

Working in spite of High Taxes: On the Role of Culture in Explaining High Employment in the Nordic Countries*

by

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Abstract

People in the Nordic countries of Denmark, Finland, Iceland and Sweden work more than the countries' high tax rates would lead us to predict. This observation can be explained by a shared belief system that emphasises women's rights to labour market participation and the ability to combine work and family responsibilities.

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As if driven by the Protestant work ethic, macroeconomists belonging to the real business cycle tradition have come to dominate the field of macroeconomics. Equipped with elegant models, firmly grounded in microeconomic foundations with well functioning markets and rational agents, they have strived to explain the observed characteristics of business cycles. Ingrained in their models is the assumption that all individuals have identical preferences. Some real business cycle theorists have also attempted to explain differences in labour supply across countries, which they trace to institutional factors such as the rate of taxation while the assumption that utility functions are the same is maintained. This leaves out any role for culture – the system of values, norms and attitudes that may have evolved in different countries.¹

The findings of the real business cycle theorists on the importance of taxes for labour supply are important because a large fraction of the difference in output per capita between France, to take one European country, and the US is explained by differences in hours worked. If high taxes are to be blamed for lower labour supply in Europe, then the continent can catch up with the U.S. in terms of output per capita by cutting taxes. However, before jumping to this conclusion it is important to analyse data from the Nordic countries of Denmark, Finland, Iceland, Norway and Sweden that suggests that high taxes do not need to suppress labour supply.² These countries have combined impressive economic performance, high taxes and extensive welfare states and do well in terms of unemployment and labour-force participation. In this paper we argue that what sets the Nordic countries apart from other countries is a set of beliefs that affects the social infrastructure in these countries as well as having a direct impact on labour force participation decisions. These are high-performance countries that have chosen to live with a large public sector.³ In particular, these nations share a strong belief in men and women having equal rights to participate in the labour market. These values may affect the structure of government expenditures as well as the behaviour of unions and

¹ For an overview of the pattern of employment across the OECD, see Faggio and Nickell (2007).

² See Appendix A1.

³ In year 2001, Norway ranked 4th, Iceland 6th, Denmark 7th, Finland 15th and Sweden 17th in terms of PPP-adjusted GDP in the world. Sweden had fallen from 4th place in 1970 to 8th place in 1980 and then 17th in 2001. In contrast, Iceland started out in 19th place in 1970 and Norway in 16th place and Finland in 18th place. Denmark has consistently ranked highly, 6th in 1970 and 9th in 1980. Government expenditures as a ratio to GDP in year 2001 were 43% in Iceland, 44% in Norway, 48% in Finland, 55% in Denmark and 57% in Sweden, in comparison to 35% in the United States. Source: Eurostat.

individual workers. Our paper thus complements the work of Rogerson (2007) and Ragan (2006) who focus on differences in the structure of government spending, which they treat as exogenous.

We are not alone in proposing alternative explanations for observed differences in labour supply. Alesina, Glaeser and Sacerdote (2005) attribute lower labour supply in Europe compared to the U.S. to mandated holidays while Blanchard (2004) suggests that 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 the U.S. has done the opposite. Our approach resembles that of Blanchard by emphasising cross-country differences in preferences but differs in emphasising differences in preferences when it comes to women’s participation in the labour market.

We proceed by first setting the stage by doing growth accounting across countries that include the five Scandinavian countries and France and the U.S. as two comparator countries, and then adopt the framework of Prescott (2004) to derive the predicted level of employment in France, the U.S. and the five Nordic countries, assuming identical preferences, and finally relate the prediction error to cultural variables. In this way we test how far the assumption of identical preferences can take us before considering the role of cultural influences.

I. Level accounting

Assume a Cobb-Douglas aggregate production function for the firm. Specifically,

$$Y_t = A_t^{1-\theta} K_t^\theta H_t^{1-\theta} \quad (1)$$

where K_t denotes the capital stock, H_t is total hours worked and A_t is a productivity parameter. Our measure of H_t is the average numbers of hours worked in employment \bar{H}_t times the number of people in employment E_t . We normalise by a measure of the maximum number of hours in each country – that is the total number of hours the working-age population could possibly work in a year – which is equal to the product of the working-age population N and the total number of hours a worker can work in a year

without leisure denoted by S .⁴ Let y_t , k_t and h_t be the normalised variables, which are calculated by dividing each of the uppercase variables by $S \cdot N_t$; $k_t = K/(N_t \cdot S)$, and similarly for y and h . This gives

$$y_t = A^{1-\theta} k_t^\theta h_t^{1-\theta} \quad (2)$$

where a key parameter is the share of capital in national income, θ . By taking the logarithm and subtracting $\theta \log(y_t)$ from both sides and rearranging we get

$$\log(y_t) = \log(A_t) + \frac{\theta}{1-\theta} \log\left(\frac{k_t}{y_t}\right) + \log(h_t). \quad (3)$$

Using the years 2001-2003 as a benchmark,⁵ the table below gives the average GDP per person (15-64), hours worked per week for the working-age population, the capital-output ratio⁶ and GDP per hour, calculated by dividing the first column by the second one.

