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HOW MUCH DOES WORK MATTER FOR INEQUALITY? TIME, MONEY AND INEQUALITY IN INTERNATIONAL PERSPECTIVE

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How Much does Work Matter for Inequality?
Time, Money and Inequality in International Perspective

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Abstract

How much of the difference between countries in inequality of the distribution of income can be explained by work – i.e. by differing probabilities of any employment?

Across OECD countries there are large differences in the average level and distribution of working hours. These differences arise from differing common entitlements to leisure (e.g. paid Public Holidays), plus differences in working hours per employee and in the percentage of the working age population who have some paid employment. The participation level is particularly important for inequality differences and there is persuasive evidence that country attitudes to paid employment, particularly for women, differ significantly.

This paper uses Luxembourg Income Study data on Canada and the USA, UK, Germany, France and Sweden to simulate the income distributions that other countries would have if they had the Canadian pattern of workforce participation. Because employment rates in the US are quite similar to those in Canada, inequality in the USA would change only fractionally. In every other case, poverty and inequality would fall, indicating that measured differences in the inequality of money income between the North America and Europe understate the extent of cross country differences in well being. Put simply, in North America the relatively poor have to work harder, and still end up poorer, than in Europe.

1. Introduction

In thinking about economic inequality, it is a bit surprising that there has not been more attention paid to differences in non-work time.[1] Economists are interested in the distribution of money income primarily because it is thought to be a good guide to the distribution of economic well being - but there is good reason to think that people care about both money income and the amount of time they have to use to earn that income. If so, then measuring differences in inequality with reference solely to differences in the distribution of money income will produce misleading results, if money income differences are heavily influenced by differences in working time.

The issue is likely to be important for cross country comparisons because differences across countries in average working time are now large - and Europe and the USA seem to be following different trends. For example, ILO data indicate that from 1980 to 2000, average actual working hours per adult (ages 15-64) rose by 234 hours in the USA to 1476 while falling by 170 hours in Germany, to 973. As Figure 1 illustrates, although Canada, France, Germany, Sweden, the United Kingdom and the United States all had average actual hours of paid work per adult which clustered in a fairly narrow interval in 1980, by 2000 the differential in actual hours of paid work was quite dramatic. When average working hours change to this degree, it is reasonable to ask whether the inequality might be affected.

[1] Exceptions include: Jenkins and O'Leary (1996), Lee (2001), Doiron and Barrett (1996), Burtless (1993).

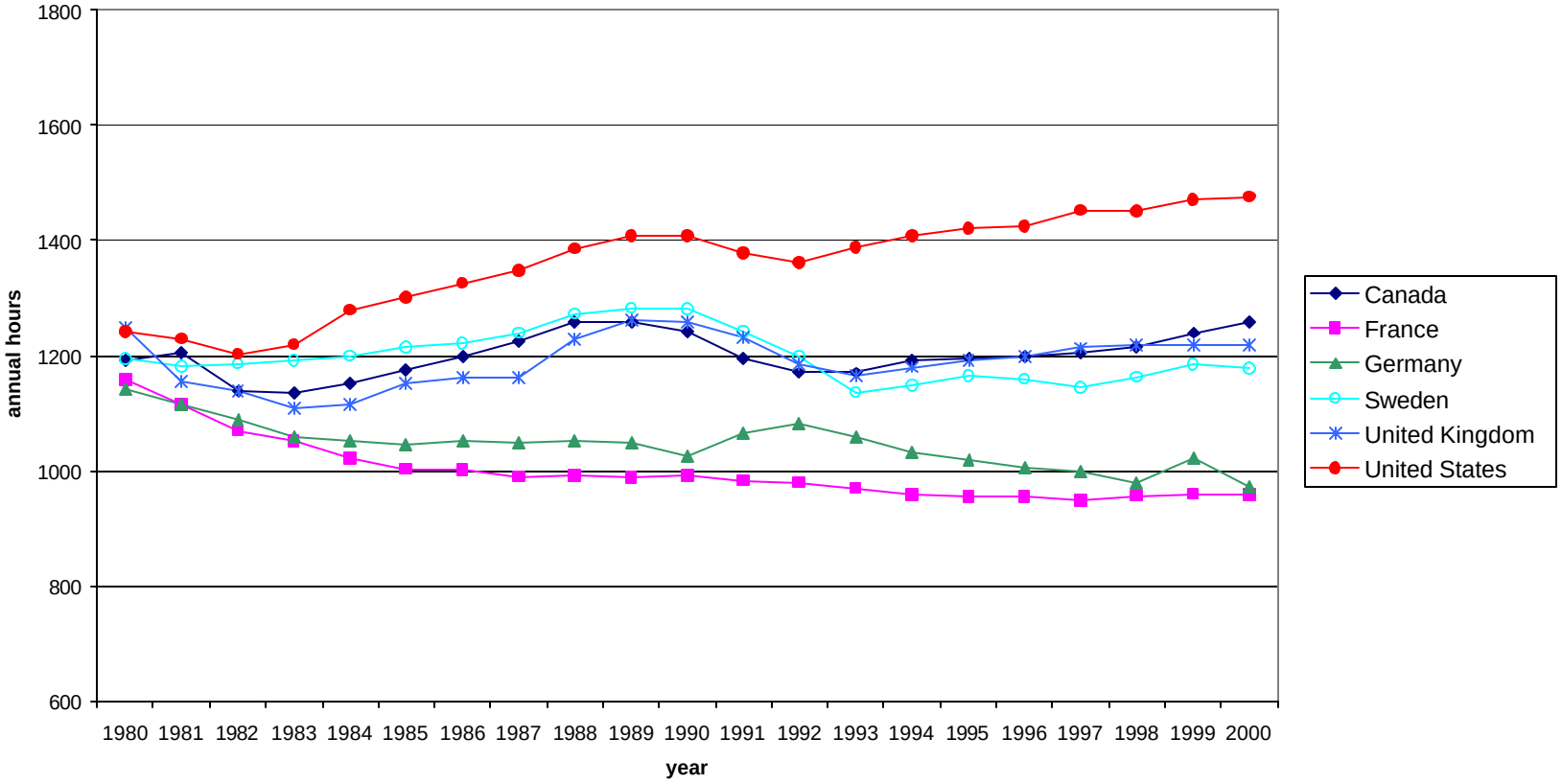
The measurement of working hours is, however, far from unproblematic[2]. As well, the correspondence between differences in working hours and differences in well being depends crucially on preferences – i.e. whether working hours are voluntarily chosen and whether preferences change over time or across countries. In comparing inequality across countries, it is also important to unpack the effects of differences in common entitlements to holiday and vacation time, differences in labour force participation and differences in individual hours of paid labour supply, conditional on participation. Differences between countries in average working hours per adult are determined both by differences in labour force participation (often called the "extensive margin" of labour supply) and by the distribution of hours among those with some employment (i.e. the "intensive margin" of labour supply). As well, if international differences in household paid labour supply are primarily driven by differences in labour force participation, the correlation between household members in probability of employment will be particularly important for inequality and social exclusion.

[2] The distinction between "actual" and "usual" hours of work is particularly important for comparative analysis. The OECD Growth Project (see DSTI/EAS/IND/SWP(2001)16) and the University of Groningen and The Conference Board, GGDC Total Economy Database, 2002,(available at http://www.eco.rug.nl/ggdc) provide somewhat different estimates of actual hours of work per employee than the ILO. Figure 1A uses the Groningen estimates and Figure 1B uses the OECD numbers, together with the employment/population ratio data available from the Bureau of Labor Statistics, to compute the same concept "average actual working hours per working age adult" as reported in Figure 1. There are differences in detail but the same basic picture emerges of widening differences in average actual work hours between the USA and France/Germany – with Canada, Sweden and the UK as intermediate cases.

Section 2 therefore begins this paper with a discussion of the problems which consideration of working time creates for the comparison of relative levels of inequality across countries. It argues that differences between countries in the probability of participation in the paid labour market (i.e. differences at the extensive margin of individual labour supply) are responsible for much of the inter-country differences in average usual hours of work that have emerged in recent years. These differences are particularly marked for women, and there is some evidence that they are consistent with differing attitudes across countries to the relative importance of paid work and of child care and unpaid household production. Section 3 therefore proposes a methodology for assessing the extent to which differences in workforce participation may help to explain cross-country comparisons of inequality. Section 4 compares the actual distribution across individuals of equivalent disposable (after tax, after transfer) household money income with the results of two simulations - one in which other nations' female workforce participation rates are held at the Canadian level and one in which their aggregate participation rates are fixed at the Canadian level. Section 5 concludes.

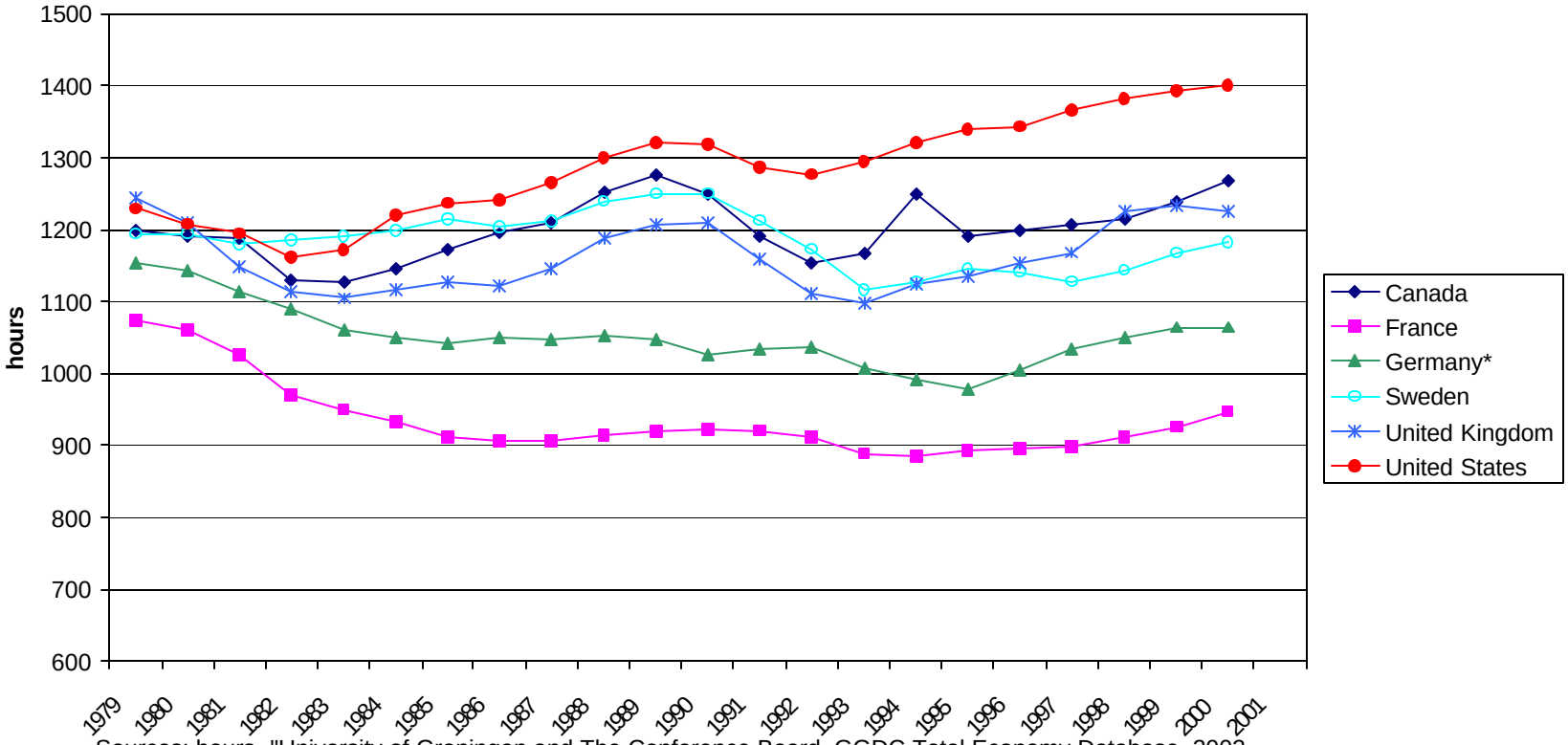
Figure 1

Annual Number of Hours Worked per Person Aged 15-64 [1]



[1] = Average hours worked per employed person *(Employment / pop. age 15-64)
Canada and France 1999, 2000 and UK, US 2000 are extrapolations.
Sources: hours of work: Key Indicators of the Labour Market 2001-2002, International Labour Office
population and employment data: OECD Health Data 98 CDROM, "A Comparative Analysis of 29 Countries".

