Understanding Growth and Inequality Trends:

The Role of Labour Supply in the U.S.A. and Germany

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Abstract

Within the OECD, there are significant differences in the trend and level of average work hours. [For example, from 1980 to 2000, average 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]. Since these trends appear to be continuing (Merz, 2000) growth in per capita GDP may be a poor indicator of trends in average economic well-being. To the extent that rising inequality in money income is driven by changes in the distribution of working hours, trends in money income inequality may misrepresent trends in the inequality of economic well-being.

Recently Bell and Freeman (2000) have argued that greater inequality in the USA provides the incentive that motivates greater work effort by Americans. However, changes in working hours, and differentials in working hours across countries, have been quite concentrated in particular demographic groups and largely arise from differences in labour force participation. [For example, the paid working hours of women in the USA have risen significantly, while German men aged 55 to 64 have reduced their labour force participation.] Except for the extreme lower tail, the distribution of working hours of prime age males is essentially identical and constant in Germany and the US. - which implies that the greater inequality of earnings in the USA has no noticeable incentive effect on the labour supply of workers.

1. Introduction

Why might labour supply matter for inequality and growth?

One reason is the interpretation of "inequality" and "growth". Typically, discussions of the relationship between inequality and growth rely on measures of inequality of money incomes and of the rate of growth of per capita Gross Domestic Product. Both measures completely ignore the level and inequality of working time, and the utility which individuals derive from non-working time. If cross-country differentials in the rate of growth of per capita GDP reflect only differences in the trend of labour supply across countries, it is unclear whether high income countries should be counted as being better off or just harder working. Similarly, if changes in the inequality of money income reflect primarily shifts in the distribution of hours worked, it is unclear how inequality in money incomes corresponds with inequality in utility or well-being.

A second set of reasons concern possible causal links between inequality, growth and working hours. Economists have long emphasized the importance for behavior of financial incentives, and it is clear that absolute equality in money income would imply zero financial incentive for greater (or any) labour supply and fairly dramatic impacts on economic growth. However, as Dalton (1935:21) recognized long ago "The rejection of crude egalitarianism does not take us far, though there are some who seem to think that, when they have disposed of the argument for absolute equality, they have disposed also of all arguments for reducing existing inequalities." Absolute equality may not be attainable, and in any case real world societies certainly are nowhere near it. Hence, the more important issue is the relationship between the degree of inequality observed in modern economies and differences in labour supply behavior and economic growth across countries, within the observed range of actual variation.

How might inequality matter affect labour supply, or vice versa ? The econometric literature on the wage elasticity of labour supply typically concludes that the effect of hourly wage differentials on annual hours of work is rather small (e.g. Osberg and Phipps 1993; Heckman, 1993). Recently, however, Bell and Freeman (1994, 2001) have argued that the current wage is an incomplete indicator of the incentives to labour supply since greater current work effort may have an impact on the probability of future promotion. They contend that the inequality of wages is a good measure of the returns to such advancement. In particular, they argue that it is the greater incentives of a more unequal U.S. labour market that explains why Americans "typically" work more hours than Germans. Since each person's annual earnings are the product of hourly wages and annual hours of work, wage inequality and inequality in labour supply may therefore interact in determining the inequality of earnings.

If greater inequality in hourly wages motivates more work effort, it may be seen as a necessary (if perhaps somewhat unfortunate) cost of faster growth of money incomes. [However, economic well-being grows at a slower rate, since individuals now enjoy less leisure.] Still, a prior question is whether there are significant differences across countries in labour supply, and how they might arise. Section 2.1 therefore begins with a presentation of aggregate data on the trend in work hours in a selection of OECD countries and discusses implications for the analysis of growth and inequality. Section 2.2 uses micro data from Germany and the US to illustrate the importance of looking beneath macro-economic aggregates. Section 3 illustrates the importance of working hours for the perception of inequality and growth by contrasting calculations of the rate of growth and the level of inequality in money income and in income standardized for labour supply. Section 4 is a conclusion.

2. What needs to be explained ?

2.1 Aggregate Trends

Figure 1 presents data[1] on the trend, from 1980 to 2000 in the average annual actual hours of paid work of all adults aged 15 to 64 in a selection of OECD countries (Canada, France, Germany, Sweden, United Kingdom and United States[2]). It is noteworthy that although all these countries began with actual hours of paid work clustered in a fairly narrow interval in 1980, by 2000 the differential in hours of paid work was quite dramatic. In 2000 the average actual hours of paid work per working age adult in Germany was 973 and in France 957, compared to 1476 in the USA. This difference amounts to 9.7 hours of work per adult per week for Germany and 9.9 for France.

This paper will argue that one should not think of this difference in average hours as arising evenly (e.g. because all Americans work an extra day a week compared to all Germans) - rather it is more accurate to think of different societies as having quite different patterns of labour force participation. However, it is still true that over the life cycle European households have many more hours of non-working time available - and these differences are surely large enough to create significant differences in quality of life.

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, do the trends in actual working time observed in Figure 1 just

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[1]The ILO KILM data base provides a measure of the aggregate number of hours actually worked per employed person (by subtracting paid vacation days and holidays from usual total paid hours). This "hours actually worked" concept is not always available - data from the US Current Population Survey and Luxembourg Income Study cited below use the concept of 'annual hours of paid employment" which is based on weeks of employment and "usual weekly hours" of paid employment.

[2]The selection of countries is dictated by the availability of the work hours variable in the Luxembourg Income Study micro data which is used in the remainder of the paper.

indicate that European labour markets were not able to generate enough jobs ? To examine this, 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.

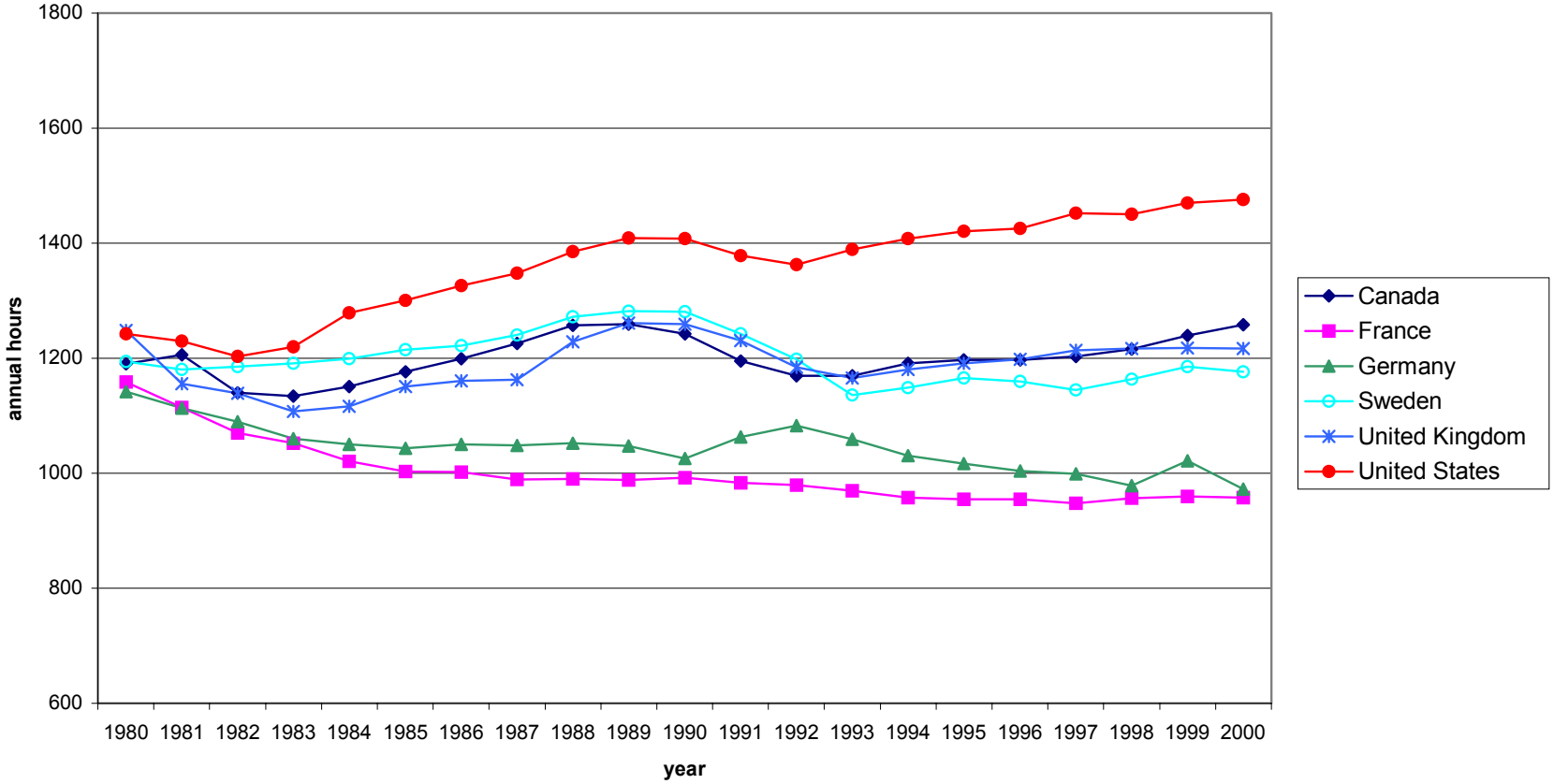
Both Figures 1 and 2 are derived from ILO data on average actual hours of work per person employed, and average employment/population ratios. This has the advantage of enabling consistent and complete time series to be calculated. However, using aggregate time series data has the disadvantage that one cannot group individuals into households or examine differential labour supply trends at different points in the distribution of earnings or hours. These issues are important, since working hours differences may be quite concentrated and it is arguable that time pressures are experienced most acutely at the household level, when all family members feel over burdened. Furthermore, if increased working hours were solely an upper income phenomenon, the affected households could presumably purchase labour saving alternatives to household production.

