Does the Fairness of the Distribution of Wealth Affect Individual Labour Supply?

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Abstract

Expanding on the theory put forward by Akerlof (1980) on the role of social custom in economic behaviour, this paper develops a simple theoretical model that explains how an individual's labour supply decision may be affected by the fairness of the wealth distribution. The accompanying empirical analysis supports the theoretical conclusion that individual labour supply and the fairness of the wealth distribution may be positively related. Specifically, using panel data, the within-group estimates reveal that for the average male employee, labour supply tends to fall as fairness perceptions of the wealth distribution becomes more unfavourable. Where productivity is concerned, this study may help understand the differences between egalitarian and less egalitarian societies.

Key words: Social norms; Labour supply; Fairness; Wealth distribution
JEL Classification: C23; C25; D11; D12; D31; D63; J22

1 Introduction

Wealth inequality and its effects are a matter of huge concern for the global body politic. In fact, it has remained a preoccupation of both economists and politicians. Notwithstanding, wealth inequality has continued to increase within countries (see Korzeniewicz and Moran (1997), Föster and Pearson (2002) and Milanovic (2002) *inter alia*) and between countries (see Goodman (2001) and Sala-i-Martin (2002) *inter alia*). In response, many individuals engage in protests[1]. Some of these protests are vocal and often take the form of visible demonstrations. Others are less visible as in the case of individuals engaging in non-paid voluntary activities aimed at helping the disadvantaged or refusing to support governments or companies thought to be purveyors of inequality.

The prevalence of voluntary activities in the UK is revealed from surveys commissioned by the Institute for Volunteering Research (IVR) in 1991 and 1997[2]. It was found that in both years, approximately 50 percent of the UK adult population engaged in formally organised voluntary activities (which is defined as work arranged through an organisation) whilst well over 70 percent was involved in informal voluntary activities (that is, work done on an individual basis). What is more substantive and salient is the finding that the number of hours that the existing volunteers spent per week on voluntary work increased by 50 percent – up from an average of 2.70 hours in 1991 to 4.05 hours in 1997[3]. Much of this increase was due to a growth in activities aimed at

[1]Some might argue that an unequal wealth distribution has been the catalyst for much of the recent conflict within and across nations and the ensuing protests.

[2]The first survey was carried out in 1981. The reports are available via the web site at www.ivr.org.uk.

[3]The total number of hours volunteered increased from 62 million in 1991 to 88 million in 1997.

helping the disadvantaged.

The increase in the number of hours spent on voluntary work coincides with an increase in wealth inequality in the UK. From 1991 to 1997, the percentage of wealth owned by the top 10 percent of the wealthiest individuals, increased from 47 percent to 54 percent[4]. Evidence from the IVR surveys suggest that these two may indeed be correlated. It was discovered that a large proportion of individuals who undertake voluntary work do so for purely altruistic reasons and many believe that there would be no need for volunteers if the government met all its obligations such as, one would imagine, achieving a more equitable wealth distribution.

Individuals' volition to take action that are clearly costly to them (for example, lost labour income or more broadly lost consumption) can be rationalised by the existence of social norms. Social norms are a pervasive part of economic life and thus, can exercise decisive influence over individuals' decision process. Their violation by self or by others may lead to a loss of "psychic income" and the underprovision of a public good.

The survival of norms depends on the willingness of individuals to act in ways that enforces and preserves them. Ergo, it can be argued, if there is a general concern for fairness and the norm of fairness is violated, as in the case of an unfair wealth distribution, individuals will seek to reduce the consequent loss of psychic income and maintain this public good by devoting time and effort towards activities aimed at restoring a fair state. In this way, wealth inequality may be negatively correlated with the time dedicated to labour market work. At this juncture, it is interesting to note that it is employed individuals who are most likely to do voluntary work[5].

[4]Data are obtained from the Office of National Statistics, which are available at http://www.statistics.gov.uk.

[5]This is based on the findings of the 1991 and 1997 surveys on voluntary work commissioned by

However, it is not possible to rule out *a priori* a positive relationship between wealth inequality and hours of work. For instance, it is possible that greater inequality in society may serve to undermine or erode social norms and encourage more individualistic and competitive behaviour. As a result individuals would be motivated to work harder[6].

Yet, though there exists broad awareness of the impact of wealth inequality at the macro level, particularly in the case of productivity[7], little is known of its influence on the micro level choices of individuals, which one might expect to lie behind the macro outcomes. Certainly, it does not appear that there are any studies which have sought to discover whether individual labour supply responds in a meaningful way to changes in the equality or fairness of the wealth distribution. On the other hand, whilst there are microeconomic analyses of the impact of fairness violations by one agent on the effort choice of the individual who is directly affected (see Adams and Rosenbaum (1962) and Fehr *et al* (1993) *inter alia*), the importance of individuals concern for distributional fairness, that is whether they are directly affected by unfairness or not, is often overlooked.

This paper thus seeks to investigate whether an unfair wealth distribution has a deleterious impact on labour supply. It finds that, for male individuals, labour supply decisions are not based solely on pecuniary concerns. Indeed, concern for a fair wealth distribution matters.

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the Institute for Volunteering Research.

[6]That is, individuals might seek to keep up with the Joneses and ahead of the Smiths by working harder in order to increase income.

[7]See for example the influential works of Galor and Zeira (1993) and Persson and Tabellini (1994) *inter alia*.

The rest of the paper is organised as follows. In Section 2 a brief overview of the related literature is provided. Section 3 develops a simple theoretical model to explain how an unfair wealth distribution may impact on the labour supply decision of the individual. The theoretical predictions of the model then form the basis of the empirical analysis which is presented in Section 4. Section 5 concludes.

2 A brief overview of related studies

The labour supply of individuals represents perhaps the most productive resource of an economy. Hence, understanding what determines individual labour supply is of paramount importance and indeed much effort has been dedicated to the study of the determinants of labour supply. A systematic analysis of some of the major studies can be found in Ashenfelter and Layard (1986). Nonetheless, there remains a paucity of studies that explore the importance of factors that reflect individuals' values and opinions.

As with other aspects of life, an individual's labour market behaviour is shaped in part by social norms. For instance, in some societies male members are expected to be in full-time employment and to be the main bread winners whereas the same level of attachment to the labour market is not expected from female members. Instead, women are expected to devote more time to the care of the home and community. Therefore, social norms that prescribe the societal roles of men and women may influence the amount of time the individual commits to labour market work (see for example Stutzer and Lalive (2001), Feldman(2002), and Cornwell *et al* (2000)) and even how much effort he expends (see Levine (1992)). Whilst these studies provide implicit reasons why social norms may affect labour market behaviour they do not provide a formal framework within which the effect of social norms on marginal choices might be established.

The theoretical model of Akerlof (1980) offers a more formal conceptualisation of

this implicit proposition that social norms affect marginal choices. Extending the standard utility function, Akerlof (1980) demonstrates how social customs may enter non-additively in the utility function and in so doing affect labour market behaviour. His approach rests on the premise that when there is a common willingness to punish those who deviate from accepted behaviour, the desire to pursue pecuniary gains is tempered by the costs of deviation. Building further on this idea while narrowing the focus, de Neubourg and Vendrik (1994) illustrate how some social norms can influence the labour supply decision of the individual and how these norms may account for the differences between male and female labour supply behaviour. However, these studies only concentrate on what may be described as local violations of norms in that they restrict consideration to how an individual's behaviour is affected if he violates a social norm. Neither study has explicitly considered how an individual's economic behaviour is influenced by the violation of social norms at the global level. Likewise, it appears that most studies focusing on specific norms prefer to concentrate on local violations, be it by the individual in concern or by some other agent.

A particular norm, which has attracted considerable attention of late, is the norm of fairness. Where work is concerned, fairness considerations appear to play a role in effort choice determination. This is persuasively corroborated by theoretical arguments such as that of Akerlof (1982) and Akerlof and Yellen (1990) and supported by experimental evidence both in the social psychology and economics literature. Studies such as those by Adams and Rosenbaum (1962), Andrews (1967), and Fehr *et al* (1993) *inter alia* conclude that effort is positively related to the (perceived) fairness of the pay received. They typically found that fairness concerns affect individuals' effective labour supply. Specifically, it was found that when individuals are treated unfairly with regard to pay, they respond by reducing their effort level and when they believe they are generously remunerated, they appear to increase their effort levels above the minimum required. In other words, individuals appear to abide by the ethos 'a fair day's work for a fair

day's pay'.

Of course, it is not only the fear of retribution for violating the norm of fairness nor when unfairness is directed towards them that individuals care about fairness. Individuals have a preference for fairness which is seen, for example, through their wish to support redistributive measures (see Carlsson *et al* (2001), Fong (2001) and Corneo and Grüner (2002) *inter alia*)[8] and their desire to punish those who are reputed to behave unfairly regardless of the object of the unfairness (see for example, Thaler (1985) and Kahneman *et al* (1986a, 1986b)). Indeed, when the norm of fairness is violated, individuals suffer a loss of psychic income. That is, unfairness is a bad that leads to 'cognitive dissonance'. This means that preference for fairness would be in conflict with the experience of unfairness. Moreover, individuals feel displeasure because of associated emotions such as guilt, pity and anger. As a result, they may take remedial action, which includes changing their beliefs to achieve consonance, in an attempt to reduce this loss. Coupled with the proposition that social norms affect marginal choices, this implies that concerns for distributional fairness can instruct much of the individual's decision-making not least his labour supply choice.