Figure 1A
Annual Hours Worked - 15-64 Year Olds
GGDC Total Economy Database, 2002

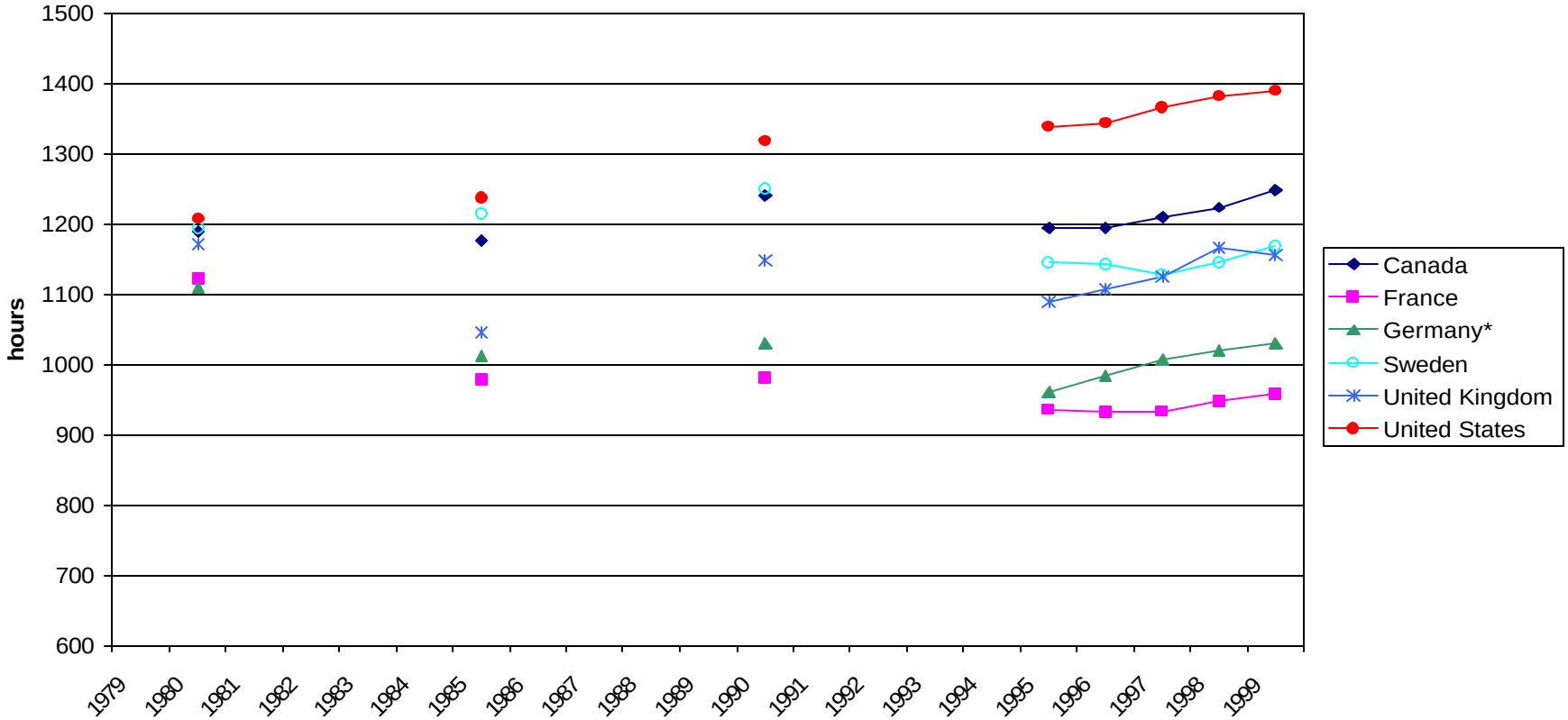


Sources: hours- "University of Groningen and The Conference Board, GGDC Total Economy Database, 2002, http://www.eco.rug.nl/ggdc"

employment - United States Bureau of Labour Statistics "COMPARATIVE CIVILIAN LABOR FORCE STATISTICS TEN COUNTRIES" ftp://ftp.bls.gov/pub/special.requests/ForeignLabor/flslforc.txt

population - OECD Health Data 2001 CDROM; OECD Health Data 2000 CDROM

Figure 1b
Annual Hours Worked - 15-64 Year Olds
OECD Data

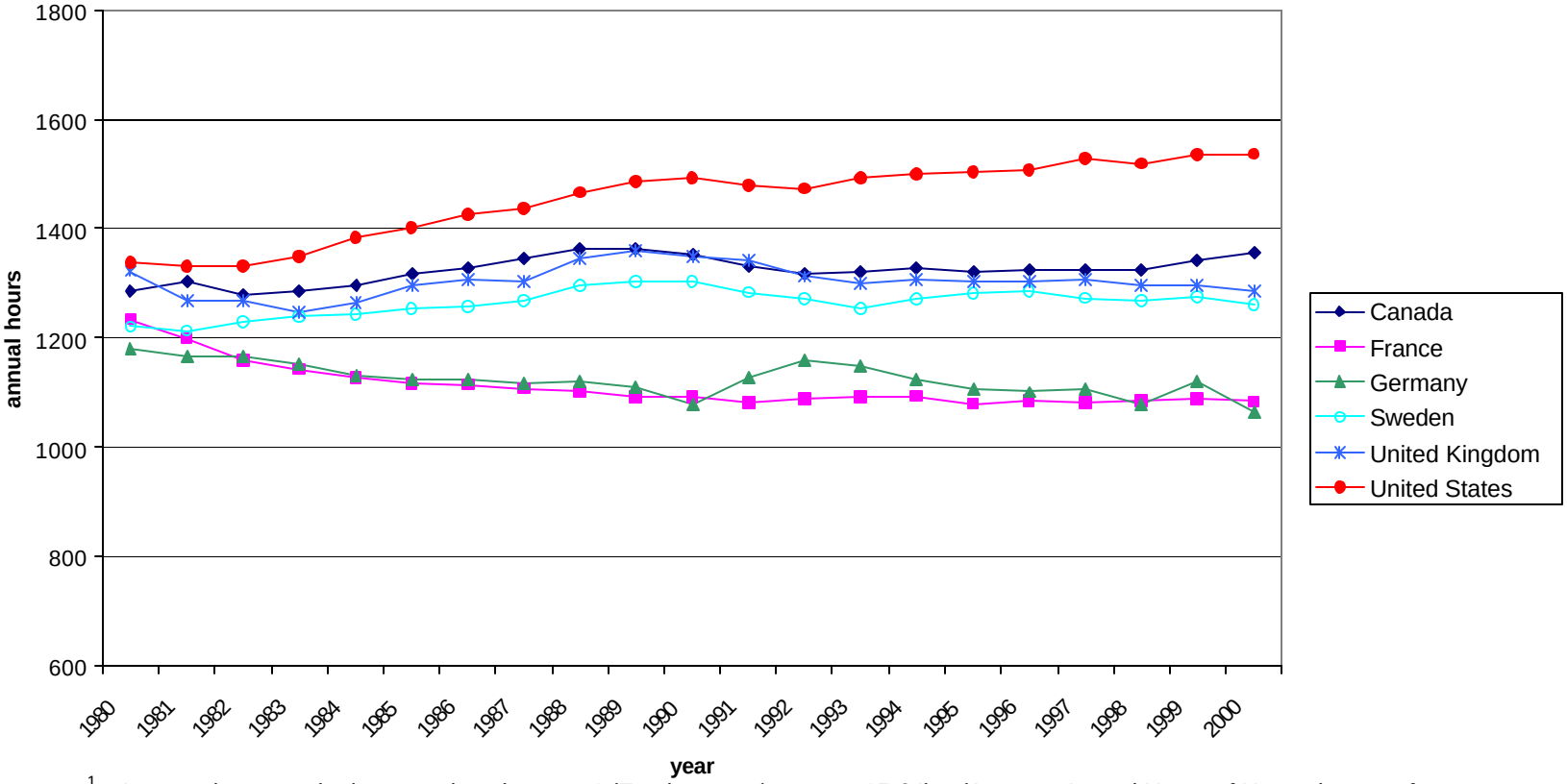


Sources: hours- ACTIVITIES OF THE WORKING PARTY ON EMPLOYMENT AND UNEMPLOYMENT STATISTICS -- ESTIMATES OF ANNUAL HOURS ACTUALLY WORKED IN OECD COUNTRIES, OECD Paris, 2001
employment - United States Bureau of Labour Statistics "COMPARATIVE CIVILIAN LABOR FORCE STATISTICS TEN COUNTRIES" ftp://ftp.bls.gov/pub/special.requests/ForeignLabor/flslforc.txt
population - OECD Health Data 2001 CDROM; OECD Health Data 2000 CDROM

Figure 2

Annual Number of Hours Worked per Person Aged 15-64 [1]

- Adjusted for Unemployment



[1]= Average hours worked per employed person * (Employment / pop age 15-64) + (Average Annual Hours of Unemployment for Persons Aged 16-64)

Canada and France 1999, 2000 and UK, US 2000 are extrapolations.

Sources: hours of work: Key Indicators of the Labour Market 2001-2002, International Labour Office

population, employment and unemployment data: OECD Health Data 98 CDROM, "A Comparative Analysis of 29 Countries".

2. Inequality in Well-Being, Work and Money Income

In Figure 1, the countries plotted seem to group themselves into three broad types, with Canada, Sweden and the UK having very similar trends, intermediate between those observed in the USA and France/Germany. However, the trends in working time observed in Figure 1 do not just indicate that European labour markets were unable to generate as many jobs as the USA. Figure 2 adds to actual work hours the total number of unemployment hours (assuming that the desired weekly hours of the unemployed equal the actual weekly hours of the employed). Since the unemployment rate in the USA in 2000 was well below that in most other countries, this procedure narrows the differences somewhat, but the same basic picture emerges. Adding together hours of actual work for pay and desired work (unemployment), the average adult aged 15 to 64 in the USA supplied about 9 hours per week more time to the paid labour market than the average adult in France or Germany.

In thinking about the relationship between time and money income, neo-classical labour supply theory often starts, in a one period model, with each individual maximizing a utility function, as in equation (1):

(1) $U = u(C, L)$

In this model, C represents consumption and L represents non-work time. The wage rate available in the paid labour market (w) and the total time (T) available for hours of paid work (H) and non-work time (L) are seen as the fundamentals which drive the time and money income constraints, as per equations (2) and (3).[3]

(2) $H + L = T$

(3) $C = wH.$

In this model, individuals are seen as choosing hours of work (H) to maximize utility (U). If it were really true that individuals could always obtain as many hours of work as they desired, at a constant real wage, then one could think of "full income" (wT) as the potential consumption available to each person. An individual's money income would, in this view, reflect partly that person's choice to consume part of their potential income in the form of material goods rather

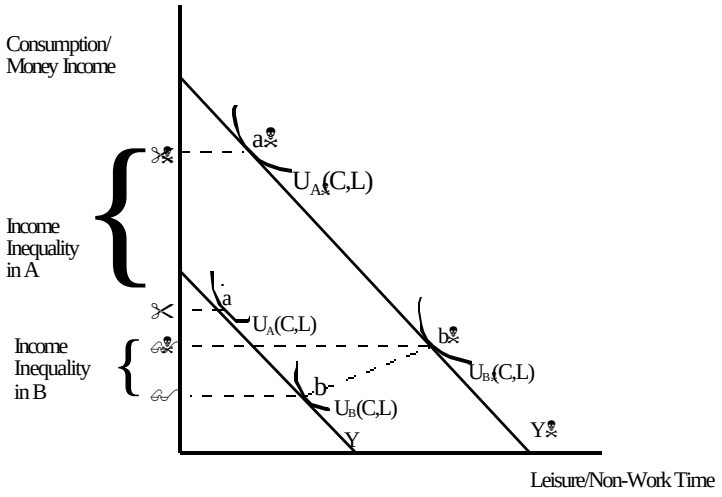
[3] Clearly, this formulation assumes that work hours are available without quantity constraint at a constant real wage, without progressive taxation. Non-labour income (from capital or transfer payments) is assumed to be zero, and any complications of human capital investment through on the job training are ignored.

than as leisure time - and one might as well summarize the options available to them in the hourly wage (*w*), since total time (*T*) is a constant.