Figure 3 uses Luxembourg Income Study micro data to calculate the average, across households, of usual paid working hours per adult in each household[3]. The disadvantage of using the "usual hours" concept is that paid holidays and vacations are not distinguished from working hours, but the advantage of using micro data is that one can examine labour supply at the household level.

[3]Exact definitions of all LIS variables can be found at http://lisweb.ceps.lu/techdoc/variabdef.htm

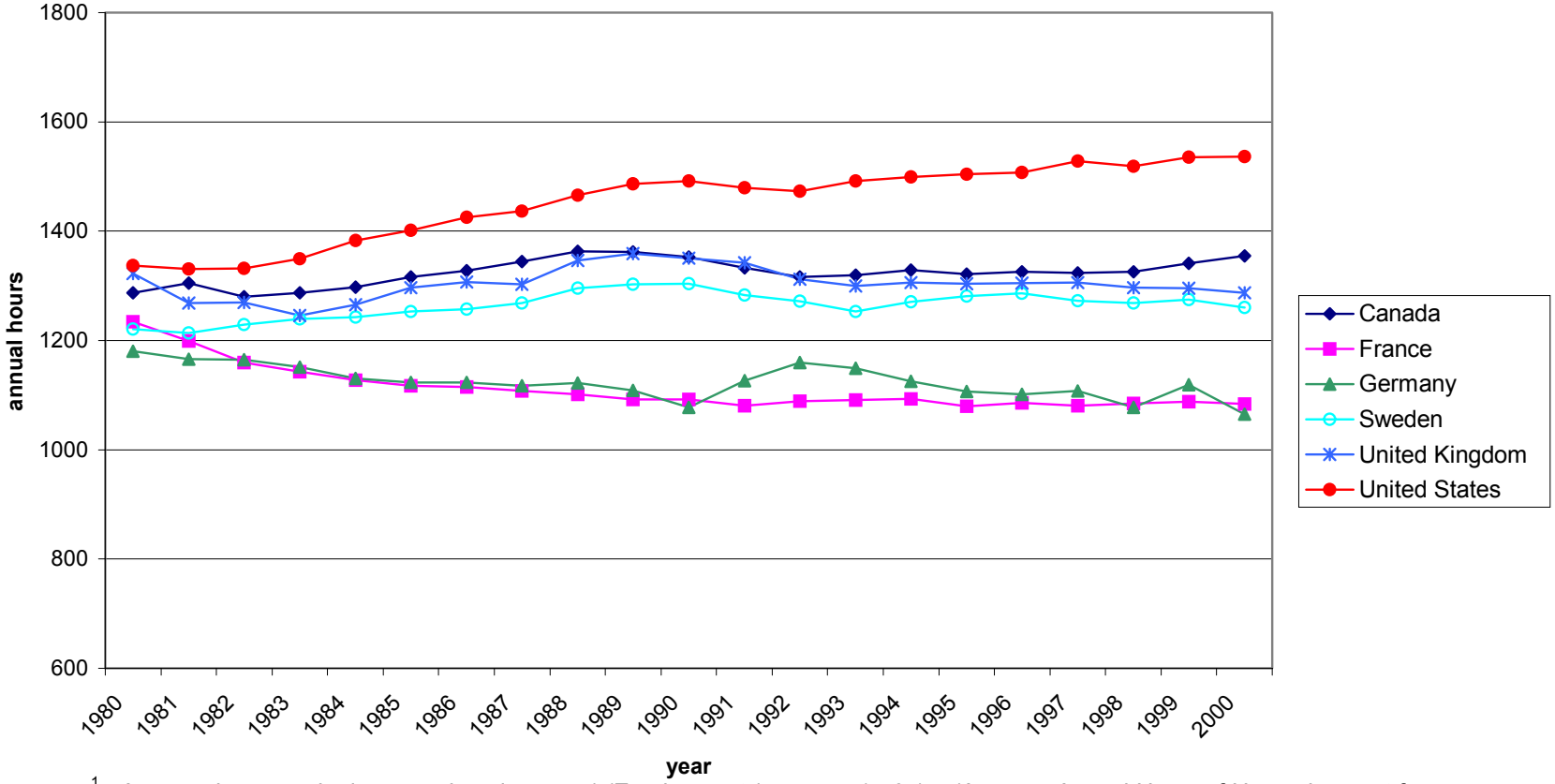
Average paid working hours per household adult may also provide a better indication of "time crunch" than average working hours per worker, since within families adults can share household chores to some degree, and balance off hours of paid work and unpaid household labour.

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 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".

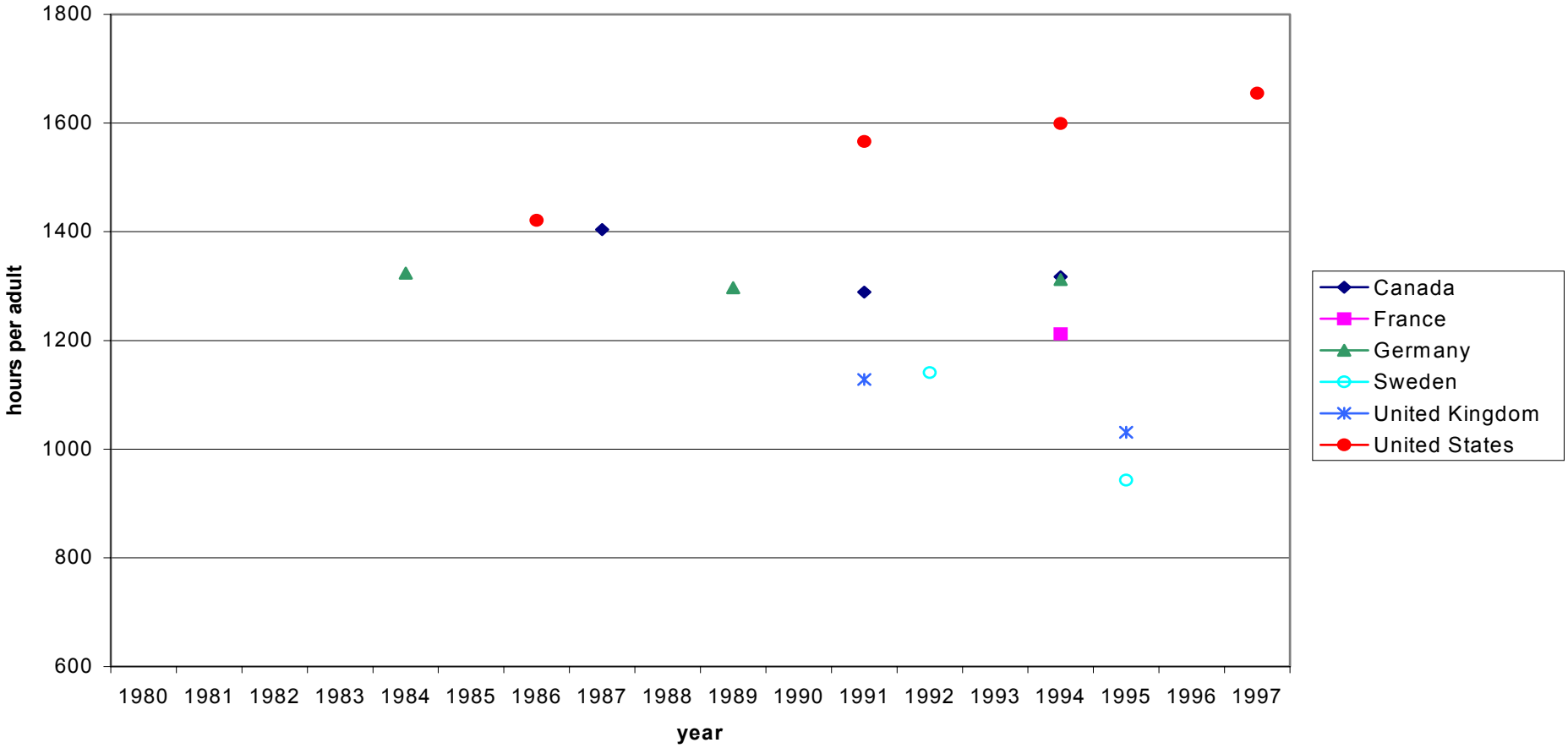
Since the LIS data uses a different hours concept and a somewhat different age categorization than the OECD data, the work hour totals are not strictly comparable, and the occasional nature of LIS data makes it more difficult to discern trends - but there does seem to be a fairly clear difference between labour supply trends (on a "per household adult" basis - i.e. household head plus spouse, if any) in the USA and elsewhere.