Table 1. Labour supply, productivity and GDP 2001-2003

	GDP per person (15-64) U.S. = 100	Hours worked per week (15-64) U.S.=100	Capital-output ratio (k/y)	GDP per hour U.S. = 100
Denmark	81	89 (23.0)*	2.85	90.9
Finland	74	87 (22.6)	2.57	85.4
Iceland	86	118 (30.6)	2.57	73.1
Norway (without oil)	87	78 (20.3)	2.65	111.1
Sweden	81	89 (23.1)	2.37	90.7
France	77	72 (18.6)	2.51	107.4
U.S.	100	100 (26.0)	2.06	100.0

* Number of weeks in parentheses.

GDP per person denotes GDP per member of the working-age population. *Hours worked per week* is calculated as the number of hours worked per week per member of the working-age population. *GDP per hour* is calculated as the ratio of GDP per person and hours worked per week, which is GDP per hour worked.

Using equation (3) above, one can proceed to calculate proportional differences between the U.S. and each of the other countries. One needs only determine the value of the

⁴ Let N_t denote the working-age population between 15-64 and let S denote the total number of hours a person can work in a year without any leisure. Specify 100 hours available in a week. Then S is 100 times 52 for a year.

⁵ See Appendix A2 for a description of the data and data sources.

⁶ Capital-output ratios are taken from Christophe Kamps (2005), <http://ideas.repec.org/a/taf/applec/v29y1997i5p563-79.html>. The series used is the private total net capital stock, volume (billions in national currency at 1995 prices), beginning-of-year stock, excluding government capital stock; and gross domestic product, market prices (billions in national currency at 1995 prices). Source: OECD Analytical Database, June 2002.

parameter θ , which is measured by the share of capital in national income and given the value 0.3224 for all the countries.⁷ This gives the decomposition shown in Table 2 below.

Table 2. Level accounting relative to the U.S. 2001-2003 (U.S. =100)

	GDP per person (y)	Productivity (A)	Capital (k/y)	Labour factor (h)
Denmark	-19	-21	15	-11
Finland	-26	-22	10	-13
Iceland	-14	-34	10	18
Norway (without oil) ⁸	-13	0	11	-22
Sweden	-19	-15	6	-11
France	-23	-1	9	-28

GDP per person y is calculated as output per maximum number of hours $S \cdot N_t$. Since S is the same for all the countries, the index also denotes output per member of the working-age population N . The labour factor is calculated as the ratio of the actual number of hours worked in a given country to the maximum possible number of ours worked $S \cdot N_t$.

Note that when comparing France and the U.S., France has a much smaller labour factor, a somewhat bigger capital factor and similar productivity factor. The net effect shows up in a significantly lower output per capita, explained by the lower labour factor.⁹ The Nordic countries tend to have lower productivity and labour inputs and a large capital factor, the first two making output per person lower than in the US. With the exception of Norway, they have somewhat lower levels of productivity than both the U.S. and France.¹⁰ The labour factor is higher than in France but smaller than in the U.S., Iceland being the exception. The capital factor tends to be larger than in the U.S. and France.

⁷ As in Prescott (2004).

⁸ In the case of Norway, the value added from extraction of crude oil and natural gas was 17.8% of GDP on average 2001-2003. See Statistics Norway www.ssb.no/oljev_en/arkiv/tab-2005-07-11-01-en.html. We have taken this into account to correct the productivity factor. When the oil sector is included in the data for Norway we get the results that GDP per person is 6% above the US level, the productivity factor 24% higher, the capital factor 10% higher and the labour factor 22% lower. The main difference is that output per person and measured productivity is higher than in Table 2.

⁹ Note that in contrast to previous studies, productivity in France is slightly lower than in the U.S. Prescott (2002) used capital/output ratios from OECD published in 1997 where France had a capital-output ratio of 2.2 and the U.S. 2.3. A higher capital output ratio for France in this paper gives lower productivity compared to the U.S. which explains the difference between our results and those of Prescott.

¹⁰ The low level of productivity in the Nordic countries does come somewhat as a surprise. In a study of 127 countries, Hall and Jones (1999) find that productivity is largely dependent on social infrastructure: Corruption, impediments to trade, government interference in production and rent seeking affects output per capita directly through productivity and indirectly through capital accumulation and education. However it is not obvious why social infrastructure is less conducive to productive activities in the Nordic

II. Labour supply

In this section we adopt the framework of Prescott (2004) and assume identical preferences for the sake of the argument in order to see how far the framework can take us in explaining differences in labour inputs between the Nordic countries, France and the U.S. The labour supply decision is modelled by describing the consumption/labour supply decision of the representative household where preferences over consumption (c) and hours worked (h) now and in the future are described as

$$E \left\{ \sum_{t=0}^{\infty} \beta^t \left[\log(c_t) + \alpha \frac{(1-h_t)^{1-\gamma}}{1-\gamma} \right] \right\} \quad (4)$$

subject to $c_t = (1-\tau)h + T, c \geq 0, 0 \leq h \leq 1$, where t denotes time, β is the discount factor reflecting the pure rate of time preference, α is the parameter describing the intensity of the disutility from working, τ is the employment tax rate, γ is the inverse of the coefficient of intertemporal 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.