Figure 3

Differences in Tastes

and Money Income Inequality



The labour/leisure choice model has many deficiencies, but it can also be used to motivate a discussion of why consideration of working time might affect the measurement of inequality. Figure 3 is constructed to represent the possible impact of differing leisure preferences on observed inequality. Imagine that two societies (labeled A and B) are exactly alike in the income earning opportunities which they present to the rich and the poor - as represented by the budget lines *Y* and *Y*' in Figure 3[4]. Imagine also that society A has more materialistic preferences, so that rich people in A maximize their utility at point *a'* (implying money income ∀') and poor people in A maximize their utility at point *a* (implying money income ∀). In less materialistic country B, which has different preferences but exactly the same choice set, rich people maximize utility at *b'* (hence have money income ∃') and poor people maximize utility at *b* (with money income ∃). It is clear that money income differences are greater in A than in B [∀∀' > ∃∃']. Money income inequality is greater in A than in B, although income earning opportunities are the same, because in A people prefer to take more of any given level of potential income in the form of cash income, rather than leisure (graphically, the expansion path of consumption with greater earnings potential has a steeper slope).

If this were a reasonable picture of the world, and if one were to assume that the USA is a more materialistic society than other nations, then this model might help to explain the greater inequality of money income - and the longer average hours of work, and higher average money incomes - in the USA than in Europe. It would also fit with the general observation (in inequality and working time as in much else) that Canada is "In Between" France/Germany and America. [As well, this model predicts a lower variance of hours worked in the USA than in Europe, which is also true, for the population as a whole.] Its implication for the comparison of inequality across nations is that a correction for differences in tastes would narrow differences in the inequality of money income.

However, the trends in average actual hours of work per person of working age outlined in Figures 1 and 2 mingle the effects of trends in:

[4]Implicitly, Figure 3 portrays a world where rich and poor differ in financial assets held, but not in human capital, hence the hourly wages implicit in both budget constraints are identical. Inequality in both human and financial capital is a more realistic, but the same basic point remains.

1. Common entitlements to leisure (i.e. paid public holidays, statutory paid vacations, etc.)
2. Individual participation in the paid workforce (often called the *extensive margin* of individual labour supply) and
3. Actual hours of work of workers (often called the *intensive margin* of individual labour supply)

It is not reasonable to expect that trends in all three components will be driven by the same processes or have the same impacts on inequality.

Common entitlements are determined by collective action, through the political process or in collective bargaining. By their nature, common entitlements tend to be an equalizing element in the distribution of economic well being, but although differences in such entitlements across nations can be significant[5], their determinants are not well understood. The number of paid public holidays are, for example, determined by a set of political processes quite different from the determinants of individual decisions to enter the workforce and to work specific hours. It is clear from national employment legislation that individuals (as voters) in some countries prefer more or less of such a *common* entitlement from *collective* decision making, as opposed to choosing (as potential workers) *individually* optimal hours of work and leisure – but the standard economics model does not explain *why*[6].

The model outlined in Figure 3 is a model of *individual* choice and it is also a model of the working time decisions *of workers* - i.e. labour supply at the intensive margin. Hence, the framework of Figure 3 is best suited to analysis of inequality *among workers* and is less well-suited to an examination of the influence on inequality *among all persons* of labour supply differences. In practice one of the most important sources of inter-country differences in labour supply is differences in the proportion of adults with zero paid employment - i.e. differences at the "extensive margin".

As well, the simple labour/leisure choice model of Equation [1] requires one to assume away involuntary unemployment. Over time, total working hours within a country can change quite quickly, as the macro economy moves from boom to bust or vice versa. Variation in the

[5]Using data from 1990, Bell and Freeman (1994:4) argue that: "Differences in weeks of vacation and holiday time translate into a 17% reduction in working time in Germany compared to a 9% reduction of work time in the United States, and therefore contribute .08 ln points to the annual hours gap between the two countries."

quantity of labour demanded can impose involuntary changes in the amount of working time obtained by workers, and it is clear that constraints on available hours of work are most acutely experienced by the lower paid.[7] Since inequality in access to employment often interacts with inequality in hourly wages, measuring inequality solely in terms of a "full income / hourly wage" (which is not actually available to the involuntarily unemployed) seems likely to be misleading.

In other work (Osberg 2002a), the author has argued that, particularly for prime age males, the distribution of usual hours of work *of workers* is very similar for Germany and the USA, except for the extreme lower tail of the distribution. Differences between these two countries in usual hours of work in the 1990s appear to be dominated by differences at the extensive margin of labour supply (especially among women and older men). Within Canada and the USA, the argument has also been made that the trend over time to greater inequality in household income is partly driven by the correlation of potential earnings of husbands and wives and the workforce entry of well educated women. If well educated women tend to marry well educated (high income) men and in the 1950s tended to stay home, but in the 1990s tended to get paid jobs, then rising female employment disproportionately swells the household income of upper income groups, thereby increasing measured inequality in household money income. If this were also an explanation of cross country differences in measured inequality, one might think that if workforce participation elsewhere were to increase to North American levels, measured inequality in household money income in other countries would also rise - hence comparing inequality in the actual distribution of household money income "overstates" international differences in inequality.

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[6] See, however, Jenkins and Osberg (2002)

[7] Osberg and Phipps (1993:283) estimated, using the Labour Market Activity Survey of Statistics Canada that the Atkinson index of inequality (r=-0.5) of earned income in Canada would have fallen by about 30% if all Canadian workers had been able to obtain their desired weeks of work in 1986/87. In the interpretation of unemployment, many have also stressed that involuntary joblessness carries significant social and psychological costs (see Jahoda (1979) or Kelvin and Jarrett (1985)).

Table 1
Decomposition of Difference in Average Actual Hours Worked - ILO KILM Data
(Canada 1996 - other countries)

	average actual hours per employee	monthly average employment rate (male /female)		average actual hours per working age[1] person	difference in actual hours per working age person	employment rate difference * own country's hours/employee	hours/employee difference * Canadian employment rate
Canada 1996	**1732**	**66.3**	**53.2**	**1024**	**--**	**--**	**--**
US 1997	**1966**	**71.3**	**56.8**	**1254**	**-230**	**-92**	**-138**
UK 1997	**1731**	**64.5**	**49.3**	**1013**	**11**	**10**	**1**
Germany 1997	**1574**	**63.8**	**42.3**	**812**	**212**	**118**	**94**
France 1997	**1656**	**57.5**	**41.2**	**808**	**216**	**171**	**45**
Sweden 1997	**1552**	**61.0**	**54.3**	**883**	**141**	**34**	**107**

[1] Working age population in the BLS data is 16 and over for the US, the UK and Sweden. For Canada and France, the population is 15 and older and in Germany it is 14 and older.

Sources - hours: KILM (2002) Key Indicators of the Labour Market 2001-2002, International Labour Office
- employment rates: US Bureau of Labour Statistics (2002) "Comparative Civilian Labor Force Statistics Ten Countries" ftp://ftp.bls.gov/pub/special.requests/ForeignLabor/flslforc.txt

Average actual working hours per adult can differ across countries because countries may differ in probability of working at all and because those people that do work may differ in total working hours. Table 1 therefore decomposes the difference in average actual hours of work in Canada and in the USA and the UK, Germany, France and Sweden due to employment rate differences, and hours per worker differences.

Evidently, differences between countries in the proportion of the working age population who have any employment are a large part of the total difference in average working hours per person. Freeman (2002) has suggested that one should think of the US/Europe employment gap in terms of the "marketization" of production. He argues that the EU "produces relatively more goods and services through household production and less through the market than the US" (2002:2). Although he suggests this has implications for relative employment levels in the low skill service sector, and argues generally for the efficiency advantages of greater female labour force participation, he does not really explain how or why such a large difference in marketization might have occurred. By leaving open the question of whether it is higher tax rates or differences in life style tastes that may be the crucial issue, he avoids judgement on whether differences in preferences explain inter-country differences in hours of work or whether the crucial issue is differences in the incentives which individuals (of broadly similar preferences) face.

By contrast, Garhammer (1999) does not hesitate to assert that nations can be characterized in terms of a specific "time culture", in which social institutions (such as the non-working weekend, or the holiday period surrounding Christmas and New Year's) and other social norms for time use are expressed in laws (such as working hour regulations, legal holidays, shop opening hours, etc.), collective agreements and individual habits (e.g. siestas). He argues that there is a distinctive European model of time culture in which the social enjoyment of time is highly prized and both "time prosperity" and material wealth are valued. He notes, for example, that "the majority of middle-aged Germans define the quality of life to which they personally aspire as "not being rushed".(Garhammer, 1999:69).

Typically, economists have been reluctant to appeal to differences in preferences to explain international differences in outcomes and have preferred to emphasize differences in incentives. Sociologists (such as Garhammer), on the other hand, have seen the description of

national differences in values as entirely legitimate (indeed, some would say, central to the discipline). These contrasting methodological models are quite important for the empirical analysis of the connection between working time and inequality. If one wants to compare the extent of economic inequality across countries and "standardize" the distribution of money income for differences in the probability of working, it might well be asked: "What thought experiment is in fact being performed?"

If preferences are similar across countries, and if actual working time differences reflect primarily differences in incentive structure, then one could not have a change in hours of work without a change in incentives. In this case, one should run the thought experiment of a change in incentives, and examine its impact on both money incomes and time worked, because the structure of income distribution processes (i.e. the net income obtainable from work, after taxes and after any impact of earnings on transfer payments) would have to change if working hours were to change. In this case, one should model, for example, the impact of a similar income tax regime on both net earned income *and* working time.

However, if the sociologists are correct in asserting that differences in social values can be significant[8], then one can ask how the distribution of income would change if preferences were similar, but the structure of incentives were unchanged. One might, for example, examine what the German distribution of income would look like, if Germans had the same preferences for material goods and non-work time as Canadians, but continued to face unchanged incentives in the labour market.

These contrasting methodological models are particularly relevant for analysis of the differences between countries in the extent of non-employment by women. If there are differences between countries in such social norms as the proper locus of care for young children and the relative importance of paid work and family life in the definition of personal identity, then these cultural differences may be the primary determinants of differences in female workforce participation. Hakim (2000) is an example of the sociologists who have tried to explain the evolution of female attitudes to "home-centred" and "work-centred" models of identity. If national societies evolve differently in these dimensions, then it is sensible to ask (without necessarily having to model differences in the income tax and social policy regimes) a

question such as: "What would the German distribution of income look like if German women had similar attitudes to workforce participation as North American women, but faced the same labour market incentives as they now do?[9]."

Many readers may already have some opinions on national differences in social attitudes, but one does not have to rely solely on casual observation. The World Values Survey and International Social Survey Program have, in repeated random samples, asked a comparable set of questions on social attitudes in advanced capitalist countries. Table 2 summarizes the results of some questions asked in the 1990-91 World Values Survey and 1998 ISSP survey rounds which were intended to probe social attitudes to "home-centred" and "work-centred" models of female identity.