On the whole, it can be said that, through theoretical arguments and experimental evidence, the literature has succeeded in showing that economic behaviour may be informed by social norms and, of importance here, that an individual's effective labour supply may respond to unfairness particularly when the individual is directly affected by the unfair outcome. Hitherto however, it does not appear that there are any studies that endeavour to discover whether and how global concerns for fairness might affect microeconomic choices. This present study addresses this gap in the literature by

[8]This is lucidly conveyed by the statement "People might not support the redistributive program which maximizes their private benefit, but the one which conforms with their vision of what constitutes a good policy for society as a whole" (Corneo and Grüner (2002)).

providing an analysis of the possible effects that concerns for distributional fairness may have on labour market behaviour. It also complements existing experimental studies by providing a non-experimental analysis of the role of fairness perceptions in shaping individual labour supply behaviour.

3 How might the fairness of the wealth distribution affect labour supply?

3.1 *A basic framework*

The canonical model of labour supply often presented in textbooks postulates that an individual's labour supply decision rests upon the maximisation of the following utility function:

$$U(X, L) \tag{1}$$

subject to:

$$PX \leq Y = Y_n + wH \quad \text{(income budget constraint)} \tag{2}$$

$$T = H + L \quad \text{(time budget constraint)} \tag{3}$$

where T is the total time available, H is the number of hours out of T spent working and L is the total time out of T spent on leisure, which is taken here to represent time spent engaged in activities other than labour market activities. Total disposable income, Y, consists of non-labour income, Y_n, and labour income, wH, with w being the hourly wage rate. All the goods and services consumed by the individual is represented by X and P is the price of this composite commodity.

The role of non-pecuniary preferences, such as fairness considerations, in shaping individual's labour supply choice is largely ignored in this model. Instead emphasis is essentially placed on pecuniary preferences. This is however, an inadequate representation of the reality. As is now widely accepted by economists, non-pecuniary concerns can and do have decisive bearing on microeconomic outcomes[9]. Of particular relevance here is the model of de Neubourg and Vendrik (1994). Following the model of Akerlof (1980), they argue that social norms enter non-additively in the utility function and can therefore shape labour market behaviour.

Maintaining the assumption that social norms affect marginal choices, the canonical model is reformulated in this study to explicitly take into account the norm of fairness a propos the wealth distribution. For the sake of simplicity, it is assumed that the societal norm of fairness is both well-established and accepted by all, though agents care to different extents about the fairness of the wealth distribution. Hence, individuals are believed to be both altruistic in that they care that others are treated fairly, feeling discomfort when they are not and self-centred, that is to say they care that they as individuals are treated fairly, feeling resentful when they are not (for reasoning, see Adams (1965), Kahneman *et al* (1986b), and Fehr and Schmidt (1999) *inter alia*). Stated differently, individuals can be said to be inequality averse (Carlsson *et al* (2003)). This implies that any activity geared towards reducing unfairness will be utility increasing and more so the higher the existing level of unfairness[10]. The intuition for this rests on the law of diminishing marginal returns – the marginal benefit of extra fairness-increasing work to a fair society is less than the marginal benefit of extra

[9]Elster (1998) contains a survey of studies that consider the impact of non-pecuniary concerns on economic behaviour.

[10]It seems reasonable to suggest that when things in society are unfair, there is a heightened sense that voluntary work is important.

fairness-increasing work to a society with a lower level of fairness. For that reason, it is assumed here that individuals devote time to fairness-increasing activities, which is more rewarding the higher the level of unfairness[11].

So then, the individual chooses his optimal labour supply by maximising the utility function:

$$U = U(X, \hat{L}, V, F; \theta) \tag{4}$$

The function U is assumed to be concave and strictly increasing in X and $\hat{L}$. As before, X represents a composite good, which includes 'consumption' such as charitable donations. The amount of time the individual devotes to fairness-increasing activities, such as helping in the vocational training of individuals in need and fundraising to help supplement the incomes of the poor, is given by V and the leisure time enjoyed by the individual is denoted by $\hat{L}$. In this case, $\hat{L}$ is the time spent on activities other than labour market and fairness-increasing activities[12]. In line with Romer (1984), the assumption is made that the norm of fairness can be violated to various degrees ranging from an wholly unequal distribution of wealth to a completely fair distribution of wealth. This is captured by the parameter $F \in [0, 1]$ with increasing values of F symbolising an increasingly fair distribution. The extent to which the individual cares about fairness is represented by θ[13]. The canonical model obtains when $\theta = 0$, in which

[11]This can also be rationalised in terms of a demand framework. The greater the demand for fairness, the higher is the 'shadow price' or value of fairness-increasing activities.

[12]This is similar to the assumption in the allocation of time model by Becker (1965), later formalised by Gronau (1977), that individuals maximise utility by dividing their time optimally between leisure, labour market work, and home production.

[13]Whilst an individual's preferred way of solving the problem of unfairness might depend on income

case utility is independent of the wealth distribution.

Using the quadratic form of de Neubourg and Vendrik (1994), the individual's direct utility function can be written as:

$$\underset{\{V,H\}}{Max}\ U = \alpha + \beta X - \frac{1}{2}\varphi X^2 + \gamma \hat{L} - \frac{1}{2}\kappa \hat{L}^2 - \delta\theta c\,(Y, 1-F) + \xi\theta(1-F)V, \qquad (5)$$

subject to:

$$X \leq Y = Y_n + wH \quad \text{(income budget constraint)} \qquad (6)$$

$$T = H + \hat{L} + V \quad \text{(time budget constraint)} \qquad (7)$$

where P is normalised to 1 for simplicity and θ has some unknown distribution among individuals[14]. The second to last term, $\delta\theta c(Y, 1-F)$, describes the utility loss when wealth is unfairly distributed[15]. The cost of unfairness, c, embodies the cognitive dissonance and the social problems, such as crime, that arise because of the unfair wealth distribution. This cost is magnified by the level of unfairness on the account that cognitive dissonance is felt more keenly and social problems are more prevalent, the greater the level of unfairness (see Kelly 2000 for empirical evidence). On the other

(for instance, his preference for redistribution), his feelings *per se* towards unfairness should not. There is no *a priori* reason to suppose that as an individual gets wealthier he becomes inured to unfairness, caring less and less about the well being of others. Certainly, not many people would claim to be less concerned about fairness as their income grows.

[14]Note that the parameters $\alpha, \beta, \varphi, \gamma, \kappa, \delta$, and ξ represent positive constants.

[15]This is in like spirit to a similar term in the model of Akerlof (1980) and de Neubourg and Vendrik (1994). In these models, the cost is a result of the *individual* disobeying a norm he believes in.

hand, the cost of unfairness is moderated as income rises insofar as the individual is able to reduce cognitive dissonance by making charitable donations or living in neighbourhoods where reminders of inequality are fewer. The individual can also limit exposure to social problems by purchasing insurance for instance, or by investing in a safer neighbourhood. Therefore, $\frac{\partial c}{\partial Y} < 0$ and $\frac{\partial c}{\partial F} < 0$. The final term represents the gain in utility from addressing unfairness, which is greater the higher the level of unfairness[16].

Substituting the constraints of equation (6) and (7) into the objective function, the interior solution for the optimal time spent on labour market work, (H^*), satisfies the following expression:

$$\frac{\partial U}{\partial H} = \beta w - \varphi(Y_n + wH)w - \gamma + \kappa(T - H - V) + \delta\theta c_H(Y_n + wH, 1 - F)w = 0 \quad (8)$$

Therefore:

$$H^* = \frac{(\beta - \varphi Y_n + \delta\theta c_H(.))w - \gamma + \kappa(T - V)}{\varphi w^2 + \kappa}, \quad (9)$$

where $c_H(.) = c_H(Y_n + wH, 1 - F)$.

Similarly, the interior solution for the optimal time spent on fairness-increasing activities, (V^*), is given by:

$$\frac{\partial U}{\partial V} = -\gamma + \kappa[T - H - V] + \xi\theta(1 - F) = 0 \quad (10)$$

[16]It is these last two terms, the time constraint of equation (6) in which V is added, and the fact that the violation of the norm is taken to be exogeneous that fundamentally distinguishes this model from that of Akerlof (1980) and de Neubourg and Vendrik (1994) and makes it novel.

This leads to:

$$V^* = \frac{-\gamma + \kappa(T - H) + \xi\theta(1 - F)}{\kappa} \tag{11}$$

Solving equations (9) and (11) simultaneously yields[17]:

$$H^* = \frac{(\beta - \varphi Y_n + \delta\theta c_H(.))w - \xi\theta(1 - F)}{\varphi w^2} \tag{12}$$

and

$$V^* = -\gamma + \kappa T - \frac{\kappa}{\varphi w}\left[(\beta - \varphi Y_n) - \varphi\theta c_H(.)\right] + \left(\frac{\varphi w^2 - \kappa}{\varphi w^2}\right)\xi\theta(1 - F) \tag{13}$$

Succinctly written, $H^* = H^*(Y_n, \theta, c_H(.), w, F)$ and $V^* = V^*(T, H, Y_n, \theta, c_H(.), w, F)$.

It can be deduced from equation (12) that at a sufficiently low wage rate, a rise in w will lead to an increase in H^*. Likewise, when w is sufficiently high, a rise will lead to a fall in H^* and as w approaches infinity, H^* will approach zero. Thus, for certain combinations of the parameters, it is expected that equation (12) will admit backward-bending labour supply.

[17]The Hessian determinant is evaluated to ensure that V^* and H^* satisfy the sufficient second order condition for a maximum. It is found that the Hessian Matrix is negative definite and so satisfies the determinantal criteria for a maximum. See Appendix A for a complete the solution.

3.2 *Comparative statics*

3.2.1 *The effect of F on H*

The effect on the optimal labour supply given a change in how fairly wealth is distributed can be evaluated by differentiating equation (12) with respect to F. This yields:

$$\frac{\partial H^*}{\partial F} = \frac{\xi\theta - c_{HF}(.)w}{\varphi w^2 - \delta\theta c_{HH}(.)w}, \tag{14}$$

where $c_{HF}(.) = c_{HF}(Y_n + wH, 1 - F)$.

