a wider data set, confirm the special status of the Nordic countries when compared to a larger set of countries, including Australia, Austria, Poland and Spain. Of the remaining OECD countries, the Netherlands come close to the Nordics in believing in equal rights to a job while Canada is on par with the Nordics. See *International Social Survey Programme* (1994).

<sup>15</sup> The cost of keeping two children in pre-school for a couple earning average wages is, according to Kristjansson (2008), 19% of income in the US, 18% in France, 9% in Denmark, 8% in Finland, 12% in Iceland, 11% in Norway and 6% in Sweden. Every child is guaranteed entry in Denmark, Finland and Sweden and, in spite of there not being a guarantee, there is adequate supply of day-care in Iceland.



wage negotiations. Andersen (2008) describes how the provision of employment-contingent social insurance enhances the attractiveness of the labor market when compared to home production by offering not only a pecuniary compensation but also a social insurance system that protects income during sickness; occasional unemployment spells; pregnancies; disability, and so on.

## 6. Values and labor supply

As shown in Table 4, the Nordic countries have significantly higher rates of labor force participation for women in the 25-64 age group than France and the U.S. as well as a lower ratio of the participation rates of men to the participation rates of women in the under 65 years age groups.

For the youngest age group the ratio of the labor force participation rate of men to the rate of labor force participation of women ranges from 0.99 in Finland to 1.09 in Denmark and Norway, while it is higher in France and the U.S.; 1.17 in the U.S. and 1.25 in France. For the 25-64 years age group we find that the ratio ranges from 1.07 in Sweden to 1.11 in Denmark and Norway while it is again higher in France and the U.S.

**Table 4.** Labor force participation, 2000-2004

	15-24 years			25-64 years		
	Men (1)	Women (2)	(1)/(2)	Men (3)	Women (4)	(3)/(4)
Denmark	75.17	68.76	1.09	85.84	77.41	1.11
Iceland*	75.02	74.64	1.01	95.60	87.60	1.09
Finland	50.45	51.08	0.99	82.60	76.99	1.07
Norway	67.47	61.76	1.09	88.35	79.44	1.11
Sweden	53.59	51.22	1.05	86.83	81.27	1.07
US	73.65	63.00	1.17	87.65	72.49	1.21
France	32.57	25.96	1.25	84.89	70.17	1.21

\*) Age categories for Iceland are: 16-24 and 25-54. Source: Statistics Iceland, Eurostat & U.S. Bureau of Labor Statistics.

The same applies to the employment rate – defined as the ratio of employment to the number of individuals of working age as shown in Figure A1 in Appendix 2. The figures show that women in Scandinavia have higher employment rates for the age groups 15-39 and 40-64 years of age. In contrast, hours of work tend to be fewer in the Nordic countries for both part-time and full-time women than in both France and the U.S. while

the unemployment rates are lower than in the continental European countries (see also Sachs, 2011).

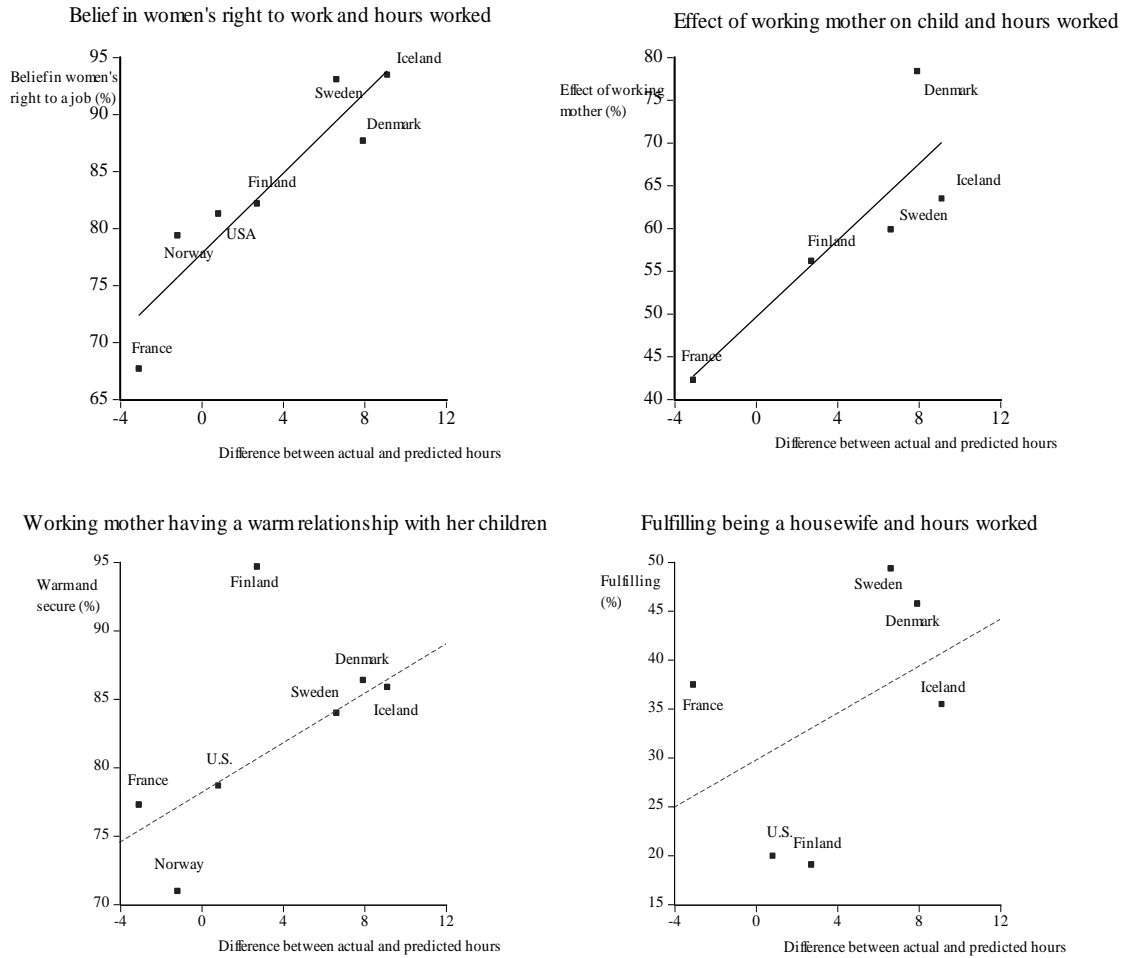
The higher labor force participation rates and employment rates of women in the Nordic countries is due to higher rates among women with children, the effect being more pronounced the more children they have. Gustafsson et al. (1996) compared the participation of women in the labor force between Germany, the U.K. and Sweden and found that the difference in total labor force participation of women results primarily from fewer mothers entering the labor force and entering later in Germany and the U.K. than in Sweden. Before the birth of a first child there is no difference in the labor force participation rate of women between these countries.