The LIS data do not, however, fit well with the hypothesis that these international differences can be explained by greater incentives to additional labour supply provided by greater inequality in the USA. Figure 4 examines working hours per household adult at different points in the distribution of income in 1994-95. Within countries, individuals are ordered by their equivalent[4] 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 is expressed as a fraction of the corresponding US 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[5]), there is a clear tendency for work hours to be higher in higher deciles of the income distribution- both absolutely and relative to the US. 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.

[4]Equivalent income is calculated using the LIS scale - i.e. Equivalent Income = Household Income divided by the square root of the number of people in the household.

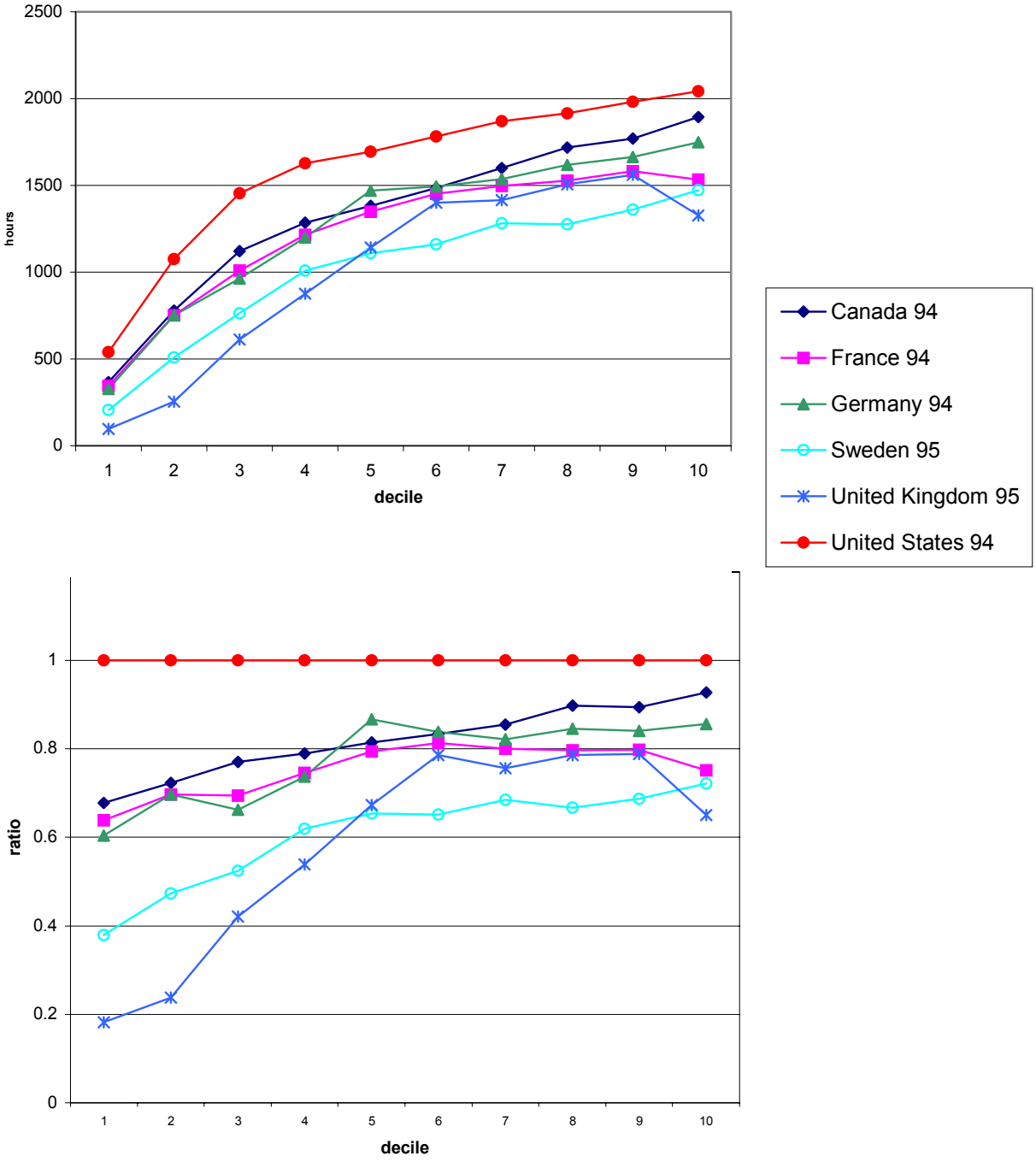
[5]Given the rhetoric surrounding "incentives" and "initiative" during the Thatcher era, this is an intriguing finding.

Figure 3
Average Working Hours per Adult in Household *
Head of Household Aged 18-64



* Average of head and spouse (if present) only.
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



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

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 relative poverty than in other countries. Cross country comparisons of inequality in money alone would be magnified if inequality in time and money were to be considered.

Thus far, the picture is one of "harder working Americans", but some disagree. Kirkland (2000) found that average weekly hours of American employees fell by 11% from 1964 to 1999. However, as she points out, in an establishment based survey (such as Current Employment Statistics) "a person working two part-time jobs of 20 hours a week is counted as having two 20 hour jobs, but in the Current Population Survey, the same individual is counted as one worker working 40 hours" (2000, 26). The growing number of part time jobs, particularly in retail trade and services, can mean that average weekly hours *of employees per job* fall, even as average weekly hours *per worker* rise.

A growing proportion of the population over 65 will affect the calculation of working hours *per person* (which might be thought of as an approximation to lifetime labour supply). There has been a steady decline in the percentage of those over 65 who are in the labour force, and in consequence working hours among seniors have declined. Averaging the market work of the elderly and non-elderly, McGrattan and Rogerson argue that "the number of weekly hours of market work per person in the United States has been roughly constant since World War II". (1998:02). However, this statement is entirely consistent with Figure 1, which indicates increased working hours among Americans *of working age.*

Thus far, this paper has considered trends in average working hours for the working age

population as a whole, and has not disaggregated by age group or gender. This mode of data presentation lends itself easily to generalizations such as Bell and Freeman's provocative 1994 summary: "All told, the impression ...is that American workers are more "into" work than are Germans and other European workers. In the same vein, Germans seem to be less into work than their European and U.S. counterparts. The puzzle is why large differences in actual hours worked have failed to quell American workaholicism and a German love of leisure". (1994: 14)

In more recent work, Bell and Freeman argue that "the difference in wage inequality between the US and Germany is a major factor underlying the difference in hours worked between countries" (2001:183). They contend that the return to work hours is not just the current wage, but also any change in future probability of promotion or higher wage - i.e. the derivative of the lifetime income stream with respect to greater hours/effort. In their work, "The key operating assumption linking work hours to inequality is the notion that pay inequality provides a good indicator of that derivative." (2001:188). Their results indicate that an individual who increases work hours by 10% can expect a 1% increase in future wages, which "suggests that working an extra hour pays off as much or more than an extra hour of schooling"(2001:198)[6].

The Bell and Freeman papers thus draw an explicit link between wage inequality and international differences in average hours worked, arguing that greater inequality signals an incentive system that elicits greater work effort. Although the incentive/tournament models they

[6]In itself, this would be a remarkable finding, since it implies that is hard to understand why people stay in school. Taken at face value, these results imply that quitting college for a full time job produces very high returns - both an immediate income and a marginal return for overtime hours equal to the current money overtime wage plus an hourly value in future wages of greater promotion probability which "pays off as much or more than" the hourly benefits of continued college attendance.

discuss may not produce a socially optimal mix of work and leisure[7], they do at least produce more GDP.

2.2 Disaggregated Trends

However, hours of work per year are the product of weekly hours of work and the number of weeks worked. Aggregate hours can therefore change because more (or fewer) individuals enter the labour market in the course of a year, or because those already employed work more (fewer) hours per week. [The influence of labour force participation decisions is often called the "extensive" margin of labour supply, while changes in working hours of those already employed can be thought of as the "intensive" margin.] Average hours of work can also change either because people of a given age work more (fewer) hours or because the population share of age groups changes. Since any number of shifts in the distribution of work hours may produce the same change in average hours, it is useful to represent graphically changes in the entire distribution of working hours.

To illustrate the importance of work hours differences at different points in the distribution, this paper concentrates on a comparison of Germany and the USA. Figures 5 to 9 are therefore drawn to indicate the changes in the distribution of working hours in both Germany and the US which arise from both changes in the frequency of non-participation and from the changing work hours of participants. In them, the population is ranked by number of hours of work, and the difference between plots of hours worked indicates which part of the distribution of hours is

[7]In a tournament, or "rat-race", model of internal labour markets, each worker's decision to increase labour supply has an externality for other workers in reducing other workers' probability of promotion. As workers compete against each other for relative position, there is no presumption that their aggregate utility will be maximized - indeed, for any given final equilibrium of hours worked, all workers would be better off if they could sign an enforceable agreement for everyone to reduce work hours by x hours.

responsible for differences in average hours.

In order to look at long term trends in hours of work, we use Current Population Survey micro data tapes for the US from 1979 and 1998. However, since the best micro data available to us at the time of writing was the Luxembourg Income Study data on Germany for 1984 and 1994, a shorter time span of data is presented for Germany[8].