From examining equation (14), it is seen that the overall sign of $\frac{\partial H}{\partial F}$ is unclear – the denominator is clearly positive since, by concavity, $c_{HH}(.) < 0$ but the sign of $c_{HF}(.)$, the change in the marginal benefit of income due to a change in fairness, is unknown. Hence, *ceteris paribus*, labour supply is positively affected by increases in the fairness of the wealth distribution if $c_{HF}(.) \leq 0$. If however $c_{HF}(.) > 0$, the effect of a change in F on H is ambiguous[18]. The results can be summarised in the following proposition:

[18]The question then is "given that an increase in fairness reduces cognitive dissonance and the incidence of social problems, does an increase in fairness lead to a decrease in the benefit of spending an additional unit of income to reduce cognitive dissonance or exposure to social problems such as crime?". Intuitively, the answer to this question seems to be 'yes'. A possible rationale is that when the wealth distribution is unfair, individuals suffer cognitive dissonance and social problems are more prevalent (see Kelly (2000)). Hence, individuals will be motivated to spend some of their income on measures to reduce cognitive dissonance and to limit exposure to social problems. However, with an increase in fairness comes a reduction in cognitive dissonance and social problems. Consequently there is less need to spend to reduce cognitive dissonance and exposure to social problems. Therefore, it can be argued that the benefit from spending an extra unit of income to reduce cognitive dissonance and exposure to social problems is greater the greater is unfairness. The corollary follows that as the wealth distribution becomes more fair, the benefit from spending an additional unit of income to reduce cognitive dissonance and social problems is less.

Proposition 1: *If an increase in the level of fairness reduces the benefit of spending an extra unit of income to reduce cognitive dissonance or exposure to social problems, then as the distribution of wealth becomes more unfair (fair), the individual will decrease (increase) the number of hours worked.*

Proof: See equations (14) ■

3.2.2 *The effect of F on V*

Differentiating equation (13), the effect of a change in the level of the fairness of the wealth distribution on the optimal amount of time spent on fairness-increasing activities is given by:

$$\frac{\partial V^*}{\partial F} = \frac{\delta\kappa\theta}{\varphi w}\left(\frac{c_{HH}(.)(\xi\theta - c_{HF}(.)w)w - c_{HF}(.)(\varphi w^2 - \delta\theta c_{HH}(.)w)}{\varphi w^2 - \delta\theta c_{HH}(.)w} + \frac{\kappa\xi - \varphi w^2}{\delta\kappa w}\right),$$

which is ambiguous.

The next section focuses on the empirical veracity of the theorised relationship between labour supply and the fairness of the wealth distribution.

4 Empirical Analysis

4.1 *The data and sample*

The data used here are five waves – waves 1, 3, 5, 7 and 10 – of the British Household Panel Survey (BHPS)[19], which is a nationally representative household-based survey of

[19]Panel data is preferred to cross-sectional data as it makes it possible to control for changes in job and individual characteristics including unobservable characteristics. Further, it reduces the problem

approximately 5,500 households (more than 10,000 individuals) randomly drawn from 250 different areas of the United Kingdom. The first wave interviews were conducted during the autumn of 1991, and annually thereafter during the same time period (see Taylor (1996) for further details on the BHPS).

To avoid the complications normally encountered when estimating female labour supply functions – not least data limitations in effectively modelling labour force participation – the empirical analysis is restricted to male workers[20]. Data are used only for individuals with valid information, who are aged 16 to 64 and are currently employees, providing positive hours of work[21]. This results in a final sample of 12,097 person-year observations. Among male employees the average age is 37 years and the mean hourly wage is £8.84. Descriptive statistics for the set of variables used in the analysis are presented in Table 1. Table 1 also includes descriptive statistics on the non-job variables for the original male sample. A comparison of the two show that sample selection bias may be minimal. Further descriptive statistics for selected demographic characteristics are shown in Tables 3 and 4.

Beside the standard labour market analyses, the BHPS also allows for the study of the relationship between individuals' beliefs and their economic behaviour. The waves used here contain additional data on individuals' perception of how fairly wealth is

of multicollinearity.

[20]This is commonly done in the literature and as Pencavel (1986) remarked "I know of no evidence from empirical studies of male labor supply (whether old, young, or prime-age men) that documents grievous biases from strategy of restricting estimation to the sample of workers and of not making any correction for this deliberate non-random selection of the observations".

[21]Self-employed individuals are excluded in order to avoid problems associated with the measurement of the hourly wage and hours of work for this group.

distributed in the United Kingdom[22]. This is garnered from the following question:

> *...which answer... comes closest to how you feel about the following statement? Ordinary people get their fair share of the nation's wealth:*
>
> 1. *Strongly Disagree*
> 2. *Disagree*
> 3. *Neither Agree/Disagree*
> 4. *Agree*
> 5. *Strongly agree*

This question requires individuals to evaluate the fairness of the wealth distribution and it forms the main explanatory variable of interest. Given the low percentage of those stating that they strongly agree (only 0.57 percent), categories 4 and 5 are grouped together as 'Agree'. Of the entire sample, 15.00 percent state that they strongly disagree with the statement, 49.91 percent state that they disagree, 15.28 percent state that they agree and 19.80 percent claim that they neither agree nor disagree with the statement.

Following from the theoretical model, it is assumed that voluntary work is the key fairness-increasing activity. However, an unfortunate limitation of the data is that there is no adequate information on the time individuals spend engaged in voluntary work[23]. Hence, it is not possible to test the exact transmission mechanism between F

[22]It is this variable, which forms part of the rolling core of questions in the BHPS, that determines the waves used.

[23]For the first four waves used here, the specific question on voluntary work focuses only on groups registered as a 'Voluntary Service Group'. It does not account for the many other groups and individuals that participate in voluntary work. Moreover, the percentage of individuals responding is quite low (only 2.5 percent) and upon inspection is not sufficient enough to yield precise estimates.

and H.

A valuable aspect of the sampled data is that they span a period within which two different political parties assumed power in the UK – the Conservative party was succeeded by the Labour Party in 1997 after 18 consecutive years in office. This is of importance because it offers reasons to believe that there is variation in the data, which is necessary to carry out meaningful analysis. Individuals' perception of how fairly wealth is distributed is likely to have changed given that the political persuasions of these opposing parties are associated with different social policies. Changes in male employees perception of the fairness of the wealth distribution over the years are shown in Table 4. The figures indicate that there is a reasonable degree of variation. It is seen that when the left came into power in 1997, there was a noticeable increase in the proportion of men who agreed that wealth is fairly distributed in the UK. This was matched by a marked decline in the proportion who disagreed that it is, although in 2000 that proportion increased slightly relative to 1997. The proportion of those who hold a neutral opinion on the fairness of the wealth distribution has fluctuated over time. These individuals are probably more prone to change their opinion on the fairness of the wealth distribution than those who hold a firm opinion. In general, the same pattern is evident for both the unmarried and married male sub-samples though not strictly so[24].

The dependent variable is actual weekly hours of work. On average, men work 39 hours a week as shown in Table 5 and this remains relatively constant over time. Thus, *prima facie*, there is no reason to suppose that fairness perceptions of the wealth distribution of the wealth distribution and hours of work move in tandem over time.

[24]In contrast to a fall between 1993 and 1995 for the entire sample, there is a rise in the proportion of those who agree that wealth is fairly distributed for the unmarried sub-sample. For the married sub-sample, there is rise in the proportion between 1993 and 1995 of those who strongly disagree that wealth is fairly distributed whereas for all male employees there is a fall.

However, from Figure 1 it can be seen that there is a positive relationship between the perception of the fairness of the wealth distribution and the labour supply of men. Male employees who believe that wealth is fairly distributed work, on average, the most hours while those who strongly disagree, on average, work the least. As is seen from the graph, this relationship is especially strong for married male employees.

In short, a cursory glance at the raw data leads to the preliminary conclusion that for male employees, opinions of the fairness of the wealth distribution is positively correlated with labour supply. This is, however, a crude analysis of the data and it is possible that the observed relationship could be explained by other mechanisms. A formal empirical analysis is presented in the next section.

4.2 *Model specification and estimation*

From the theoretical model, the reduced form hours equation, for individual i at time t, is assumed to be approximated by the following linear form[25]:

$$H_{it} = w_{it}\beta_1 + F_{it}\beta_2 + \mathbf{X}_{it}\mathbf{\Gamma} + \alpha_i + u_{it}, \tag{15}$$
$$i = 1, ..., N;\ t = 1, ..., T;$$

where H_{it} is actual weekly hours of work, and w_{it} is the natural logarithm of the gross hourly wage rate. The variable F_{it} represents the individual's opinion on how fairly wealth is distributed and the other exogenous variables, both time-varying and time-invariant, are contained in the 1 x k vector $\mathbf{X}_{it}$[26] with β_1, β_2, and $\mathbf{\Gamma}$ being the parameters

[25]Although it is based on rather restrictive assumptions, this type of labour supply function is probably the most popular in the empirical literature.

[26]The variables included in $\mathbf{X}$ are guided by economic theory and data availability. These are age and its square, non-labour income, household size, managerial status, job term, union recognition, marital status, health status, the unemployment rate and the usual intercept term.

to be estimated. The time-invariant random error term, α_i, captures the effects of unobservable individual-specific heterogenous characteristics. The idiosyncratic error term, given by u_{it}, is assumed to be independently identically distributed $(i.i.d)$ with mean zero and variance σ^2. As is customarily assumed, $(u|\mathbf{Z}_{i1}, ..., \mathbf{Z}_{iT}, \alpha_i) = 0$, where $\mathbf{Z} = [w, F, \mathbf{X}]$.