In thinking about whether to enter the workforce, women must compare the positive attractions of possible greater intrinsic satisfactions of work for pay, compared to work in the home, with a possible negative - a potential cost in relationships, particularly with children. To the extent that families make joint decisions on these issues, male attitudes on these issues also matter. To track the perception of these issues, the WVS asked respondents whether they agreed that "A working mother can establish just as warm and secure relationship with her children as a mother who does not work" and the ISSP asked whether respondents disagreed that "family life suffers when the woman has a full-time job". Although there is some evidence that younger Canadian women have more "non-traditional" attitudes than young American women, the similarity in Canadian and American responses is otherwise fairly high. There is some clear evidence in Table 2 of generational effects, there are also strong national differences, even among the relatively young - e.g the difference between younger German and North American women in the 1990-91 WVS was very large (twenty five percentage points). By 1998 there was

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[8]Scott et al (1996) examine the evolution of gender-role attitudes in the UK, Germany and the USA. The difference in levels of support for what they call "pro-feminist" attitudes is striking.

[9]The problem with this thought experiment is that if Germans had different attitudes as workers, they would likely also have different attitudes as voters - and changes in social policy and labour market incentives might be a likely result. German social policy has been expressly framed to provide substantial financial incentives, for up to two years, for women to remain at home and care for their children (Phipps:1994,1998). Tax/transfer incentives strongly favor the "Traditional" model of the family and child care by stay-at-home mothers. By contrast, American social policy has provided no such support for mothers to stay at home (indeed welfare policy has shifted strongly to encouraging/requiring the labour force participation of social assistance clients). This article is, therefore, best thought of as a *ceteris paribus* approximation in which labour market attitudes change, but voting behavior does not - thereby holding constant the current tax/transfer regimes and wage payment structures in each country.

less difference between Germany and the USA in attitudes to whether "family life suffers when the woman has a full-time job", but it was still significantly large.

Moreover, it is notable that on the straightforward role differentiation question of "do you agree, disagree ..A husband's job is to earn the money, a wife's job is to look after the home and family", the percentage of younger Germans and North Americans who "disagree" or "strongly disagree" in 1998 differed by sixteen percentage points for women and twenty six percentage points for men. Evidently, there continue to be substantial differences between countries in how people answer questions which are designed to elicit the extent of support for a more traditional "home centred" model of female identity10.

The responses summarized in Table 2 do not always conform to the stereotype of "More Liberated American Women". In 1998, for example, the percentage of American women under 35 who disagreed with role differentiation was appreciably less than in Canada, the UK, Sweden or France. As well, it is very clear that male and female attitudes to gender roles differ - the twenty percentage point discordance between under 35 Swedish males and females in attitudes to husband and wife roles is especially notable! However, more often than not, the differences in attitudes between men and women within countries, in any given year, are small compared to the differences between countries. Attitudinal survey evidence therefore indicates broad support for the hypothesis of international differences in attitudes to participation in the paid workforce. However, the differences between "All ages" and "Under 35" attitudes can also be broadly taken as some evidence of convergence in attitudes - which can be seen as an indication that the thought experiment of "changing values" may not be entirely fanciful.

[10]As well, the definition of what it means to be a "feminist", and the focus of desired reforms to patriarchal institutions, may differ significantly between the USA and Europe.

Table 2
Attitudes towards Traditional Gender Roles Across Countries
Males and Females, All Ages and Those < 35 Years

	International Social Survey Program: 1998				World Value Survey 1990-91	
	V12 - How much do you agree, disagree ... A husband's job is to earn the money, a wife's job is to look after the home and family.		V 13 - How much do you agree, disagree ... All and all, family life suffers when the woman has a full-time job.		V 98 Do you agree strongly, agree, disagree... A working mother can establish just as warm and secure a relationship with her children as a mother who does not work	
	% disagree1		% disagree[1]		% agree[2]	
	male	female	male	female	male	female
	All ages		All ages		All ages	
USA	56	56.7	43	51.3	65.6	79.9
Canada	56.6	68.9	43	56.6	63.8	75.4
UK	50.6	61.5	43.3	48.4	66.5	72.8
German	35.2	41.6	34	40	41.8	50
France	39.4	59.8	23.6	34	73	73.4
Sweden	57.6	74.6	48.1	57.3	64.6	81.7
	< 35 years of age		< 35 years of age		< 35 years of age	
USA	66.9	66.2	52.5	56	73.6	83.3
Canada	66.6	72.9	53.3	62.9	71.3	83.3
UK	71.4	77.1	65.4	61.5	78.5	78.3
German	40	50.7	39.5	47.1	48.1	58.6
France	60.8	73.4	36.2	44.7	81.8	72.4
Sweden	65.3	84.3	54.6	67.7	62.2	80.9

[1] includes "strongly disagree" and "disagree"; [2] includes "strongly agree" and "agree"
Author's calculations from micro-data
source: International Social Survey Program: Religion II, 1998 Koeln, Germany. Inter-University Consortium for Political and Social; Research version, Ann Arbor, 2001.

Inglehart, Ronald et al. "World Values Surveys and European Values Surveys 1981-84, 1990-93, 1995-97. Inter-University Consortium for Political and Social; Research version, Ann Arbor, 2000.

3. Statistical and Data Issues

3.1 Statistical

The objective of this paper is examine how much of the differences in income distribution between a selection of advanced capitalist countries may be due to inter-country differences in the probability of working for pay. The USA is the largest nation in our sample, with the longest average working hours and the highest average money incomes, and is often used as the basis for comparisons (e.g. in the earlier version of this paper). However, for Canadians, the most interesting thought experiment is a change in other countries' probability of paid employment, given the reward structure already in place there, to Canadian probabilities. This paper therefore models the impact of a change (from the current country determinants to a Canadian model) in the probability of any employment in a year and, conditional on being employed at some point in the year, the expected net income associated with employment, for a person or household of given characteristics. The analysis proceeds in two stages, first examining the implications of changed workforce participation by women and then considering men and women together.

In doing this, it considers separately the employment outcomes of single individuals and of persons in households. A probit model of the probability of employment at some point in the year in Canada is estimated for single workers, the results of which are presented in Appendix Table B1. Because there is a long tradition in labour economics (see, for example, Killingsworth, 1983) which recognizes that the labour supply decisions of husbands and wives living in households are interdependent, a multinomial logit model of household labour market decisions in Canada is estimated, conditional on the personal characteristics of both partners. For each household, four possible states are identified - [1] both husband and wife are employed at some point in the year; [2] husband employed, but wife never employed; [3] wife employed but husband never employed; [4] neither husband nor wife employed at any point in the year. The results are presented in Table B2.

The coefficients from these estimated equations are then used to answer the question: "what would the probability of employment at some point in the year be, for a person of given characteristics, if it was determined by the same probability process as in Canada?" For a single

person, it is their own characteristics, plus the structural parameters estimated in Table B1, which determine an expected probability of some employment. For a person who is part of a household, the probability that they individually will be employed at some point in the year is the sum of the associated probabilities of household behaviour implied by Table B2 (e.g. a married woman's probability of employment is sum of [1] the expected probability that a household whose members have the same characteristics as her household will have both husband and wife employed plus [2] the expected probability that a household whose members have the same characteristics as her household will be a "wife employed but husband not employed" household).

In Tables B1 and B2, the influence of education on probability of employment is captured by a relative education variable which is calculated as the mean educational rank of a person of given educational credentials, in their ten year birth cohort. Countries differ significantly in the educational credentials they report, and equivalencies between credentials in different countries are sometimes problematic, but relative intra cohort educational rank is a concept that can be directly compared across countries. Individuals are classified as employed if they report any earnings or any weeks of work during the survey year.

As Table 4 illustrates, in North America the chance of a person aged 18 to 64 having some employment during the year is higher than in Europe. To simulate the income distribution that could be expected in European countries if the workforce expanded to a Canadian level of participation, the expected probability of employment is calculated for each person and those outside the workforce are ranked by that probability. Table 3 reports the results obtained from a simulation of [1] changed behaviour by women and [2] when both male and female workforce participation is at Canadian levels. Assuming that a change (to Canadian values) in probability of employment would most affect those at the margin of labour market participation, this paper simulates this change in outcomes by adding to the workforce of the UK, Germany, France and Sweden, the non-employed who have the greatest relative probability of employment. Table 3 presumes that those individuals who already have some employment would continue in employment, and that if workforce participation were to rise to Canadian levels it would be the jobless individuals with highest expected probability of employment who would join the workforce.

In the USA, the probability of employment is quite close to Canadian levels, but a bit higher. This implies that in simulating the income distribution corresponding to Canadian patterns of employment one has to *subtract* from the work force those individuals at the margin of employment (i.e. those employed persons with the *lowest* estimated probability of employment). However, because the difference between Canadian and US employment probabilities is not large, the simulated income distribution is in practice not much different from the actual US income distribution.

The impact, on the household distribution of disposable income, of those individuals joining the workforce will depend on the size of their additional individual earnings, the size of any associated change in the earnings of other household members, the impact of changed earnings (of both partners) on transfer payments and the change in taxes paid by both partners. To estimate the net income that the households containing additional workers would receive this paper uses the country specific regressions reported in Tables B3 and B4 which report, for each country, OLS regressions of the form:

Net Disposable Income = F(age, age^2, relative education, family status, disability, immigrant and labour market participation status, etc....)

The purpose of these regressions is to enable prediction (for the purpose of simulation). These regressions can be seen as a reduced form of the structural equations system which might predict the expected working hours of a person (or household) of given characteristics with specific expected wage(s), the earnings that those work hours would imply and the net income that a household with those earnings would receive after income tax is deducted and transfer payments are adjusted. Both the structure of the tax/transfer system and the functional form of the labour supply function may be rather complex - hence the linear functional form of the reduced form equations reported in Table B3 should be seen as a first order approximation.

In the simulated income distributions for each country reported in Table 3, this imputed net disposable income, of the households with simulated additions to the workforce, is added to the income of the other households whose labour market status is unchanged, and household equivalent income distribution statistics are calculated for the population as a whole. Note that

this methodology will impose on all countries the Canadian pattern of correlation across spouses in employment, but leaves the country-specific income determination process of workers unchanged, under the maintained hypothesis that those households with unchanged workforce status do not change their net income.

The important issue for the accuracy of the simulations reported in Table 3 is whether the conditional expectation of disposable household income of workforce entrants - as calculated using the combination of their personal characteristics and the additional income associated with those characteristics implied by Tables B3 and B4 - is systematically biased to a degree that affects the summary statistics on income distribution reported in Table 3. Since there is always an element of judgement in the specification of the net income function (e.g in choice of functional form, or selection of right hand side variables), one way to check is to use an alternative plausible specification. Those alternatives that have been tried to date do not make very much difference.

3.2 Data

This paper uses Luxembourg Income Study micro data to present point estimates[11] of income distribution for the following economies: Canada (1997), France (1994), Germany (1994), Sweden (1995), United Kingdom (1995), and United States (1997). The focus is on "standardizing" the distribution of equivalent income among individuals to account for the impact of different national probabilities of employment, but the statistical starting point is the LIS definition of total household money income after tax and including transfers (disposable household income)[12] as the basis for calculation of the "equivalent income" of all working age individuals (and dependent children). All summary statistics refer to the distribution of equivalent disposable income among all national residents living in households with a head aged 64 or less, excluding only those economic families or unattached individuals who reported a zero or negative before tax money income. In all cases, where money figures are provided, local currency figures for income have been converted to year 2000 US dollars using the relevant country price deflator for consumer expenditure and OECD PPP estimates of purchasing power parity for consumption by households.

Estimates of the economic well-being of individuals within households depend heavily upon the assumptions made about the degree and pattern of economic sharing within households[13]. As well, estimates of the total well-being of the household depend upon the equivalence scale which is used to estimate the economies of scale in household consumption.[14]

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[11] Although estimates of the confidence intervals surrounding these point estimates are not presented here, interested readers can find such estimates (for the population as a whole), as calculated using a bootstrap methodology, in Osberg and Xu (1997).