Figures 5 plots the usual hours of paid work per year in Germany and the US for all adults aged 18 to 64[9]. It is notable that the top half of the hours distribution is much the same, in both time periods and in both Germany and the USA - a fact that should produce considerable scepticism about the "incentives" story, given the substantial difference in after tax wage differentials. The main event is the difference in labour market participation rates. In Germany, substantially more people have no paid work, and the fraction jobless has increased marginally over time. In the USA, the percentage of working age adults who did some paid work was 15.4 percentage points greater than in Germany in 1984 and 18 points greater in 1994 - a substantial and widening difference (see Appendix Table A1).

Looking separately at men and women further isolates the changes in these two labour markets. Figure 6[10] indicates that the distribution of paid working hours for males 18 to 64 in the

[8]In order to maintain comparability over time, the 1994 data presented in this paper refer only to the states comprising the former West Germany. In practice, however, this makes little difference.

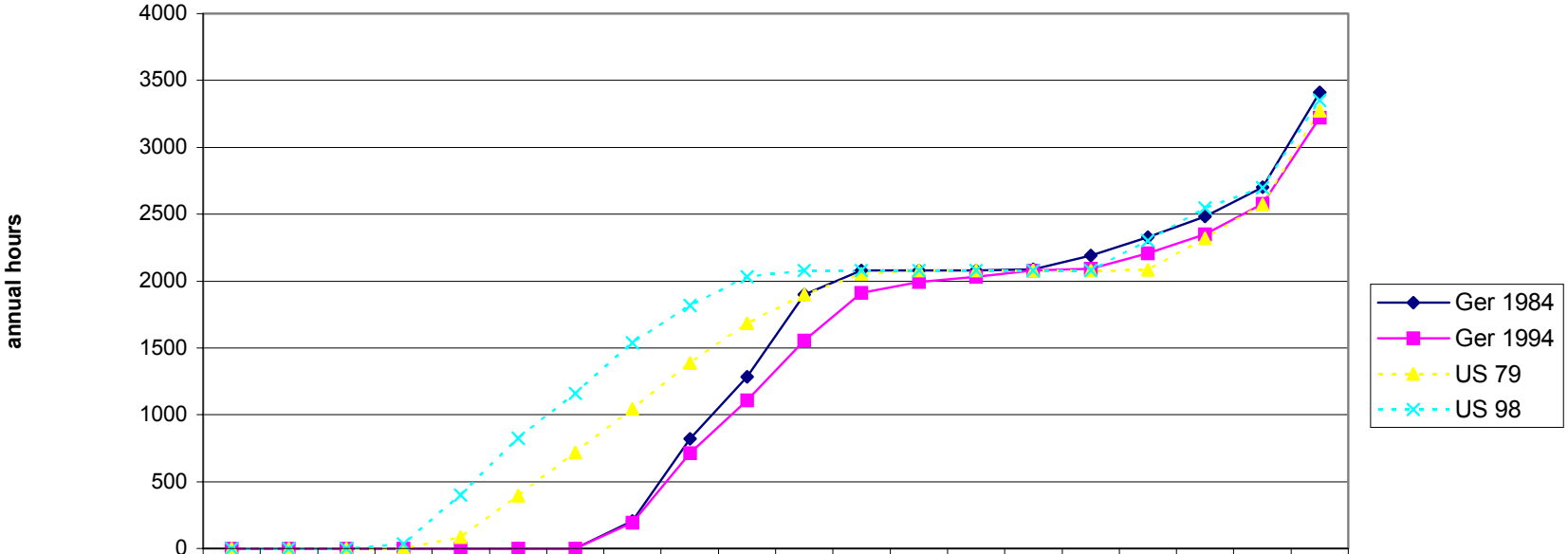
[9]Because they are based on the "usual hours" concept, Figures 5 to 10 do not reflect the greater length of paid vacations and more frequent paid holidays of German workers. Using data from 1990, Bell and Freeman (1994:4) argue that: "Differences in weeks of vacation and holiday time translate into 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." However, there is no evidence of a *trend* in vacation and holiday entitlements large enough to explain Figure 1. Cross country differences in common entitlements to vacations and holidays also cannot explain the individual choice of work hours that the "incentives" argument relies on.

[10]To save space, only the usual annual hours data are presented - weekly data tell the same story and are available on request from the author.

USA was essentially constant in 1979 and 1998, but the working hours distribution of German males shifted down by about five percentage points. Figure 7 shows how much more American women, increased their paid working hours - to a far greater degree than German women.

The picture for men becomes even clearer if one looks separately at men aged 25 to 54 and 55 to 64. Figure 8 illustrates how among men aged 25 to 54, the top three quarters of the hours distribution is essentially the same, and essentially constant, in both countries. The USA has a higher labour force participation rate among prime age males, but it is likely that social assistance regulations are a better explanation for that than wage differentials.

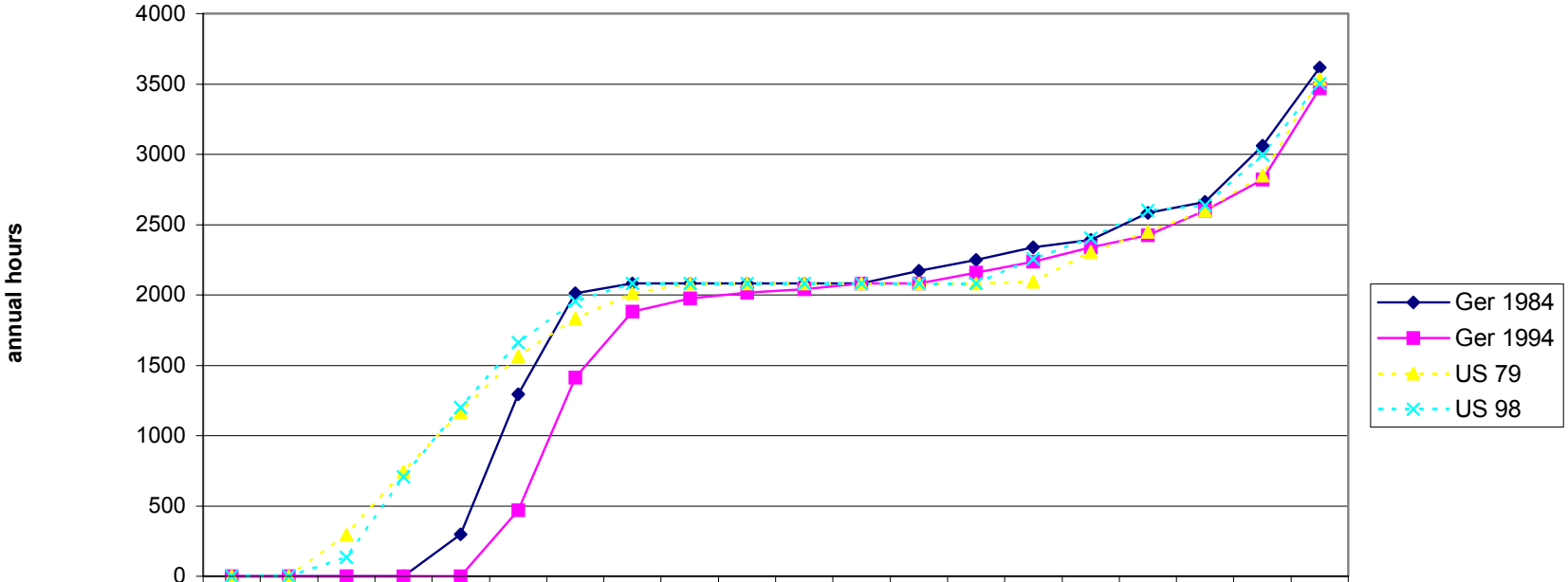
Figure 5
Usual Annual Paid Hours by Vingtile
Germany and the United States
All Adults 18-64



vingtile	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ger 1984	0	0	0	0	0	0	0	205	819	1285	1901	2080	2080	2080	2088	2192	2329	2483	2701	3409
Ger 1994	0	0	0	0	0	0	0	193	715	1109	1555	1912	1995	2031	2080	2094	2207	2350	2577	3223
US 79	0	0	0	0	88	396	716	1046	1389	1683	1899	2052	2080	2080	2080	2080	2082	2320	2575	3275
US 98	0	0	0	36	398	826	1158	1538	1816	2034	2080	2080	2080	2080	2080	2080	2303	2548	2696	3351

note: Vingtiles divide the population, ordered by annual hours of work, into twenty equal groups. Data points plot the average hours of work of each vingtile.
Source: Author's calculations using the Luxembourg Income Study (Germany) and the Current Population Survey (US).