4.2.1 *Unobserved Heterogeneity*

An important issue that must be addressed to ensure consistent and efficient parameter estimates is the relationship between the unobserved individual heterogeneity term and the observed explanatory variables. If α_i is arbitrarily correlated with the observed explanatory variables, a fixed effects estimation approach will yield consistent and efficient estimates but the GLS (random effects) estimator would be inconsistent. On the other hand, if $E(\alpha_i|\mathbf{Z}) = E(\alpha_i) = 0$, that means α_i is orthogonal to the observed explanatory variables, both a random effects estimation and a fixed effects estimation would give consistent and efficient estimates but the within-group (fixed effects) estimator would be inefficient. Therefore, under the null hypothesis that α_i is uncorrelated with the observable explanatory variables, the two estimators should not differ systematically.

Hausman (1978) proposed a test based on the difference between the two estimators to determine which of the methods of estimation is most appropriate. To illustrate, let δ_{FE} be the 1 x m vector of within-group estimates on the time-varying observables and likewise let δ_{RE} be the 1 x m vector of GLS estimates on the time-varying observables. Then, the H statistic is given by

$$H = \left[\hat{\delta}_{FE} - \hat{\delta}_{RE}\right]' \left[\hat{cov}(\hat{\delta}_{FE}) - \hat{cov}(\hat{\delta}_{RE})\right]^{-1} \left[\hat{\delta}_{FE} - \hat{\delta}_{RE}\right] \tag{16}$$

and is distributed $\chi^2_{(m)}$ where m denotes the degrees of freedom. The terms $\hat{cov}(\hat{\delta}_{FE})$

and $\hat{cov}(\hat{\delta}_{RE})$ are consistent estimates of the asymptotic covariance matrices of δ_{FE} and δ_{RE} respectively. The implementation of this tests yields $\chi^2_{(22)} = 154.48$, which against the 10 percent critical value of 30.81 leads to a rejection of the random effects model[27]. Hence, the analysis employs a fixed effects model.

For the case of the linear fixed effects specification[28] this requires transforming equation (13) by first averaging all variables over $t = 1, ..., T$ to get the cross-section equation:

$$\bar{H}_i = \bar{w}_i\beta_1 + \bar{F}_i\beta_3 + \bar{\mathbf{X}}_i\mathbf{\Gamma} + \alpha_{1i} + \bar{u}_i \tag{17}$$
$$i = 1, ..., N;\ t = 1, ..., T;$$

$$\text{where } \bar{H}_i = \frac{1}{T}\sum_{t=1}^{T} H_{it},$$
$$\bar{w}_i = \frac{1}{T}\sum_{t=1}^{T} w_{it},\ \bar{F}_i = \frac{1}{T}\sum_{t=1}^{T} F_{it},$$
$$\bar{\mathbf{X}}_i = \frac{1}{T}\sum_{t=1}^{T} X_{it}, \text{ and } \bar{u}_i = \frac{1}{T}\sum_{t=1}^{T} u_{it}$$

Equation (15) is then subtracted from equation (13). This gets rid of the heterogeneity and gives the fixed effects estimating equation:

[27]The random effects model is also rejected at the 1 percent and 5 percent significance level.

[28]It is should borne in mind that as in the random effects specification, the α_is are still regarded as random in the fixed effects linear model (see Mundlak (1978)) but in contrast, they are treated as parameters to be estimated.

$$H_{it} - \bar{H}_i = (w_{it} - \bar{w}_i)\beta_1 + (F_{it} - \bar{F}_i)\beta_3 + (\mathbf{X}_{it} - \bar{\mathbf{X}}_i)\mathbf{\Gamma} + (u_{it} - \bar{u}_i) \tag{18}$$
$$i = 1, ..., N;\ t = 1, ..., T$$

By using fixed effects estimation, it is possible for the necessary orthogonality condition to hold (that is, $E(\alpha_i|\mathbf{Z}_{it}) = 0$) while still being able to allow for $E(\alpha_i|\mathbf{Z}_{i1}, ..., \mathbf{Z}_{iT})$ to be any function of the **Z**s. This ability to provide a more robust answer to the omitted variables problem *vis-à-vis* random effects estimation is a very attractive advantage of fixed effects estimation. Moreover, the problem of sample selection bias is generally presumed to be less of a concern since α_i is removed from the estimating equation thereby eliminating the drawback of any correlation with u_{it} (see Vella (1998))[29]. Given this and the information in Table 1, which shows a very close similarity between the descriptive statistics for the sample of male employees and the original male sample, it will be assumed that sample selection bias is not a cause for concern here.

4.2.2 *The endogeneity of wages*

It is widely acknowledged that wages may be endogenous in an hours equation. Consequently, the ordinary least squares (OLS) estimate will be biased and the consistency of the other estimators may be affected. Here, two reasons for this possible endogeneity are that: (1) hourly wages is not reported directly and must be derived by dividing labour income by hours worked. Therefore, any measurement errors in hours may give rise to what is referred to by Borjas (1980) as a 'division bias'. In other words, a downward bias to the estimated wage coefficient as a result of spurious correlation between hourly wage, w_{it} and the error term, u_{it}, in the hours equation may emerge. (2) unobservable characteristics that influence wages may be correlated with unobservable

[29]Nonetheless, if the idiosyncratic error term in a labour force participation equation is correlated with u_{it}, selectivity bias will not necessarily be mitigated by fixed effects estimation.

characteristics that affect hours of work in the same direction. For instance, individuals with high aspirations may have higher wages and such individuals may also enjoy working[30]. A regression-based test for endogeneity confirmed here that the wage is endogenous in the hours equation[31].

To account for the endogeneity of wages, the instrumental variables (IV) technique is used. This involves finding an instrument G_{it} that is correlated with wages but not directly associated with hours of work. If this condition is met, the IV estimate of the coefficient on wages is consistent. Moreover, the greater the correlation between wages and G_{it}, the more efficient the estimates.

The choice of appropriate instruments remains controversial. Most instruments used to control for the endogeneity of wages in an hours equation are often thought to be of poor quality. Usually, these instruments are weak predictors of wages or it is not clear that they should be excluded from the hours equation. Typically, studies use years of education, age (and its square), and experience (and its square) as instruments. However, as Pencavel (1986) noted, education does have an effect on hours of work. Furthermore, the strong age profile normally found in hours of work equations make age and experience questionable instruments. Certainly, it is extremely difficult to find the perfect instrument. Instead, researchers must endeavour to use instruments that meet the requirements of validity as recommended by Bound *et al* (1995) and Staiger

[30]For a further brief account on why wages are considered endogenous in the labour supply model, see Biddle and Zarkin (1989).

[31]This test was proposed by Hausman (1978, 1983). It was carried out by first performing a fixed effects regression of w_{it} on F_{it}, $\mathbf{X}_{it}$, α_i, and an instrument, which is discussed shortly, and obtaining the residuals v_{it}. Thereafter, a fixed effects regression of H_{it} on w_{it}, F_{it}, $\mathbf{X}_{it}$, and v_{it} was conducted. The coefficient on v_{it} was then tested for significance. The T-statistic for the coefficient was 0.048, which at the 5 percent significance level, confirms that wage is endogenous in the hours equation.

and Stock (1997). To this end, in this study, the life expectancy of men at age 65 is used as an instrument for wages[32]. It is expected that there will be an upward pressure on current wage as life expectancy at retirement age increases. This is because pension contribution would need to rise to finance consumption after retirement. This would have implications for wage bargaining and in general the wage package offered by firms. Beyond any effect through wages, life expectancy at 65 is not thought to have a direct impact on current weekly hours of work and is assumed to be uncorrelated with u_{it}. That is to say, it is assumed that life expectancy at age 65 affects the demand for labour but not the supply thus making identification possible.

For validity, the life expectancy variable must satisfy two main requirements. Firstly, it must be strongly correlated with. Secondly, beyond its impact through wages, it should be uncorrelated with labour supply[33].

The test results support the appropriateness of life expectancy at age 65 as an instrument for wages. The R^2 for the correlation between wages and life expectancy at age 65 is 0.139. Relative to what is normally reported in the literature for the correlation between the endogenous variable and the instrument, this value is quite high and suggests that life expectancy at 65 should not be regarded as a weak instrument. The F-statistic for the effect of life expectancy at 65 in the wage equation is 19.73 against the 5 percent critical value of 3.84. This exceeds the benchmark value of 10

[32]Data on the life expectancy of men at age 65, defined as 'the average number of years which a 65 year old person could be expected to live if the rates of mortality at each age were those experienced in that calendar year', was obtained from the Office of National Statistics via the website www.statistics.gov.uk.

[33]In technical jargon, life expectancy should enter the first stage regression but not the second stage regression.

proposed by Staiger and Stock (1997) and indicates negligible finite-sample bias[34]. Further, the R^2 for the correlation between weekly hours and life expectancy at age 65 is 0.00 and in the hours equation, the F-statistic is 0.46 against the 5 per cent critical value of 3.84.

4.2.3 *Testing for the endogeneity of fairness perceptions*

Given the importance of fairness perceptions of the wealth distribution in this analysis, it is prudent to check whether or not it is endogenous. If it is and it is not accounted for, the estimates could be seriously biased and the coefficients on the other variables might also be affected.

Two plausible reasons why fairness perceptions of the wealth distribution might be endogenous in the labour supply equation are: (1) the number of hours worked may influence fairness perceptions of the wealth distribution. For example, when individuals work longer hours they may be prone to greater fatigue and this may change their perceptions of the fairness of the wealth distribution and (2) the possible existence of measurement errors may cause a spurious correlation between F_{it} and u_{it}.