The first-order conditions for utility maximisation follow;

$$\frac{1-\tau}{(1-\tau)h+T} = \alpha(1-h_t)^{-\gamma} . \quad (5)$$

The left-hand side 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. Assume that tax revenues are rebated back to the consumer in a lump-sum fashion every year, which eliminates the income effect from taxation. Inserting the government's budget constraint $\tau h = T$ into the condition and assuming $\gamma=1$ gives,

$$\frac{\alpha h}{1-h} = 1-\tau \quad (6)$$

countries than in France and the United States. The Nordic countries are also no more open to trade than other European economies and the level of competition is comparable, see Baily and Solow (2001).

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. The condition can also be rewritten as

$$\frac{\alpha c}{1-h} = 1 - \tau \quad (6')$$

and gives the point of tangency between an indifference curve and a budget line in the $c-h$ space.

Equation (6) can be used to describe the possible reasons proposed for differences in labour 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) emphasises the effect of differences in tax rates τ 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. A related idea is due to Phelps (2007) who argues that European culture has over time become less entrepreneurial as reflected in differences in attitudes towards initiative, risk taking and so forth, which makes working less stimulating and rewarding.

Without loss of generality, one can change the model to become identical to Prescott's (2004) formulation by introducing firms that employ labour and use capital in production and assuming that the production function takes the following form;

$$y_t = k_t^\theta (A_t h_t)^{1-\theta}. \quad (7)$$

The firms maximise output net of wage costs wh and get the first-order condition

$$w_t = (1-\theta) \frac{y_t}{h_t}. \quad (8)$$

The household's maximisation problem is the same as before except that the period t budget constraint becomes

$$(1 + \tau_c)c_t + (1 + \tau_i)i_t = (1 - \tau_h)w_t h_t + (1 - \tau_k)(r_t - \delta)k_t + \delta k_t + T_t, \quad (9)$$

where τ_c is the tax on consumption, τ_i the tax on investment, τ_h the marginal tax rate on labour income, τ_k the tax rate on net capital income, w_t the real wage, r_t the rental price of capital, δ the rate of depreciation and T_t denotes transfers as before.

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

$$(1 - \tau) = \frac{1 - \tau_h}{1 + \tau_c} \quad (10)$$

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 labour income;

$$\tau = \frac{\tau_h + \tau_c}{1 + \tau_c} \quad (10')$$

An equation for labour supply can be derived from two first-order conditions. The first is equation (6') as before that makes the marginal rate of substitution between consumption and leisure equal to the after tax real wage and the second equation is the profit-maximizing condition that requires workers to be paid their marginal product, as in equation (8) above. Combining the two equations gives the following equilibrium for labour supply:

$$h_t = \frac{1 - \theta}{1 - \theta + \frac{c_t}{y_t} \frac{\alpha}{1 - \tau_t}} \quad (11)$$

This expression gives current labour supply as a function of the current value of the fraction of gross income consumed, c_t/y_t and the current tax rate τ_t . The variable c_t/y_t captures the inter-temporal effect of taxes and other factors on labour supply, whereas the variable $(1 - \tau_t)$ captures the intra-temporal distortion to the relative prices of consumption and leisure. We set $\alpha = 1.54$ as in Prescott (2004).

Based on the model description, tax rates for all of the countries can be calculated (see Appendix A3 for detailed derivations). The intra-temporal tax wedge defined by equation (10) gives the units of goods a worker pays in labour 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 3.

Table 3. The intra-temporal tax wedge τ and the consumption-output ratio 2001-03

	Denmark	Finland	Iceland	Norway	Sweden	France	U.S.
τ_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
τ_c	0.37	0.31	0.30	0.31	0.31	0.20	0.10
1-τ	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

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. Finally, equation (11) can be used to calculate predicted hours and these are compared to hours actually worked in Table 4.

Table 4. Actual and predicted hours, 2001-2003

	Denmark	Finland	Iceland	Norway	Sweden	France	U.S.
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

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, however.

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. The results are shown in Table 5 below. As in Table 4, the Nordic countries have higher labour 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 labour supply than predicted in 2001-2003 and the same labour supply as predicted in 1970-1972 while the U.S. has somewhat higher labour 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.

Table 5. Actual and predicted hours, 1970-1972

	Denmark	Finland	Iceland	Norway	Sweden	France	U.S.
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

Looking back at equation (11) and its derivation one can conclude that the Nordic countries either have different preferences, as captured by α , or a different structure of government spending. Rogerson (2007) and Ragan (2006) show how differences in the structure of government spending imply different elasticities of hours of work with respect to tax rates, i.e. that it is possible that workers in Scandinavia work more because of the structure of government spending in spite of high levels of taxation. However, they do not attempt to explain why the structure of government spending differs. We will argue that the culture found in Scandinavia may both explain the structure of spending as well as having a direct impact on women's labour market participation.

III. Distinct cultures

In a recent paper, Fortin (2005) uses data from the World Values Survey to explore the impact of gender role attitudes and work values on women's labour supply in the OECD countries. The results suggest that egalitarian views display a positive association with female employment rates. Moreover, perceptions of women as homemakers are also found to be associated with women's labour market outcomes as are feelings of mother's guilt. In an earlier paper, Vella (1994) found that attitude variables were important determinants of women's labour supply in Australian data. A distinguishing feature of the culture of the Nordic countries is a belief system that values the labour market participation of women. Using the World Values Survey we can measure this aspect of their culture 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).