Figure 6
Usual Annual Paid Hours by Vingtile
Germany and the United States
All Males 18-64

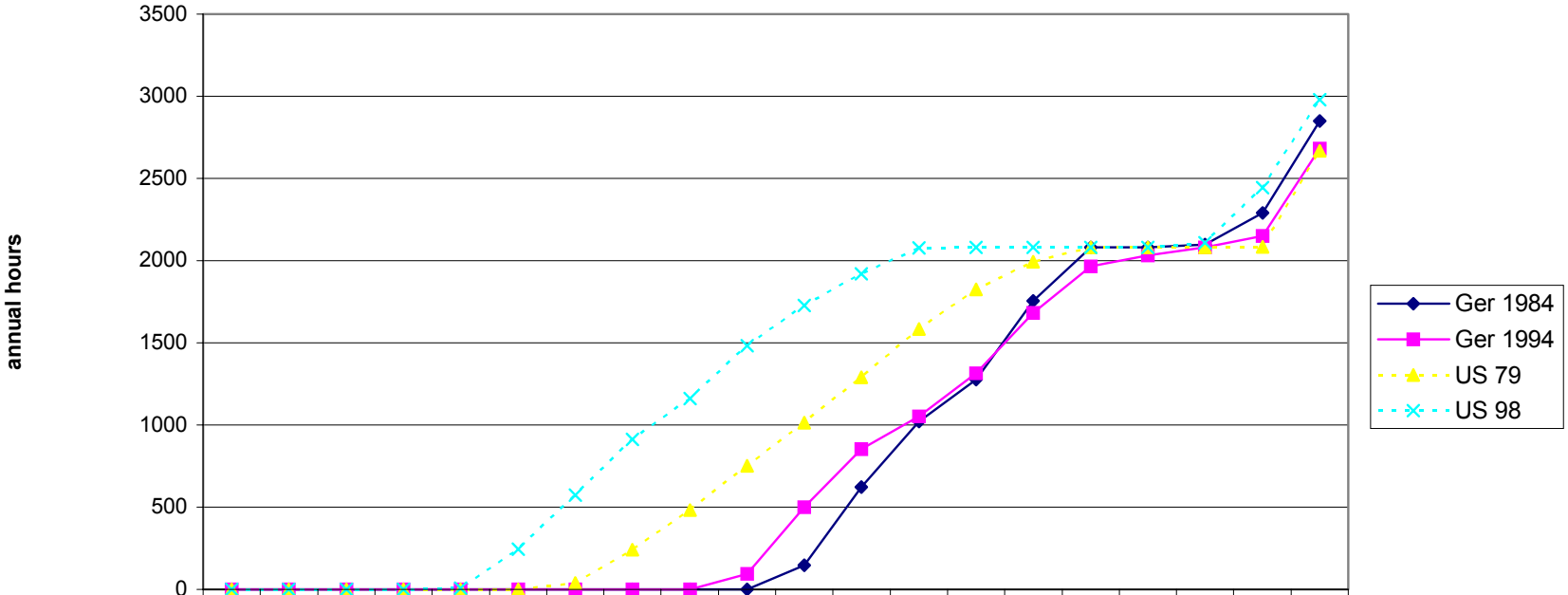


	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ger 1984	0	0	0	0	296	1294	2012	2080	2080	2080	2080	2082	2171	2248	2340	2391	2584	2661	3063	3616
Ger 1994	0	0	0	0	0	470	1414	1882	1975	2017	2039	2080	2082	2161	2236	2340	2424	2600	2819	3468
US 79	0	0	293	742	1168	1562	1831	2013	2080	2080	2080	2080	2080	2080	2092	2305	2449	2600	2849	3535
US 98	0	0	136	707	1199	1662	1954	2080	2080	2080	2080	2080	2080	2080	2256	2405	2600	2637	2995	3501

vingtile

note: Vingtiles divide the population, ordered by annual hours of work, into twenty equal groups. Data points plot the average hours of work of each vingtile.
Source: Author's calculations using the Luxembourg Income Study (Germany) and the Current Population Survey (US).

Figure 7
Usual Annual Paid Hours by Vingtile
Germany and the United States
All Females 18-64

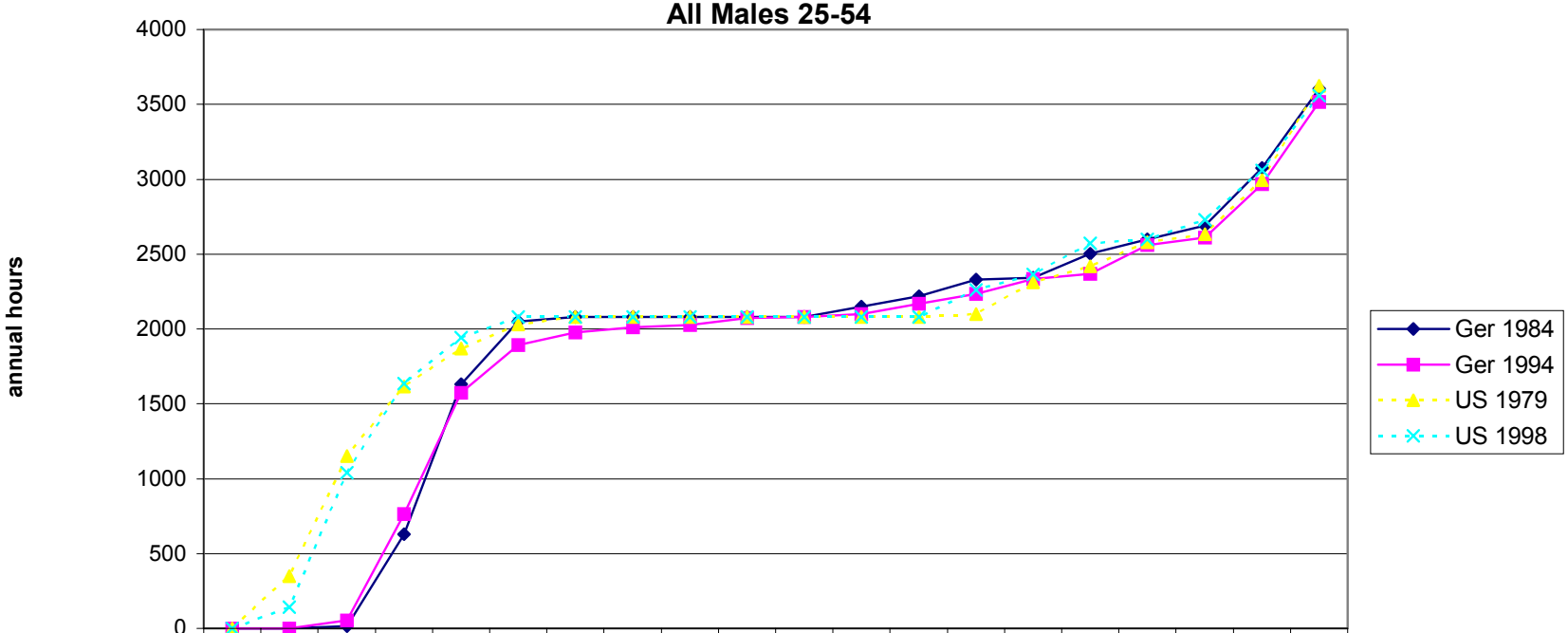


	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ger 1984	0	0	0	0	0	0	0	0	0	0	146	624	1019	1277	1756	2080	2080	2098	2292	2849
Ger 1994	0	0	0	0	0	0	0	0	0	95	500	852	1053	1313	1681	1965	2030	2080	2151	2683
US 79	0	0	0	0	0	0	38	242	482	751	1014	1289	1584	1824	1993	2080	2080	2080	2083	2669
US 98	0	0	0	0	7	245	572	912	1159	1481	1728	1918	2079	2080	2080	2080	2080	2109	2443	2979

vingtile

note: Vingtiles divide the population, ordered by annual hours of work, into twenty equal groups. Data points plot the average hours of work of
each vingtile.
Source: Author's calculations using the Luxembourg Income Study and the Current Population Survey (US).

Figure 8
Usual Annual Paid Hours by Vingtile
Germany and the United States
All Males 25-54

