Advertising And Labour Supply: Why Do Americans Work Such Long Hours?

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Abstract

Americans are working much longer hours in the paid labour market than workers in Western Europe. Much of the debate focuses on whether this is the result of voluntary worker choice or whether this is a decision imposed on workers by their employers. This paper shows that American hours of work have become more or less stabilised as a result of the rising intensity of advertising in the U.S.: advertising may raise the desired amount of marketed goods and services for which workers find it necessary to work long hours.

JEL Classification: M37; J22

Keywords: Advertising; Time Allocation and Labour Supply

I. INTRODUCTION

This paper advances the view that the intensity of creation of wants through advertising and marketing might be an influence on decisions made by Americans about how much time they should devote to paid work, and how much time to leisure. The record shows that the nineteenth century witnessed a sharp decline in hours of work in the face of rising real wages. The decline continued in the twentieth century, but by the second half of the century, the decline was much diminished. Towards the end of the century the decline had largely been eliminated, with some evidence that working hours actually increased over the last quarter of the twentieth century.

This relationship was investigated over the twentieth century up to 1976 by Brack and Cowling [1983], but they obviously missed the last development. Whilst causing some minor ripples in the literature the paper failed to have any wider impact: the significant and robust relationship between hours of work and the intensity of advertising revealed by this research seemed generally to be ignored by the profession. In a sense this was not surprising. Advertising was not seen, and is not seen, by the profession as terribly important in the workings of the major elements of the economy.[1] It may affect the market share for Kelloggs cornflakes, but it was unlikely even to effect the demand for cornflakes in total, never mind hours of work. Such was the prevailing wisdom within economics, and this seems to be true in mainstream economics today: obviously there are economists who feel otherwise, especially within industrial organisation and business research. However, even here there appears to be a reluctance to address the possible macroeconomic consequences.

Needless to say we feel very differently, and we are of the opinion that more research effort should be expended on probing these possible effects. Advertising in general, the broad sweep of marketing effort to shape the nature of demand, is a major characteristic of the modern firm, and it is getting more important. Unless mainstream economics begins to

recognise this we may be prone to misinterpret many events and phenomena. This may be the case so far as labour supply is concerned. Prescott [2004] has very recently drawn our attention to the huge differences in hours worked in the United States and Western Europe; see also Gordon [2002], Blanchard [2004] and Craft [2004]: productivity levels (output per hour worked) are roughly similar in western Europe and the U.S., with the U.K. below and France above the U.S. level. However GDP per person in Western Europe stands at only 70% of the level in the U.S., which remains unchanged on the relative position a quarter century previously. It seems fairly clear that while the gap in productivity between Europe and the U.S. has been largely eliminated, the gap in output per person is the same as it was in the seventies. Prescott [2002, 2004] identifies this as a gap in "prosperity", a loss in welfare in Europe which is explicable in terms of lower hours worked due to higher marginal tax rates on labour income and consumption. If Europe were to adopt similar taxes on work and consumption then hours of work in Europe would be similar to the U.S., and Europe would observe a similar prosperity to that in the U.S. today: for example Prescott calculates that if France were to reduce its effective tax rate on labour income from its present level of 60% to the U.S. level of 40%, the welfare of the French people would increase by 19%.[2]

We would argue that the main difference between Europe and the United States is that, whilst Europe has used some of the increased productivity over the last quarter-century to increase leisure rather than income, the United States has not done this, but continues to work roughly the same hours. Workers in the United States may be discouraged from taking more leisure because of the pressure on them to raise material consumption. We examine the half-century of U.S. history since the Second World War and find that the level of advertising has expanded considerably: real advertising expenditure rose more than seven fold, nearly four-fold when measured per capita. (In contrast the level in France was only one-tenth of that in the U.S., European Audiovisual Observatory: Statistical Year Book (1985 – 2001))

The rest of the paper is set out as follows. The next section discusses trends in working time with particular reference to advertising. Section II discusses alternative explanations of the trends in working time. In Section III, a statistical framework is introduced and justified and the empirical results reported. Section IV and V contain some discussion and conclusion, respectively.

II. Advertising and Hours of Work

Our argument is that advertising in general, the marketing effort to change the nature of demand, will result in additional material consumption, which, initially, will provide extra pleasure, but this is usually only a transitory consequence. The higher level of satisfaction from additional material goods wears off as more and more effective marketing efforts catch us in a larger web of wants and desires. Satisfaction thus depends on continued increasing consumption levels and conflicts with the desire for leisure time.