The attitudes towards women's participation in the labor market revealed in Table 3 can explain the discrepancy between the predicted and actual hours of work in Table 2 and account for some of the differences between the Nordics and the rest in the table . Plotting the prediction error from Table 2 against the values described in Table 3 generates the surprisingly good fit as shown in Figure 1. With only seven observations, the correlation between the discrepancy in hours worked, on the one hand, and belief in women's rights to a job, on the other hand, is 0.96 and the corresponding correlation between the discrepancy and the proportion claiming that pre-school children do not suffer from having working mothers is 0.85 with only five observations. A clear relationship, although not as strong as the first two relationships, is also visible for the last two scatter plots relating the prediction error to the proportion of people who tend to agree with the statement that working mothers can establish just as warm and secure a relationship with her children and the proportion agreeing with the statement that being a housewife is just as fulfilling as working for pay.<sup>16</sup>

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<sup>16</sup> There are two outliers, Finland in the third scatter plot and France in the fourth scatter plot.

**Figure 1. Values and labor supply 2001-2003**



Source: *World Values Survey* (<http://www.worldvaluessurvey.org>). Lines are fitted with least squares (top two graphs) and robust least squares (bottom two graphs). Differences are taken from Table 2.

## 7. An expanded sample

In this section we expand our sample by including, in addition to the previous seven countries, Austria, Canada, Germany, Ireland, Italy, the Netherlands, Spain, Switzerland, and the U.K. Table 5 shows actual and predicted hours for the countries as well as responses to the survey questions. While labor supply in the Nordic countries tends to be under-predicted – these nations tend to work more than their high tax rates would lead us to expect – the continental European countries have less labor supply than the model

predicts. Canada, the U.K. and the U.S. have labor supplies that more or less conform to the predicted values.

Comparing the Nordic and the continental countries, we find that a higher proportion of the Nordics disagree with the statement that men should have more rights to a job than women. The proportion is somewhat lower in Norway than the other Nordic countries and higher in the Netherlands than in the other continental countries. A higher proportion disagrees with the statement that pre-school children suffer with working mothers in the Nordic countries and a higher proportion agrees that working mothers establish warm and secure relationships with their children – Norway being the one exception that puts it on par with the continental countries. However, the difference between the two sets of countries disappears when we look at responses to the final statement on being a housewife being as fulfilling as working for pay.

Overall, there does not appear to be a great difference between the continental and the English-speaking countries when it comes to the four questions. Comparing the Nordics and the English-speaking nations of Canada, the U.K. and the U.S. we find that the Nordics disagree more with the statement that men should have more rights to a job than women and that pre-school children suffer with working mothers (data not available for Canada and the U.S.). The same applies to the statement that a working mother establishes a warm and secure relationship with her children. Again, the difference between the two country groups is less clear for the final question, although Denmark and Sweden show much more disagreement than Canada, the U.K. or the U.S.

**Table 5.** Attitudes towards women participating in the labor market

	DE	FI	IC	NO	SW	AU	FR	GE	IR	IT	NE	SP	SW	CA	UK	US
Hours, $h$	23.0	22.6	30.6	20.3	23.1	21.7	18.6	18.4	21.2	20.0	19.0	20.8	25.4	24.4	24.0	26.0
Predicted $h$	15.1	19.9	21.5	21.5	16.5	21.9	21.7	22.0	32.1	22.1	24.3	25.3	28.1	26.1	23.8	25.2
Difference	7.9	2.7	9.1	-1.2	6.6	-0.2	-3.1	-3.6	-10.9	-2.1	-4.3	-4.5	-2.7	-1.7	0.2	1.2
Men should have more right to a job than women -- % disagree	87.7	82.2	93.5	79.4	93.1	54.4	67.6	55.7	77.0	56.8	83.7	65.3	55.7	78.5	63.7	81.3
Pre-school child suffers with working mother-- % disagree or strongly disagree	78.4	56.2	63.5	-	59.9	-	42.3	26.8	-	18.8	54.4	54.3	-	-	53.7	-
Working mother establishing a warm and secure relationship with her children -- % agree or strongly agree	86.4	94.7	85.9	71.0	84.0	-	77.3	62.0	-	64.1	81.1	78.7	-	77.5	73.0	78.7
Being a housewife is just as fulfilling as working for pay-- % disagree or strongly disagree	45.8	19.1	35.5	-	49.4	-	37.5	53.6	-	45.1	48.6	40.2	-	17.8	38.9	20.0
Father's origin -- % disagree or strongly disagree	82.8	79.7	89.4	80.1	91.6	78.5	74.6	75	72.7	59.6	83.8	61.1	70.2	87.5	72.2	81.8
Mother's origin -- % disagree or strongly disagree	92.3	83.3	92.1	85.5	97.9	76.4	66.9	81.3	69.5	54.1	90.6	63.4	42.1	86.2	74.0	88.2