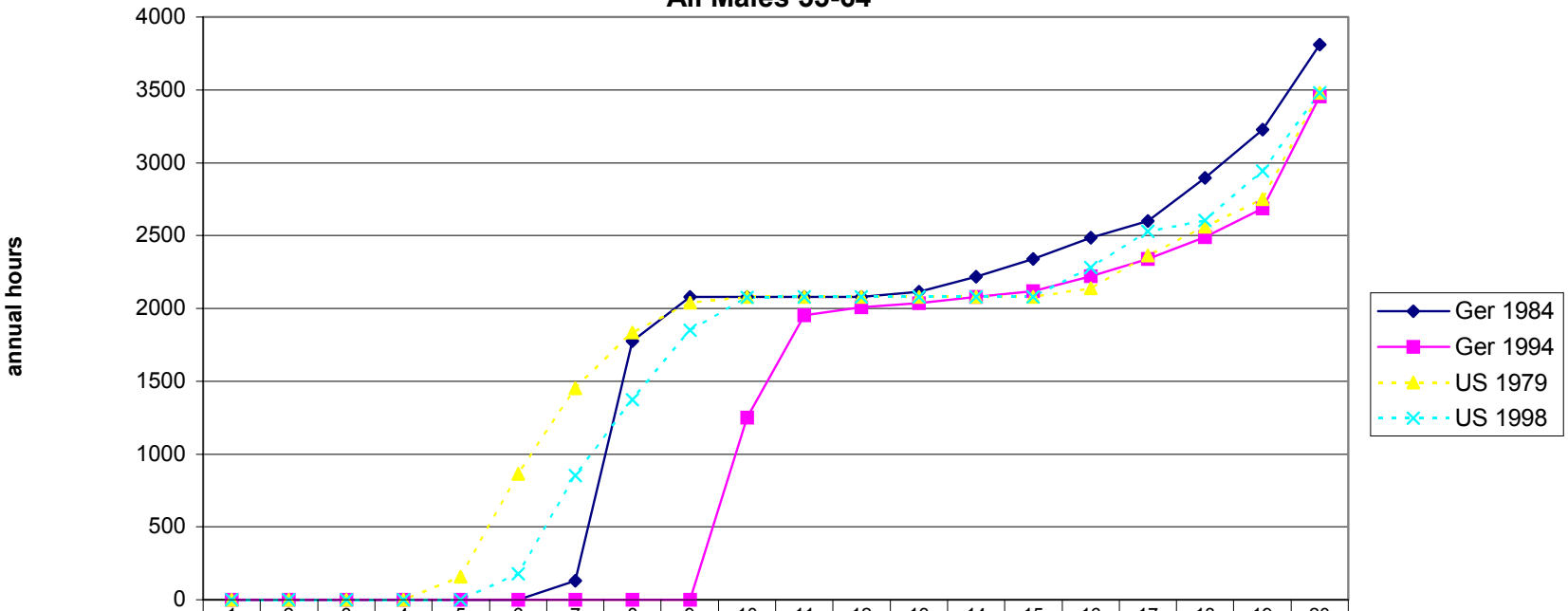


	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ger 1984	0	0	15	628	1630	2052	2080	2080	2080	2080	2080	2151	2220	2328	2342	2504	2600	2691	3074	3604
Ger 1994	0	0	53	765	1576	1893	1976	2010	2028	2072	2080	2099	2168	2234	2335	2370	2562	2610	2969	3515
US 1979	0	349	1153	1615	1868	2029	2080	2080	2080	2080	2080	2080	2080	2101	2312	2420	2580	2635	2995	3623
US 1998	0	141	1041	1636	1941	2080	2080	2080	2080	2080	2080	2080	2080	2261	2365	2572	2600	2730	3061	3560

vingtile

note: Vingtiles divide the population, ordered by annual hours of work, into twenty equal groups. Data points plot the average hours of work of each vingtile.
Source: Author's calculations using the Luxembourg Income Study (Germany) and The Current Population Survey (US).

Figure 9
Usual Annual Paid Hours by Vingtile
Germany and the United States
All Males 55-64



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ger 1984	0	0	0	0	0	0	132	1775	2080	2080	2080	2080	2115	2216	2340	2484	2600	2896	3228	3809
Ger 1994	0	0	0	0	0	0	0	0	0	1249	1952	2007	2035	2080	2118	2220	2340	2489	2688	3456
US 1979	0	0	0	0	158	866	1452	1834	2041	2080	2080	2080	2080	2080	2080	2140	2364	2561	2751	3481
US 1998	0	0	0	0	0	177	853	1372	1851	2073	2080	2080	2080	2080	2080	2279	2530	2603	2942	3478

vingtile

note: Vingtiles divide the population, ordered by annual hours of work, into twenty equal groups. Data points plot the average hours of work of each vingtile.
Source: Author's calculations using the Luxembourg Income Study (Germany) and The Current Population Survey (US).

Figure 9 presents data for men aged 55 to 64, and the picture is very different than for younger males. From 1984 to 1994, Germany saw both a twenty percentage point increase in the fraction of men aged 55 to 64 with no paid work and a quite significant decline in hours of work throughout the hours distribution. In the USA, even over a considerably longer period of time (1979 to 1998) changes were much smaller and more ambiguous. The hardest working twenty percent of 55 to 64 year old males worked even harder, and the second hardest working quintile worked the same amount, but others cut their work hours and the percentage of complete non participants rose by 4.7 percentage points.

However, a striking feature of the working hours distributions is their essential similarity in the top end. Differences in working hours appear to arise primarily in the degree of non-participation, and are concentrated by age and gender. Although Bell and Freeman rely on the idea of extra effort as a signaling device for promotion, and the greater inequality of wages in the USA as indicative of a greater incentive to get promoted, presumably this sort of tournament model would have its greatest impact on the frequency and extent of "above normal" working hours[11]. And presumably the greatest impact on above normal hours should be detected among prime age males, who are the demographic group least likely to expect periods of labour force withdrawal which would reduce the payoff to promotion. Yet it is precisely among above normal working hours males aged 25 to 54 that there is least difference between the USA and Germany, and least change over time. Although there has been a fairly substantial widening of wages differentials in the USA compared to Germany, but changes in hours worked are rather small. Any explanation of German/American differences must

[11]As well, since Figure 1 indicates that aggregate working hours were much the same in Germany and the US in 1980, it is the *change* in aggregate working hours that needs explanation - not the *level* difference. To make this argument, Bell and Freeman should be appealing to *widening differentials in wage inequality* (an issue on which they present no evidence) rather than to point in time differences in the level of wage inequality.

somehow cope with the fact that there is least difference in labour supply among the group most likely to be influenced by greater monetary incentives to labour supply.

The differences between American and German women may be at least partly explained by public policy emphasis. 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).

Figures 6 to 9 present the behavior of specific demographic groups, but average working hours can also change over time because the relative weight of different demographic groups in the population changes. International comparisons are affected because demographic unevenness in cohort size has been more important in the USA than in Germany. In particular, the last twenty years have seen many "Baby Boomers" shift into middle age. In the US, the percentage of the population aged 18 to 24 (which has relatively low average annual work hours - in part because many are still students) fell considerably (from 21.3% to 15.5%) between 1979 and 1998, with a corresponding increase in the proportion of the population in their peak working years of 25 to 54. In Germany, the shift was noticeably smaller.

Since there has always been a difference in labour supply between youth and the middle aged, it is useful to distinguish between that change in average hours of work which is due to the general aging of the population and that change which is due to changes in labour supply of the middle aged, and of other specific demographic groups - and since the change in the labour supply of women has

been particularly large, it is useful to distinguish both age and gender effects. As well, because a given age/sex cohort may change its hours of work either because a higher percentage are employed at some point in the year or because the work hours of workers increase, we also want to distinguish the impact of *employment rate change* and *hours per worker change* . Table 1 therefore presents a decomposition of the change in average hours of work in the USA and Germany due to *demographic change, employment rate change, and hours per worker change*[12].

Each cell entry in the table should be read as the difference in average annual hours of work that would have been observed "ceteris paribus" - if all other changes had been zero. The top panel of Table 1 examines the change between 1979 and 1998 in average work hours of the population in the USA. In it, the cell entry for "Hours per worker change" of - 1.02 for males aged 18 to 24 can be read as an estimate of the change in over all average annual hours of work that would have been observed if there had been no other changes - i.e. no change in the demographic weight of any cohort, no change in the employment rate of any cohort and constant hours per worker in all other age/sex cohorts. The table is presented so that one can add up across cells. For example, the sum across age groups of men in the top panel of Table 1 is 16.88 (= -1.02 + 16.73 + 1.16) - which estimates the change in over all average hours of work that would have been observed if male workers of a given age in the USA had changed their hours of work in the way actually observed, but with no demographic change, no change in the employment rate and no change in female behaviour.

Overall, there was an increase of 167 hours per year in the average labour supply of Americans between 1979 and 1998 - so the increase in work hours of prime age American male *workers* accounts for almost exactly 10% of the total change. The increasing percentage of the

[12]I owe this latter distinction to Garnett Picot. Note that in a three way decomposition, the order of decomposition can matter, although in the particular cases of this paper the differences are very minor.

population in this age group naturally implies that other age groups supplied fewer total hours of work, but since the middle aged have longer hours of work the net effect of demographic change was about twice as large (33.32 = -35.34 + 83.12 - 14.46) as the impact of working hours change within cohorts. Simultaneously, the percentage of 25 to 54 year old American males who were entirely without work increased (from 6.3% to 7.8%) - a trend that, *ceteris paribus,* would have cut average hours by 11.35.

However, in understanding US trends, the importance of disaggregation by gender can be seen by comparing the final columns for Male + Female with those for Males and Females separately. Added together, one would see the change in work hours per worker as dominant (at 92.17 hours), but about five sixths of that change (75.29 hours) came about as part time and part year female workers increased their annual hours of work. Demographic change was unimportant for aggregate female labour supply, but adding together the impact of a greater tendency for American women to have some employment (62.86 hours) and the longer hours of those working, over 80% of the increase in average US hours of work can be ascribed to the changed labour supply of American women - particularly those aged 25 to 54.

The middle panel of Table 1 presents the same decomposition for Germany between 1984 and 1994 while the bottom panel decomposes the USA - Germany differential in average work hours, comparing Germany in 1994 to 1998 data on the USA.

The middle panel indicates how different the German trends are from American trends. In the shorter period 1984 to 1994, average working hours per working age adult in Germany fell by approximately eighty hours (80.4) per year - which was essentially all due to the decline in working time among German men. The principle difference with the US is the lack of any appreciable

increase in paid working time among women, since a rising employment rate among women aged 25 to 54 was almost entirely offset by falling employment among younger women and decreased average hours of female workers. The main event was the decreased employment rate of youth aged 18 to 24 and older workers aged 55 to 64 which would, *ceteris paribus,* have produced a decline of almost sixty hours in average working time. Working hours changes among prime age male workers only contributed about a quarter [24.5% = -19.7/-80.4] of the total decline in hours. Again, if the issue is to explain *differing trends* in labour supply and if it were "incentives to promotion in an unequal society" that drove working hours, one would have expected to see the biggest changes in the labour supply behaviour of prime age male *workers.*

The bottom panel of Table 1 examines cross sectional USA - Germany differences in the 1990s. Over all, differences are very substantial - Americans of working age worked 356.8 hours, or almost an hour a day, more than Germans, on average. Differences in population weights explain essentially none of this. Approximately half of the working hours differential (189.6/356.8 = 53.1%) is contributed by the different employment rates of German and American women. A further seventh (=52.42/356.8) was due to the greater annual hours of American women workers. Almost all of the remaining difference is due to lower employment rates among German males. Indeed, the difference in working hours of male workers aged 25 to 54 (9.16) is not only a very small part (2.6%) of the total hours differential, it is outweighed by slightly longer average hours among other German male workers.