[12] Disposable income consists of the sum of gross wages and salaries, farm self-employment income, non-farm self-employment income, cash property income, sick pay, disability pay, social retirement benefits, child or family allowances, unemployment compensation, maternity pay, military/veteran/war benefits, other social insurance, means-tested cash benefits, near cash benefits, private pensions, public sector pensions, alimony or child support, other regular private income, and other cash benefits; minus mandatory contributions for self employed, mandatory employee contribution, and income tax.

[13] Phipps and Burton (1995:194) have demonstrated the potential importance of inequality within the family - the same Canadian family income data is consistent with a child poverty rate (for two parent families) of as little as 5.9% if resources are equally shared or as much as 52.1% if resource sharing is minimal. However, this paper does not address these issues.

[14] Phipps and Garner (1994:13) argue that if one uses the same methodology for estimating equivalence scales, US and Canadian results are statistically and practically indistinguishable. Burkhauser, Smeeding, and Merz (1996) emphasize the differences in incidence and patterns of poverty implied by alternative equivalence scale methodologies in official use in Germany and the US and provide estimates of the sensitivity of the poverty rate in

This paper uses the so-called LIS equivalence scale[15] in which the number of equivalent adults in each household is calculated as $N^{0.5}$. The LIS equivalence scale implies fairly large economies of scale in household consumption - the second person in a household counts as 0.41, the third person receives a weight of 0.32 and a four person household is thought of as having the same relative level of consumption needs as two unattached individuals (i.e. with the same total money income, two adults living separately could live as well as each member of a four person family living together). This paper makes the assumption of equal sharing among all household members, and calculates the equivalent income of each household member as equal to the total money income of the household, divided by the number of equivalent adults in the household. This equivalent income is attributed to all household members, and the distribution of equivalent income across individuals is then calculated.

The most popular summary statistic of inequality is undoubtedly the Gini index, which is most sensitive to changes in the mid-range of the distribution. The Theil index is more sensitive to the bottom end, and also has the advantage of being additively decomposable (for further discussion see Jenkins (1991)). As an indicator of the extremes of the income distribution, we present also the "90/10 ratio" -i.e. the ratio between the average incomes of the top 10% of persons and the average incomes of the bottom 10%. However, none of these measures reveal directly which part of the income distribution is changing - e.g. whether inequality is widening because the top end is pulling away from the middle or because the poor are falling behind the income growth of the middle of the income distribution. Since these issues are often of interest, Table 3 also presents the 90/50 and 50/10 ratios in order to better distinguish changes in the top and bottom of the income distribution. The percentages of the population with equivalent income greater than 150%, and less than 50%, of the median are also reported, as these statistics have also often been used as a guide to the degree of "polarization" in living standards.

In international comparisons, a frequently used relativistic conception of poverty draws the poverty line at one half the median national standard of living (Hagenaars, 1986, 1991) and since this paper calculates the equivalent income of each individual in each year, it defines the

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the US and Germany to alternative scale elasticities. See also Buhmann et al. (1988); Coulter, Cowell, and Jenkins (1992);

poverty line as one half the median equivalent income of all individuals[16] in that year. Two measures of poverty are presented - the poverty rate (percentage below half the median equivalent income) and the Sen-Shorrocks-Thon (SST) index of poverty intensity. Although the poverty rate is undoubtedly the most commonly used measure of poverty, it does not reflect the amount by which the incomes of the poor fall below the poverty line and it ignores the degree of inequality among the poor. As Osberg and Xu (2000) note, the SST index of poverty intensity is preferable on axiomatic grounds and can be decomposed into:

$$(3) \qquad P(Y; z) = (RATE)\,(GAP)\,(1+G(X)).$$

Where *RATE* is the poverty rate, and *GAP* is the more familiar average poverty gap ratio among the poor. Since *(1+G(X))* is in practice nearly constant over time and across countries, the SST index has the appealing property that it is roughly proportional to the expected poverty gap of a randomly selected individual (i.e. the crude probability of poverty multiplied by the expectation of the poverty gap, conditional on being poor).

4. Empirical Results

Table 3 presents the actual median and mean equivalent disposable income and the above set of income distribution summary statistics for Canada (1997), the USA (1997), UK (1995), Germany (1994), Sweden (1995) and France (1994). For the latter five countries it also presents the results of simulating a Canadian level employment probability of women and of men and women combined. In these simulations, the impact on household disposable income of a change in probability of workforce participation is simulated - i.e. the simulations calculate the net benefit to households of greater workforce participation *after* subtracting direct taxes and *after* any associated reduction in transfer payments. Typically, rising employment levels would

[15]Figini (1998, p. 2) notes that "OECD and other two-parameter equivalence scales empirically used show a similarity of results [in measurement of inequality] to one parameter equivalence scales with elasticity around 0.5."
[16]Measures of aggregate inequality (such as the Gini index) are dominated by the income distribution of the non-poor (the vast majority of the population). Hence, defining the poverty line in this way does not necessarily imply that poverty and aggregate inequality are closely related - see Osberg and Xu (1997).

partially benefit the budget balance of governments (as well as the net income of households), and one would expect the impacts of greater workforce participation on GDP per capita to exceed its impacts on average disposable personal income. However, since the focus here is the distribution of households' command over resources (of time and money), this paper emphasizes the change in equivalent disposable household income.

It is no surprise that in all countries the results indicate that if additional workers entered the paid labour force, average and median equivalent income would rise. The effect is particularly marked in the UK when additional workforce participation by both men and women is considered - the simulations indicate that median equivalent disposable income might be expected to rise by about 13% and average income by 7%. As a number of authors have noted[17], although the UK employment rate is in aggregate fairly high, that employment is concentrated among households. The percentage of working age households with zero employment income is particularly high in UK data, so the impacts on average and median income of moving to Canadian workforce participation levels would be particularly large in the UK. Furthermore, since households without earnings are the poorest of the poor, bringing more households into the workforce would have large impacts on poverty.

The biggest changes in UK data therefore occur at the bottom of the income distribution. Bringing male and female workforce participation to Canadian levels could be expected to cut poverty intensity from 8.4 to 4.0 - and the poverty rate would fall from 15.6% to 10.6 %. Polarization (as measured by the 90/10 ratio) would decline from a 10:1 ratio to about a 6.5:1 ratio, but most of that is happening because there is a compression at the bottom, since the 50/10 ratio shrinks by more than the 90/50 ratio. All these improvements in the money income of the less affluent would reduce measured inequality, and since the Theil index is more low end sensitive than the Gini, the fall in inequality as measured by the Theil (from .212 to .154) is proportionately much larger than the fall in the Gini (from .344 to .291). In general, bringing female workforce participation to Canadian levels produces about half the total change from bringing male and female participation to Canadian levels.

[17] Osberg (2002a) notes that 20.4% of households of working age in the UK in 1995 LIS data have no reported employment - well above the rate in other countries. See also Gregg et al (1999).

Table 3
Income Distribution in Canada, UK, USA, Germany, France and Sweden - Working Age Households
Actual + Simulated at Canadian levels of Workforce Participation

	median (Can 2000 $)	mean (Can 2000 $)	Gini	Theil	% < .5 * median	% > 1.5 * median	90/10 ratio	90/50 ratio	50/10 ratio	Poverty Intensity*
Canada 97 - actual	21,301	23,305	0.293	0.144	13.5	20.0	8.0	2.5	3.2	8.2
US 97 - actual	27,480	33,127	0.371	0.252	16.9	24.5	13.5	3.6	3.7	11.0
- female simulation	27,423	33,096	0.371	0.252	16.9	24.6	13.5	3.7	3.7	11.0
- female+male sim.	27,210	32,860	0.374	0.255	17.3	24.7	13.7	3.7	3.7	11.2
UK 97 - actual	17,938	21,144	0.344	0.212	15.6	23.8	10.1	3.3	3.1	8.4
- female simulation	19,032	21,515	0.321	0.184	14.0	20.2	8.4	2.9	2.8	7.0
- female+male sim.	20,286	22,626	0.291	0.154	10.6	18.0	6.5	2.8	2.3	4.0
Germany 94 - actual	18,983	21,027	0.269	0.139	8.4	17.4	6.3	2.6	2.5	4.7
- female simulation	19,560	21,319	0.257	0.129	7.6	15.2	5.8	2.5	2.4	4.1
- female+male sim.	19,910	21,553	0.252	0.125	7.2	14.3	5.6	2.4	2.3	3.8
Sweden 95 - actual	16,504	17,230	0.223	0.093	7.6	11.5	5.7	2.0	2.8	6.6
- female simulation	16,664	17,268	0.216	0.088	7.3	10.4	5.4	2.0	2.7	6.2
- female+male sim.	16,647	17,216	0.210	0.082	6.6	10.0	4.9	1.9	2.5	5.3
France 94 - actual	17,629	20,395	0.289	0.154	7.9	19.7	6.6	2.9	2.3	3.6
- female simulation	18,308	20,637	0.272	0.137	7.4	17.9	5.9	2.7	2.2	3.2
- female+male sim.	18,498	20,743	0.264	0.129	6.4	17.5	5.5	2.6	2.1	2.6

Note: After-tax equivalent household disposable income per person - population is all persons in households with working age head (18-64), equivalence scale is square root of number in household. *SST Index - Poverty line = ½ median equivalent disposable income, calculated separately for actual & simulated income distributions.

Where there are smaller differences in workforce participation to begin with (e.g. the USA compared to Canada), the impacts on average and median incomes of changing to Canadian participation levels are correspondingly smaller. Table 4 shows the annual employment rate, by country.

Table 4

Annual Employment Rates*

18-64 Year Olds - All and Females Only

	Males and Females	Females
US 1997	83.4	76.2
UK 1995	67.1	59.7
Canada 1997	81.7	75
Germany 1994	74.7	64.9
Sweden 1995	66.2	65.1
France 1994	72.6	63.1

* note: Defined as those who had positive employee hours or weeks in the past twelve months or who were defined as being self employed.

In the USA, for example, median income changes by only -$57 (about 0.2 %) as the US female workforce participation rate falls to the Canadian level, and by a further -$270 (about 1%) as male and female employment levels are standardized. There is some change in poverty rate (an increase from 16.9 % to 17.3 %) when the impact of lower Canadian male workforce participation is simulated, but the impacts of simulated participation changes on the US income distribution are otherwise notably small – or non-existent. The broad conclusion from Table 3 is

that very little of the US/Canada difference in income inequality can be explained by differences in workforce participation.

In Table 3 the Swedish results project a very small change in median and average equivalent income, and a tendency for income changes to be somewhat concentrated in the lower part of the income distribution. When both male and female participation is modelled at Canadian levels, Poverty Intensity falls significantly (from 6.6 to 5.3) as the bottom tail of the distribution compresses by considerably more than the top - the 90/50 hardly changes (shrinking from 2.0 to 1.9), while the 50/10 ratio declines from 2.8 to 2.5. Actual Canadian inequality starts from a considerably higher level than actual Swedish inequality, by any statistic one can choose, but the difference would be even larger if Canada and Sweden had similar patterns of workforce participation.

In the UK, and to a lesser extent in Sweden, the simulated changes in workforce participation reduce inequality most at the low end of the income distribution. In Germany and France, however, changes in family income from an increase in workforce participation to Canadian levels would be spread more evenly throughout the distribution. The simulations indicate a change in both countries in the Gini which is less than the drop in the Theil, but such overall indices cannot indicate changes in different parts of the income distribution. In Table 3, the drop in the German population percentage with incomes above 150% of median income is considerably larger (3.1 percentage points) than the decline in the poverty rate (1.2 percentage points). In Germany and France, the simulated income distribution is more compressed than the actual income distribution - the simulated decline in the 50/10 ratio and the drop in the 90/50 ratio are of roughly the same size. Poverty intensity starts from a lower base in both countries than in Canada and although it falls in both (from 4.7 to 3.8 in Germany and from 3.6 to 2.6 in France), the decline is not nearly as dramatic as in the UK.