Period: 1999, except Norway and Switzerland, for which the data from 1996 are used, and Canada and Finland for which the data from 2000 are used. Source: *World Values Survey* (<http://www.worldvaluessurvey.org>). Actual hours worked are taken from the OECD Factbook 2007 and defined as average hours actually worked, hours per week per person in employment. Data on values of children of immigrants born in Europe by nationality are taken from the *European Social Survey* (<http://nesstar.ess.nsd.uib.no>) and refer to the question “men should have more rights to a job than women when jobs are scarce”.

Figure 2 shows the association between the prediction error and responses to the four survey questions in Table 5. A clear and positive relationship exists between the predication error and responses to all statements except for “being a housewife is just as fulfilling as working for pay.” Note that the Nordic countries find themselves in the upper right-hand corner of all the charts while some of the continental countries are in the bottom left-hand corner. The positive relationship disappears when the Nordic countries are dropped from the sample.

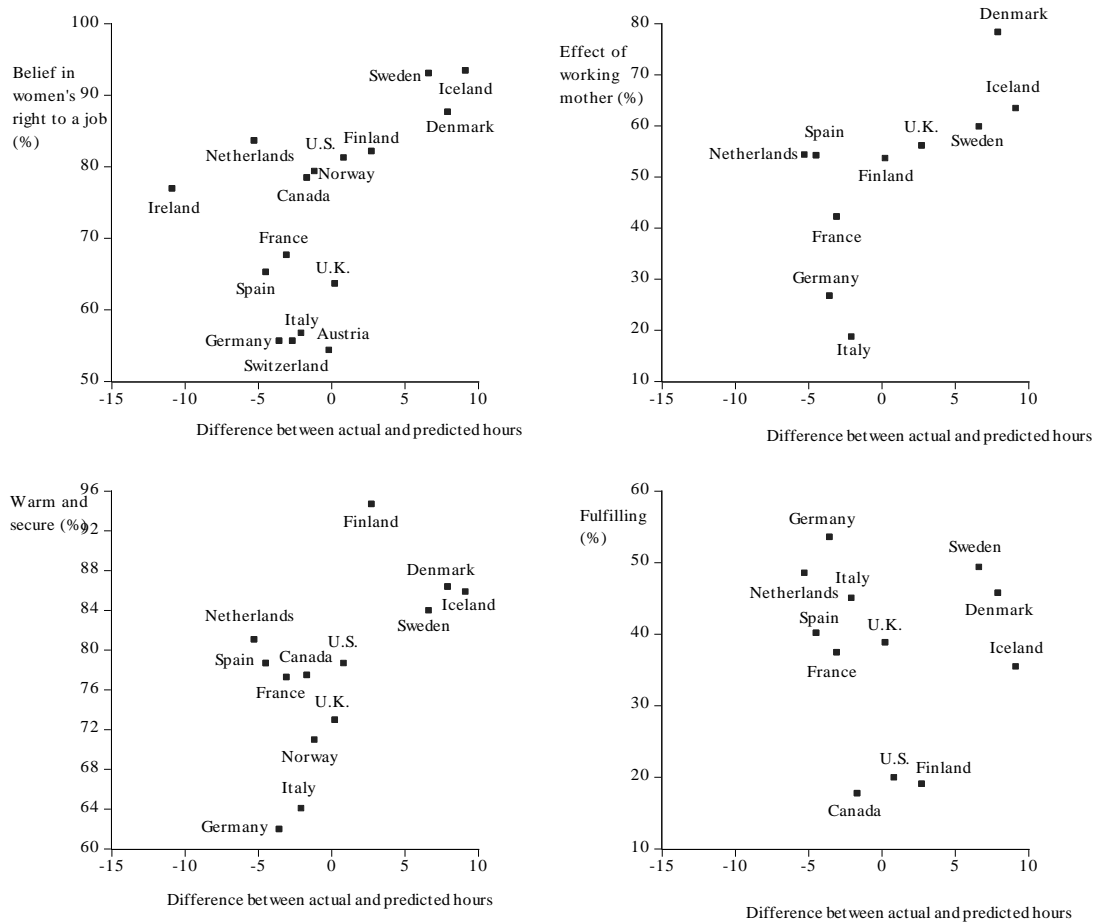
The issue of endogeneity of preferences remains. Perhaps the structure of public spending in the Nordic countries encourages mothers of your children to participate in the labor market as shown by Ragan (2006) and Rogerson (2007), which makes them acquire the values found in the surveys. But by looking at the preferences of people born in other European countries but having either one of parents from a Nordic country should dispel any doubts about the causal effect of values. The last two lines of Table 5 show the proportion of children of immigrants in Europe that disagree or strongly disagree with the statement that “men should have more rights to a job than women when jobs are scarce.”<sup>17</sup> The same pattern emerges for this group. A higher proportion of responders with either the mother or the father coming from one of the Nordic countries disagree with the statement than is the case for responders having parents from most of the other countries.

