WORK AND LEISURE

by

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Preface

I wish to thank Professor C. V. Brown in his capacity as Director of the S.S.R.C. financed study of the Alleged Disincentive Effects of Taxation for his generosity in allowing me to use the data. I also wish to thank Professor A.D. Bain, Professor C.V. Brown, Professor L. Hunter, Professor D. MacKay, Dr. R. J. Ruffell and David Ulph for their valuable criticism and assistance in working out the problems. Any errors remaining are of course the sole responsibility of the author.

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Summary

A Priori Economic Theory is unable to predict whether the supply of labour will increase or decrease as the wage rate changes. Political interest in the effect of income maintenance schemes on the incentive to work has stimulated a spate of empirical research into labour supply based on the simple text-book theory of labour supply. Unfortunately the empirical work to date has produced an unacceptably wide range of labour supply estimates. One reason for the poor results is that the assumptions of the simple text-book model of labour supply don't take account of important variables in the real world. However even if we assume the simple text-book theory of labour supply to be theoretically adequate, the conventional procedures used to estimate labour supply based on the simple text-book model are theoretically invalid, econometrically unsound and suffer grave measurement problems with one of the key variables required by the method. Furthermore the functional form normally used has been highly restrictive therebye reducing the tax policy relevance of this research, most of which has been undertaken with a view to estimating the effect of income maintenance schemes on labour supply.

A new procedure is discussed to estimate labour supply in which hours worked is regressed on perceived net marginal wage rate, net average wage rate and non-employment income. The new model represents a marked improvement over the conventional procedure which regresses hours worked on the average wage rate and non-employment income, because unlike the conventional procedure it is theoretically correct in a world with non-linear budget lines, and because price income and substitution

effects can be estimated independently of the (dubious) non-employment income coefficient therebye avoiding theoretical econometric and data measurement problems associated with non-employment income. The new average/marginal procedure is also superior because it employs a functional form which is not highly restrictive such that it allows the labour supply estimates to vary more freely over the income distribution and should therefore be more relevant for tax policy. Furthermore the average/marginal procedure overcomes the problem of spurious correlation between hours worked and the average wage rate arising from error in the measurement of hours worked. There is however one remaining econometric problem intrinsic to the conventional procedure which is not resolved by the new average/marginal procedure, namely that the average wage rate is endogenous where average and marginal wage rates are unequal.

The new average/marginal procedure is used to obtain labour supply estimates for a cross section sample of British weekly paid married men. Price income and substitution effects are calculated at different points over the sample distribution of wage rates to ascertain the effect of the flexible functional form used, and this is found to have a profound effect insofar as the magnitude of the substitution effect decreases as a function of the average wage rate. The regression estimates are also used to derive the implied (skeleton) indifference map for income and leisure. Finally the implications of the estimated labour supply function with respect to income maintenance schemes are discussed, using alternative negative income tax schemes on a hypothetical population to illustrate the issues.

CHAPTER 1

ECONOMIC THEORY AND RESEARCH

Introduction

A priori Economic Theory is unable to predict whether the supply of labour will increase or decrease as the wage rate changes. Because a priori theoretical analysis can provide no solution to this question, a substantial body of empirical research has been undertaken attempting to estimate labour supply. Historically, this empirical research was generated out of academic interest, but more recently political interest in the effect of income maintenance schemes on the incentive to work has stimulated a spate of empirical research into labour supply based on the simple text-book theory of labour supply. Unfortunately the empirical research to date has produced an unacceptably wide range of estimated labour supply functions. It is very likely that one reason for the poor results is that the assumptions of the simple text-book model of labour supply don't take account of important variables in the real world. However it is argued in this chapter that even if we assume the simple text-book theory to labour supply to be theoretically adequate, the conventional procedures used to estimate the labour supply function based on the simple text-book model are theoretically invalid, econometrically unsound, and suffer grave measurement problems with one of the key variables required by the method.

General Economic Theory of Labour Supply

The formal economic viewpoint first set out by Robbins[1] is that an individual has twenty-four hours each day which he allocates between work and leisure. In order to gain income he must work and thereby sacrifice leisure. The

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1. Lionel Robbins, "On the Elasticity of Demand for Income in Terms of Effort", Economica, Vol. 10, No. 29, June 1930, pp 123-124: for a more recent treatment see Richard A Musgrave, "The Theory of Public Finance", McGraw-Hill Book Co. Inc., Tokyo 1959, Chap. 11.

rational man will tend towards an optimum level of satisfaction by working that number of hours at which he values his leisure time at the going wage rate. If he works longer hours than this, the leisure he foregoes is more valuable to him than the income he receives for this extra work. If he works fewer hours than this the extra leisure is worth less to him than the extra income he could earn by working longer.