The continental European countries have, to begin with, an income distribution that is substantially more equal than that in the US, UK or Canada. Their actual poverty rates (among working age households) are in the 8% range, well below the poverty rate in Canada (13.5%), the UK (15.6%) and the USA (16.8%). Poverty intensity and the 50/10 ratio are similarly much lower in Germany, Sweden and France than in the Anglo-American countries, even before one

considers the impact of added workforce participation. In continental Europe one can therefore argue that the income poverty and employment dimensions of social exclusion are, to begin with, much less closely aligned than in the Anglo-American countries. Hence, the simulations of rising workforce participation tend to show, for France and Germany, more of a compression of the distribution of income as a whole, rather than an effect which is concentrated in the lower tail.

Simulations of the impact of changing workforce participation on the income distribution can be a useful way of analyzing particular welfare state regimes. However, Table 3 also has two very general conclusions.

[1] In Europe, a higher employment rate would mean more equality of income distribution.

[2] In the mid 1990s, the differences between Canada and continental European countries in poverty would increase, if other countries had Canadian levels of employment.

The argument suggested by Figure 1 was that standardizing for workforce participation should have narrowed differences in measured inequality of income. As well, if it was the correlation of potential earnings of husbands and wives and the workforce entry of well educated women (married to high income men) in the 1980s and 1990s that was responsible for increasing measured inequality in household money income (by disproportionately swelling the household income of upper income groups), measured inequality in household money income in other countries would rise if workforce participation elsewhere were to increase to Canadian levels. If either hypothesis were true, comparing inequality in the actual distribution of household money income "overstates" international differences in inequality.

However, the simulations of this paper indicate emphatically that this is not the case. In every country, rising workforce participation reduces inequality and poverty. If continental European countries had Canadian style determinants and levels of employment, differences in money income inequality and poverty would be larger - not smaller - than they are in actual data.

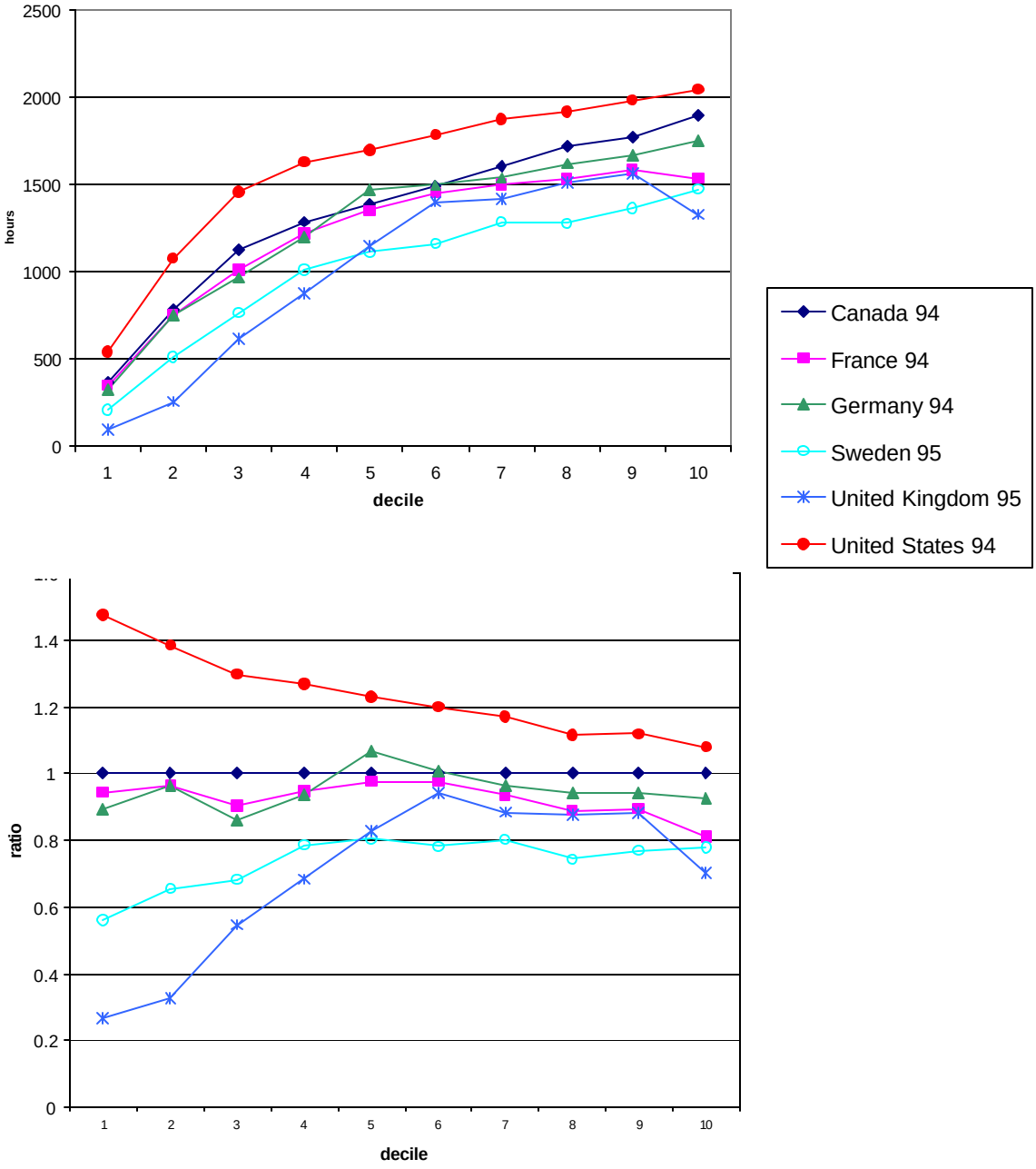
Figure 4, which examines working hours per household adult at different points in the distribution of income in 1994-95, may help to explain the simulation results. In Figure 4, individuals are ordered in each country by their equivalent individual disposable money income

(after direct taxes and after transfers) and the average labour supply per household adult is calculated for each income decile. Panel A presents the average hours total. In Panel B each country's decile average of working hours per household adult is expressed as a fraction of the corresponding Canadian decile. With the exception of the top income decile in the UK (which has the least work effort of the top decile of all countries examined[18]), there is a clear tendency for work hours to be higher in higher deciles of the income distribution- both absolutely and relative to Canada. At all points in the income distribution, Americans work more hours - but although the US incentive system has its greatest differentials in hourly rewards at the top of the income distribution, the differential in hours of work is significantly smaller at the top of the income distribution than at the bottom.

If non work time has utility, these data indicate that comparisons of money income inequality between the USA and other countries will underestimate differences in the inequality of utility. In the USA, the relatively poor work significantly harder for their greater relative poverty than they do in other countries. Cross country comparisons of inequality in money alone understate inequality differences in time and money.

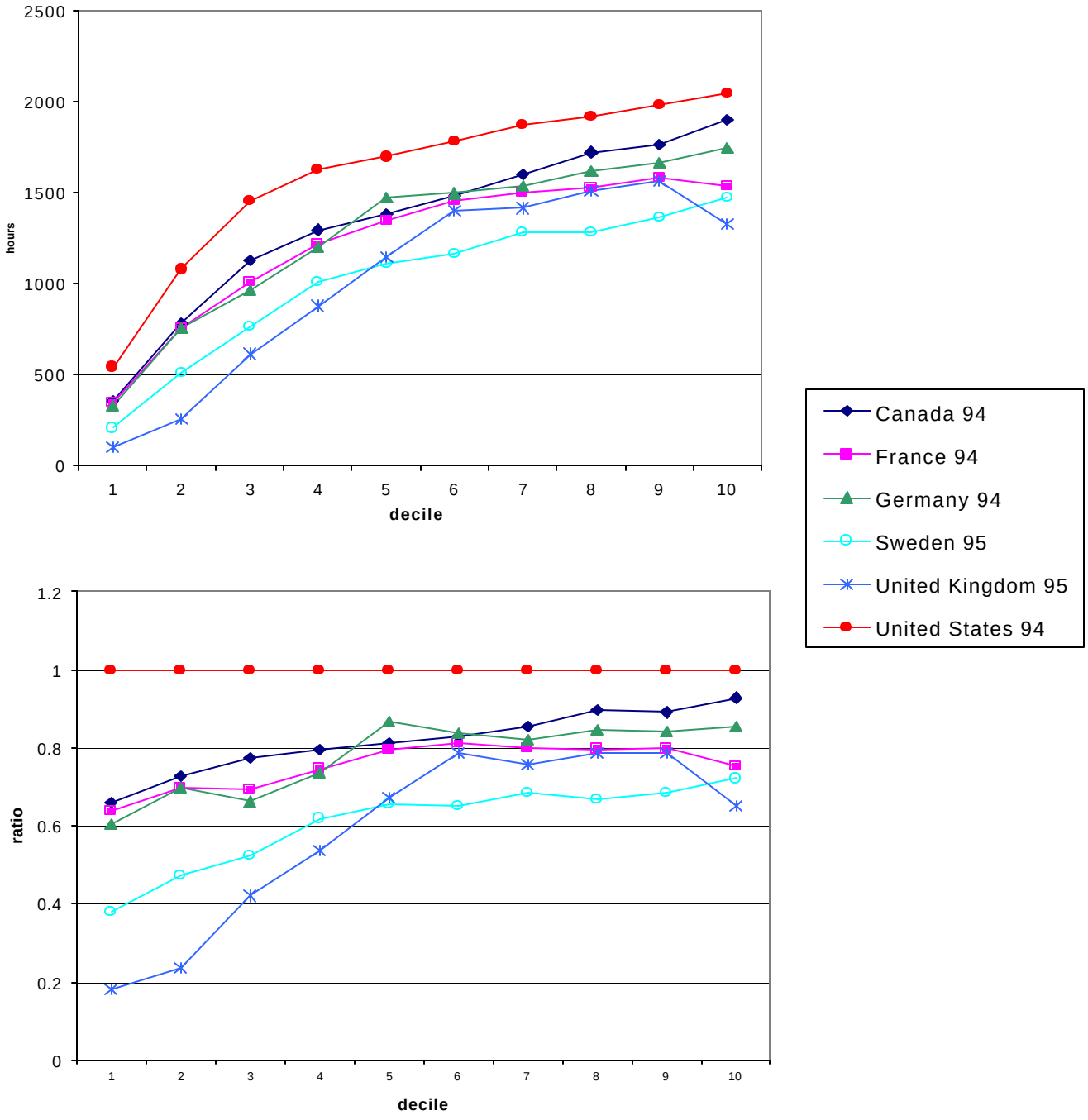
[18]Given the rhetoric surrounding "incentives" and "initiative" during the Thatcher era, this is an intriguing finding.

Figure 4
Average Working Hours per Household Adult (Head Aged 18-64*) and Mean Ratios to Canada by Decile 1994/95



note: Deciles by after-tax equivalent household income where the equivalence scale is the square root of the total number in the household.
Source: Author's calculations using the Luxembourg Income Study

Figure 4
Average Working Hours per Household Adult (Head Aged 18-64*)
and Mean Ratios to the US by Decile 1994/95



Appendix A

Measurement Issues

How many hours do people work in a given year? What methodology provides the best estimates?

To some extent, the answer depends on why one wants to know. Economists who are concerned with the study of factor productivity are interested in how many hours are worked, in total, at work sites and are uninterested in how those hours are distributed among particular workers. For this purpose, establishment based surveys may be appropriate, even if such surveys cannot reveal if the same worker has a number of simultaneous part time jobs, or how working hours are combined within households.

This paper is concerned with hours worked because it is part of the distribution of economic well being. Consequently, the aggregation of an individual's jobs into total hours and the correlation of hours within households is crucial and household based surveys are the appropriate instrument. However, as the OECD notes (2001:6), such surveys do not align exactly with administrative records in their aggregate totals. Since accurate calculation of total actual hours worked is crucial to the estimation of productivity trends, survey data is often corrected for the discrepancies - but agencies differ in their assumptions, which produces the differences in estimates embodied in Figures 1, 1A and 1B.