This provides a solution to our problem, but also to one of Duesenberry's [1967] problems: he asked the same question as we pose today, why do people (Americans) continue to work such long hours? (and relatedly, why do they (Americans) save so little, in the face of so much insecurity?). His own view relates to his own theory consumption which is based on interdependent preferences: to the question, why the drive to higher levels of consumption? He offers the demonstration effect. But if the demonstration effect is to lead to higher levels of consumption then we must presuppose its existence: emulation can go either way, to yuppy or hippy, conspicuous consumption or conspicuous non-consumption. Duesenberry relies on the "character of our culture" (American), but our argument raises the question of the endogeneity of its character within the economic system: advertising and product innovation, the characteristics of the modern economy, could provide the key to unlocking Duesenberry's problem. Duesenberry [1967, p.105] himself "was doubtful advertising

explains the phenomenon before us", and he devoted very little attention to it (just 15 lines of text). We remain unconvinced with his dismissal: advertising could be seen as creating a continuing dissatisfaction with present consumptions and this fits in well with the happiness literature: happiness does not appear to be related to personal consumption. Over the period from the 1940's to the mid-nineties "very happy people" remained at 30% of the population of Americans, despite the large growth in material consumption over this period, Kenny [1999]. The recent evidences on happiness and work-life balance by Blanchflower and Oswald [2004] confirmed that the U.S. has the most severe problem with work-life balance.[3] In the U.S. there has been a steady decline in job satisfaction since 1970s.

And so to labour supply: if advertising creates a continuing dissatisfaction with current levels of consumption, people may be encouraged to offer a larger fraction of their time for the generation of income in order to satisfy their increased demands for material consumption (despite its purely transitory effect on satisfaction). Labour supply will be affected by the pressure to consume. We then have a ready explanation for the slowing-down in the rate of decline of the work week and work year. Americans may not want more time off because they may want to consume more market goods than the Europeans. Despite a substantial increase in real wages over the second half of the twentieth century, U.S. workers have chosen not to take significantly more leisure time to enjoy higher living standards. (In contrast to the second half of the nineteenth and the first half of the twentieth century.) Over the second half of the twentieth century people in the U.S. have been exposed to a massive increase in the intensity of advertising: real advertising expenditure per capita grew at 4.5% p.a. and its effectiveness likely increased with the diffusion of television across households (Table I).

Some earlier econometric work by Brack and Cowling [1983] revealed that the work year in the U.S. was 27% longer in 1976 than it would have been had not advertising

increased by the amount it did since 1919 (the advertising elasticity was estimated at 0.18, and the wage elasticity at -0.32 and there was a growth of 150% in advertising).[4] There is also evidence that the participation of women in the U.S. market workforce has been increased by advertising (estimated elasticity 0.4), Giulietti and Meschi [1991].

III. Explanations of Trends in Working Time: Supply and Demand

Brack and Cowling [1983] took the view that observations on work week (and work year) over a long period may reasonably be regarded as indicating supply side responses, citing the view of major analysts in the field, Lewis [1957] and Harberger [1964]. However since then we have the demand side explanation of American hours of work proposed by Schor [1991] [5]: employers are able to force employees to work longer than they would ideally choose. This view gains support from the empirical work of Stewart and Swaffield [1997] who find that over a third of British male employees would prefer to work fewer hours at the prevailing hourly wage. The authors claim that job insecurity, fear of redundancy and scarcity of alternative job opportunities all encourage employees to accede to a firm's requirement for hours above those preferred. Thus working hours could be determined by the employer. However we question whether or not this situation will figure prominently in the longer term: Gunderson and Riddell [1988] have argued "*to a certain extent most firms may have an element of monopsony power in the short run, ….. However, it is unlikely that they would exercise this power in the long run because it would lead to costly problems of recruitment, turnover and morale*." Matthews et al., [1982] also claim that there is a good deal of evidence that, under normal economic conditions at least, workers have a significant amount of control over long-run movements in working time. Stewart and Swaffield [1997] themselves report that the previous literature on the U.S. does not accord with their results for the U.K.. Perhaps the pressure on the British to consume is less than that of the Americans, certainly the level of

advertising is.[6] Fraser and Paton [2003] suggest that if we focus on the supply response, increased overtime hours may provide a further mechanism whereby production workers may exert at least some control over working time. To draw any conclusions from overtime hours, however, is not possible. On the demand side, overtime that is officially 'voluntary' may be viewed by the worker as a necessary strategy to maintain employment, as suspected by George [1997]. He suggests that a comprehensive study would be necessary to establish whether such considerations have caused 'voluntary overtime' to become more common.

George [1997] argues that a widening gap between required work time and the worker's preferred work time might be expected to have a positive effect on savings, given that the worker would be receiving income above that planned, but the evidence is strongly, to the contrary. No comparable rise in savings has occurred in the U.S. over the past 50 years: saving rates went from approximately 8.5 per cent of disposable income in the 1950s to around 5 per cent of disposable income by the late 1990s (see Figure II).