Table 6. Attitudes towards women participating in the labour market

	Denmark	Finland	Iceland	Norway	Sweden	France	U.S.
Men should have more right to a job than women -- % disagree	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 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 favour 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). Finally, in question (4) Danes and Swedes disagree most with the statement that being a housewife is just as fulfilling as working for pay while Fins disagree least frequently.^{11,12} Note that Norwegians appear not to share

¹¹ 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).

the values of the other four Nordic countries when it comes to two of the statements in Table 6. Also, remember that the Prescott model did quite well for Norway.

The differences in values between the countries fit well with differences in the welfare systems and differences in labour market outcomes. As shown in Appendix A1, the Nordic countries have higher employment rates but not more hours worked per full-time employee and this is explained by higher rates of labour force participation of women. This sits well with an essential feature of the Nordic welfare state, which is an emphasis on employment; benefits are to a great extent contingent on participation in the labour market. Policies encourage labour force participation of women such as a 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 (2005: 21-5) and Arnaldur Kristjansson (2008) 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.¹³ The subsidised 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 internalised by labour unions and taken into account during wage negotiations. Furthermore, as emphasised by Andersen (2008), the provision of employment-contingent social insurance enhances the attractiveness of the labour 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.¹⁴

¹² The value system of Nordic nations also have other distinct features: for example, they put great emphasis on the workplace as a place where people can achieve their goals; and Danes, Finns, Norwegians and Swedes share a high level of trust in other people, much more so than the French or the Americans. For some reason, Icelanders do not share this positive belief.

¹³ 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.

¹⁴ The work ethics of Icelanders resemble those of American even more than those of the other Nordic nations. They value initiative; work is important in their lives; and they tend to like competition more than the Scandinavians (see Olafsson, 2003 and 2008). These attitudes have influenced labour unions in that they have put less emphasis on shortening the length of the working week than their counterparts in Denmark, Finland, Norway and Sweden (see Olafsson, 2007). Olafsson (2008) explains the American-type work ethics and attitudes towards work by a “settlers’ mentality” that can also be found in North America, Australia and New Zealand.

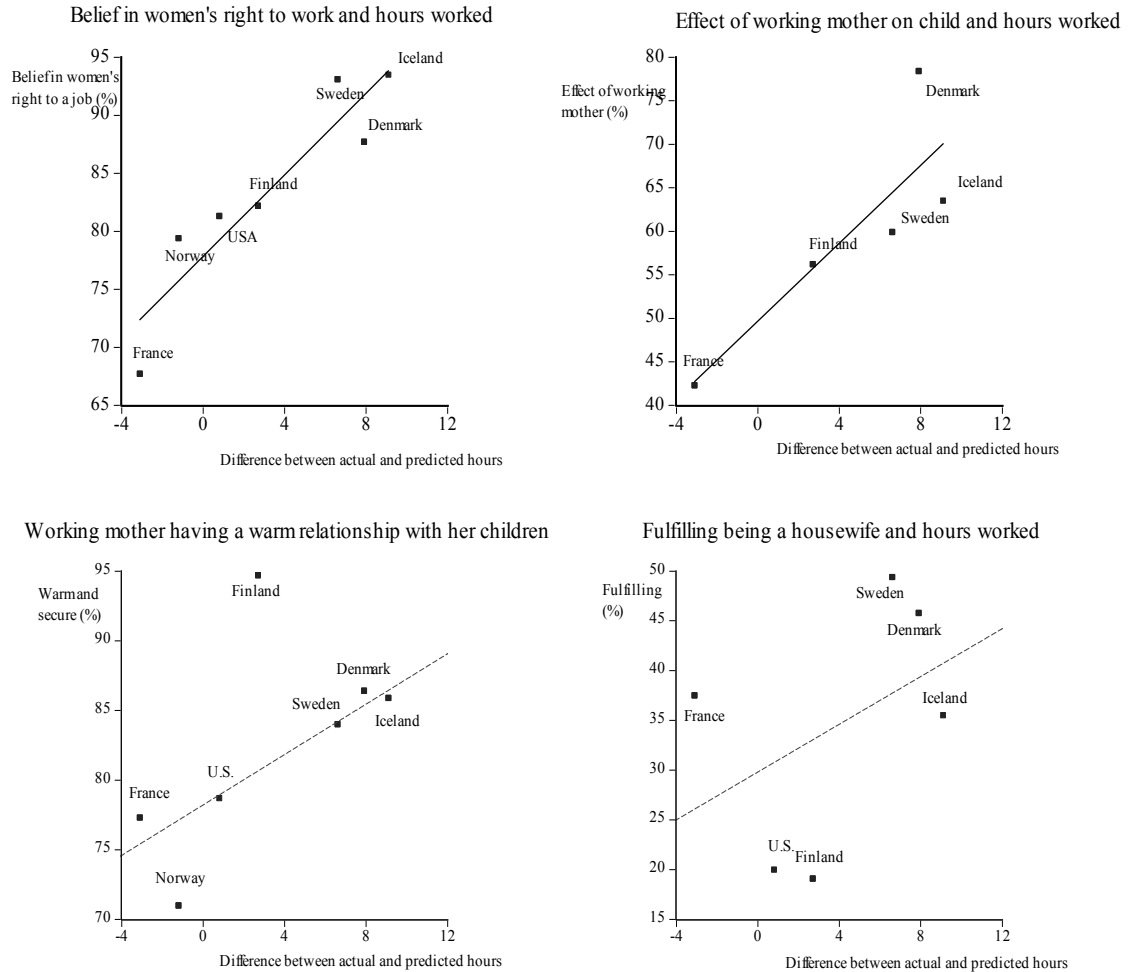
However, one does not need to measure the institutional differences as such; culture may be all that is needed. Attitudes towards women's participation in the labour market can explain the discrepancy between the predicted and actual hours of work in Table 4. Differences in beliefs, in particular when it comes to attitudes towards women participating in the labour market shown in Table 6, can explain the discrepancy between hours predicted and hours worked for the period 2001-2003 in Table 4 above. The fit is surprisingly good as shown in the figure below. 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 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.¹⁵