Of the other eleven countries, it is only respondents having Dutch, Canadian and American parents that show similar disagreement with the statement. None of these three countries have more people disagreeing than Iceland, Sweden and Denmark (with Scandinavian mothers. This was also the case when using *World Values Survey* numbers for these same countries – that is measuring responses to the same question in the sixteen countries – as shown in line 3 of the table where Finland also had higher rates of disagreement than the three English speaking countries.

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<sup>17</sup> The data are taken from the European Social Survey, 2010 (<http://nesstar.ess.nsd.uib.no>). The possible answers differ slightly from those in the *World Values Survey* in that responders choose between “disagree strongly”, “disagree”, “neither agree nor disagree”, “agree” and “agree strongly”.

**Figure 2. Values and labor supply – expanded sample**



Source: *World Values Survey* (<http://www.worldvaluessurvey.org>).

## 8. On the origins of Nordic family values

There remains the issue of the origins of the values found in the Nordic countries. No study of the effect of culture on economic outcomes is complete without a consideration of the possible causes of differences in culture.

Engels (1902) traced the causes of gender inequality to the rise of agriculture that created private property by men, which then allowed them to establish exclusive paternity over children, making wives dependent. A recent paper puts the emphasis on the type of agriculture practiced in different countries. Alesina et al. (2013) trace the historical origins of current differences in values regarding the role of women in society to

traditional – or pre-industrial – agricultural practices. In their thesis, societies that practiced plough agriculture during the pre-industrial period, requiring masculine muscle strength, did not value the labor market participation of women as much as societies where shifting cultivation was practiced. It follows that societies where plough agriculture was practiced developed a gender division of labor and the belief that the natural place for women was the home. These beliefs and values were then passed from one generation to another, outliving the plough agriculture that generated them and producing a positive correlation in the data between plough use in the past and current attitudes reflecting gender inequality.

An alternative explanation for the uniqueness of the Nordic countries can be found in religion since they are all five predominantly Lutheran, in contrast to all other European countries, and have very small Catholic populations. The high proportion of the population belonging to the Lutheran church<sup>18</sup> opens up the possibility that the views and values on women's labor force participation have religious origins. We would not be the first to use religion as a potential determinant of values and behavior. Guiso, Sapienza and Zingales (2003) study the determinants of the importance of thrift and find that Catholics and Protestants are more likely than nonreligious people to teach their children about the importance of thrift. The cross-differences in the values attached to the importance of thrift are then positively correlated with national savings rates. In a later paper, Guiso, Sapienza and Zingales (2006) find that Catholics and Protestant respondents dislike redistribution of income more than those with no religion.

But why would the Lutheran church, more generally the Protestant church, promote values conducive to the labor market participation of women? And is there any empirical evidence supporting this hypothesis? The overall impression is somewhat ambiguous in that he both elevated the role of women as wives and mothers and also stated that men and women were equal under god and could serve god in many capacities, including motherhood and different types of religious and nonreligious occupations.<sup>19</sup> However,

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<sup>18</sup> As of 1 January 2013, 79.1% of the population of Denmark are members of the National Church (Statistics Denmark); 76.2% of Norwegians were members of the state Church of Norway at the end of 2012 (Statistics Norway); the Swedish Lutheran church has 67.5% of the population (Svenska kyrkan); about 79% of the population belong to the Lutheran Church of Iceland (Statistics Iceland); and 76.4% of Finns were members of the Church (Lutheran church member statistics).

<sup>19</sup> See Karant-Nunn and Wiesner-Hanks (2003).



Luther demonstrated a more positive attitude towards women than that of many earlier religious thinkers by asserting that both men and women are god's creation and that neither sex should disrespect the other.

Gudmundsdottir (2007) describes how Lutheran doctrine departed from the Roman Catholic one in several respects that contributed to women taking a more proactive role in society. First, marriage was no longer considered to be one of the holy sacraments. Moreover, women were encouraged to leave monasteries and find men to marry and raise families with. By being active members of society they could serve god just as they did within the confines of monasteries. Second, Luther put an emphasis on universal education, including the education of women. Third, Luther writes that fathers should participate in the bringing up of their children. Lastly, the ordination of priests is no longer considered to be one of the sacraments, having the effect of making all people equal before god. According to Luther, individuals of all vocations can serve god, both men and women. Or in the words of Max Weber (1905), in Luther "there remains, more and more strongly emphasized, the statement that the fulfillment of worldly duties is under all circumstances the only way to live acceptably to God. It and it alone is the will of God, and hence every legitimate calling has exactly the same worth in the sight of God."<sup>20</sup> This change gave women a greater role within the church and opened the door for a greater engagement in society.<sup>21</sup>