Fig. I

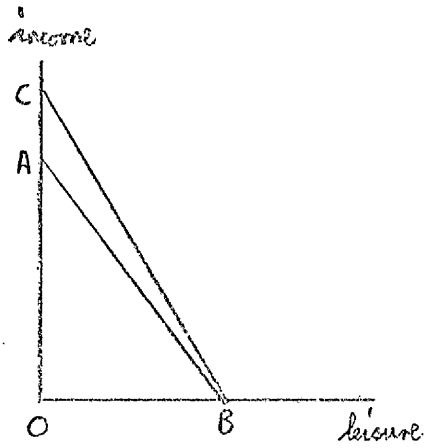


Fig II

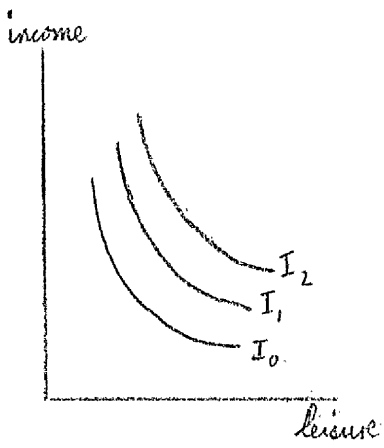
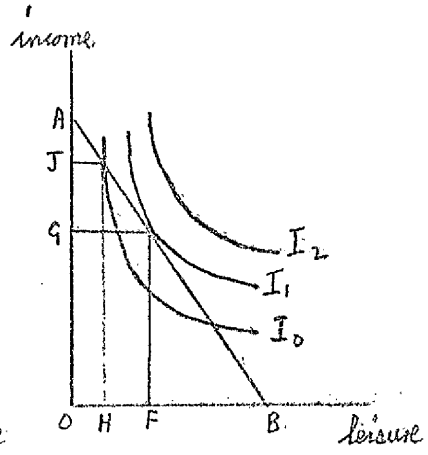


Fig. III



This position can be represented diagrammatically. In Fig.1, AB is the wage line which indicates the different combinations of income and leisure open to the individual at a given wage rate. Thus the individual could choose OA income with no leisure, or OB leisure with no income, or differing combinations of income and leisure in between A and B on the wageline AB. Point B is fixed since there are 24 hours in each day, which are allocated between leisure and income (via work).

Point A is determined by the wage rate and a rise in the wage rate would result in a new level of income being theoretically attainable. If the individual worked for 24 hours at the new wage rate, his income would rise from A to C and a new wage line BC would be operative.

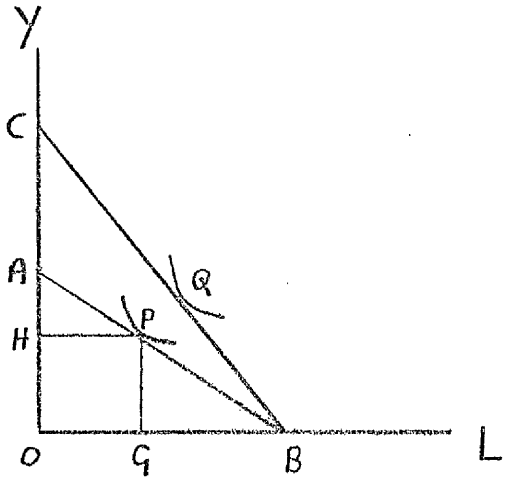
Fig. II shows the individual's preference map where an indifference curve shows different combinations of income and leisure between which the individual is indifferent. Although the individual is indifferent between different points on the indifference curve, he will increase his satisfaction by moving to the highest indifference curve possible.

Fig. III indicates that the individual reaches his highest level of satisfaction (i.e. the highest indifference curve) at the point of tangency between the wage line AB and indifference curve I_1. Hence if the individual has income OJ and OH hours of leisure, he would increase his leisure to OF and reduce his income to OG, thereby moving to the highest indifference curve possible at the going wage rate. As there are a fixed 24 hours each day, he necessarily reduces his hours of work from BH to BF as his leisure time increases from OH to OF.

In order to avoid confusion between the commodity "income" and the level of overall income expressed by the wage line, henceforth the commodities income and leisure will be referred to as Y and L respectively.

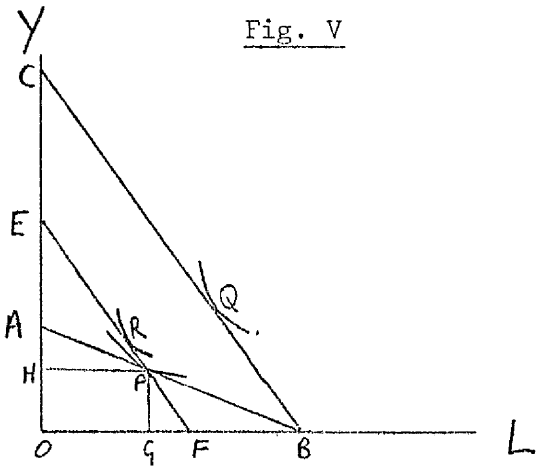
At a level of income given by the wage line AB the individual is in equilibrium at OH of Y and OG of L in Fig. IV.

Fig. IV



If the individual's hourly rate is increased he moves onto a higher indifference curve from P to Q. This price effect consists of an income and a substitution effect.[2] In other words the new combination of Y and L chosen is partly the result of a change in the overall level of income whereby the person can now choose more of both Y and L at the higher level of income, i.e. the income effect. The new combination of Y and L chosen is also partly the result of a change in the relative prices of the two commodities Y and L, i.e. the substitution effect.

Fig. V



2. George J. Stigler, The Theory of Price, Revised edition, The Macmillan Co. New York, 1953, pp. 76-80.

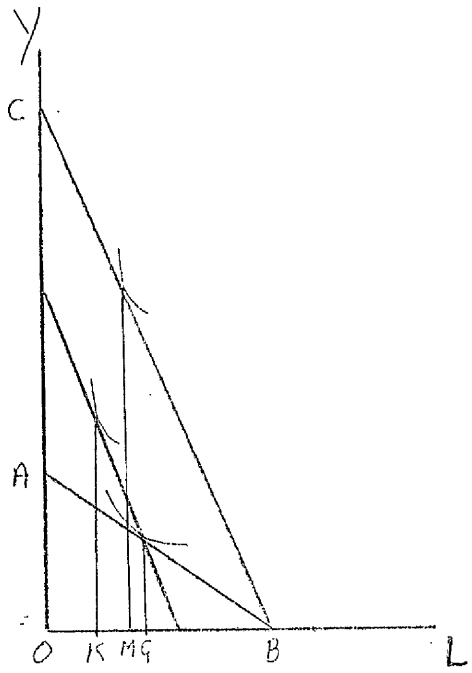
The substitution and income effects for the change in the wage rate from BA to BC are graphically demonstrated in Fig. V. The substitution effect is the change in behaviour for a fall in the price of Y relative to L while holding the individual's level of income unchanged such that he may still consume his original bundle of goods. This situation is represented by a new price line FE drawn parallel to BC giving the new relative price of Y in terms of L, and holding income constant so that the individual is still able to consume OH of Y and OG of L. This compensated change in relative prices would lead to a new equilibrium level where the person maximises his satisfaction by substituting Y for L from P to R, and this change in behaviour is the substitution effect.