The bottom line of all this is that it is extremely hard to argue that the differences in average working hours in Germany and the USA, either at a point in time or as they have changed over time, represent *general* differences in the labour supply behavior of workers. There are big differences

how many people decide to work at all, but this primarily affects women. Among male *workers*, behavior is broadly similar.

When there just isn't much of a difference in working hours (among male workers) to explain, the implication has to be that the greater inequality in US earnings does not matter much for labour supply - at least at the intensive margin. If one decomposes the total difference across countries into the influence of change at the "intensive" margin of hours of work *per worker* and the "extensive" margin of a changing *employment rate,* it is clear that across country differences are primarily due to differences in the employment rate - i.e. differences in labour supply at the *extensive* margin. Over time, *within* countries there are smaller differences to be explained, and changes at the *intensive* margin are more important - but even then the changes in labour supply of prime age male workers are relatively small.

However, although differences in working hours may not be *caused* by differences in inequality, they do represent a challenge for the *interpretation* of statistics on inequality and growth - an issue to which we now turn.

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Table 1
Contributions of Differences in Average Hours and Population Weight to Total Average Hours Differential
Ages 18-64

	Males			Females			Males + Females		
Age	Hours per Worker Change	Emp. Rate Change	Demo. Change	Hours per Worker Change	Emp. Rate Change	Demo. Change	Hours per Worker Change	Emp. Rate Change	Demo. Change
USA 1998 - USA 1979									
18-24	-1.02	-6.48	-35.34	1.07	-1.25	-29.64	0.05	-7.73	-64.98
25-54	16.73	-11.35	83.12	69.59	52.85	41.61	86.32	41.50	124.73
55-64	1.16	-6.29	-14.46	4.63	11.26	-9.06	5.79	4.97	-23.52
Total	16.88	-24.13	33.32	75.29	62.86	2.92	92.17	38.74	36.24
Germany 1994 - Germany 1984									
18-24	-8.57	-33.47	-44.22	-3.85	-27.22	-24.99	-12.42	-60.69	-69.12
25-54	-19.70	3.75	26.91	-19.91	43.92	34.14	-39.61	47.68	61.05
55-64	-6.92	-26.01	14.54	-9.72	22.23	-1.28	-16.64	-3.78	13.26
Total	-35.19	-55.73	-2.78	-33.48	38.94	7.87	-68.67	-16.79	5.09
Germany 1994 - US 1998									
18-24	2.90	-38.99	-25.83	5.73	-32.36	-18.10	8.63	-71.36	-43.93
25-54	-9.16	-45.90	-9.07	-50.20	-120.33	-5.65	-59.36	-166.23	-14.72
55-64	8.89	-35.06	36.82	-7.94	-36.85	24.37	0.94	-71.91	61.19
Total	2.63	-119.96	1.92	-52.42	-189.55	0.62	-49.79	-309.5	2.54

Note: The sum of the totals for males and females is equal to the total change in average hours worked for all 18-64 year olds.

$$\Delta \text{ hours} = \Sigma_i \alpha_{1i} * E_{1i} * h_{1i} - \Sigma_i \alpha_{0i} * E_{0i} * h_{0i}$$

$$= [\Sigma_i \alpha_{1i} * E_{1i} * (h_{1i} - h_{0i})] + [\Sigma_i \alpha_{1i} * h_{0i} * (E_{1i} - E_{0i})] + [\Sigma_i (\alpha_{1i} - \alpha_{0i}) * E_{0i} * h_{0i}]$$

= hours per employee change + employment rate change + demographic change

α_i = fraction of population in cohort i ; E_i = employment rate of cohort i; h_i = hours per worker cohort i

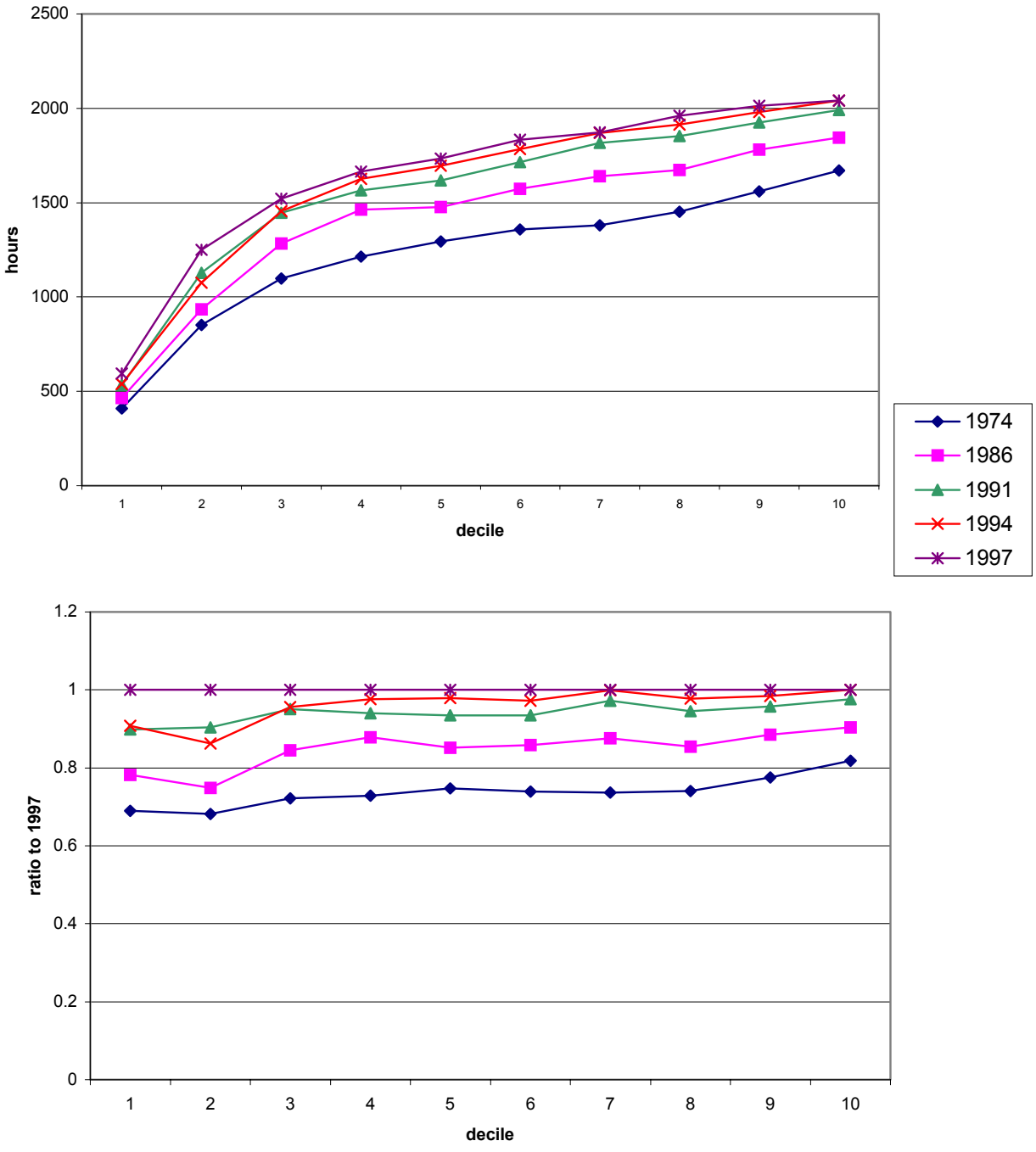
Sources: Author's calculations using the Luxembourg Income Study (Germany) and the Current Population Survey (United States).

3. The Interpretation of "Growth" and "Inequality"

Economists are interested in the growth rate and inequality of money incomes because they think that these correspond in some way to growth in average utility and the inequality of utility. Some economists would argue that "well-being" would be a better term to use than "utility", and there is a provocative and profound literature on just what we want to say in using such terms (see Sen (1987) or Elster and Roemer (1991)) - but there is no real disagreement with the idea that income and consumption are *intermediate inputs* in the production of utility or well-being, and not ends in themselves. The question then is: (1) *How* do changes in average income over time, and differentials in individual income at a point in time, affect utility or well-being? (2) *What else* influences utility/well-being ?