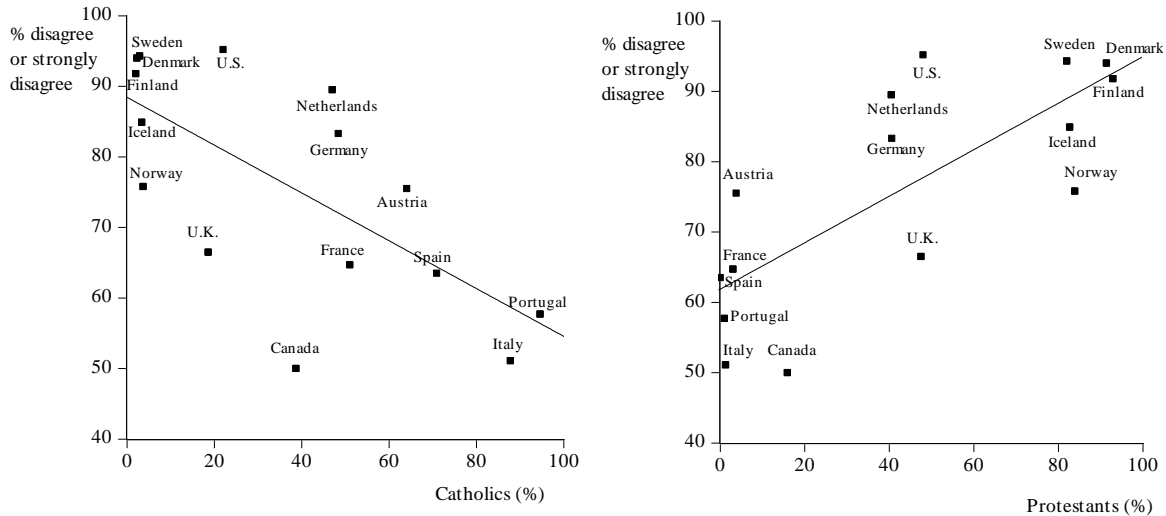
But what do the data reveal? In Figure 3 we take data from the *European Social Survey* and plot the proportion of responders who disagreed with the statement that "men should have more rights to a job than women when jobs are scarce" (sum of proportion who disagreed and disagreed strongly) against the proportion of responders who are Catholics and Protestants.

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<sup>20</sup> Max Weber, *The Protestant Ethic and the Spirit of Capitalism* (1905), Chapter III, Luther's Conception of the Calling. See <http://www.marxists.org/reference/archive/weber/protestant-ethic/ch03.htm>.

<sup>21</sup> Margaret Inglehart (1981) found that their political activism was greater in Protestant countries than in Catholic countries; a finding that she attributed to the Catholic Church being more hierarchical and authoritarian than the Protestant churches

**Figure 3. Religions and disagreement with men having more rights to a job**



Source: *European Social Survey* (<http://nesstar.ess.nsd.uib.no>). Vertical axis measures the percentage agreeing or disagreeing with the statement “men should have more rights to a job than women when jobs are scarce.” Horizontal axis measures the proportion of the population being Roman Catholic (left-hand panel) and Protestant (right-hand panel).

There is a clear downward-sloping relationship between the proportion of survey respondents who disagree with the statement that “men should have more rights to a job than women when jobs are scarce” and the proportion of Catholics and a positive relationship between the proportion disagreeing and the proportion of Protestants.<sup>22</sup> We note that the Nordic countries are in the upper right-hand corner of the graph making the relationship stronger.

To further test for an effect of religion on values we can compare the values of Protestants and Catholics in Germany, Germany being a country with both a substantial group of Protestants and Roman Catholics, each amounting to around 30% of the population. Of the Protestant population, 40% belong to Lutheran congregations. A comparison of the values of individuals raised in the same country but belonging to different religious denominations may reveal if Protestants are more supportive of women’s right to work.<sup>23</sup> Table 6 shows the responses of Protestants and Roman

<sup>22</sup> A univariate regression explains 50% of the variation of the proportion disagreeing in the left-hand side panel and 56% of the variation in the right-hand side panel.

<sup>23</sup> Cultural remnants of the old communist society of East Germany remain. Adler and Brayfield (1997) use data from the 1991 *German Social Survey* to examine East-West differences in work values among German

Catholics to the same statement that men should have more rights to a job when each group is divided into three groups depending on the intensity of their religion.

**Table 6.** Percentage agreeing or disagreeing in Germany with the statement “men should have more rights to a job than women when jobs are scarce.”

Religious intensity	Roman catholic (%)	Protestant (%)
<u>Very religious</u>		
Agree strongly	3.3	3.4
Agree	41.1	26.8
Neither agree nor disagree	22.1	11.1
Disagree	5	31.6
Disagree strongly	28.4	27.1
<u>Middle (5)</u>		
Agree strongly	1.4	4.7
Agree	12.8	8.5
Neither agree nor disagree	24	21.3
Disagree	41	36
Disagree strongly	20.8	29.6
<u>Not at all religious</u>		
Agree strongly	6.1	17.1
Agree	12.8	19.6
Neither agree nor disagree	30	24.9
Disagree	20.5	10.7
Disagree strongly	30.7	27.7

Source: European Social Survey, 2010 (<http://nesstar.ess.nsd.uib.no>).

The table shows that among those who are not at all religious Roman Catholics are more in disagreement with the statement while among those who claim to be religious Protestants are more strongly in disagreement with the statement. Thus, among the religious ones, 58.7% of Protestants either disagree or disagree strongly while 33.4% among Roman Catholics do so. The same pattern is found in the middle group.

We have found that nations that are more Protestant agree more strongly with the statement that men should have more rights to a job than women and also that among religious Germans Protestants agree more than Catholics. We now go back to the *World Values Survey* and use data on 21 thousand individuals, taken from the 1990-91 and the

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women and find a regional gap between the east and the west. Women born in East Germany are more likely than West German women to consider employment to be important.

1990-2000 surveys, and use a host of variables to explain which individuals disagree with the statement that “when jobs are scarce, men should have more right to a job than women.”