The income effect occurs when the individual's income level rises with no change in the relative prices of Y and L. The change in the wage line from FE to BC represents this situation and the income effect would be a movement from R to Q in Fig. V. In other words, as the income level rises, the individual takes more L as well as more Y. As the individual takes more leisure time he necessarily works fewer hours because there are only 24 hours in each day. Thus the income effect in the Y/L choice is called a negative income effect because as income rises, the number of hours per day worked falls, unless leisure is an inferior good.

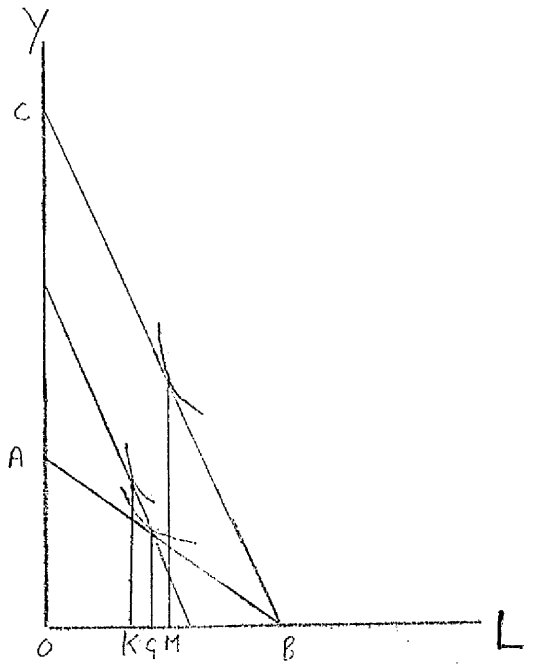
If the wage rate increases there will therefore be a price effect which consists of a negative income effect (decreasing hours of work) and a positive substitution effect (increasing hours of work). As it is a priori impossible to say whether the positive substitution effect will outweigh the negative income effect or not, the effect of an increase in the wage rate on the number of hours worked cannot be predicted. Two examples are given below in Fig. VI to illustrate this conclusion.

Fig. VI

Person W



Person Z



After a rise in the wage rate causing the wage line to move from BA to BC, the substitution effect increases hours of work from BG to BK while the income effect reduces hours of work from BK to BM. In Fig. VI we can see that for person W the effect of the increased wage rate is an increase in the number of hours worked, i.e. the positive substitution effect outweighs the negative income effect. Person Z on the other hand works fewer hours as the negative income effect outweighs the positive substitution effect after an increase in the hourly wage rate. A similar analysis could demonstrate that a fall in the wage rate could increase or decrease hours of work depending on the magnitude of the opposing income and substitution effects.

It is evident that economic theory cannot predict the direction of the change in hours of labour supplied after an increase (or decrease) in the wage rate

because a priori we do not know which is stronger, the negative income effect or the positive substitution effect.

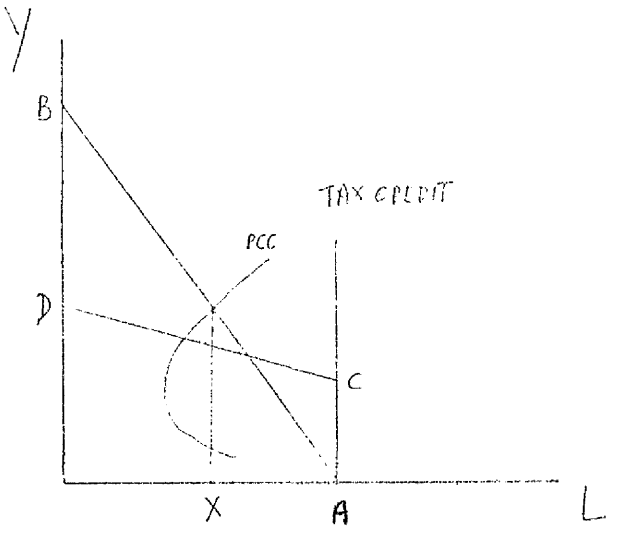
The problem has been defined, namely, that economic theory cannot predict what happens to the quantity of labour supplied after a change in the wage rate. The reason that the problem has arisen has also been stated, namely, that a priori we do not know the relative strengths of the income and substitution effects. At this stage of the argument it is normal to conclude that a priori theoretical analysis can provide no solution to the problem and that one must resort to empiricism in order to reach an answer.

Empirical Research into Labour Supply

One rather obvious empirical approach would be to estimate a labour supply curve with hours worked as a function of the wage rate, using cross-section data or aggregate time series data. Such a relationship would yield the price consumption curve for leisure, it would be possible to observe whether or not the labour supply curve was backward bending, and we would know whether or not the income effect was greater than the substitution effect as hours of work increase or decrease as a function of the wage rate. Unfortunately, this approach would give the price effect only and could not separate out the income and substitution effects. This is a very serious drawback because it would be impossible to estimate the effect of an income maintenance or negative income tax scheme on labour supply, and so this approach loses much policy relevance. An example is given below in Fig. VII

The person has a gross wage rate AB working AX hours on the labour supply curve given by PCC. The government then introduces a negative income tax which gives the individual a tax credit of AC and imposes a marginal tax rate such that the individual's wage rate is now CD. We do not know from the knowledge of the Price Consumption Curve PCC alone whether he works more or less hours after the imposition of the negative income tax

Fig. VII



because the individual will not be in equilibrium anywhere on the price consumption curve PCC.