Before the test is conducted, a suitable instrument for fairness perceptions of the wealth distribution must be found. The instrument used is a variable describing individuals' opinion on whether 'there is one law for the rich and one for the poor'. This is based on the assumption that opinions on whether rich and poor individuals are treated differently will shape perceptions of the fairness of the wealth distribution but will not affect labour supply. This is substantiated by the results from the following validity checks[35]. The partial correlation (R^2) between the fairness perceptions of

[34]Indeed, the bias of the IV estimates *vis-à-vis* the OLS estimates is practically zero since the bias is proportional to the number of instruments minus the number of endogenous variables.

[35]These are checks recommended by Bound *et al* (1995) and Staiger and Stock (1997) to determine

the wealth distribution and individuals' opinion on whether 'there is one law for the rich and one for the poor' is 0.040. Such a low value indicates that this instrument is relatively weak and must have, as recommended by Staiger and Stock (1997), an F-statistic that is no less than 10 in the fairness perception equation in order for it to meet the conditions for validity. Fortunately, the F-statistic is 67.04. This far exceeds the benchmark value. In addition, the instrument must be insignificant in the labour supply equation. The partial correlation (R^2) between labour supply and individuals' opinion on whether 'there is one law for the rich and one for the poor' is 0.001 and the F-statistic for this instrument in the labour supply equation is 0.72. In sum, the conditions for validity are satisfied: individuals' opinion on whether 'there is one law for the rich and one for the poor' are correlated with fairness perceptions of the wealth distribution but are uncorrelated with labour supply. Therefore, it is concluded that individuals' opinion on whether 'there is one law for the rich and one for the poor' is a valid instrument for fairness perceptions of the wealth distribution.

The test proceeds within the fixed effects framework. First, F_{it} is regressed on w_{it}, $\mathbf{X}_{it}$, α_i, and the variable describing individuals' opinion on whether 'there is one law for the rich and one for the poor'. Then the residual, ς_{it}, is used as an additional regressor in equation (18). This yields the following estimating equation:

$$H_{it} - \bar{H}_i = (w_{it} - \bar{w}_i)\beta_1 + (F_{it} - \bar{F}_i)\beta_3 + (\mathbf{X}_{it} - \bar{\mathbf{X}}_i)\mathbf{\Gamma} + (\varsigma_{it} - \bar{\varsigma}_i)\pi + (u_{it} - \bar{u}_i) \quad (19)$$
$$i = 1, ..., N;\ t = 1, ..., T$$

If π is insignificant, then F_{it} can be regarded as exogenous. The T-statistic on π is 0.21 which means that $\pi = 0$ cannot be rejected. Thus, it is safe to assume that the variable representing fairness perceptions of the wealth distribution is not endogenous

the validity on an instrument.

in the hours equation and that the possible problems of time-varying unobservables and measurement error are not cause for concern.

4.3 *Results*

4.3.1 *Main Results*

For comparative purposes, the OLS results for equation (16) are presented along with the IV estimates.

OLS within-group Estimates

The OLS within-group estimates in Table 6 corroborates the conclusion that was drawn from the tabulations of the raw data – there is a positive relationship between the labour supply of male employees and their perceptions of the fairness of the wealth distribution. That is to say, male employees are likely to work significantly less hours a week as perceptions of the fairness of the wealth distribution becomes more unfavourable.

The estimates on the fairness perception dummies are highly significant and reveal that, *ceteris paribus*, relative to male individuals who believe that wealth is fairly distributed, those who strongly disagrees that it is, will work on average 0.746 hours (or approximately 45 minutes) less a week and those who disagree, will work on average 0.614 hours (or approximately 37 minutes) less a week. For those male workers who neither believe wealth is unfairly distributed nor that it is fairly distributed, weekly hours, on average, will be less than that of those who agree by 0.497 hours (or approximately 30 minutes). It can therefore be concluded that the average male employee will reduce (increase) weekly hours of work by 30 minutes or more as perceptions of the wealth distribution becomes more unfavourable (favourable).

Looking at the estimates for other variables to check consistency with standard findings, it is found that the familiar inverted u-shaped age profile exists. Weekly

hours of work rise with age at about one hour and a quarter a week but at a decreasing rate reaching a peak at age 44 and then declining thereafter[36].

For both wages and non-labour income there is a negative relationship with hours of work. Intuitively, as non-labour income increases, the need for working diminishes insofar as the individual is able to maintain consumption by working less hours and will wish to do so since working tends to reduce utility. On the contrary, wages would normally be expected to be positively related to hours of work. However, it is not unusual in empirical studies of labour supply to find that log wage enters the hours equation negatively as it does here. One explanation is that individuals are on the backward bending portion of their labour supply curve. Another could be that the endogeneity of wages in the hours equation may be the cause of this downward bias in the estimate. This possibility is addressed by looking at the IV results.

IV within-group Estimates

To address the concern that the OLS within-group estimates may be biased, the log wage is instrumented in the hours equation. The first stage wage regression is presented in Table B1 of Appendix B. The IV within-group estimates are shown in Table 6. The coefficients on the fairness perception dummies are still significant and negative as expected. Relative to those who agree that wealth is fairly distributed, male workers who strongly disagree will work on average 0.590 less hours (or approximately 35 minutes less) a week. Similarly, for male workers who disagree that wealth is fairly distributed hours of work will be less than that of those who agree that wealth is fairly distributed by 0.622 hours (or approximately 37 minutes). In terms of minutes, this is roughly the same as the corresponding OLS estimate. In addition, male workers with no firm opinion on the fairness of the wealth distribution – they neither disagrees nor

[36]It should be noted that this is so while holding wage fixed, which itself exhibits a u-shaped age profile.

agrees that wealth is fairly distributed – can be expected to work, on average, 0.521 hours (31 minutes) less a week than those who believe that wealth is fairly distributed. This too, in terms of minutes, is very close to the corresponding OLS estimate.

There is a slight suggestion from the IV estimates that weekly hours of work do not decline continuously as perceptions of the wealth distribution becomes successively unfavourable. It can be seen that compared to those who agree that wealth is fairly distributed, male employees who disagree will reduce weekly hours by 2 minutes more than those who strongly disagree. However, this difference is quite small and possibly insignificant.

In sum, the IV within-group estimates lead to the same conclusion as the OLS within-group estimates, which is that the average male employee will decrease (increase) his weekly hours of work as the wealth distribution becomes more unfair (fair) by as much as 30 minutes or more.

In the case of the other variables, it is found that the coefficient on age and age squared have the same sign as those in the OLS estimation but they are insignificant. Non-labour income on the other hand still has a negative and significant influence on weekly hours of work. Not surprising, the IV estimate of log hourly wage is greater than the OLS estimate and has the expected positive sign but it is insignificant.

In general, the IV standard errors are much greater than the OLS standard errors. This is not uncommon with IV estimation. Nonetheless, the estimates are still highly precise and are consistent whereas, despite being more precise, the OLS estimates are inconsistent.

4.3.2 *Additional Results*

The sample is split into unmarried[37] and married male employees to determine whether there are marked differences between the two[38]. Arguably, unmarried individuals may have less home commitments and hence more flexibility with respect to their weekly hours of work. Therefore, hours of work of unmarried individuals may be more responsive to perceptions of how fairly wealth is distributed. IV estimates are presented in Table 7 and the first stage wage regressions are shown in Table B2 of Appendix B.

To begin, it is important to check that life expectancy at age 65 remains a valid instrument for wages in each subsample. The R^2 for the correlation between wages and life expectancy at age 65 is 0.216 for unmarried male employees and 0.077 for married employees. Based on this, it appears that life expectancy may be a weak instrument in the case of married male employees but not so for unmarried male employees.

Given the weak correlation between life expectancy at age 65 and log hourly wage in the subsample of married male employees, a small correlation between life expectancy at age 65 and weekly hours can give rise to a larger inconsistency in the IV estimates compared to the OLS estimates for this group. Consequently, unlike for unmarried male employees, it is necessary to check that the F-statistic on life expectancy at

[37]Unmarried individuals are those who are either separated, divorced, widowed, or have never married.

[38]Age subsamples were also considered (<25, 25–34, 35–44, 45–54, ≥55) and no strong evidence that age moderates the impact of fairness perceptions on labour supply behaviour was found. The subsamples were quite small but this was again supported by the insignificance of the interactions between age and fairness perceptions for the entire sample. Interactions between wage and the fairness perception dummies were also tested for significance. The results revealed that the impact of fairness perceptions on labour supply is not dependent on wages. Given the insignificance of these results, they are not reported here.

age 65 in the hourly wage equation for married male employees is no less than the benchmark value of 10 suggested by Staiger and Stock (1997). For the subsample of married male employees, the F-statistic is 15.48. This implies negligible finite sample bias[39]. In the case of unmarried male employees, the F-statistic is 1.95. Since the correlation between life expectancy at age 65 and log hourly wage is relatively high, finite sample bias may not be a significant problem[40]. It can therefore be concluded that it is possible for reliable conclusion to be drawn from the IV estimates in both the subsamples of unmarried and married male employees.

The results show that the labour supply of unmarried male employees may indeed be more responsive to perceptions of the fairness of the wealth distribution. Unmarried male employees who strongly disagree that wealth is fairly distributed will work on average 1.105 hours (or approximately 1 hour and 6 minutes) less than those who agree that it is. A similar reduction in weekly hours occurs for those who disagree. They are likely to work, on average, 1.099 hours (or approximately 1 hour and 6 minutes) less than unmarried male employees who agree that wealth is fairly distributed. For those who neither agree nor disagree that wealth is fairly distributed hours of work will be, on average, less than that of those who agree by 0.906 hours (or approximately 54 minutes) a week.