The data suffer from the weakness that the distinction between groups of Protestants, including Lutherans, is not made. Thus Protestants in the Nordic countries are labeled as Lutheran even though a separate category for the latter exists in the WWS.<sup>24</sup> For this reason we will have to compare the country fixed effects in our regression below to the proportion of Lutherans in each county.

The dependent variable in all regressions is a binary variable that takes the value one for those individuals who disagree with the statement that men should have more rights to a job. The explanatory variables include the age and sex (1 for women and 0 for men) of individuals; a binary variable for marital status (1 if married) and binary variables for religion (again taking the value 1 if the individual belongs to a religious group) where religion is captured by two variables; one variable for Catholicism and one for Protestants; the number of years of education; and a time dummy for the period 1999-2000.

The results are shown in Table 7. Columns (1) and (2) have the results of pooled regression while columns (3), (4) and (5) have the results of fixed effect regressions. In columns (2) and (5) we add the cross products of the sex variable and each of five other variables. From column (1) we can see that disagreement with the statement is increasing in age; it is stronger for women than men; weaker for married individuals; rising in education; it is stronger in the 1999-2000 survey than in the 1990-1991 survey; and it is stronger for the two religious groups than for non-religious individuals and stronger for Protestants than for Catholics. In column (2) one finds that married women are less opposed to the statement than women overall and that religious women, including Protestant women, are less opposed than Protestants overall. Column (3) has the results when only country fixed effects are included as regressors. The fixed effects reveal the same pattern that the Nordic nations disagree more with the statement than any other nation. Controlling for country fixed effects in columns (4) and (5) does not change these results qualitatively from columns (1) and (2). However, the coefficient of the religious

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<sup>24</sup> There are only nine Lutherans in our sample, none of whom reside in the Nordic countries.

variables is smaller and less significant; the coefficient for Roman Catholics becomes insignificant while the one for Protestants remains significant but is smaller. Comparing columns (3), (4) and (5), the pattern found in the country fixed effects remains similar and does not change significantly when personal attributes are added in columns (4) and (5). However, the size of the fixed effects for the Nordic countries becomes smaller and much less statistically significant. In column (6) we have put Lutherans as the proportion of the population of each country. A comparison of the country fixed effects in (3), (4) and (5) and the proportion of Lutherans in column (6) shows a clear correlation in that the Nordic countries have the largest fixed effects as well as the higher proportion of the population being Lutherans.

## **9. Conclusions**

Values emphasizing the right of women to combine paid work and motherhood underlie the welfare states of the Nordic countries. These values can be found in the writings of some of the founders of the welfare state in the early part of the 20<sup>th</sup> century. As a consequence, the combined effect of social policies and institutions in these countries is to facilitate the labor force participation of women. While it is true that institutions, such as subsidized health care, can account partially for the high employment rates in these countries the question then remains what explains the existence of such institutions. We have shown that values that have to do with the labor force participation of women are distinct in the Nordic countries and are also found among descendants of people of Nordic origins living in other European countries. These values may have origins in the religious beliefs of these countries.

**Table 7.** Estimated equation explaining the percentage disagreeing with the statement that “men should have more right to a job than women”

Pooled					Fixed effects						
	(1)		(2)		(3)		(4)		(5)		Proportion
	estimate	z-stat.	estimate	z-stat.	estimate	z-stat.	estimate	z-stat.	estimate	z-stat.	Lutheran***
constant	-0.10	0.48	-0.17	0.85	0.45	15.51	-0.08	0.40	-0.15	0.76	
age	-0.003	0.81	-0.003	0.89			-0.003	0.94	-0.004	1.02	
age_squared	-0.0001	3.94*	-0.0001	3.92*			-0.0001	3.32*	-0.0001	3.35*	
sex (1 if female)	0.21	11.17*	0.37	6.25*			0.23	11.78*	0.38	6.1*	
married (1 if married)	-0.13	5.98*	-0.06	2.04*			-0.07	3.3*	0.02	0.60	
catholic (1 if catholic)	0.13	4.7*	0.19	4.6*			0.03	0.62	0.07	1.41	
protestant (1 if prot.)	0.69	21.5*	0.79	16.77*			0.08	1.81**	0.12	2.01*	
education (years)	0.33	16.41*	0.31	10.63*			0.43	19.35*	0.41	12.95*	
time	0.59	3.11*	0.58	3.08*			1.01	5.14*	1.01	5.16*	
sex_marriage			-0.11	2.87*					-0.16	3.99*	
sex_catholic			0.04	0.91					0.04	0.99	
sex_protestant			-0.19	2.89*					-0.07	1.00	
sex_education			-0.11	1.92**					-0.09	1.49	
Belgium					-0.22	6.28	-0.35	5.33*	-0.35	5.36*	0.0
Canada					0.26	7.02	-0.08	1.28	-0.08	1.32	0.5
Czech					-0.48	14.62	-0.48	6.56*	-0.48	6.64*	0.5
Denmark					0.71	15.50	0.55	6.73*	0.56	6.74*	80.7
Finland					0.34	8.55	0.36	4.62*	0.36	4.61*	81.8
France					-0.07	1.82	-0.31	4.48*	-0.32	4.56*	0.0
Germany					-0.20	6.30	-0.56	8.83*	-0.57	8.86*	15.5
Greece					0.15	3.11	-0.49	6.98*	-0.50	7*	0.0
Hungary					-0.36	9.60	-0.33	4.35*	-0.34	4.41*	2.1
Iceland					1.06	19.02	0.85	9.51*	0.85	9.51*	58.7
Ireland					0.00	0.00	0.03	0.38	0.02	0.32	0.0
Italy					-0.39	11.18	-0.70	11.01*	-0.70	11.03*	0.0
Japan					-1.23	32.35	-1.82	20.63*	-1.82	20.65*	0.0
Luxembourg					-0.03	0.71	-0.40	5.56*	-0.40	5.61*	0.3
Netherlands					0.28	6.61	0.08	1.00	0.08	0.95	12.6
Norway					0.36	8.79	NA		NA		82.1
Poland					-0.76	21.46	-0.89	13.2*	-0.90	13.33*	0.2
Portugal					-0.26	6.48	-0.39	5.51*	-0.39	5.53*	0.0
Slovakia					-0.68	19.27	-0.71	10.61*	-0.71	10.68*	7.4
Slovenia					-0.15	3.99	-0.31	4.14*	-0.31	4.18*	0.0
Spain					-0.12	3.73	-0.36	5.77*	-0.36	5.77*	0.0
Sweden					0.90	20.91	0.66	7.46*	0.66	7.47*	71.4
Switzerland					-0.33	7.10	NA		NA		0.1
Turkey					-0.84	25.91	NA		NA		0.0
UK					-0.10	2.70	-0.31	4.37*	-0.31	4.35*	0.1
USA					0.16	4.56	0.00		0.00		2.4
Number of obs.	21527		21527		91017		21527		21527		
LR chi2(8)	2257.42		2276.58		11025.33		3935.36		3956.59		
Pseudo R2	0.0821		0.0828		0.09		0.1431		0.1439		