There remains the issue of causality. The correlations shown in Figure 1 do not prove that culture affects labour supply and not the other way around. It is also possible that other factors – for example an egalitarian politician or labour union leaders – in the past had the effect of making the structure of taxes and government spending in the Scandinavian countries conducive to women's participation, which then gradually had an impact on values. However, we note that the strong preference is revealed consistently since the beginning of the 1990s in the World Values Survey (earlier results not available). Moreover, survey evidence from the European Union countries (OECD, 2001) shows that preferences for female participation are stronger than actual female participation rates indicate. Thus 24.9% of Swedish couples consist of the man working full-time and the woman being out of the labour force while only 6.6% of couples find this to be a preferred status and 66.8% prefer the woman to be employed full-time while

¹⁵ There are however outliers, Finland in the third scatter plot, relating the prediction error to the proportion of people who tend to agree with the statement that working mother can establish just as warm and secure a relationship with her children, and France in the fourth scatter plot, relating the prediction error to the proportion agreeing with the statement that being a housewife is just as fulfilling as working for pay.

only 51.1% find themselves in that position. Similar numbers for Finland are 32.8% and 10.2% for the non-working wife and 80.3% and 49.3% for the fully employed wife. This indicates that it is preferences that are driving labour-market outcomes and not the other way around.

Figure 1. Values and labour 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).

V. Dealing with endogeneity

In order to address the issue of causality further we use estimates from a recent paper by Fernández and Fogli (2009) who 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 faced the same institutions and economic opportunities and these differences in values cannot for that reason reflect their current environment.¹⁶ Fernández and Fogli run a cross-section regression where the dependent variable is the work decision of women of a given ancestry in 1970 (number of hours worked in previous week) by area and the explanatory variables include a set of individual characteristics such as age, education and husband's characteristics, area dummies and cultural variables that are taken from the country of father's birthplace. These are data on labour force participation and birth rates in 1950 from different countries – in particular 1950 female labour force participation rates and total fertility rates taken from the International Labor Organization (ILO) and the United Nations *Demographic Yearbook*. The results suggest that labour force participation in father's country of origin is an important determinant of a daughter's work decision .

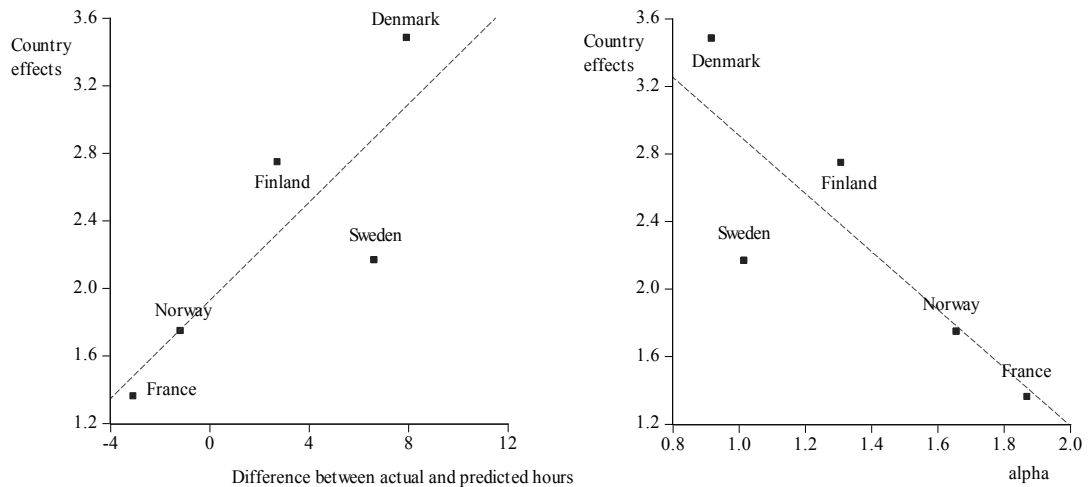
We make use of the results of Fernández and Fogli (2009) to acquire an exogenous measure of values towards work. In one of their regressions, these authors use fixed effects for country of father's origin instead of the cultural variables and these fixed effect estimations can be used to proxy for the values of each of these countries. These fixed effects can be related to the prediction error in Table 4. Moreover, we can solve equation (11) above for the value of α that makes the predicted number of hours match the observed number of hours – that is put actual values for h into equation (11) which gives a solution for α ;

$$\alpha_i = \left((1 - \tau) \cdot (1 - \theta) \frac{y_i}{c_i} \right) \frac{(1 - h_i)}{h_i} . \quad (12)$$

¹⁶ These authors follow in the footsteps of Reimers (1985), who found that married black women in the United States have a higher propensity to participate in the labour market than women belonging to other ethnic groups, and Antecol (2000) who studied male and female labour force participation by ethnic group and found that ethnicity played a role.