This problem was tackled by adopting a different procedure and over the last ten years there have been a number of empirical studies which have regressed hours worked on wage rate and non-employment income in order to measure the price and income effects respectively, and by subtraction the substitution effect. Before discussing these studies, the basic model they all use to estimate income and substitution effects will be examined in detail. This model will be subsequently referred to as the Kosters model.[3]

A change in the wage rate, δW, for a worker supplying L units of labour causes a change in income $\delta Y = L\delta W$. The total effect of a wage rate change is the partial derivative $\frac{\delta L}{\delta W}$, and the component which is due to the associated change in income is $\frac{\delta L}{\delta Y} \cdot \frac{\delta Y}{\delta W}$. The derivative $\frac{\delta L}{\delta Y}$ represents the effect of a change in income with no change in wage rates, such as the

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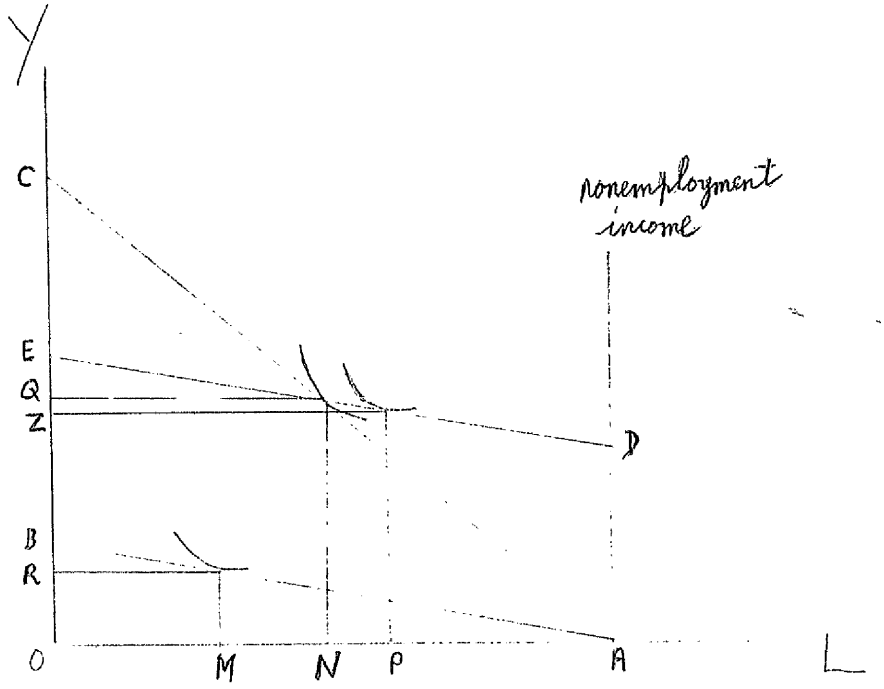
3. Marvin Kosters, Income and Substitution Effects in a Family Labor Supply Model, p 3339 Santa Monica, Calif. The Rand Corporation, 1966.

receipt of an annuity, and L can be substituted for the derivative $\frac{\delta Y}{\delta W}$. Hence, an expansion for the substitution effect S or compensated wage rate effect is

$$S = \frac{\delta L}{\delta W} - L\frac{\delta L}{\delta Y}$$

This model is illustrated in Fig. VIII

Fig. VIII



The person has a wage rate AB and is in equilibrium consuming OR of Y and OM of L. An increase in the wage rate from AB to AC leads to a new equilibrium position where the individual consumes OQ of Y and ON of L. Hours worked fall by MN and this change in hours worked for the change in the wage rate AB to AC holding non-employment income constant gives the price effect. If instead of the increase in the wage rate, the individual had received AD non-employment income, his income would have risen by the same amount in the sense that he could still consume OQ of Y and ON of L. In this situation the wage line would be given by DE parallel to AB and passing through the point OQ of Y and ON of L. The increase in non-employment income AD holding the wage rate constant leads to a new

equilibrium position where the individual consumes OZ of Y and OP of L. Hours worked fall by MP and this change in hours worked for the change in non-employment income holding the wage rate constant gives the income effect.

Insofar as non-employment income has altered to allow the individual to consume the same combination of goods (OQ of Y and ON of L) the substitution effect is equal to the difference between the negative income effect MP and the price effect MN, i.e. the substitution effect is equal to PN.

Marvin Kosters[4] presented the first empirical evidence based on this model using a one in a thousand sample of the 1960 United States Bureau of the Census. He defined non-employment income as all income coming in to the family excluding that earned by the member whose labour supply is being studied, and assumed that the wife would not alter her labour supply for a change in the husband's wage rate. Regressing hours worked on wage rate and non-employment income to estimate price and income effects respectively, he found that total wage rate elasticities for older males, aged 50 to 64, were usually in the range from -0.07 to -0.09. These results support the backward bending labour supply curve hypothesis, with the income effect outweighing the substitution effect. A priori economic theory predicts that the substitution effect will always be positive but Kosters found that the compensated wage rate elasticity (the substitution effect) was positive in only four out of the eleven regression results shown. The t statistic for the non-employment income term was significant at 5% in only one regression out of the eleven and in that case R^2 was only equal to 0.10

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4. Marvin Kosters, "Effects of an Income Tax on Labor Supply", in the Taxation of Income from Capital ed. A C Harberger & Martin in Bailey Brookings Institution, 1969, National Committee on Government Finance.

even when 15 additional control variables were included in the regression.