Looking at married male employees, it is seen that the estimates are not very precise. For the fairness perception dummies, the signs on the coefficients are negative as expected and are smaller in magnitude than those for unmarried male employees. However, only the coefficient for those who disagree that wealth is fairly distributed is

[39]Moreover, the R^2 for the correlation between life expectancy at age 65 and weekly hours for the subsample of married male employees is 0.000.

[40]For the correlation between life expectancy at age 65 and weekly hours for the subsample of unmarried male employees, the R^2 is 0.007.

significant and this is so only at the 10 percent level. According to the estimate, when compared to those who agree that wealth is fairly distributed, married male employees who disagree, work on average, 0.566 hours (or approximately 34 minutes) less a week.

Taken together, the findings show that there are important regularities in the data that are consistent with a positive relationship between labour supply and fairness perceptions of the wealth distribution.

5 Conclusions

The literature has focused primarily on how the violation of a social norm affects the economic behaviour of the individual when the individual is the one in violation of the norm or the target of the violation. Little is known of how the behaviour of individuals respond to a more global violation of a social norm. That is, the violation of a norm in cases where the individual is not necessarily directly affected.

Insofar as individuals wish to maintain the norm of fairness in society and suffer a loss of psychic income whenever the norm of fairness is violated, it is likely that an unfair wealth distribution will motivate them to engage in fairness-increasing activities even though they are not themselves directly affected. The prevalence of altruistic behaviour such as donations and voluntary work attests to individual's concern for the well-being of others. Interestingly, survey evidence indicate that voluntary work has increased alongside increasing wealth inequality.

This paper sets out to determine whether individuals overall concern for fairness in society influences their labour market behaviour. To this end, a theoretical model was developed to explain how the fairness of the wealth distribution may affect the labour supply decision of individuals. It is argued that unfairness in society motivates individuals to engage in voluntary activities, which draw time away from labour market

work. Consequently, it is proposed that labour supply will fall as the wealth distribution becomes more unfair.

This hypothesis is supported by the empirical findings. It is found that individual labour supply is positively related to the fairness of the wealth distribution. Using a fixed effects estimation method and controlling for the endogeneity of wages, the results reveal that, on average, male employees who believe that wealth is not fairly distributed or who hold no firm opinion as to whether or not wealth is fairly distributed work about half an hour less a week than those who believe that it is.

Looking only at unmarried male employees, it is found that, on average, the reduction in hours is almost double that for the entire sample of male employees. When married male employees are considered, it is found that only those who disagree that wealth is fairly distributed relative to those who agree, that have a statistically significant reduction in weekly hours. In this case, the reduction is similar to that found for the entire sample of male employees.

One implication of the results is that, *ceteris paribus*, if wealth becomes more unfairly distributed, productivity, as measured by the number of hours spent on labour market work, will be adversely affected. In this way, the results are suggestive as to why more egalitarian societies may enjoy higher productivity levels than less egalitarian societies.

From a policy point of view, the recommendation is simple. To increase productivity levels the government should seek to achieve a fair distribution of wealth.

Figure 1: Average weekly hours and fairness perceptions of the wealth distribution.

Table 1: Descriptive Statistics

Variable	Selected Sample Mean (Std Dev)	Original Sample Mean (Std Dev)
Age	37.341	37.990
	(11.564)	(13.339)
Non-labour income	12.637	30.703
	(41.928)	(73.471)
Hourly Wage	8.992	
	(5.254)	
Fairness Opinion of the Wealth Distribution (4)	2.354	2.377
	(0.913)	(0.942)
Marital Status (5)	2.425	2.564
	(1.835)	(1.862)
Household Size	3.082	3.109
	(1.277)	(1.360)
Health Status (5)	1.916	2.037
	(0.796)	(0.903)
Weekly Hours of Work	39.56	
	(7.580)	
Managerial Status (3)	2.332	
	(0.842)	
Job Term (3)	1.077	
	(0.354)	
Union Recognition (2)	0.499	
	(0.500)	
Unemployment Rate	6.502	6.586
	(2.540)	(2.535)
Sample size (person-year observations)	12097	20331

Notes:(1) Std Dev = Standard Deviations. (2) Wage and non-labour income are measured in 1996 prices.

Table 2: Mean weekly hours for selected individual characteristics

Variable	
All	34.757
Race:	
White	34.713
Non-white	35.749
Age:	
16–24 years	36.661
25–34 years	35.561
35–44 years	34.104
45–54 years	34.081
55–64 years	32.563
Income:	
First quartile	23.865
Second quartile	36.809
Third quartile	38.718
Fourth quartile	39.645

Table 3: Mean weekly hours by fairness perceptions of the wealth distribution

Variable	Strongly disagree	Disagree	Neither Disagree/Agree	Agree
All	35.085	34.551	34.573	35.496
Race:				
White	35.045	34.517	34.520	35.433
Non-white	36.476	35.395	35.392	36.363
Age:				
16–24 years	37.003	36.475	36.588	37.135
25–34 years	35.693	35.396	35.331	36.527
35–44 years	34.546	33.920	33.202	35.763
45–54 years	34.577	33.945	33.602	34.626
55–64 years	34.240	32.504	32.055	31.578
Income:				
First quartile	24.450	23.716	23.766	24.011
Second quartile	37.292	36.588	36.612	37.461
Third quartile	38.880	38.585	38.418	39.602
Fourth quartile	39.116	39.556	39.527	40.497

Table 4: Fairness opinion of the wealth distribution in the UK over time

All	1991	1993	1995	1997	2000	*Total*
Strongly Disagree	22.27	16.61	15.53	10.65	12.06	15.00
Disagree	40.13	52.21	55.29	50.06	51.92	49.91
Neither Disgree/Agree	16.38	17.91	16.43	25.88	20.73	19.80
Agree	21.22	13.27	12.74	13.41	15.29	15.28
Total	100.00	100.00	100.00	100.00	100.00	100.00
Unmarried	1991	1993	1995	1997	2000	*Total*
Strongly Disagree	20.57	18.41	14.93	10.09	12.22	14.50
Disagree	39.03	47.03	52.86	49.15	50.10	48.06
Neither Disgree/Agree	20.57	21.67	19.15	27.55	22.65	22.65
Agree	19.83	12.89	13.06	13.21	15.03	14.79
Total	100.00	100.00	100.00	100.00	100.00	100.00
Married	1991	1993	1995	1997	2000	*Total*
Strongly Disagree	23.20	15.56	15.94	11.07	11.95	15.34
Disagree	40.73	55.23	56.93	50.75	53.27	51.15
Neither Disgree/Agree	14.09	15.72	14.61	24.63	19.31	17.90
Agree	21.98	13.50	12.52	13.56	15.47	15.61
Total	100.00	100.00	100.00	100.00	100.00	100.00

Columns may not sum due to rounding.

Table 5: Average Weekly Hours Over Time

Year	All	Unmarried	Married
1991	39.82	39.21	40.16
1993	39.44	38.85	39.79
1995	39.46	38.74	39.95
1997	39.60	39.12	39.95
2000	39.48	38.90	39.92

Table 6: The effect of fairness perceptions of the wealth distribution on hours of work

Weekly Hours	*OLS within group estimates*		*IV within group estimates*	
Age	1.268***	(0.087)	0.259	(0.567)
Age Squared	-1.431***	(0.101)	-0.387	(0.587)
Household size	-0.360***	(0.085)	-0.260**	(0.109)
Log Hourly Wage	-5.823***	(0.249)	3.241	(5.026)
Monthly non-labour Income	-0.008***	(0.002)	-0.005**	(0.002)
[a]Managerial Status: Supervisor	-0.788***	(0.242)	-0.462	(0.321)
[a]Managerial Status: Non-Managerial	-1.803***	(0.239)	-0.951*	(0.539)
[b]Job Term: Temporary Contract	-4.675***	(0.499)	-3.722***	(0.760)
[b]Job Term: Fixed Term	-1.878***	(0.434)	-1.282**	(0.579)
[c]Union Recognition	-0.742***	(0.213)	-1.602*	(0.530)
Regional unemployment Rate	-0.064	(0.044)	0.042	(0.075)
Fairness of wealth distribution:				
[d]Strongly disagree	-0.746***	(0.281)	-0.590*	(0.320)
[d]Disagree	-0.614***	(0.221)	-0.622***	(0.242)
[d]Neither Agree/Disagree	-0.497**	(0.231)	-0.521**	(0.254)
Prob > F		0.000		0.000
R^2		0.111		N/A
F-statistic (excluded instruments)				19.73
R^2 (excluded instruments)				0.139
Number of observations [individuals]	12,097 [5,373]		12,097 [5,373]	

Notes: (1) ***, **, * denotes significance at the 1% level, 5% level, and the 10% level respectively. (2)Marital Status, and Health Status dummies are included. (3) Standard errors are in parenthesis. (4) Omitted categories: (a) Manager, (b) Permanent Job, (c) No Union Recognition (d) Agree.

Table 7: The effect of fairness perceptions of the wealth distribution on hours of work for different marital status: *IV Within-group Estimates*

Weekly Hours	*Unmarried*		*Married*	
Age	1.876	(1.898)	-0.351	(0.587)
Age Squared	-2.316	(1.994)	0.273	(0.596)
Household size	-0.391**	(0.183)	-0.344*	(0.185)
Log Hourly Wage	-6.586	(14.461)	8.236	(6.474)
Monthly non-labour Income	-0.014***	(0.005)	-0.002	(0.003)
[a]Managerial Status: Supervisor	-0.845	(0.828)	-0.277	(0.409)
[a]Managerial Status: Non-Managerial	-1.457	(1.480)	-0.823	(0.709)
[b]Job Term: Temporary Contract	-4.027***	(1.263)	-3.700***	(1.399)
[b]Job Term: Fixed Term	-1.877***	(0.767)	-0.785	(1.026)
[c]Union Recognition	-1.075	(1.284)	-1.800**	(0.745)
Regional unemployment Rate	-0.059	(0.145)	0.107	(0.102)
Fairness of wealth distribution:				
[d]Strongly Disagree	-1.105*	(0.656)	-0.589	(0.429)
[d]Disagree	-1.099***	(0.432)	-0.566 *	(0.328)
[d]Neither Agree/Disagree	-0.906**	(0.445)	-0.278	(0.354)
Prob > F		0.000		0.000
R^2		0.051		0.105
F-statistic (excluded instruments)		1.95		15.48
R^2 (excluded instruments)		0.216		0.077
Number of observations [individuals]	4,834 [2,684]		7,263 [3,158]	

Notes: (1) ***, **, * denotes significance at the 1% level, 5% level, and the 10% level respectively. (2)Health Status, Occupation, and year dummies are included. (3) Standard errors are in parenthesis. (4) Omitted categories: (a) Manager, (b) Permanent Job, (c) Disagree.