Estimation method: Probit. \*) significant at 5% level; \*\*) significant at 10% level.

Note: Norway, Switzerland and Turkey omitted because of collinearity when in (4) and (5).

\*\*\*) The Lutheran World Federation 2010 Membership Figures.

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### *Appendix 1: The tax wedge*

The theoretical framework has households paying all taxes. Consequently, it is necessary to adjust the national income accounts to be consistent with this framework. The adjustment consists of treating indirect taxes less subsidies as net taxes on final product by removing net indirect taxes as a cost component of GDP and reducing the final product components correspondingly.

We adopt the Prescott (2004) methodology and assume that two-thirds of indirect taxes net of subsidies falls directly on private consumption expenditures and that the remaining one-third is split evenly between private consumption and private investment. Writing OECD variables in capital letters we have the following expression for indirect taxes on consumption,  $IT_c$ ;

$$IT_c = \left[ \frac{2}{3} + \frac{1}{3} \frac{C}{C+I} \right] IT \quad (A1)$$

where  $C$  is OECD private consumption expenditures,  $I$  is OECD private investment, and  $IT$  is net indirect taxes. In the model, consumption  $c$  and output  $y$  can now be calculated as

$$c = C + G - G_{mil} - IT_c \quad (A2)$$

and

$$y = GDP - IT \quad (A3)$$

where  $G_{mil}$  denotes military expenditures.

There are two taxes on labor income, the income tax  $\tau_{inc}$  and the social security tax  $\tau_{ss}$ . The social security tax is calculated as

$$\tau_{ss} = \frac{SST}{(1-\theta)(GDP - IT)} \quad (A4)$$

where  $SST$  denotes social security taxes,  $IT$  is net indirect taxes, and  $\theta$  is measured by the share of capital in national income. The (average) income tax rate is calculated as

$$\tau_{inc} = \frac{DT}{GDP - IT - Depreciation} \quad (A5)$$

where  $DT$  denotes government revenues from direct taxation. Direct taxes are those paid by households and do not include corporate income taxes. The expression for the consumption tax rate is