Finally, despite Schor's explanation of trends in work time in the U.S., other countries have been through the same economic changes and still take time off.[7] Cross-national comparisons are valuable, not only because they tell us something about the different behavioural aspects in different societies but also because such comparisons can tell us how robust an underlying assumption is, and to what extent certain explanations can be generalised. Even if Americans work hours have not increased substantially in recent decades, U.S. workers tend to work more hours per year than workers in all other industrialised economies.[8] While European workers have been reducing their hours of work, American workers maintain theirs. If this is the case, the long- run trend in hours worked is more likely to be dependent on supply-side factors. Specifically, desires for a high income or high consumption level may be caused by more extensive and more effective marketing

efforts (i.e. advertising), which may be seen as an important motivator with consequences for individual behaviour in terms of hours worked.

The dominant popular assumption has usually been that as rates of pay rise, working hours will fall and more time will be left for other activities. However, this fails to acknowledge the fact that rising wages raise the opportunity cost of other uses of time, and thus the substitution effect may become larger than the income effect. Therefore, advertising may raise the opportunity cost of leisure, when so many material wants are unsatisfied, and this may dominate the assumed tendency of the income elasticity of the demand for leisure to be positive.

We can save out of today's earnings in order to work less or consume more in the future. However, Americans spend more time working than anyone else does. Americans increasingly spend a higher percentage of their earnings, and, with the explosion of household debt, a higher fraction of what they have not earned (see Figure II). In simpler terms, Americans may "spend to work" the term used by George [1997].[9] Increased material needs cause the work hours eventually to be work that is necessary if changing tastes are to be adequately satisfied. Material desires and consumption aspirations are thus put forward to explain long working hours. This is an insidious cycle: in order to continue to consume at increasing levels, they must also continue to work at increasing levels. Therefore, the slow reduction or even increase in hours may be explained by a shift in preferences from leisure to the consumption of market goods and services.

The notion that the intensity of advertising has influenced the income-leisure decisions of the U.S. labour force implies a particular view about the nature of advertising that is not widely accepted among economists. However, Galbraith [1958] suggested that advertising may have the effect of shifting preferences in favour of consumption in general rather than simply affecting relative consumption patterns. The economic effects of

advertising on consumption have not been studied to any significant extent. There is also very limited empirical research on advertising and labour supply in economics. This belief was first tested formally by Brack and Cowling [1983] for U.S. manufacturing production workers. They used OLS to estimate an aggregate labour supply function for U.S. hours worked between 1919 and 1976, and concluded that advertising had the effect of increasing the working year in the U.S. by about 27 per cent over that period. Another possible impact of advertising not to be ignored is the changing attitudes of women, which has lent even more status to working for an income and less status to housework. For example, Matthews et al. [1982, p. 459] suggest that the increase in the participation rate of women is due to an 'increase in family income aspirations and the tendency for goods and services that would formerly have been produced in the household to become cheaper and easier to acquire in the market'. Some evidence is provided by Giulietti and Meschi [1991], who find a positive association between female participation rates and advertising in the U.S.. More recently, the debate has been reopened by Fraser and Paton [2003] for both U.K. males and females from 1952 to 1997. Advertising is shown to be positively associated with hours worked for both male and female series.

So far, we have been reasoning in terms of marketing efforts to create material needed for consumption, which result in work time requirement of labour. However, there is another prediction that would have followed from encouraging policy of longer working hours for workers – as an alternative to focusing on changing tastes.[10] For example, Prescott [2002, 2004], observes that the large difference in the labour supply of France and the U.S. is due to differences in tax policy. The effective marginal tax rates are thus introduced in our analysis to capture this possible effect. The hours worked over the last 50 years in the U.S. reflects a choice that is likely to be made voluntarily by workers, a supply side explanation. The

remaining issue is how much of this choice comes from preferences and increasing income, and how much from tax policy.

IV. Empirical Specification

A. The Basic Model

We consider the supply of labour (and the related demand for leisure) by considering leisure time as one of the features of the consumer's utility function. The theory of utility-maximising consumption and work decisions is that the consumer-worker acts as if maximising his/her utility function, whose arguments are goods and leisure, under the constraints imposed by a fixed amount of time and an exogenously-given wage rate and non-wage income.

Each individual's consumer-worker optimisation problem is of the form:

$$\underset{\{C,H\}}{Max} \qquad u\{C(a),H\} \tag{1}$$

$$s.t. \qquad C = Y + w.H - R(I)$$

where C is consumption of composite good (c_i), H is hours of work, a is advertising intensity, $u\{C(a),H\}$ is the utility function, w is the gross wage, Y is non-wage income (independent of a working decision), and R is tax payments. The partial derivative of u with respect to H is negative, but positive with respect to C. An increase in advertising will decrease the marginal rate of substitution (m) between consumption (C) and leisure $(1-H)$ as the slope of the indifference curve shifts towards consumption and away from leisure.