Figure 2 below plots the estimated fixed effects from Fernández and Fogli against the prediction error when $\alpha=1.54$ – left-hand side panel – and against the value of α that makes the prediction error disappear – right-hand side panel.¹⁷

Figure 2. Country effects and labour supply



Country effects taken from Fernández and Fogli (2009). Lines are fitted with least squares. Iceland not included.

The pattern seen in the left-hand side of the figure resembles that seen in Figure 1 above. However, we do not need to worry about causality in this case since the labour market behaviour of American women in 1970 cannot possibly be caused by conditions or institutions contributing to high labour supply in the Nordic countries in 2001-2003. In the right-hand side of the panel we see that a low value of α – low preference for leisure – is matched by a large value of the fixed effects. We have thus found that differences in labour supply between the Nordic countries, and between these countries and France and the U.S., accord well with observed differences in their preferences for women’s labour market participation.

¹⁷ When values for α are calculated for the period 1970-1972 and compared to the α s calculated for each of the seven countries in the 2001-2003 period, we find a correlation of 0.59 between the two sets of α s.

V. An expanded sample

In this section we expand our sample to include several additional European countries as well as Canada. We include, in addition to the previous seven countries, Austria, Canada, Germany, Ireland, Italy, the Netherlands, Spain, Switzerland, and the U.K. Table 7 shows actual and predicted hours for the countries as well as responses to the survey questions. We observe that while labour 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 labour supply than the model predicts while Canada, the U.K. and the U.S. have labour supplies that more or less conform with 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 right to a job than women. We note that 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.

Comparing the Nordics and the English-speaking nations of Canada, the U.K. and the U.S. we find that the Nordics – apart from Norwegians – disagree more with the statement that men should have more right to a job than women and that pre-school children suffer with working mother (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. Overall, there does not appear to be a great difference between the Continental and the English-speaking countries when it comes to these four questions.

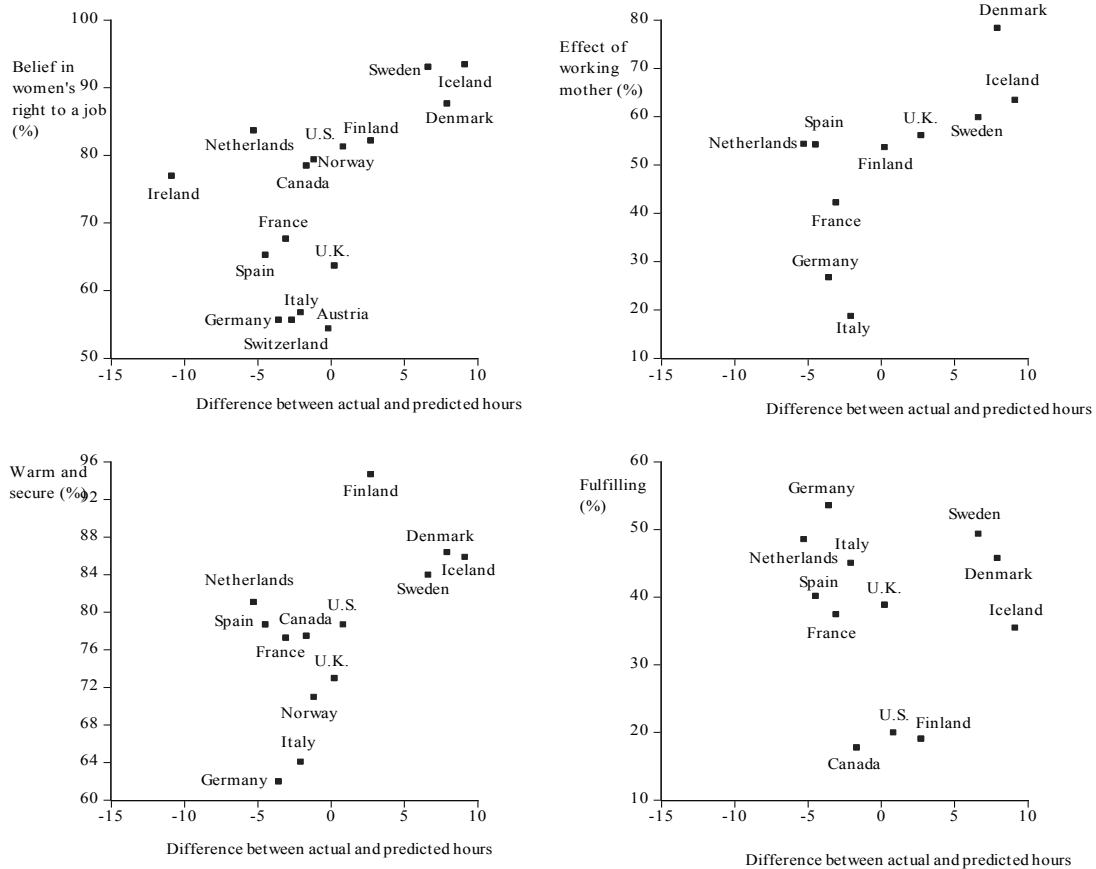
Table 7. Attitudes towards women participating in the labour market