As the OECD also notes (2001:5) "There are six main concepts of hours of work that are retained in different sources of labour statistics: actual hours, usual hours, contractual hours, legal hours, paid hours, hours offered (by employers)." It is the first two concepts which come closest to the labour supply concept used in economics. The "actual" hours of work concept highlighted in Figures 1 and 2 differs from usual hours of work since it allows for time not worked due to public holidays, paid vacation, illness[19], etc. Using "actual" hours of work for a

[19]The Luxembourg Employment Study data contains both actual and usual weekly hours and codes as possible reasons for any discrepancy: "Person has worked more than usual due to: variable hours (e.g. flexible working hours) 2. other reasons Person has worked less than usual due to: 3. bad weather 4 slack work for technical or economic reasons 5 labour dispute 6. education or training 7. variable hours (e.g. flexible working hours) 8. own illness, injury or temporary disability 9. maternity leave 10. special leave for personal or family reasons 11. annual

given respondent in a given week in a micro data survey exposes the data to both individual sampling variability in such events as vacations and illnesses and full sample variability in such events as whether the survey was run during a week with a public holiday. As a consequence, the "usual hours" concept is commonly used in empirical work - but one must be aware that international differences in average actual hours substantially exceed international differences in average usual hours (partly because countries differ in the number of paid public holidays and in mandatory vacation time entitlements).

Both usual and actual hours measures are assessed by the direct questioning of the respondents to household surveys (such the Current Population Survey in the US, or Canada's Labour Force Survey). It is this sort of data that the Luxembourg Income Study data base records. This methodology relies on the underlying assumption that the individual respondents to household surveys can provide unbiased estimates of their working time, subject to some ambiguity about the actual reporting of unpaid interruptions in working time (e.g. lunch or coffee breaks), an unavoidable amount of random reporting error and a tendency to "spiking" at standard working hour norms (such as 35 or 40 hours per week).

In the "time-use" field, this assumption has come under attack. Zick (2002) has commented: 'time diaries provide the most cost effective way of gathering valid and reliable time-use information.. In time diary surveys, respondents are asked to record sequentially how they spend their time (primary and sometimes secondary and tertiary) over a 24-hour period, who they were with, and where activities were done. Ideally, information from at least two 24-hour periods are gathered for each respondent – one from a week day and another from a weekend day. Interviews must also be spaced over the year in order to capture any possible seasonal variations in time use. All of which means that undertaking a time diary survey is a very expensive and time-intensive proposition. As a consequence, time diary data have been infrequently gathered and researchers have often been forced to test their time-use hypotheses with less valid and reliable (but also less costly) stylized survey questions that ask respondents about usual or typical time spent in various activities. In particular, economists investigating labor supply issues often use data gathered on usual or typical hours of market work."

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holidays 12. bank holidays 13. start of/change in job during reference week 14. end of job without taking up a new

Gershuny (2000, 249-253) has noted that when respondents fill in a time use diary, their answers to the question "What did you do yesterday?" are a narrative which follows the time line through the day (e.g. "got up at 7, left the house at 8, got to work at 9, etc...."). This method has the advantages that it is the natural way people keep track of time and it necessarily imposes consistency in aggregate time use. It is then up to the researcher to calculate aggregate work or leisure hours, by summing across similar uses of time - but he argues this is likely to be more accurate than the implicit process of categorization and aggregation that goes on when respondents are asked to add up in their heads the amount of time they spend "working for pay[20]". The riposte, by defenders of the summary question methodology, is that time use diaries are typically constructed for one or two days - which imposes a sampling of days within the working week (or month) which introduces errors of its own.

How much might reporting error in paid labour supply matter? Zick (2002) comments "the few time-use reporting error studies that have been done to date suggest that data taken from stylized questions may be systematically less accurate than time-diary data and this reporting error may be related to individual and/or household characteristics that are often used as covariates in time use analyses." However, whether or not time diaries are more accurate, the core problem for researchers is the scarcity of data on working hours drawn from time use diaries, and the lack of linkage with comparable international data on the distribution of money income. Hence, this paper depends on the "stylized survey question" methodology.

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one during reference week 15. other reasons"

[20] As a check, the readers of this article might want to think how they personally would respond to the question "What is the usual number of hours per week you spend working for pay?"

Appendix Table B1
Probit Regression - The Probability of Employment[1] in the Past Twelve Months
Canada1997
Single Males and Females 18-64 Head or Spouse

	Males	Females
Intercept	-0.681** (0.271)	-2.427* (0.220)
Age	0.109* (0.014)	0.181* (0.012)
Age squared	-0.002* (0.0001)	-0.002* (0.001)
Relative education[2]	0.007* (0.001)	0.014* (0.001)
Dummy=1 if children < 18 in household	0.490** (0.221)	-0.293* (0.082)
Number of children	-0.247** (0.123)	-0.231* (0.041)
Dummy=1 if immigrant	-0.217* (0.062)	-0.278* (0.055)
Dummy=1 if disabled	-2.382* (0.116)	-2.329* (0.121)
observations	4002	5243
-2 Log Likelihood	3203.5	4575.9

* significant with 99% confidence;** significant with 95% confidence;*** significant with 90% confidence

[1] Employed is defined as those who had positive employee hours or weeks in the past twelve months or who were described as being self employed.

[2] Since education is reported differently across countries (e.g. the US reports highest level attained and the UK reports years of education), a relative measure of education is used. The population is divided into five age groups 18-24, 25-34, 35-44, 45-54, and 55-64 and ordered by education within each age cohort. Individuals are put into percentiles based on education level within each age cohort. Each individual is then assigned the average percentile for his/her education level.

Appendix Table B2
Multinomial Logit[1] - Probability of Employment[2] in the Past Twelve Months
Canada 1997-Married Males and Females

	both not working vs both working	wife working, husband not working vs both working	husband working, wife not working vs both working
Intercept	8.420* (0.653)	2.245* (0.794)	2.871* (0.372)
Age of the wife	-0.401* (0.050)	0.085 (0.060)	-0.308* (0.027)
Age of the wife squared	0.005* (0.001)	-0.001*** (0.001)	0.004* (0.0003)0
Relative education[3] of wife	-0.021* (0.002)	0.002 (0.002)	-0.017* (0.001)
Wife is an immigrant	0.455* (0.164)	0.328** (0.165)	-0.036 (0.081)
Wife is disabled	3.008* (0.292)	-1.389 (1.003)	3.376* (0.230)
Age of the husband	-0.255* (0.053)	-0.439* (0.058)	0.038 (0.029)
Age of the husband squared	0.004* (0.001)	0.006* (0.001)	-0.0004 (0.0003)
Relative education[3] of husband	-0.005* (0.002)	-0.004** (0.002)	0.001 (0.0009)
Husband is an immigrant	-0.042 (0.165)	0.151 (0.163)	0.321* (0.079)
Husband is disabled	4.589* (0.217)	5.274* (0.211)	-0.173 (0.394)
Dummy=1 if children < 18	-0.394** (0.182)	-0..521* (0.197)	0.155*** (0.080)
Number of children	0.416* (0.078)	0.235* (0.091)	0.356* (0.031)
observations	17,074		
Likelihood Ratio	19,143		

* significant with 99% confidence;** significant with 95% confidence;*** significant with 90% confidence
[1] There are four categories: 1. husband and wife have no employment; 2. the wife has employment but the husband has no employment; 3. the husband has employment but the wife does not 4. both employed
[2] Employed = employee hours >0 or weeks in past 12 months > 0 or self employed.
[3] See Note to Table 1

Appendix Table C
Ordinary Least Squares Regressions Disposable Household Income, Logged (Can 2000 $) - Coefficients Used to Estimate Equivalent Household Income for Those Who Moved into Employment- Single Households 18-64, Males and Females (standard errors in parentheses)

	United States 1997		UK 1995		Germany 1994		France 1994		Sweden 1995	
	M	f	m	f	m	f	m	f	m	f
Intercept	8.503* (0.387)	8.884* (0.232)	10.112* (0.464)	9.512* (0.534)	7.465* (0.569)	7.622* (0.499)	6.086* (0.468)	7.287* (0.276)	5.718* (0.161)	5.762* (0.145)
Dummy=1 if employed[1] in past 12 months	0.447 (0.410)	-0.819* (0.258)	-0.802 (0.630)	-0.979** (0.403)	0.410 (0.676)	0.489 (0.615)	1.600* (0.570)	0.051 (0.341)	1.050* (0.228)	0.682* (0.202)
Age	0.017 (0.018)	0.004 (0.011)	-0.062** (0.024)	-0.006 (0.013)	0.057** (0.028)	0.063** (0.025)	0.104* (0.023)	0.066* (0.014)	0.171* (0.009)	0.159* (0.008)
Age squared	0.00003 (0.0002)	0.0001 (0.0001)	0.0008* (0.0003)	0.0001 (0.0002)	-0.001*** (0.0003)	-0.0006** (0.0003)	-0.0009* (0.0003)	-0.0005* (0.0002)	-0.002* (0.0001)	-0.002* (0.0001)
Relative education[2]	0.004* (0.001)	0.0007 (0.0008)	0.0008 (0.002)	0.0004 (0.001)	0.009* (0.002)	0.003** (0.002)	0.009* (0.002)	0.003* (0.0009)	0.003* (0.0006)	0.004* (0.0006)
Dummy=1 if children < 18 present	0.220* (0.063)	0.017 (0.029)	-0.194 (0.234)	-0.170* (0.061)	0.046 (0.393)	-0.271* (0.104)	0.374 (0.249)	0.021 (0.062)	0.102 (0.187)	0.195* (0.057)
Number of children < 18	0.051 (0.034)	0.061* (0.012)	0.303** (0.127)	0.130* (0.027)	0.261 (0.324)	0.188* (0.061)	0.044 (0.162)	0.167* (0.035)	0.136 (0.122)	0.165* (0.030)
Dummy=1 if disabled	-0.225* (0.043)	-0.167* (0.030)	0.219** (0.101)	0.154** (0.063)	-0.021 (0.090)	0.134 (0.082)	-0.032 (0.090)	0.029 (0.069)	0.141 (0.159)	0.368* (0.120)
Dummy=1 if immigrant	-0.061 (0.035)	-0.065** (0.029)	na	na	-0.130 (0.096)	0.106 (0.091)	-0.019 (0.074)	-0.138* (0.053)	-0.212* (0.057)	-0.130* (0.0493)
Employed in past 12 months * age	0.026 (0.020)	0.071* (0.012)	0.093 (0.033)	0.053* (0.020)	0.023 (0.034)	-0.015 (0.031)	-0.026 (0.028)	0.023 (0.017)	-0.046* (0.013)	-0.020*** (0.011)
Employed in past 12 months * age squared	-0.0005** (0.0002)	-0.0009* (0.0001)	-0.001* (0.0004)	-0.001** (0.0002)	-0.0002 (0.0004)	0.0002 (0.0004)	0.00003 (0.0003)	-0.0004** (0.0002)	0.0005* (0.0002)	0.0002 (0.0001)
Employed in past 12 months * education	0.004* (0.001)	0.008* (0.0008)	0.002 (0.002)	0.006* (0.001)	-0.006* (0.002)	0.002 (0.002)	-0.0001 (0.002)	0.004* (0.001)	0.001 (0.001)	-0.0001 (0.0009)
Observations	6304	9120	599	1044	481	682	944	1497	2436	2039
Adjusted R^2	0.187	0.234	0.310	0.236	.0.363	0.241	0.323	0.363	0.333	0.522

[1] See footnote 1 in table 1; [2] See footnote 2 in table 1.