The interior solution (assuming that it exists) to the maximisation problem is:

$$w = -m(c,h,a,y), \tag{2}$$

In other words, hours of work are chosen such that the negative of the marginal rate of substitution for working hours is equal to the real wage rate. Solving equations (1) and (2) gives the demand function for the composite commodity and the supply function for labour[11]:

$$c = c(w, a, y) \tag{3}$$

$$h = h(w, a, y) \tag{4}$$

The labour supply function for both male and female is:

$$h_{jt} = \beta_{j0} + \beta_{j1} w_{mt} + \beta_{j2} a_t + \beta_{j3} w_{ft} + \beta_{j4} tax + \varepsilon_t,$$
$$j = m, f; t = 1,...,T \tag{5}$$

where h = hours worked; w = annual income; a = advertising expenditure; tax = effective marginal tax rate; ε is an error term and all variables (except tax rates) are measured in natural logarithms. The $j = m, f$ subscripts pertain to male and female variables/parameters respectively. The t, t = 1,….T, subscript is time. Following Prescott [2002], distortions are introduced to the labour market by the intra-temporal tax wedges which distort the trade-off between consumption and leisure decision. Thus, an intra-temporal tax wedge term, tax_t, is constructed to allow for these distortions in the labour market.

The aim is to estimate a long-run supply side relationship. Unlike Fraser and Paton [2003] we measure the real wage in a long-run sense to exclude overtime premia. As argued above, although we claim to be estimating a long-run supply side relationship, it is clear that in times of recession, labour hours may be constrained. It is also evident that there are far more people working fewer hours than they would wish during economic downturns than during upturns.[12] Although the economic recession and concomitant employment losses were felt by workers in all major industries, Coleman et. al., [1993] claim that trend movements in the hours of both males and females are largely unaffected when the effects of the business cycle are taken into account. This might be because the conclusion relies heavily on data pertaining to all employed workers. However, work behaviour in manufacturing industry is well-known to be cyclically sensitive, and indeed is sometimes used as a “leading” indicator of business conditions. No attempt to adjust for the business cycle in estimating changes in the allocation of time can seriously distort the trend in working hours. For example, if a later

year in a study happens to be a recession year, it would easily distort the upward trend in work time. Thus, a dummy term, d_{short}, is constructed to allow for years in which there was a particularly high level of short- time working. A full specification of the variables used is listed in the Data Appendix A.

B. Empirical results

Univariate analysis: Time series plots for the logs of hours, wages, advertising and tax are provided in Figs. III-VIII and are indicative of univariate nonstationarity. The approach, in the first instance, is to perform augmented Dickey–Fuller (ADF) tests (Dickey and Fuller, [1979]) with a constant and trend included in the regressions. The unit root test conducted for both levels and for the first differences of each series. According to the results in Table III and IV, the null hypothesis of a unit root is accepted for the level series, but rejected for the first-differenced series at the 5 percent level of significance.

Cointegration analysis: The VECMs, used in the analysis are given by

$$\Delta y_t = \Pi\ y_{t-1} + \sum_{i=1}^{k-1} \Gamma_i \Delta y_{t-i} + \Phi D_t + u_t \qquad (6)$$

$$t = 1,\ldots.\mathrm{T}$$

where the vector y_t is given by $\left(h_t, w_{jt}, a_t, tax_t\right)'$ where $j = m, f$. We include an intercept in the cointegrating space as well as outside the cointegrating space. The deterministic component, D_t, is given by the column vector $\left(d_{short}\right)'$ (see also Appendix A). Γ_i, α and β are, respectively $n \times n$, $n \times r$ and $n \times r$, $0 < r < n$, matrices such that $\Pi = \alpha\beta'$; the r linear combinations of y_t, the cointegrating vectors, $\beta' y_t$, are often interpreted as deviations from equilibrium and α is the matrix of adjustment or feedback coefficients, which measure how strongly the r stationary variables $\beta' y_{t-1}$ feedback onto the system. In addition, to facilitate

maximum likelihood analysis, it is assumed that u_t is an $i.i.d.$ normal distributed vector of errors, with a zero mean and a positive definite covariance matrix Σ, and k is a constant integer.

The standard approach to the Johansen [1988], and Johansen and Juselius [1990] cointegration analysis is to determine the VAR order, *k*, and the cointegration rank, *r*, sequentially. We determine the optimal lag length by using model selection criteria such as the Akaike's (AIC) and Bayes Information Criteria (BIC). In addition the system LM statistic for first order autocorrelation and the system Jarque–Bera (JB) statistic for non-normal disturbances were estimated, for each *k*, to provide diagnostics of possible misspecification of the systems. The results of this analysis are reported in Table V and VI. The information from these statistics support the conclusion that the total yearly hours systems are well specified with $k = 2$. Conditional on $k = 2$, the likelihood ratio tests of cointegrating rank tend to support the finding of one cointegrating vectors (see Tables VII and VIII). Accordingly the estimated cointegrating vectors $(\hat{\beta})$ and adjustment coefficients $(\hat{\alpha})$, for models with $k = 2$ and $r = 1$, are presented in Tables VII and VIII.