	DE	FI	IC	NO	SW	AU	FR	GE	IR	IT	NE	SP	SW	CA	UK	US
Hours, <i>h</i>	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 <i>h</i>	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	93.4	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
Country effect	3.49	2.75	-	1.75	2.17	2.11	1.37	2.70	0.23	1.73	1.96	-0.25	2.17	2.15	1.58	-

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>). Country effect are taken from Fernández and Fogli (2009), Table 3, page 161.

Figure 3 shows the association between the prediction error and responses to the four survey questions in Table 6. Note that the positive relationship between the variables in the first three scatterplots is only due to the inclusion of the Nordic countries. If we remove these five countries from the charts, the positive relationship disappears. This underlines a distinctive feature of Nordic culture which is views on womens' labour market participation.

Figure 3. Values and labour supply – expanded sample

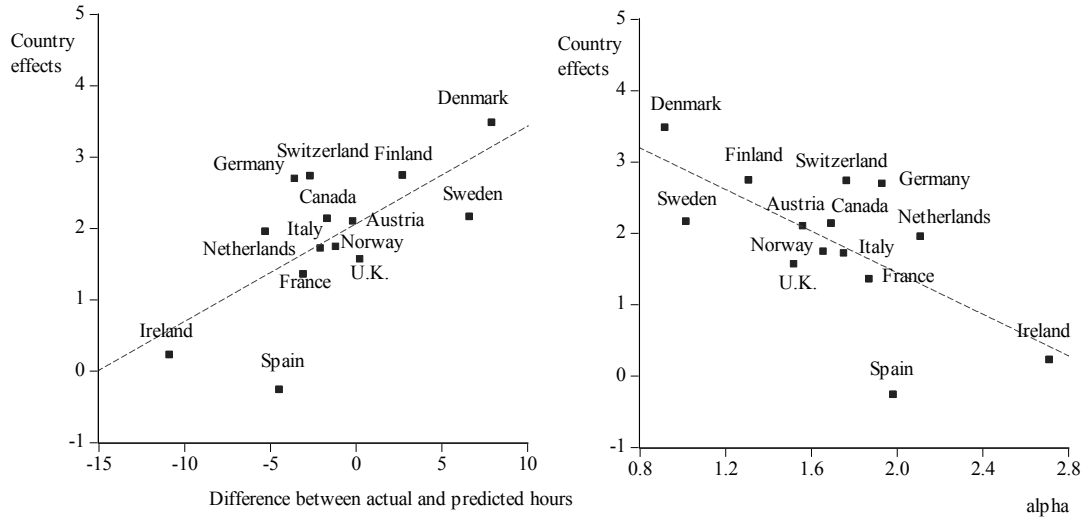


Source: World Values Survey (<http://www.worldvaluessurvey.org>).

Finally, we plot the prediction error as well as the value of α calculated from equation (12) against the country effects taken from Fernández and Fogli. The results are shown in Figure 4 below. The relationships are somewhat stronger than those in Figure 3. Ireland and Spain now form a distinct group which has a low value of the country effect, a negative prediction error (work less than predicted) and a high value of α . The Nordic

countries are found at the other extreme with a positive prediction error (work more than predicted), a large country effect and a small value of α .

Figure 4. Country effects and labour supply – an expanded sample



Country effects taken from Frenández and Fogli (2009). Lines are fitted with least squares.

Overall, Figure 4 implies that culture helps explain differences in labour supply across the larger sample of countries.

VI. Conclusions

We have found that the Nordic countries have high labour force participation in spite of heavy taxation. This is manifested in high employment rates for women, while hours per full-time employed worker are fewer than in France and the U.S. A possible explanation for this observation was found in values that emphasise the rights of women to participate in the labour market. In particular, the Nordic nations tend to disagree with the statement that men have a greater right to work, that mothers' employment is detrimental to a pre-school child's development and they tend to agree that working women can form warm and secure relationships with their children. By using country effects taken from a regression of the labour supply of second-generation American women in 1970 on personal attributes we find that these country effects help explain the prediction error of

Prescott's (2004) model of labour supply, which relies solely on differences in tax rates across countries in explaining differences in hours worked. In particular, the country effects, as well as views on the labour force participation of women, help explain why the Nordic nations work more than the Prescott model predicts while Continental European nations work less. We conclude that cultural factors play an important role in determining the supply of labour.