Appendix Table C1
Ordinary Least Squares Regressions Disposable Household Income, Logged (Can 2000 $) - Coefficients Used to Estimate Equivalent Household Income for Those Who Moved into Employment
Males and Females 18-64,Married Couple Households
United States, 1997

	both working	male employed, female not employed	female employed, male not employed	both not employed
Intercept	8.491* (0.062)	8.295* (0.162)	8.325* (0.361)	7.328* (0.839)
Husband's age	0.040* (0.005)	0.023*** (0.012)	0.005 (0.022)	-0.024 (0.046)
Husband's age squared	-0.0004* (0..0001)	-0.0002 (0.0001)	0.0001 (0.0002)	0.0002 (0.0005)
Wife's age	0.050* (0.005)	0.049* (0.011)	0.048** (0.021)	0.079*** (0.047)
Wife's age squared	-0.0005* (0.0001)	-0.0005* (0.0001)	-0.0005** (0.0002)	-0.0005 (0.0005)
Relative education[2] of husband	0.005* (0.0002)	0.008* (0.0005)	0.006* (0.0009)	0.007* (0.002)
Relative education[2] of wife	0.004* (0.0002)	0.004* (0.0005)	0.005* (0.001)	0.001 (0.002)
Dummy=1 if children < 18 present	0.029** (0.013)	0.102* (0.036)	0.091 (0.069)	0.081 (0.146)
Number of children < 18	-0.006 (0.006)	0.036* (0.012)	0.037 (0.027)	0.068 (0.052)
Dummy=1 if husband disabled	-0.169* (0.025)	-0.457* (0.068)	0.183* (0.044)	0.237* (0.093)
Dummy=1 if wife disabled	-0.180* (0.024)	-0.098* (0.033)	-0.213** (0.108)	-0.014 (0.096)
Dummy=1 if husband is an immigrant	-0.007 (0.017)	-0.091** (0.042)	-0.104 (0.102)	-0.068 (0.205)
Dummy=1 if wife is an immigrant	-0.079* (0.017)	-0.082** (0.041)	-0.010 (0.099)	-0.187 (0.192)
Observations	16,305	4690	962	683
Adjusted R^2	0.264	0.265	0.233	0.125

*significant with 99% confidence; **significant with 95% confidence; ***significant with 90% confidence
[1] see footnote 1 in table 1; [2] see footnote 2 in table 1

Appendix Table C2
Ordinary Least Squares Regressions Disposable Household Income, Logged (Can 2000 $) - Coefficients Used to Estimate Equivalent Household Income for Those Who Moved into Employment
Males and Females 18-64,Married Couple Households
United Kingdom, 1995

	both working	male employed, female not employed	female employed, male not employed	both not employed
Intercept	8.253*	7.792*	8.651*	9.322*
	(0.172)	(0.340)	(0.598)	(0.726)
Husband's age	0.039*	0.068*	-0.053	-0.003
	(0.012)	(0.026)	(0.048)	(0.044)
Husband's age squared	-0.0004*	-0.001**	0.0007	0.0003
	(0.0001)	(0.0003)	(0.0005)	(0.0005)
Wife's age	0.065*	0.038	0.084***	-0.023
	(0.013)	(0.025)	(0.047)	(0.039)
Wife's age squared	-0.001*	-0.0004	-0.001***	0.0003
	(0.0002)	(0.0003)	(0.0005)	(0.0004)
Relative education[2] of husband	0.004*	0.005*	0.001	0.003
	(0.0004)	(0.0009)	(0.002)	(0.002)
Relative education[2] of wife	0.004*	0.003*	0.005*	-0.0007
	(0.0004)	(0.001)	(0.002)	(0.002)
Dummy=1 if children < 18 present	-0.038	-0.126	0.045	-0.427**
	(0.038)	(0.084)	(0.158)	(0.171)
Number of children < 18	-0.028	0.032	-0.047	0.202*
	(0.018)	(0.028)	(0.074)	(0.052)
Dummy=1 if husband disabled	0.433*	-0.067	0.512*	0.361*
	(0.152)	(0.359)	(0.087)	(0.103)
Dummy=1 if wife disabled	-0.001	0.161**	0.820	0.356*
	(0.168)	(0.077)	(0.610)	(0.129)
Observations	1856	760	263	427
Adjusted R^2	0.189	0.129	0.217	0.144

*significant with 99% confidence; **significant with 95% confidence; ***significant with 90% confidence
[1] see footnote 1 in table 1; [2] see footnote 2 in table 1

Appendix Table C3
Ordinary Least Squares Regressions Disposable Household Income, Logged (Can 2000 $) - Coefficients Used to Estimate Equivalent Household Income for Those Who Moved into Employment
Males and Females 18-64,Married Couple Households
Germany 1994

	both working	male employed, female not employed	female employed, male not employed	both not employed
Intercept	8.452* (0.151)	8.011* (0.245)	8.950* (0.429)	8.054* (0.699)
Husband's age	0.061* (0.011)	0.057* (0.018)	-0.038 (0.032)	0.019 (0.043)
Husband's age squared	-0.001* (0.0001)	-0.0005** (0.0002)	0.0005 (0.0003)	-0.0002 (0.0004)
Wife's age	0.031* (0.011)	0.027*** (0.016)	0.080* (0.030)	0.044 (0.039)
Wife's age squared	-0.0004* (0.0001)	-0.0004** (0.0002)	-0.0009* (0.0003)	-0.0004 (0.0003)
Relative education[2] of husband	0.003* (0.0003)	0.005* (0.0006)	0.003** (0.001)	0.014 (0.001)
Relative education[2] of wife	0.001*** (0.0003)	0.001*** (0.0006)	0.002** (0.001)	-0.002 (0.002)
Dummy=1 if children < 18 present	-0.027 (0.030)	-0.036 (0.051)	0.002 (0.119)	-0.406** (0.161)
Number of children < 18	-0.024 (0.016)	0.060* (0.017)	0.063 (0.063)	0.248* (0.078)
Dummy=1 if husband disabled	-0.046 (0.034)	-0.028 (0.049)	0.198* (0.057)	-0.068 (0.074)
Dummy=1 if wife disabled	0.016 (0.046)	0.057 (0.046)	0.017 (0.073)	0.349* (0.098)
Dummy=1 if husband is an immigrant	-0.020 (0.083)	0.042 (0.161)	-0.023 (0.402)	0.117 (0.873)
Dummy=1 if wife is an immigrant	-0.050 (0.083)	-0.007 (0.163)	-0.035 (0.410)	-0.398 (0.873)
Observations	2129	969	208	232
Adjusted R^2	0.183	0.240	0.205	0.221

*significant with 99% confidence; **significant with 95% confidence; ***significant with 90% confidence
[1] see footnote 1 in table 1;[2] see footnote 2 in table 1

Appendix Table C4
Ordinary Least Squares Regressions Disposable Household Income, Logged (Can 2000 $) - Coefficients Used to Estimate Equivalent Household Income for Those Who Moved into Employment
Males and Females 18-64,Married Couple Households
France 1994

	both working	male employed, female not employed	female employed, male not employed	both not employed
Intercept	8.298*	7.949*	7.711*	6.531*
	(0.109)	(0.199)	(0.404)	(0.398)
Husband's age	0.047*	0.047*	0.026	0.059**
	(0.008)	(0.015)	(0.027)	(0.025)
Husband's age squared	-0.0006*	-0.0005*	-0.0003	-0.0006**
	(0.0001)	(0.0002)	(0.0003)	(0.0003)
Wife's age	0.036*	0.027**	0.058**	0.063*
	(0.008)	(0.013)	(0.027)	(0.023)
Wife's age squared	-0.0003*	-0.0002	-0.0006***	-0.0006**
	(0.0001)	(0.0002)	(0.0003)	(0.0002)
Relative education[2] of husband	0.005*	0.006*	0.005*	0.004*
	(0.0003)	(0.0005)	(0.001)	(0.0009)
Relative education[2] of wife	0.004*	0.003*	0.005*	0.007*
	(0.0003)	(0.0005)	(0.001)	(0.001)
Dummy=1 if children < 18 present	-0.038***	0.034	-0.034	0.151***
	(0.022)	(0.041)	(0.106)	(0.092)
Number of children < 18	0.055*	0.098*	0.121**	0.077**
	(0.011)	(0.014)	(0.049)	(0.031)
Dummy=1 if husband disabled	0.023	-0.021	-0.090	0.045
	(0.037)	(0.063)	(0.081)	(0.061)
Dummy=1 if wife disabled	0.054	0.010	-0.113	0.076
	(0.079)	(0.077)	(0.159)	(0.084)
Dummy=1 if husband is an immigrant	-0.029	0.087***	-0.153	-0.038
	(0.028)	(0.051)	(0.096)	(0.097)
Dummy=1 if wife is an immigrant	-0.014	-0.160*	0.074	-0.026
	(0.029)	(0.049)	(0.097)	(0.097)
Observations	3544	1668	342	542
Adjusted R^2	0.337	0.277	0.345	0.310

*significant with 99% confidence; **significant with 95% confidence; ***significant with 90% confidence
[1] see footnote 1 in table 1;[2] see footnote 2 in table 1

Appendix Table C5
Ordinary Least Squares Regressions Disposable Household Income, Logged (Can 2000 $) - Coefficients Used to Estimate Equivalent Household Income for Those Who Moved into Employment
Males and Females 18-64,Married Couple Households
Sweden 1995

	both working	male employed, female not employed	female employed, male not employed	both not employed
Intercept	8.937* (0.067)	9.503* (0.254)	8.895* (0.203)	8.643* (0.196)
Husband's age	0.027* (0.005)	-0.017 (0.019)	0.004 (0.018)	0.029** (0.014)
Husband's age squared	-0.0003* (0.00006)	0.0002 (0.0002)	-0.00002 (0.0002)	-0.0004** (0.0002)
Wife's age	0.030* (0.005)	0.037** (0.018)	0.039** (0.018)	0.038* (0.013)
Wife's age squared	-0.0003* (0.00006)	-0.0003 (0.0002)	-0.0004*** (0.0002)	-0.0003** (0.0001)
Relative education[2] of husband	0.003* (0.0002)	0.002* (0.0007)	0.002* (0.0005)	0.003* (0.0004)
Relative education[2] of wife	0.002* (0.0002)	0.0006 (0.0008)	0.001*** (0.0006)	0.001* (0.0005)
Dummy=1 if children < 18 present	0.003 (0.015)	0.059 (0.064)	0.127** (0.060)	-0.003 (0.043)
Number of children < 18	0.034* (0.007)	0.082* (0.030)	0.052** (0.026)	0.078* (0.018)
Dummy=1 if husband disabled	0.025 (0.079)	0.077 (0.240)	0.125 (0.111)	0.064 (0.177)
Dummy=1 if wife disabled	0.108 (0.117)	0.186 (0.127)	0.463*** (0.261)	0.028 (0.111)
Dummy=1 if husband is an immigrant	0.002 (0.026)	0.270* (0.082)	-0.179* (0.057)	-0.078*** (0.046)
Dummy=1 if wife is an immigrant	-0.068* (0.026)	-0.138** (0.067)	-0.009 (0.057)	-0.308* (0.044)
Observations	4944	648	360	1114
Adjusted R^2	0.205	0.112	0.331	0.217

*significant with 99% confidence; **significant with 95% confidence; ***significant with 90% confidence
[1] see footnote 1 in table 1;[2] see footnote 2 in table 1

Appendix Table D1
Decomposition of Difference in Average Actual Hours Worked OECD Data
(Canada 1996 - other countries)

	average actual hours per employee	monthly average employment rate	average actual hours per working age[1] person	difference in actual hours per working age person	employment rate difference * own country's hours/employee	hours/employee difference * Can employment rate
Canada 1996	1784	59.1	1054	--	--	--
US 1997	1849	63.8	1180	-125	-87	-38
UK 1997	1595	58.5	933	121	10	112
Germany 1997	1506	51.6	777	277	113	164
France 1997	1605	48.8	783	271	165	106
Sweden 1997	1624	56.9	924	130	36	95

[1] Working age population in the BLS data is 16 and over for the US and the UK. For Sweden the lower limit is 16 but there is an upper limit of 64 years. For Canada and France, the population is 15 and older and in Germany it is 14 and older.

Sources - hours: OECD (2001) "Activities of the Working Party on Employment and Unemployment Statistics - Estimates of Annual Hours Actually Worked in OECD Countries" Paris.

- employment rates: US Bureau of Labour Statistics (2002) "Comparative Civilian Labor Force Statistics Ten Countries" ftp://ftp.bls.gov/pub/special.requests/ForeignLabor/flslforc.txt

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