$$\tau_c = \frac{IT_c}{C - IT_c} \quad (A6)$$

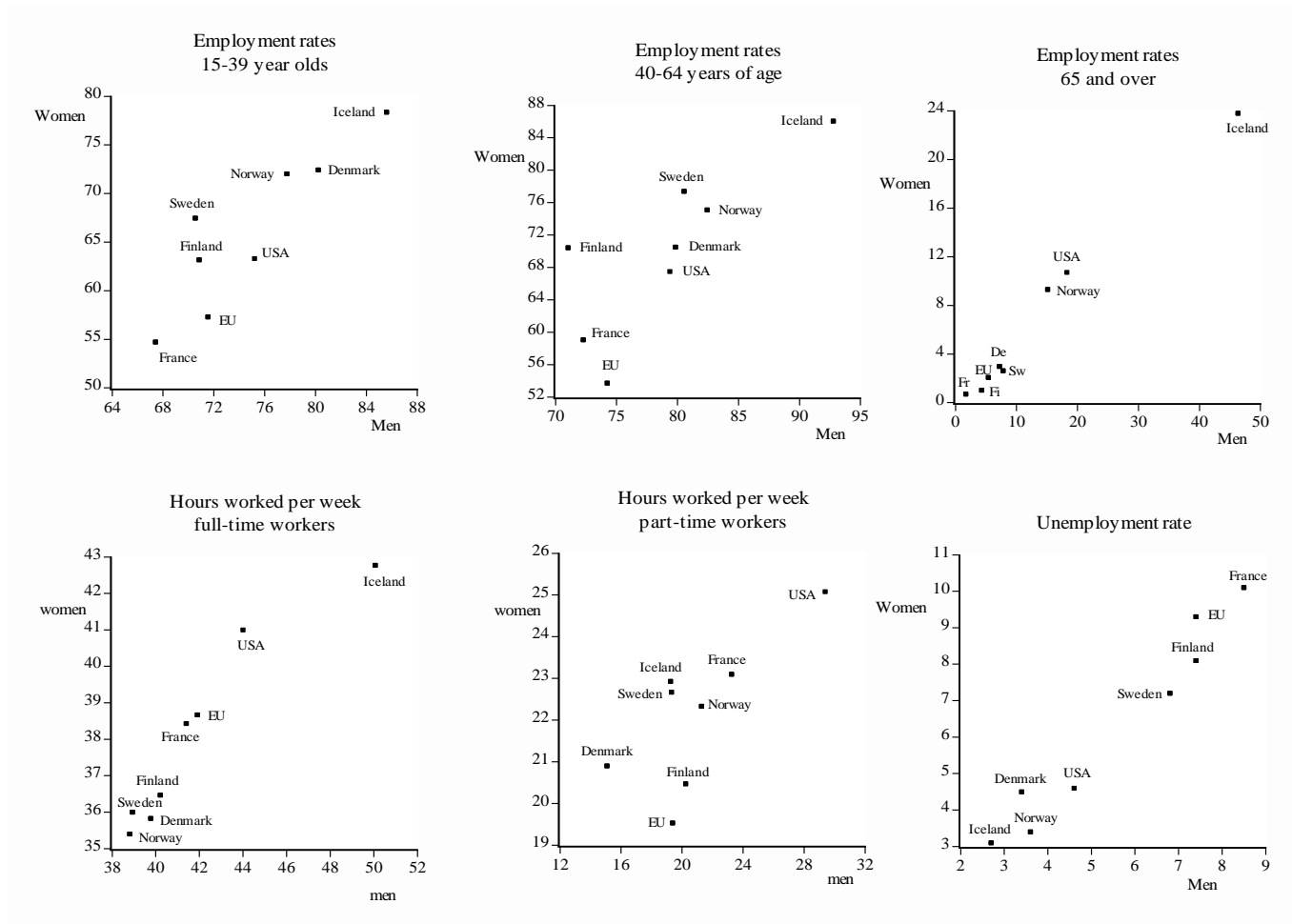
The Prescott methodology then calculates the marginal labor income tax rate as

$$\tau_h = \tau_{ss} + 1.6 \cdot \tau_{inc} \quad (A7)$$

Equation (A6) can be used to describe the possible reasons proposed for differences in labor supply between countries. These either have to do with the slope of the budget line  $1 - \tau$  or the slope of the indifference curves. While Prescott (2004) emphasizes the effect of differences in tax rates  $\tau$  on the slope of the budget line and the point of tangency, Blanchard (2004) claims that preferences differ between Europe and the US. According to Prescott, lower output per capita in France can be accounted for by fewer hours of work that he attributes to a higher tax wedge that lowers the opportunity cost of leisure. Blanchard, in contrast, attributes fewer hours of work in France to the French having a stronger preference for leisure, which makes them increase their leisure as real income has increased.

## Appendix 2:

**Figure A1. Labor supply**



The employment rate is calculated as the ratio of employment and working-age population. Source: Eurostat & U.S. Bureau of Labor Statistics.

### *Appendix 3: The data*

Model calibration required data that are described in the table below. Furthermore for the national income accounts data to be consistent with the theoretical framework some modifications and assumptions are called for. Table A2 lists the variables used and their sources in the OECD database.

**Table A2.** The data and their sources

Our ref.	Dataset table or variable:	Currency or other reference	Countries	Years
1	Details of Tax Revenue – Government Total	National currency, current prices, millions	Individual table for each	2001-2003
2	11-Government expenditure by function	National currency, current prices, millions	Individual table for each	2001-2003
3	1-Gross domestic product	National currency, current prices, millions	Individual table for each	2001-2003
4	1-Gross domestic product	US \$, constant prices, constant PPPs, OECD base year, millions	Individual table for each	2001-2003
5	12--Main aggregates of general government	National currency, current prices, millions	Individual table for each	2001-2003
6	Annual National Accounts - Volume 2, 1970-2005 - Detailed aggregates- Consumption of fixed capital & taxes less subsidies on products	National currency, current prices, millions	All countries in one table	2001-2003
7	Labor force survey by sex and age	Population 15-64 annual frequency	All countries in one table	2001-2003
8	Labor force survey by sex and age	Total Employment annual frequency	All countries in one table	2001-2003
9	OECD Factbook 2007: Economic, Environmental and Social Statistics	Average hours actually worked. Hours per year per person in employment	All countries in one table	2001-2003

For the period of 1970-1972, two main data sources were used in addition to the data sources previously described: United Nations 1980 *Yearbook of National Accounts Statistics: Vol. 1 Part 1-2. Individual Country Data*. New York: United Nations, 1982; and OECD *Labor Force Statistics 1970-199*, Paris, 1992. The same methodology in processing the data was applied as described previously.

## Variables and references

Variable:	Reference table:	Variable in table:
$Y_t$	3	B1_GE: GDP
$C_t$	3	P31S14: Final consumption expenditure of households & P31S15: Final consumption expenditure of non-profit institutions serving households
$G_t$	3	P3S13: Final consumption expenditure of general government
$G_{mil}$	2	020: Defence
$I_t$	3	P5: Gross capital formation
$IT_t$	6	Direct taxes less subsidies
Social Security Tax	1	2000 Social security contributions
Direct Taxes	1	Total tax revenue code: 1100 Of individuals
Depreciation	6	Consumption of fixed capital
$\bar{H}_t$	9	Average hours actually worked. Hours per year per person in employment
$E_t$	8	Total Employment, annual frequency
$N_t$	7	Population 15-64, annual frequency