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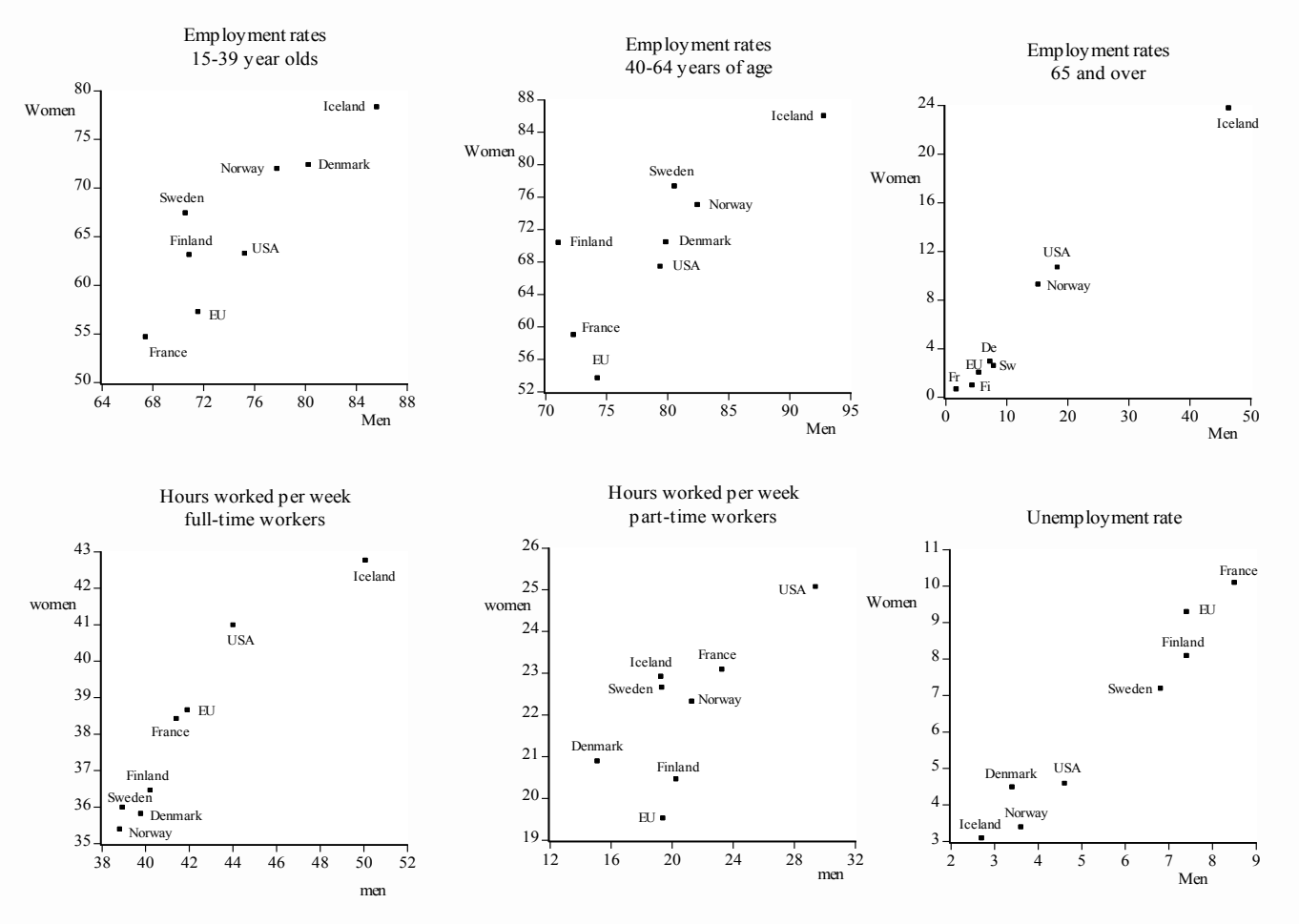
Appendix A1:

Table A1. Labour force participation, 2000-2004

	15-24 years			25-64 years			Over 65 years		
	Men (3)	Women (4)	(3)/(4)	Men (1)	Women (2)	(1)/(2)	Men (5)	Women (6)	(5)/(6)
Denmark	75.17	68.76	1.09	85.84	77.41	1.11	1.60	3.91	0.41
Iceland*	75.02	74.64	1.01	95.60	87.60	1.09	55.60	72.60	0.77
Finland	50.45	51.08	0.99	82.60	76.99	1.07	1.64	6.25	0.26
Norway	67.47	61.76	1.09	88.35	79.44	1.11	8.47	14.19	0.60
Sweden	53.59	51.22	1.05	86.83	81.27	1.07	6.27	14.99	0.42
US	73.65	63.00	1.17	87.65	72.49	1.21	9.38	17.73	0.53
France	32.57	25.96	1.25	84.89	70.17	1.21	0.92	1.89	0.49

* Age categories for Iceland are: 16-24, 25-54 and 55-74. Source: Statistics Iceland, Eurostat & U.S. Bureau of Labor Statistics.

Figure A1. Labour supply



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

Appendix A2: 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

Appendix A3: The tax wedge

The theory has households paying the taxes. Consequently, it is necessary to adjust the national income accounts to be consistent with this theoretical 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 methodology (2004) 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 labour income, the income tax τ_{inc} and the social security tax τ_{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 θ 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

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

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

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