Current interest in income-maintenance programs has resulted in a spate of studies attempting to measure income and substitution effects, with a view to estimating the effects of redistributing income on labour supply. Glen Cain and Harold Watts[5] have published eight studies all of which are broadly based on the Kosters model, using the wage rate and non-employment income.

To quote Cain and Watts in their summary of the current state of the empirical evidence largely based on the Kosters theoretical model " .... it makes a major difference whether the overall net reduction in labor supply on the part of the working poor (as a result of income-maintenance legislation) is, say, 4% or 40%. Estimated responses that span at least this range are implicit in these (empirical) results, ... But the basic reason the range of estimates must be considered unacceptably large is that the range of reductions in the labor supply implied is too large to be useful to the policymaker."

Thus a priori analysis could provide no unambiguous answer to the effect of tax on labour supply and the Cain and Watts quotatiom above suggests that the empirical work to date has produced equally ambiguous answers. This raises the question as to why empirical analyses based on the Kosters model have not been successful. One approach to this would take the view that the Kosters model is too simple insofar as it does not provide an adequate representation of the real world.

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5. Glen C. Cain and Harold W. Watts (ed.) Income Maintenance and Labor Supply, 1973 Rand McNally Co. Chicago.

First, the definition of labour supply is incomplete. The simple text-book model assumes that the individual is endowed with 168 hours of leisure time per week which he can convert into income at a competitive wage rate, but many individuals are on piece-work schemes in which, holding leisure constant they can vary the intensity of their effort and therefore convert effort into income. This implies that in reality the initial endowment consists of time (168 hours each week) and energy with a transformation function whereby the individual converts time and energy into income.

Second, a correctly specified model of labour supply must recognise intra-household substitution whereby the amount of labour supplied by one member of the household may depend not only on his own wage rate but also on the wage rate of the spouse.

Third, the actual wage rate may not be accurately perceived by the individual, because of misconceptions about the marginal rate of tax. C. V. Brown[6] asked 179 workers and 53 managers "If you were to earn one extra pound next week how much of it would be taken off in tax? His results are shown below.

	Workers	Managers
0 to 3/11	10%	nil
4/- to 5/11	15%	8%
6/- to 6/11	20%	23%
7/- to 9/11	31%	63%
10/- and over	16%	6%
don't know	6%	nil

The sample was chosen to ensure that the correct answer was 6/5 in every case, yet not one worker gave this answer.

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6. C. V. Brown, "Misconceptions about Income Tax and Incentives", Scottish Journal of Political Economy, Vol. 15, Feb., 1968, pp 1-21.

Fourth, traditional indifference curve analysis assumes that people can choose the number of hours they wish to work each day. However, many people work a standard working week and may not have sufficient freedom of choice to make marginal adjustments in hours worked in order to reach their optimum position. Thus there will be constrained income preferrers[7] who would work longer hours at the going wage rate if they could, and constrained leisure preferrers who cannot secure as much leisure as they would be prepared to pay for at the going rate. Moreover, the presence of constraints could imply that labour participation is extremely important as a measure of labour supply, rather than hours worked.

Fifth, the simple text-book model says that the wage line indicates the trade-off rate between leisure and income, but this ignores the nature of the work itself.

M. Bruce Johnson[8] explains that the normal theoretical prediction that an individual values his leisure time at the going wage rate involves the assumption that work is neither pleasant nor unpleasant. This assumption implies that the individual sacrifices leisure in order to gain income to the point where the individual values leisure at the going wage rate, but that apart from the income thus earned, the work itself and the working situation have no effect on the individual's decision as to how many hours he will work. It is therefore evident that there could be three possibilities:-

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7. L.N. Moses, "Income, Leisure and Wage Pressure", Economic Journal, Vol. 72, June 1962, pp.320-334.

8. M. Bruce Johnson, "Travel Time and the Price of Leisure", Western Economic Journal, Spring 1966, p.138

1) A man who enjoys his work will work to a point where his valuation of leisure > wage rate.

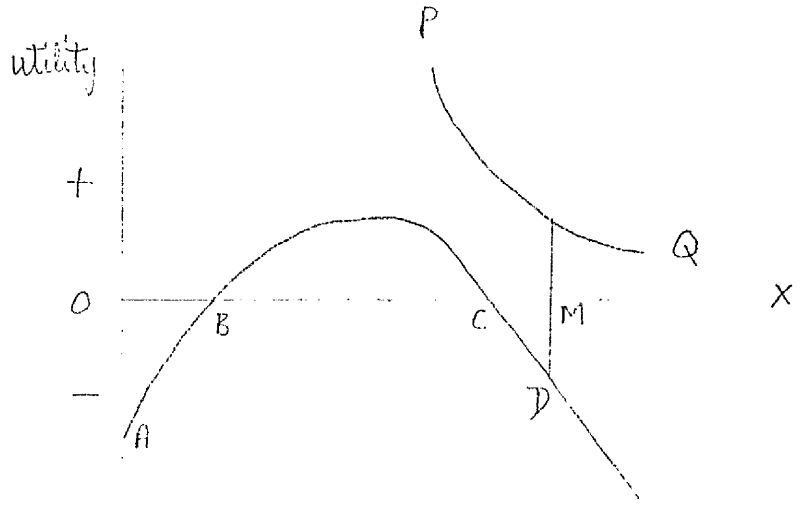
2) A man who neither likes nor dislikes his work will work to a point where his valuation of leisure = wage rate.

3) A man who dislikes his work will work to a point where his valuation of leisure < wage rate.

"The decision to supply an additional hour of work at the margin involves balancing the utility of the increment to money income against the marginal disutility of sacrificing an additional hour of desirable leisure plus the marginal disutility of providing an extra hour of odious work."