6 Appendix A

The individual's maximisation problem is:

$$\underset{\{V,H\}}{Max}\ U = \alpha + \beta X - \frac{1}{2}\varphi X^2 + \gamma \hat{L} - \frac{1}{2}\kappa \hat{L}^2 - \delta\theta c\,(Y, 1-F) + \xi\theta(1-F)V,$$

subject to:

$$X \leq Y = Y_n + wH \quad \text{(income budget constraint)}$$

$$T = H + \hat{L} + V \quad \text{(time budget constraint)}$$

Substituting $L = T - H - V$ and $X = Y = Y_n + wH$ into the objective function, the first order conditions are given by:

$$\frac{\partial U}{\partial H} = \beta w - \varphi(Y_n + wH)w - \gamma + \kappa(T - H - V) + \delta\theta c_H(Y_n + wH, 1-F)w \leq 0$$

$$\frac{\partial U}{\partial V} = -\gamma + \kappa[T - H - V] + \xi\theta(1-F) \leq 0$$

and the interior solutions are:

$$H^* = \frac{(\beta - \varphi Y_n + \delta\theta c_H(.))w - \gamma + \kappa(T - V)}{\varphi w^2 + \kappa},$$

$$V^* = \frac{-\gamma + \kappa(T - H) + \xi\theta(1-F)}{\kappa},$$

where $c_H(.) = c_H(Y_n + wH, 1-F)$.

To ensure that V^* and H^* satisfy the sufficient second order condition for a maximum it is necessary to evaluate the Hessian determinant. The Hessian Matrix (A) is

given by:

$$A = \begin{pmatrix} \frac{\partial^2 U}{\partial H^2} & \frac{\partial^2 U}{\partial H \partial V} \\ \frac{\partial^2 U}{\partial V \partial H} & \frac{\partial^2 U}{\partial V^2} \end{pmatrix}$$

Hence, the Hessian determinant is:

$$|A| = \begin{vmatrix} -\left(\varphi w^2 + \kappa + \delta\theta c_{HH}(.) w^2\right) & -\kappa \\ -\kappa & -\kappa \end{vmatrix}$$

with the following principal minors:

$$\begin{aligned} |A_1| &= -\left(\varphi w^2 + \kappa + \delta\theta c_{HH}(.) w^2\right) < 0 \\ |A_2| &= \left(\varphi w^2 + \kappa + \delta\theta c_{HH}(.) w^2\right) \kappa > 0, \end{aligned}$$

where $c_{HH}(.) = c_{HH}(Y_n + wH, 1 - F)$.

Given that $|A_1| < 0$ and $|A_2| > 0$, A is negative definite and hence, satisfies the determinantal criteria for a maximum.

The equations for H^* and V^* can be solved simultaneously. Solving first for H^*:

$$H^* = \frac{(\beta - \varphi Y_n + \delta\theta c_H(.))w - \gamma + \kappa\left(T - \left(\frac{-\gamma + \kappa(T-H) + \xi\theta(1-F)}{\kappa}\right)\right)}{\varphi w^2 + \kappa},$$

$$\Rightarrow H^* = \frac{(\beta - \varphi Y_n + \delta\theta c_H(.))w + \kappa H - \xi\theta(1-F)}{\varphi w^2 + \kappa},$$

$$\Rightarrow \left(1 - \frac{\kappa}{\varphi w^2 + \kappa}\right) H^* = \frac{(\beta - \varphi Y_n + \delta\theta c_H(.))w - \xi\theta(1-F)}{\varphi w^2 + \kappa},$$

$$\Rightarrow H^* = \frac{(\beta - \varphi Y_n + \delta\theta c_H(.))w - \xi\theta(1-F)}{\varphi w^2}$$

Solving for V^*:

$$V^* = -\gamma + \kappa \left(T - \left(\frac{(\beta - \varphi Y_n + \delta\theta c_H(.))w - \xi\theta(1-F)}{\varphi w^2} \right) \right) + \xi\theta(1-F)$$

$$\Rightarrow V^* = -\gamma + \kappa T - \frac{\kappa}{\varphi w} \left(\beta - \varphi Y_n + \delta\theta c_H(.) \right) + \left(\frac{\varphi w^2 - \kappa}{\varphi w^2} \right) \xi\theta(1-F)$$

The effect of F on H^* and V^* are therefore given by:

$$\frac{\partial H^*}{\partial F} = \left(\frac{\delta\theta c_{HH}(.)w}{\varphi w^2} \right) \frac{\partial H^*}{\partial F} - \frac{c_{HF}(.)w + \xi\theta}{\varphi w^2},$$

$$\Rightarrow \left(1 - \frac{\delta\theta c_{HH}(.)w}{\varphi w^2} \right) \frac{\partial H^*}{\partial F} = -\frac{c_{HF}(.)w + \xi\theta}{\varphi w^2},$$

$$\Rightarrow \frac{\partial H}{\partial F} = \frac{\xi\theta - c_{HF}(.)w}{\varphi w^2 - \delta\theta c_{HH}(.)w},$$

$$\frac{\partial V^*}{\partial F} = \frac{\delta\kappa\theta}{\varphi w} \left(c_{HH}(.) \frac{\partial H^*}{\partial F} w - c_{HF}(.) \right) - \left(\frac{\varphi w^2 - \kappa}{\varphi w^2} \right) \xi\theta,$$

$$\Rightarrow \frac{\partial V^*}{\partial F} = \frac{\delta\kappa\theta}{\varphi w} \left(c_{HH}(.) \left(\frac{\xi\theta - c_{HF}(.)w}{\varphi w^2 - \delta\theta c_{HH}(.)w} \right) w - c_{HF}(.) \right) - \left(\frac{\varphi w^2 - \kappa}{\varphi w^2} \right) \xi\theta,$$

$$\Rightarrow \frac{\partial V^*}{\partial F} = \frac{\delta\kappa\theta}{\varphi w} \left(\frac{c_{HH}(.)(\xi\theta - c_{HF}(.)w)w - c_{HF}(.)(\varphi w^2 - \delta\theta c_{HH}(.)w)}{\varphi w^2 - \delta\theta c_{HH}(.)w} + \frac{\kappa\xi - \varphi w^2}{\delta\kappa w} \right),$$

where $c_{HF}(.) = c_{HF}(Y_n + wH, 1-F)$.

7 Appendix B

Table B1: Hourly Wage: *First stage regression*

Hourly Wage		
Age	0.082***	(0.008)
Age Squared	-0.115***	(0.005))
Household size	-0.011***	(0.004)
Monthly non-labour Income	-0.0003***	(0.0001)
[a]Managerial Status: Supervisor	-0.036***	(0.012)
[a]Managerial Status: Non-Managerial	-0.093***	(0.012)
[b]Job Term: Temporary Contract	-0.105***	(0.024)
[b]Job Term: Fixed Term	-0.062***	(0.021)
[c]Union Recognition	0.092***	(0.010)
Regional unemployment Rate	0.003	(0.004)
Life expectancy at age 65	0.206***	(0.046)
Fairness of wealth distribution:		
[d]Strongly disagree	-0.017	(0.014)
[d]Disagree	0.002	(0.011)
[d]Neither Agree/Disagree	0.003	(0.011)
Prob > F		0.000
R^2		0.250
Number of observations [individuals]	12097 [5373]	

Notes: (1) ***, **, * denotes significance at the 1% level, 5% level, and the 10% level respectively. (2)Marital Status, and Health Status dummies are included. (3) Standard errors are in parenthesis. (4) Omitted categories: (a) Manager, (b) Permanent Job, (c) No Union Recognition (d) Agree.

Table B2: Hourly Wage for different marital status: *First stage regression*

Weekly Hours	*Unmarried*		*Married*	
Age	0.113***	(0.015)	0.056***	(0.010)
Age Squared	-0.138***	(0.010)	-0.087***	(0.007)
Household size	-0.007	(0.007)	0.011*	(0.007)
Monthly non-labour Income	-0.0001	(0.0002)	-0.0004***	(0.0001)
[a]Managerial Status: Supervisor	-0.046*	(0.024)	-0.032**	(0.014)
[a]Managerial Status: Non-Managerial	-0.096***	(0.024)	-0.094***	(0.014)
[b]Job Term: Temporary Contract	-0.071**	(0.036)	-0.157***	(0.038)
[b]Job Term: Fixed Term	-0.018	(0.035)	-0.109***	(0.029)
[c]Union Recognition	0.083***	(0.020)	0.101***	(0.013)
Regional unemployment Rate	0.0004	(0.007)	0.004	(0.005)
Life expectancy at age 65	0.124	(0.089)	0.219***	(0.056)
Fairness of wealth distribution:				
[d]Strongly Disagree	-0.026	(0.027)	-0.015	(0.016)
[d]Disagree	-0.004	(0.021)	0.001	(0.013)
[d]Neither Agree/Disagree	0.006	(0.022)	-0.009	(0.014)
Prob > F		0.000		0.000
R^2		0.313		0.168
Number of observations [individuals]	4,834 [2,684]		7,263 [3,158]	

Notes: (1) ***, **, * denotes significance at the 1% level, 5% level, and the 10% level respectively. (2)Health Status, Occupation, and year dummies are included. (3) Standard errors are in parenthesis. (4) Omitted categories: (a) Manager, (b) Permanent Job, (c) Disagree.