Although there is a literature on subjective well being that finds "surprisingly small correlations" between individual income and self reported happiness (see Diener and Suh, 1997:201), economics as a discipline relies heavily on the idea that annual money income does matter. *Why* income matters is another issue. Cross sectional correlations between individual income and measures of self reported happiness may simply reflect the relative status that conspicuous consumption and relative "success" produce. Since the consumption norms of individuals habituate fairly rapidly to changes in average incomes, it may not be surprising that once countries have passed a threshold of average incomes sufficient to maintain nutrition and basic public services, further increases in average incomes produce little or no increase in self reported happiness or life

Figure 10
Average Work Hours per Household Adult by Decile of Equivalent Income in the USA



note: Deciles based on after-tax equivalent household income using the LIS equivalence scale (i.e. the square root of the number of persons in the household.
Source: Author's calculations using the Luxembourg Income Study.

satisfaction.(see Frank, 1999:64-75)[13]

However, whether it is absolute or relative income that matters for individual well-being, most economists would agree that utility also depends on the amount of non-working time available. If rising average incomes are attained only at the cost of greater labour hours, there is a utility cost associated with decreased non working time. It is clear that rising average money incomes in the USA are partly due to greater hours of work, and that this is true throughout the income distribution. Figure 10 compares American work hours per household adult at each point in the distribution of equivalent income from 1974 to 1997, both absolutely and as a fraction of 1997 hours. If one looks at life in terms of dollars available to finance consumption, and time available in which to do it, then the increase in money income of American households overstates the increase in utility or economic well being.

Table 2 examines the question - "How different would things be if each working household supplied the same amount of work time to the paid labour market?" Historically, social policy in both North America and Europe has been influenced by the idea of a "living wage" - that the earnings of one person, working full time, full year, should be able to support a family. Table 2 therefore compares the actual distribution of income (after taxes and transfers, and adjusted for economies of scale using the LIS equivalence scale) with a simulated distribution of income which supposes that the higher income spouse in all working households supplied the same number of hours of paid work (2000 = 50 weeks @ 40 hours) and there was only one paid worker in each household.

[13]Hill (2000) also provides a comprehensive list of references. Wilkinson (1997) notes that at average income levels below approximately $5,000 (US), trends in per capita GDP dominate mortality rates, but above that the level of inequality is the primary determinant of mortality differentials.

The top panel of Table 2 presents mean and median income and some summary statistics on the distribution of income (Gini, Theil, 90/10 ratio and the poverty rate, average poverty gap and SST index of poverty intensity) for the population as a whole. Since some households have no working members, the middle panel presents the same statistics for the population of people who live in households with some labour market earnings. The bottom panel looks at those working households and simulates the distribution of income on the assumption that each working household supplies 2000 hours of work.

Comparing actual and simulated money income, the actual increase in average equivalent income (USA 15.5%, Germany 10.4%) was considerably greater than would have occurred had labour supply per working household been a constant 2000 hours (i.e. 9.4% increase in the US, 6.6% increase in Germany). However, as the substantial increase in Gini and Theil indices of inequality in the top panel of Table 2 might lead one to suspect, increases in income were concentrated at the top end of the distribution. In actual money income the rise in median income was less (USA 7.9%, Germany 9.3%) than the increase in average income, and if working hours had been held constant the median person in a working household in the USA would have had a small ($262, or about 2%) decline in real equivalent income. However, doing the same standardization for Germans produces a 14.7% *increase* in median income - which is substantially greater than the increase in median money income, uncorrected for labour supply changes. Hence, if the median person were the reference point, one can say that American households fended off a decline in living standards by working more hours, while German households took out part of their increase in living standards in the form of relatively less working time.

In the USA, comparing the actual increase in the Gini (10.4%) and the Theil (35.3%) is an important clue to inequality trends since the Theil is more low end sensitive than the Gini. Moreover, the increase in the Gini (20.1%) and the Theil (120.1%) of the simulated distribution is much greater - indicating that increased labour supply by households in the lower part of the distribution in the US fended off much of the increase in inequality, by increasing work effort. In Germany, by contrast, the simulated distributions of income show a *decline* in inequality measures if household work hours are held constant. Hence, if working hours were standardized across these countries, one would perceive a much larger increase in US inequality than observed in actual money income (combined with a decline in median income), while German data would show a decline in inequality (combined with a substantial increase in median income).

Trends in working hours therefore have major implications for the interpretation of trends in inequality and growth in incomes. However, when changes in labour supply are so heavily concentrated among women, one cannot really discuss utility and labour supply at the household level without some consideration of changing gender norms and roles within households. It would be more convenient if preferences did not change or if the answer to the question "How much better off or worse off are you ?"did not depend on whether well-being was evaluated using the initial, or the final, set of preferences - but that seems a poor guide to the social reality of the last thirty years.

Table 2
Standardizing Household Hours of Work - What Difference would it make ?
Post-Tax, Post-Transfer Equivalent Income Among Individuals

	mean[1]	median[1]	Gini	Theil	% poor[2]	poverty gap[2]	Poverty Intensity[2]	90/10 ratio
Money Income-All Persons								
USA 1986	21,852	19,237	0.337	0.187	17.9	0.354	11.9	11.0
USA 1997	25,236	20,766	0.372	0.253	16.8	0.333	10.6	13.2
Germany 1984	15,728	14,306	0.250	0.111	6.5	0.223	2.8	5.16
Germany 1994	17,371	15,633	0.272	0.141	8.5	0.310	5.2	6.59
Money Income-Positive Earnings								
USA 1986	23,177	20,564	0.315	0.164	13.1	0.334	8.4	9.33
USA 1997	26,697	22,182	0.357	0.235	12.8	0.297	7.3	11.2
Germany 1984	16,558	15,161	0.233	0.092	3.3	0.213	1.4	4.48
Germany 1994	18,400	16,610	0.255	0.128	4.9	0.266	2.6	5.38
Money Income- if 2000 hours[3]								
USA 1986	15,946	13,473	0.338	0.219	28.2	0..320	16.5	10.2
USA 1997	17,450	13,211	0.406	0.482	34.2	0.332	20.3	14.7
Germany 1984	12,868	9,986	0.339	0.350	17.0	0.222	7.2	8.55
Germany 1994	13,723	11,456	0.303	0.228	16.1	0.262	8.1	7.73

[1] Converted to 1997 US dollars using purchasing power parities (OECD); Household income after taxes and transfers is converted to equivalent income using the LIS equivalence scale.
[2] Poverty rate, average poverty gap and Sen Shorrocks Thon index of poverty intensity calculated using one half median equivalent income of all persons as poverty line
[3] Simulation results where households with $Y_L > 0$ are assumed to have one earner who works 2000 hours in the year. The hourly wage used is that of the higher income spouse.
Note: German data excludes former East German states.
Source: Author's calculations using the Luxembourg Income Study micro data

4. Conclusion

International differences in inequality, growth and hours worked per person present an almost irresistible temptation to generalize about the work habits of nationalities, the rewards to work and the overall distribution of resources. However, detailed disaggregation paints a more shaded picture. There are significant differences between countries - particularly the USA and Germany - in both inequality and hours of work, but work hours differences are mostly at the extensive margin of labour supply. Although broad assertions and fearless stereotypes are most vivid when they refer to common categories - as in comparisons of "Holiday loving Germans" and "Workaholic Americans"- the vast majority of German and American *workers* seem to behave in fairly similar ways. Differences in total working time are primarily explained by the fraction of the working age population that works. Hence, since the vast majority of prime age males in both countries continue (as always) to be in the labour force, for this cohort there is not a lot of difference in the labour supply of male workers for differences in net after tax wage to explain. The greater equality of the German income distribution seems to come without much cost in decreased labour supply - ***among workers.***

When looking at the population as a whole, however, the overall difference in probability of employment among people of working age is strikingly large. Differences this large between countries - particularly in the behaviour of women - are hard to explain as marginally diifferent responses to marginal differences in incentives. It seems more likely that there are national differences in preferences and choice of lifestyle - particularly those that concern gender roles and the appropriate locus of care for young children. However, differences in tastes greatly complicate the international comparison of statistics on trends in the inequality or the average level of money income and their correspondence to trends in the inequality and level of economic well being.

Appendix - Table A1 Percentage with Zero paid Hours by Age Group United States and Germany							
		US 98	US 94	US 84	US 79	Germany 94	Germany 84
males and females	Ages 18-64	18.1%	18.7%	21.4%	21.3%	36.7%	36.8%
	Ages 18-24	21.1%	20.5%	20.1%	17.7%	66.9%	39.1%
	Ages 25-54	14.2%	14.9%	17.4%	18.3%	26.7%	30.2%
	Ages 55-64	34.9%	37.1%	40.1%	38.1%	55.6%	58.1%
males	Ages 18-64	11.9%	12.0%	12.4%	10.0%	25.6%	21.4%
	Ages 18-24	18.1%	16.3%	16.3%	12.5%	65.8%	36.8%
	Ages 25-54	7.8%	8.2%	8.0%	6.3%	13.9%	14.4%
	Ages 55-64	26.5%	28.2%	26.5%	21.8%	45.3%	33.2%
females	Ages 18-64	24.1%	25.1%	30.0%	32.0%	47.3%	52.0%
	Ages 18-24	24.0%	24.8%	23.8%	22.7%	67.9%	41.7%
	Ages 25-54	20.4%	21.5%	26.5%	29.8%	39.1%	46.6%
	Ages 55-64	42.8%	45.1%	52.0%	52.6%	65.1%	78.2%

Note: Germany 1994 excludes those living in the former East German states.
Source: Author's calculations using the Luxembourg Income Study (Germany) and the Current Population Survey (United States)

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