V. Discussion

Advertising seems to have a significant impact in both the identified male-female, and manufacturing production workers long-run labour supply relations: the advertising coefficient is positive taking both weekly and yearly hours as the measure of labour supply. Using Johansen's co-integration estimator, the advertising intensity elasticity is estimated to be 0.124 for male weekly hours, 0.171 for female weekly hours, and 0.263 for manufacturing production workers. For male weekly hours, male and female real wage elasticity is estimated to be 0.377 and 0.468, respectively. For female system, the female wage elasticity is not significant while, male real wage elasticity is estimated to be 0.243. For manufacturing

workers yearly hours, the real wage elasticity is 0.419. Based on the present results, labour supply increases with the wage. In other words, an increase in income increases the opportunity cost of leisure (i.e., substitution effect outweighs income effect), which result in an increase of the number of work hours, even if leisure is a normal good. The finding that labour supply is positively related to advertising provides support to Brack and Cowling's hypothesis that it has shifted the preferences of workers from leisure towards consumption.

In addition the issue of the relationship between hours and tax has been addressed. We found a significant negative elasticity with respect to the tax rate but at a smaller order of magnitude compared with the advertising elasticity. Over the period 1962-2001, the impact of the effective marginal tax rate on labour supply has been small: elasticity of tax on labour supply is estimated to be 0.014 and 0.006 for male and female, respectively, while the effect of tax on manufacturing workers stands at 0.013. The finding that labour supply is negative related to tax rate provides support for Prescott's hypothesis of tax distortion. However, the estimate of the advertising elasticity for labour supply is much greater than that for the elasticity of effective marginal tax rate; as a result, Prescott [2002, 2004] estimating might over-predict the effect of tax rate. Alesina et. al. [2005] also suggest that the effect of tax is too low to explain the differences in hours worked between U.S. and Europe. They claim that cross country differences in labour market regulations, advocated by unions explain the difference between U.S. and Europe, while this paper suggests that advertising may determine the underlying parameters.

These results have important implications for the understanding of the determination of hours of work. In particular, they demonstrate the possibility that high observed hours of work may be the result of pressure from employees who wish to increase their earnings to satisfy their increasing desire for consumption. However, these should not be treated as radically opposed to Schor's explanations. The proverbial grain of truth can reside in each.

VI. Conclusion

In this paper, we have argued that the high U.S. hours of work appears due to a difference in preferences between the U.S. and elsewhere, as a result of a greater intensity of advertising in the U.S., rather than simply due to tax differences. The results demonstrate the possibility that high observed hours of work was the result of a desire of workers to work longer due to a shift in their preferences from leisure to increased consumption, caused by the huge increase in advertising.

Finally, if policy-makers are concerned with the negative externalities of long working hours (for example on family life), the actions of the federal government in placing a legal maximum on work hours may be appropriate. However, such measures are less appropriate if their aim is to protect workers from undue managerial pressure. Many people believe that Americans are working long hours and that the federal government should mandate a reduction in work hours. The big problem for these policies, however, is that by and large Americans do not really want more time off. Although it appears that Americans generally do not want longer vacations or shorter working weeks because they are caught in a spending cycle, this may not deter the advocates of laws forcing Americans to work less. For many, this is an ideological issue divorced from economics or even the actual preferences of workers. Ultimately, it is up to workers to decide whether they prefer more money or less work. In the end, the real question is not whether people are working longer, but whether they are happy with whatever work arrangements they have. At least for now, it is fairly clear that the shift in American's labour supply curve is caused by American's willingness to work more rather than by a reaction to having to work more.

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Table I: U.S. Advertising Expenditure; Ten-Year Averages, 1941-2000

Years	Advertising Expenditure ($bn)	Advertising Messages [a] (Real Advertising Expenditure) ($ 1982bn.)	Advertising Intensity (Real Advertising per Capita) ($1982)
1941-1950	3.588	15.977	112
1951-1960	9.240	29.857	177
1961-1970	15.748	41.783	213
1971-1980	33.399	52.709	242
1981-1990	96.916	85.076	353
1991-2000	175.985	118.247	439

[a] Advertising Messages figures are derived from deflating advertising expenditure by the GDP Price Deflator, based on 1982.

[b] Advertising Intensity measures the advertising messages that audiences received. Advertising Intensity figures are derived by deflating real advertising expenditure by population size.

Source: U.S. Bureau of the Census, *Statistical Abstract of the United States*, various issues.

Source: Bureau of Economic Analysis.