The importance of the utility (or disutility) of work was recognised by Jevons' theory of the supply of labour.[9]

Fig. IX



9. W S Jevons, The Theory of Political Economy, 2nd Edition, Macmillan. London, 1879, pp 187-188.

"At the moment of commencing labour it is usually more irksome than when the mind and body are well bent to the work. Thus at first, pain is measured by OA. At B there is neither pain nor pleasure. Between B and C an excess of pleasure is represented as due to the exertion itself. But after C the energy begins to be rapidly exhausted and the resulting pain is shown by the down-ward tendency of the line CD." At OM the marginal utility of income just equals the marginal disutility of work. It is therefore clearly important that job satisfaction should not be ignored in the determination of labour supply.

It is almost certainly true that all of the problems mentioned above have contributed to the poor empirical results obtained from analyses using the Kosters model. However, even if we assume that these problems did not exist, the poor empirical results should come as no surprise, because the conventional procedures based on the Kosters model are intrinsically wrong and this is discussed in detail in the next section.

Problems associated with empirical research based on the Kosters Model

There are four major defects associated with the conventional procedures used to estimate labour supply based on the Kosters model.

First, the conventional procedure is theoretically invalid because there is in general no functional relationship between hours worked, average wage rate and non-employment income.

Second, the conventional procedure is econometrically unsound because hours are regressed on the average wage rate defined as total income divided by hours worked. This introduces two sources of bias:-

a) Any error in the measurement of hours worked will produce a spurious negative correlation between hours worked and the average wage rate.

b) Whenever average and marginal wage rates differ (which is the norm under a progressive tax system) the average wage rate itself will depend on hours worked and this results in statistical bias in the estimates through endogeneity.

Third, the conventional procedure has grave measurement difficulties associated with non-employment income, which must be used to estimate income and substitution effects.

Fourth, the functional form employed by almost all researchers using the Kosters model imposes severe constraints and this has seriously restricted the relationship between price income and substitution effects for different income groups in the population as to make any estimated function unsuitable for discussing important policy issues such as the impact of income maintenance schemes.

Each of these four problems is discussed in detail below.

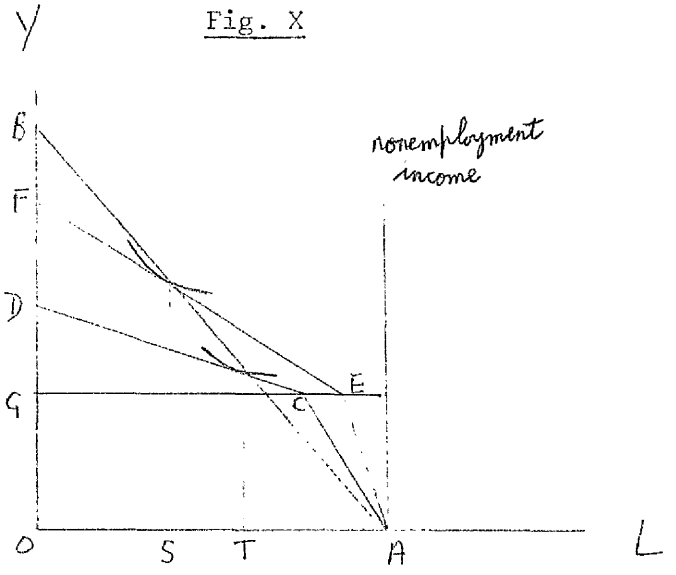
Theoretical Inadequacy of the Conventional Procedures

A correct application of the Kosters model requires empirical data in which the marginal wage rate is equal to the average wage rate i.e. the wage opportunity line is a straight line, but this is seldom true in the real world for several reasons.

First, under a progressive tax system such as exists in most developed countries the marginal rate of income tax is not equal to the average rate of income tax. Thus in Fig. X, the first few pounds of income OG is exempt from income tax, and income in excess of OG is taxed at some marginal rate of income tax. In the diagram, the net wage lines ACD and AEF are shown for two individuals. Note that both individuals have the same level of non-employment income (zero) and the same average wage rate AB. The

conventional procedure which regresses hours worked on average wage rate

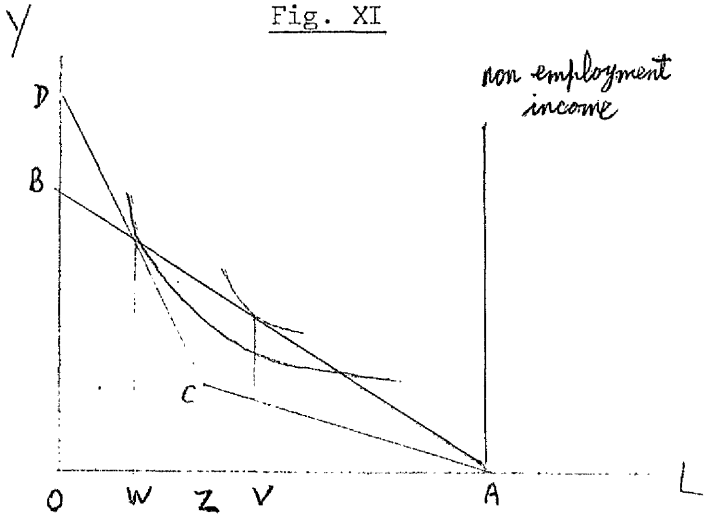
Fig. X



and non-employment income would be unable to explain why these two individuals work different hours (AS and AT).