References

[1] Adams, Stacy J., and William B. Rosenbaum (1962), "The Relationship of Worker Productivity to Cognitive Dissonance About Wage Inequities", *Journal of Applied Psychology*, 46(3):161–164.

[2] Adams, Stacy J. (1965), "Inequity in Social Exchange", *Advances in Experimental Social Psychology*, in L. Berkowitz (ed), pp. 267–299, New York: Academic press.

[3] Akerlof, George A. (1980), "A Theory of Social Custom, of Which Unemployment May be One Consequence", *The Quarterly Journal of Economics*, 94(4):749–775.

[4] Akerlof, George A. (1982), "Labor Contracts as Partial Gift Exchange", *The Quarterly Journal of Economics*, 97(4):543–569.

[5] Akerlof, George A., and Janet Yellen (1990), "The Fair Wage-Effort Hypothesis and Unemployment", *The Quarterly Journal of Economics*, 101(1):83–96.

[6] Amiel, Yoram, John Creedy, and Stan Hurn (1999), "Measuring Attitudes Towards Inequality", *Scandinavian Journal of Economics*, 105(2):255–283.

[7] Andrews, I.R. (1967), "Wage Inequity and Job Performance", *Journal of Applied Psychology*, 51(1):39–45.

[8] Ashenfelter, Orley, Richard Layard (1986), *Handbook of Labor Economics*, Vol 1, Amsterdam: North Holland.

[9] Becker, Gary S. (1965), "A Theory of the Allocation of Time", *The Economic Journal*, 75(299):493–517.

[10] Biddle, Jeff E., and Gary A. Zarkin (1989), " Choice Among Wage-Hours Packages: An Empirical Investigation of Male labor Supply", *Journal of Labor Economics*, 7(4):415–437.

[11] Borjas, George J., (1980), "The Relationship Between Wages and Weekly Hours of Work: The Role of Division Bias", *Journal of Human Resources*, 15(3):409–423.

[12] Bound, John, David A. Jaeger, and Regina M. Baker (1995), "Problems with Instrumental Variables Estimation When the Correlation Between the Instruments and the Endogenous Explanatory Variable is Weak", *Journal of the American Statistical Association*, 90(430):443–450.

[13] Carlsson, Fredrik, Dinky Daruvala, and Olof Johansson-Stenman (2003), "Are People Inequality Averse or Just Risk Averse?", Unpublished.

[14] Conway, Karen Smith, and Thomas J. Kniesner (1994), "Estimating Labor Supply with Panel Data", *Economics Letters*, 44:27–33.

[15] Corneo, Giacom and Hans Peter Grüner (2002), "Individual Preferences for Political Redistribution", *Journal of Public Economics*, 83:83–107.

[16] Cornwell, Christopher, Peter Schmidt, and Donald Wyhowski (1992), "Simultaneous Equations and Panel Data", *Journal of Econometrics*, 51:151–181.

[17] Cornwell, Christopher, Karen L. Tinsley, and Ronald S. Warren Jr. (2000), "Religious Background and the Labor Supply and Wages of Young Women", Unpublished.

[18] de Neubourg, Chris, and Maarten Vendrik (1994), "An extended Rationality Model of Social Norms in Labour Supply", *Journal of Economic Psychology*, 15:93–126.

[19] Elster, John (1998), "Emotions and Economic Theory", *Journal of Economic Literature*, 34:47–74.

[20] Epstein Gil S. and Uriel Spiegel (2001),"Natural Inequality, Production and Economic Growth", *Labour Economics*, 8:463–473.

[21] Fehr, Ernst, Georg Kirchsteiger, and Arno Riedl (1993), "Does Fairness Prevent Market Clearing? An Experimental Investigation", *Quarterly Journal of Economics*, 108(2):437–459.

[22] Fehr, Ernst, and Klaus Schmidt (1999), "A Theory of Fairness, Competition and Cooperation", *Quarterly Journal of Economics*, 114(3):817–868.

[23] Feldman, Daniel C. (2002), "Managers' Propensity to Work Longer Hours – A multilevel Analysis", *Human Resource Management Review*, 12:339–357.

[24] Fong, Christina (2001), "Social Preferences, Self-interest, and the Demand for Redistribution", *Journal of Public Economics*, 82:225–246.

[25] Fong, Christina, Samuel Bowles, and Herbert Gintis (2002), "Behavioral Foundations of Egalitarianism, Reciprocity, and Altruism", Unpublished.

[26] Föster, Michael, and Mark Pearson (2002), "Income Distribution and Poverty in the OECD Area: Trends and Driving Forces" *OECD Economic Studies*, No. 34, 2002/I.

[27] Galor, Oded, and Joseph Zeira (1993), "Income Distribution and Macroeconomics", *The Review of Economic Studies*, 60(1):35–52.

[28] Goodman, Alissa (2001), "Inequality and Living Standards in Great Britain: Some Facts", *The Institute for Fiscal Studies*, Briefing Note No.19.

[29] Greene, William H. (2000), *Econometric Analysis*, 4th Edition, New Jersey: Prentice Hall International, Inc.

[30] Gronau, Rueben (1977), "Leisure, Home Production, and Work – The Theory of the Allocation of Time Revisted", *The Journal of Political Economy*, 85(6):1099–1124.

[31] Gronau, Rueben (1997), "The Theory of Home Production: The Past Ten Years", *Journal of Labor Economics*, 15(2):197–205.

[32] Hausman, Jerry A. (1978),"Specification Tests in Econometrics", *Econometrica*, 46:1251-1271.

[33] Hausman, Jerry A. (1983), "Specification and Estimation of Simultaneous Equation Models", *Handbook of Econometrics*, pg 391–448, Z. Griliches and M.D. Intriligator (ed), Volume 1 Amsterdam: North Holland.

[34] Heckman, James (1993), "What Has Been Learned About Labor Supply in the Past Twenty Years", *The American Economic Review*, 83(2):116–121.

[35] Kahneman, Daniel, Jack Knetsch, and Richard Thaler (1986a), "Fairness as a Constraint on Profit Seeking: Entitlements in the Market", *The American Economic Review*, 76(4):728–741.

[36] Kahneman, Daniel, Jack Knetsch, and Richard Thaler (1986b), "Journal of Business", *The American Economic Review*, 59(4):S285–S300.

[37] Kelly, Morgan (2000), "Inequality and Crime", *The Review of Economics and Statistics*, 82(4):530–539.

[38] Korzeniewicz, Roberto Patricio, and Timothy Patrick Moran (1997), "World-Economic Trends in the Distribution of Income", *American Journal of Sociology*, 102(4):1000–1039.

[39] Lee, Woojin and John E. Roemer (1998), "Income Distribution, Redistributive Politics, and Economic Growth", *Journal of Economic Growth*, 3:217–240.

[40] Levine, David I. (1992), "Piece Rates, Output Restriction, and Conformism", *Journal of Economic Psychology*, 13:473–489.

[41] Milanovic, Brian (2002), "True World Income Distribution, 1988 and 1993: First Calculation Based on Household Surveys Alone", *The Economic Journal*, 112:51–92.

[42] Mundlak, Yair (1978), "On The Pooling of Time Series and Cross Section Data", *Econometrica*, 46(1):69–85.

[43] Pencavel, John (1986), "Labour Supply of Men: A Survey", In *Handbook of Labour Economics*, (ed. O. Ashenfelter and R. Layard), Amsterdam: North-Holland.

[44] Persson, Torsten, and Guido Tabellini (1994), "Is Inequality Harmful for Growth", *The American Economic Review*, 84(3):600–621.

[45] Romer, David (1984), "The Theory of Social Custom: A Modification and Some Extensions", *The Quarterly Journal of Economics*, 99(4):717–727.

[46] Roy, Kakoli, and Susanne Ziemek (2000), "On The Economic of Volunteering", *ZEF Discussion Papers on Development Policy*, No. 31.

[47] Rutström, Elisabet E. and Melonie B. Williams (2000), "Entitlements and fairness: An Experimental Study of Distributive Preferences", *Journal of Economic Behavior and Organization*, 43:75–89.

[48] Sala-i-Martin, Xavier (2002), "The World Distribution of Income (Estimated From Individual Country Distributions)", unpublished.

[49] Staiger, Douglas, and James H. Stock (1997), "Instrumental Variables Regression with Weak Instruments", *Econometrica*, 65(3):557–586.

[50] Stutzer, Alois, and Rafael Lalive (2001), "The Role of Social Work Norms in Job Searching and Subjective well-Being", *IZA Discussion Paper*, No. 300.

[51] Taylor, M.F (ed. with J. Brice *et al*) (1996), *British Household Panel Survey User Manual Volumes A and B*, University of Essex, Colchester.

[52] Thaler, Richard H. (1985), "Mental Accounting and Consumer Choice", *Marketing Science*, 4(3):199–214.

[53] Thurow, Lester (1971), "The Income Distribution as a Pure Public Good", *The Quarterly Journal of Economics*, 85(2):327–336.

[54] Vella, Francis, (1998), "Estimating Models With Sample Selection Bias: A Survey", *Journal of Human Resources*, 33(1):127–169.

[55] Wooldridge, Jeffrey M. (2002), *Econometric Analysis of Cross Section and Panel Data*, United States: MIT.