Figure I: U.S. Personal Savings Ratio

Figure II: Household Debt and Mortgage Debt to Income Ratios

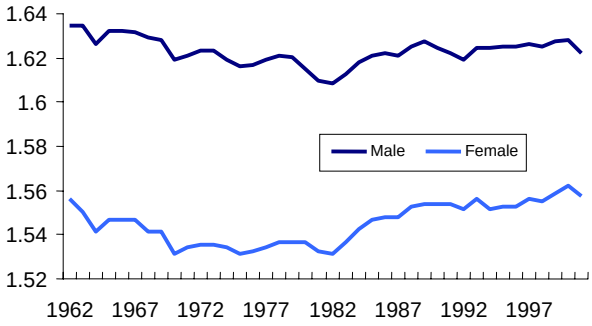

Fig. III. Graphs of Male and Female (log) weekly hours

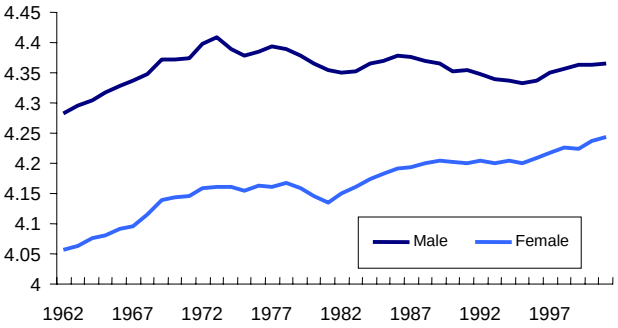

Fig. IV. Graphs of (log) Male and Female Income

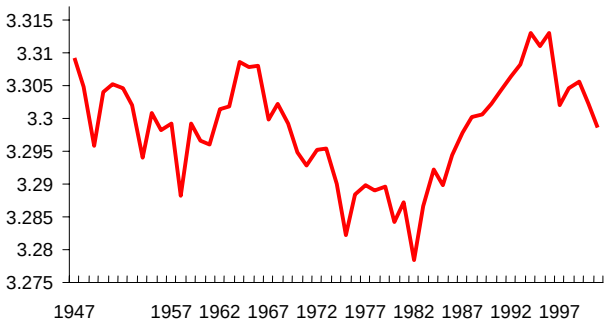

Fig V. Graph of Manufacturing Workers (log) Total Yearly Hours

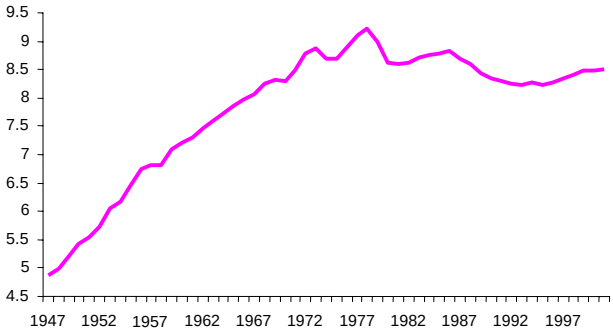

Fig. VI. Graph of (log) Manufacturing Workers Real Wages

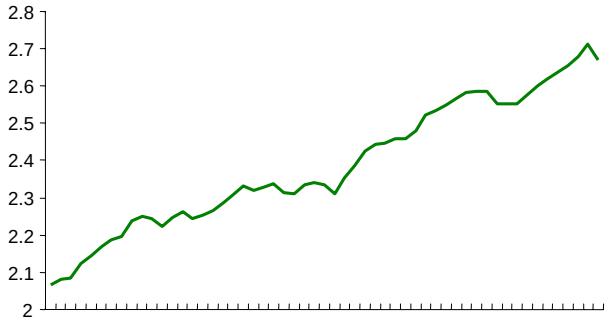

Fig. VII. Graph of (log) Advertising Intensity

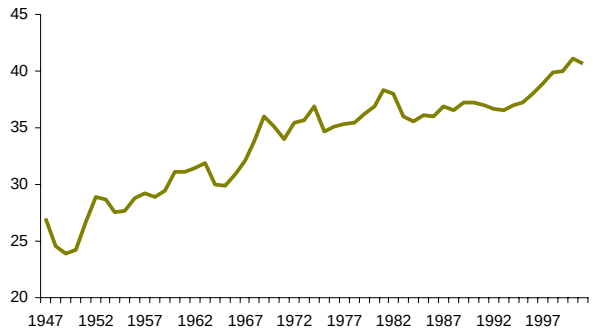

Fig. VIII. Graph of Effective Marginal Tax Rate

Appendix A:

Data Description

Unless otherwise stated, all variables are measured in natural logarithms.

Labour market variables

H_m^w, H_{mf}^w: Average hours worked per week by non-agricultural male and total (male and female combined) 16 years and over workers respectively.

H^y: average hours worked per year by manufacturing production workers.

w_m, w_f: Real median income before tax for full-time, year-round workers (15 years and over), respectively. Nominal wages are deflated by the consumer price index (CPI-U 1982=100). U.S. Census Bureau Historical Income Table P-36.

w: real hourly wage rate of manufacturing production workers. Nominal wages are deflated by the consumer price index (CPI-U 1982=100).