Second, hours worked in excess of the standard working week are often paid at premium rates i.e. the overtime wage rate may differ from the basic wage rate. Thus in Fig. XI, one individual has a wage opportunity line AB, while the other is paid at a wage rate AC for the standard working week of AZ hours and CD for overtime hours worked thereafter. Once again the conventional prodedure which regresses hours worked on average wage rate and non-employment income would be unable to explain why these two individuals work different hours (AV and AW), because

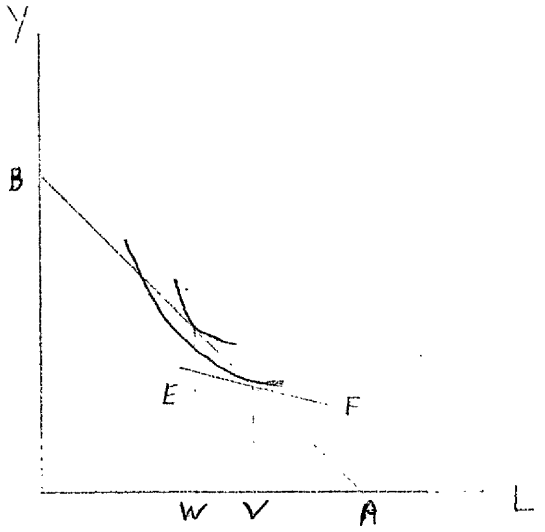
Fig. XI



both individuals have the same level of non-employment income (zero) and the same average wage rate AB.

It is evident from these two examples above that the conventional procedure of regressing hours worked on the average wage rate and non-employment income is theoretically invalid insofar as there is no functional relationship between hours worked, average wage rate and non-employment income in a world in which the wage line is non-linear. Finally, to the extent that misconceptions about the marginal rate of income tax exist, even if average and marginal wage rates were objectively the same, it is extremely unlikely that the perceived net marginal wage rate could be measured by the average wage rate.* A diagrammatic example is given in Fig. XII. M and N are two

Fig. XII



men who have the same indifference map and net wage opportunity line AB, and are identical in every respect except that man M has a misconception about the marginal rate of tax such that he believes the net marginal wage rate is EF, while man N has no misconceptions and believes the net marginal wage rate to be AB. Given their respective perceptions of the world it would be quite rational for man M to work AV hours and man N to work AW hours as both will believe they are maximising their level of satisfaction.

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* op. cit. see p. 12

Once again the conventional procedure of regressing hours on average wage rate and non-employment income could not explain the difference in hours worked for these two men when both have the same average wage rate (AB) and the same level of non-employment income (zero).

Econometric Inadequacy of the Conventional Procedures

There are two conceptually distinct sources of statistical bias associated with the conventional procedures based on the Kosters model which regresses hours worked on average wage rate and non-employment income.

The first source of statistical bias results from any error in the measurement of hours worked which will result in a spurious negative correlation between the dependent variable hours worked and the independent variable average wage rate. If hours worked was too high (low) because of error on the part of respondent, interviewer, coder or card punch operator, the average wage rate which is defined as income divided by hours worked will be too low (high) i.e. any error in the measurement of hours worked will result in a spurious negative correlation between hours worked and average wage rate. The effect of such a spurious negative correlation would be to depress the average wage rate coefficient when hours worked is regressed on average wage rate and non-employment income, and this will not only bias the estimated price effect downwards, but will also depress the estimated substitution effect which is obtained by subtracting the income effect from the (biased) price effect. This may well explain why Kosters found that in the majority of his regressions the substitution effect was negative, contrary to the prediction of a priori economic theory.*

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* Op. cit. see page 10

Subsequent researchers using the conventional procedures were aware of this problem and made various attempts to get round the problem. Rosen and Welch's study[10] based on the Kosters model which used a one in one thousand sample of the U.S.A. Census of Population freely admits to "built-in" spurious correlations between the wage rate term and the dependent variable hours worked. They defined wage rate as employment income in 1959 divided by weeks worked in 1959 multiplied by hours worked "last week". But if hours last week were greater than average this understated the hourly wage, while if hours last week were less than average this over-stated the hourly wage, hence the "built-in" spurious negative correlation. To get around this problem they also used the weekly wage rate instead of the hourly rate. Weekly wage was defined as employment income in 1959 divided by weeks worked in 1959 but this assumes that there is no correlation between the number of weeks worked per year and the number of hours worked per week. These problems combine to cast some doubt on the validity of the findings that the elasticity of substitution at the sample means for the urban sample lay between +.17 and +.36. The estimated partial elasticity of hours with respect to income for the same sample lay between -.000051 and -.000071.

E. D. Kalachek and F. Q. Raines[11] using Current Population Survey (CPS) data found that actual wage rate in the regression resulted in most of the derived substitution effects having patently absurd negative signs, and they attributed this to the spurious correlation between actual wage rate and hours worked. Actual wage rate was defined as annual income divided by

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10. S Rosen and F Welch, "Labour Supply and Income Redistribution". The Review of Economics and Statistics, Vol. 53, No. 3, August 1971 pp 278-282

11. E. D. Kalachek and F. Q. Raines, "Labour Supply of Lower Income Workers", The President's Commission on Income Maintenance Programs, Technical Studies, (Washington: Govt. Printing Office, 1970).

hours worked during the week prior to the survey, times weeks worked during the prior year. This definition yields an accurate measure of the wage rate only when weekly hours during the survey period are representative of weekly hours during the preceding year. In order to get around this problem they calculated a "potential wage rate" based on age, education and region, and they used potential wage rates instead of actual wage rates. This resulted in the expected signs for men but not for women. The elasticity of substitution with respect to hours worked was found to be between .121 and .343 for men (-.133 and .084 for women) and the income elasticity was between -.040 and -.049 for men (+.020 and -.068 for women).