Other variables

a: U.S. annual aggregate advertising expenditure per capita at constant prices. The data used for advertising are taken from the Statistical Abstract of the United States and refer to the total of all advertising expenditure in the economy. Real advertising expenditures are deflated by GDP Price Deflator (1982 =100).

d_{short}: define a recession in terms of two consecutive quarters of decline in real GDP. These years are 1947, 1949, 1953, 1958, 1970, 1974, 1980, 1982, 1991 and 2001.

tax: effective marginal tax rate. Following Prescott (2004), we define the effective marginal tax rate as $\left(\frac{\tau_{ht}+\tau_{ct}}{1+\tau_{ct}}\right)\times 100$. τ_{ct} is a consumption tax, and τ_{ht} is a marginal tax rate on labour income. Tax rates are expressed in percentage points (e.g. 36.5) .

Data sources:

Labour market data are taken from the following sources: the Bureau of the Census, Annual Survey of Manufactures.

Advertising, Population, Real GDP, GDP Price Deflator and CPI-U data are taken from Statistical Abstract of the United States (various issues) published by U.S. Dept. of Commerce, Bureau of Census, Washington, D.C.

Income and consumption tax, U.S. Dept. of Commerce: Bureau of Economic Analysis, NIPA table.

Unit Root Tests:

The ADF regressions are given by

$$\Delta x_t = \alpha_0 + \alpha_1 x_{t-1} + \alpha_2 t + \sum_{i=1}^{p} \gamma_i \Delta x_{t-i} + \varepsilon_t$$

where p is set at the highest significant lag order from the partial autocorrelation function of δx_t.

Table III: Male-Female System Weekly Hours: Augmented Dickey-Fuller Unit Root Tests

Variable	No. of lags (p)	$H_0 : \alpha_1 = 0$	$H_0 : \alpha_1 = \alpha_2 = 0$
Levels:			
h_m	1	-2.652	-2.497
h_f	0	-1.182	-2.996
w_m	1	-2.878	-2.856
w_f	0	-1.859	-2.295
a	0	-0.523	-2.053
tax	0	-1.083	-2.365
First-Differenced:			
h_m	1	-4.815**	-4.644**
h_f	0	-6.081**	-6.332**
w_m	1	-3.846**	-4.047*
w_f	0	-4.163**	-4.184*
a	0	-4.458**	-4.339**
tax	0	-5.694**	-5.616**

Notes: *(**) denotes rejection of the hypothesis at the 5%(1%) levels respectively.

Table IV: Manufacturing Workers System Yearly Hours: Augmented Dickey-Fuller Unit Root Tests

Variable	No. of lags (p)	$H_0 : \alpha_1 = 0$	$H_0 : \alpha_1 = \alpha_2 = 0$
Levels:			
h_y	0	-2.600	-2.599
w	2	-4.303**	-2.834
a	0	-0.925	-2.452
tax	0	-0.821	-2.633
First-Differenced:			
h_y	0	-9.462**	-9.403**
w	1	-3.643**	-5.273**
a	0	-5.573**	-5.516**
tax	0	-6.627**	-6.565**

Notes: *(**) denotes rejection of the hypothesis at the 5%(1%) levels respectively.

Table V: Male-Female System Weekly Hours: VAR Lag Order Selection Criteria

Lag (*k*)	Male				Female			
	AIC	BIC	LM	JB	AIC	BIC	LM	JB
1	-35.653	-34.097	0.022	0.278	-35.393	-33.837	0.012	0.308
2	-36.171	**-33.504***	0.167	0.258	-35.732	**-33.066***	0.248	0.252
3	-36.813	-33.036	0.168	0.163	-35.379	-31.602	0.1945	0.200
4	-37.937	-33.049	0.827	0.289	-36.763	-31.875	0.792	0.314
5	39.241*	-33.241	0.630	0.836	38.008*	-32.009	0.4923	0.708

Notes: 1. * indicates lag order selected by the criterion

2. LM ~ $\chi^2(25)$ under the null of no first order autocorrelation

3. JB ~ $\chi^2(10)$ under the null of normality.

Table VI: Manufacturing Workers System Yearly Hours: VAR Lag Order Selection Criteria

Lag (k)	AIC	BIC	LM	Jarque-Bera
1	-27.491	-26.582	0.0394	0.4052
2	-27.579	**-26.064***	0.2460	0.5210
3	-27.732	-25.611	0.0235	0.3094
4	-27.837*	-25.109	0.3241	0.5532

Notes: 1. * indicates lag order selected by the criterion

2. LM ~ $\chi^2(16)$ under the null of no first order autocorrelation.

3. JB ~ $\chi^2(8)$ under the null of normality.

Table VII: Male-Female System Weekly Hours: Johansen Cointegration Test

Hypothesised No. of CE(s) $(k=1)$	*Male System*		*Female System*	
	Trace Statistic	Max-Eigen Statistic	Trace Statistic	Max-Eigen Statistic
$H_0: r = 0$	**82.347***	**42.993***	**83.216***	**40.622***
$H_0: r \leq 1$	39.354	23.625	42.593	42.627
$H_0: r \leq 2$	15.728	11.099	17.966	11.956
$H_0: r \leq 3$	4.629	4.459	6.009	5.569
$H_0: r \leq 4$	0.169	0.169	0.440	0.440

Notes: *(**) denotes significance at the 5% (1%) levels respectively.

Table VIII: Manufacturing Workers System Yearly Hours: Johansen Cointegration Test

Hypothesised No. of CE(s) $(k=1)$	Yearly Hours	
	Trace Statistic	Max-Eigen Statistic
$H_0: r = 0$	**50.615***	26.599
$H_0: r \leq 1$	24.016	14.678
$H_0: r \leq 2$	9.337	9.212
$H_0: r \leq 3$	0.125	0.125

Notes: *(**) denotes rejection of the hypothesis at the 5%(1%) level

Table IX: Male-Female System Weekly Hours: Standardised Cointegrating Vectors and Adjustment Coefficients

Normalized cointegrating coefficients: β (std.err. in parentheses)

	MALE HOURS	FEMALE HOURS
MALE	0.377	0.243
WAGE	(0.144)	(0.085)
FEMALE	0.468	**0.035**
WAGE	(0.171)	**(0.095)**
ADVERTISING	0.124	0.171
	(0.056)	(0.033)
TAX	-0.014	-0.006
	(0.002)	(0.001)

Notes: Female Wage is not significant.

Table X: Manufacturing Workers Yearly-Hour Systems: Standardised Cointegrating Vectors and Adjustment Coefficients

Normalized cointegrating coefficients: β (std.err. in parentheses)	
	YEARLY HOURS
WAGE	0.419
	(0.107)
ADVERTISING	0.263
	(0.051)
TAX	-0.013
	(0.003)

* Acknowledgement: Thanks for good comments to Natalie Chen, Nicholas Crafts, Dennis Mueller, Andrew Oswald, Geoff Renshaw, Jeremy Smith, Roger Sugden, Phil Tomlinson, participants at EUNIP 2004, Birmingham, Seminar at Department of Commerce, University of Birmingham and participants at IIOC 2006 Boston.

[1] Despite Galbraith [1967] having wrote persuasively on the subject. Also Rothschild [1942] and Baran and Sweezy [1966].

[2] Blanchard [2004] is not convinced by such calculations: he considers Prescott's assumption about the elasticity of labour supply far too high.

[3] In fact, 85% of American workers say they want more time with their family, and 46% of people want 'much more time' at home.

[4] Clearly this is a quite simplistic interpretation of the econometric results: it is simply intended as a rough guide to the possible quantitative significance of the effects.

[5] Schor argued that companies have shifted to having employees work overtime to handle extra demands, rather than hire extra personnel. Initially, overtime was intended to be more expensive to the employers forcing them to hire more workers and lessen the other workers' hours. However, this concept backfired. For many employers paying workers overtime is cheaper than hiring more workers and paying for their benefits.

[6] Bell and Freeman [1995] show that, although Americans work more hours than German workers (and workers in other European countries), they are still more likely to prefer additional hours than German workers are. Approximately 33 per cent of Americans want to work more hours and only 6 per cent fewer hours. Only 14 per cent of Germans, on the other hand, would like to work more and 10 percent would like to work less.

[7] American vacations average 8.1 days after a year on the job and only 10.2 days after three years, according to the Bureau of Labor Statistics [2003]. While many European workers in countries including France, where workers have a 35-hour workweek and five weeks of vacation.

[8] The report, issued by the International Labor Organization [2002], found that Americans added nearly a full week to their work year during the 1990's, climbing to 1,979 hours in 2001**,** up 36 hours from 1990. That means Americans who are employed are putting in nearly 49½ weeks a year on the job. Americans work 137 hours, or about three and one-half weeks, more a year than Japanese workers, 260 hours (about 6½ weeks) more a year than British workers and 499 hours (about 12½ weeks) more a year than German workers. The Japanese had long been at the top for the number of hours worked, but in the mid-1990's the United States surpassed Japan, and since then it has pulled farther ahead.

[9] The workers did experience increased preferences for marketed goods and services as a consequence of greater income that came with the longer work hours.

[10] Since the early 1980s, there have been marked changes in tax and welfare policies in the U.S.. For example, the number of tax brackets sharply diminished with the passage of the federal tax reform in 1986. In-work benefits increasingly became the main platform for encouraging low-income families to increase their work effort and incomes. In 1996, the U.S. adopted sweeping reforms in its welfare systems; all were designed to induce recipients to support themselves through work (see also Blundell and MaCurdy [1999]).

[11] See, for example, Pencavel [1986].

[12] During recessions, employers are no longer indifferent about hours of work; cutting overtime and putting workers on short time may be preferable alternatives to redundancies, forcing workers off their long-run supply schedule.