The technique of estimating a potential wage rate became quite a popular method of dealing with the problem. R. E. Hall's study[12] also tackled the problem of spurious negative correlation between hours worked and the wage rate by estimating a "potential wage rate" (based on age, education, sex, colour, region, etc.) in a first stage estimation which was then used as the price variable in the subsequent analysis. This method of dealing with the problem of spurious negative correlation is unsatisfactory because

" ..... the predicted wage rate in fact accounts for rather little of the total variation in wages, so that the use of the imputed wage not only suppresses a good deal of the variation observed in actual wages but also in effect assigns the same wage to all persons with the same value for the "predictor" variables (even though they may have very different values for other variables which influence wages - hours of work, experience, quality of education etc. - but are not used as "predictors")." [13]

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12 In G. C. Cain and H. Watts. Op. cit. p. 11

13 Mark R Killingsworth "Neo-classical Labour Supply Models: A survey of Recent Literature on Determinants of Labour Supply at the Micro Level." Mimeo.

This first source of statistical bias (spurious correlation arising from error in the measurement of hours worked) would therefore be a problem with the Kosters model even if the procedures used were theoretically correct where average and marginal wage rates were equal.

The second source of statistical bias would arise even if there was no error in the measurement of hours worked. If the marginal wage rate is not equal to the average wage rate, the average wage rate will itself be determined by hours worked. This means that the average wage rate is endogenous and is not a truly independent variable. This endogeneity is likely to bias the average wage rate coefficient and therefore once again estimated price and substitution effects. This problem is best illustrated by an example. Hours worked is determined by many variables some of which are not included in the regression analysis. Suppose hours worked is positively related to temperature and the variable "temperature" has not been included in the regression analysis. Those respondents working in a higher temperature will work longer hours and if the marginal wage rate is greater than the average wage rate, ceteris paribus their average wage rate would be higher, resulting in a spurious positive correlation between hours worked and the average wage rate. If on the other hand the marginal wage rate is less than the average wage rate, there would be a spurious negative correlation between hours worked and the average wage rate. In short, where average and marginal wage rates are not equal because of an overtime premium or a progressive income tax system, hours worked will determine the average wage rate as well as the average wage rate determining hours worked.

Thus in a world where the wage opportunity line is non-linear the conventional procedure for estimating labour supply is econometrically unsound as well as being theoretically invalid.

Measurement Problems associated with the Conventional Procedure

The conventional procedure uses the derivative of hours with respect to non-employment income to measure the income effect, and the substitution effect is given by subtracting this income effect from the price effect. Thus both the estimation of income and substitution effects depend on the non-employment income coefficient and it is evident that non-employment income is a critical and necessary variable in the conventional procedure for estimating labour supply.

What is in principle required is income which a person receives which is wholly independent of hours worked. There are however severe difficulties in obtaining such a measure of non-employment income.

First, a large proportion of the population has little or no non-employment income. For example, Rosen and Welch's study[14] more than seventy-five per cent of individuals reported no non-wage income.

Second, for most people such non-employment income as does exist is not independent of hours worked. Unemployment compensation, means tested benefits, Family Income Supplement etc. are inversely related to hours worked (holding wage rate constant). The non-employment income coefficient in a regression using this measure of non-employment income will overstate the true income effect because of the tautological nature of the variable. Thus the estimated income effect in the Kosters model given by the derivative of hours with respect to non-employment income is biased because non-employment income is also a function of hours worked. In addition to this problem, non-employment income in the form of means tested benefits, Family Income Supplement, etc. is directly related to the number of dependents in the household (holding wage rate constant)

14. Op. cit. See page 20

and because hours worked will be positively related to the number of dependents, these two relationships will result in an understatement of the true income effect.

The original Kosters analysis defined non-employment income as all income coming in to the family excluding that earned by the member whose labour supply was being studied. Kosters had to assume that the wife would not alter her labour supply for a change in the household's wage rate. This assumption of zero cross elasticity between income of wife and hours of husband thus enabled Kosters to count in earnings of other household members in his measurement of non-employment income. However wife's hours (and therefore non-employment income) may well be influenced by husband's income and hours of work, therefore once again hours worked by the husband may well determine wife's income and therefore non-employment income. It is perhaps not surprising that a number of studies using non-employment income to measure the income effect have yielded an estimated substitution elasticity with the "wrong" sign after subtracting the estimated income effect from the estimated price effect in order to measure the substitution effect. One attempt to overcome problems caused by the large proportion of the population who have little or no non-employment income independent of hours worked was to impute a return to equity in the home for a family who owned their house, and also to count in the negative income stream the represented by consumer debt,[15] but this raises a whole set of new problems. It may appear at first sight that the return to capital, imputed rent from home ownership, and consumer debt is independent of hours worked, but this may not be the case, e.g. the ability to raise a mortgage to buy a house and get into debt may depend on income and therefore on hours worked.

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15. Greenberg & M. Kosters, Income Guarantees and the Working Poor: The Effect of Income Maintenance Programs on the Hours of Work of Male Family Heads, Rand Corp. Office of Economic Opportunity, December 1970.

All of the above arguments lead to the painful conclusion that it may well be impossible to find any empirical measure of the theoretical construct of non-employment income independent of hours worked which is required by the Kosters model to measure both income and substitution effects.

Difficulties associated with the Functional Form

The simple text-book theory of labour supply states that the indifference curves for income and leisure are convex to the origin and do not intersect. The theory says nothing about price income and substitution effects remaining constant at different budget levels. Thus there may be asymmetry between low and high budget individuals with respect to the magnitude of price, income and substitution effects for a change in the wage rate. Asymmetry could arise because the magnitude of the income effect I.C.C. varies as a function of the budget as shown in Fig. XIII and most studies based on the Kosters model have added in squared non-employment income and squared wage rate terms into their regressions to allow for this kind of non-linearity shown in Figs. XIII and XIV.

Fig. XIII

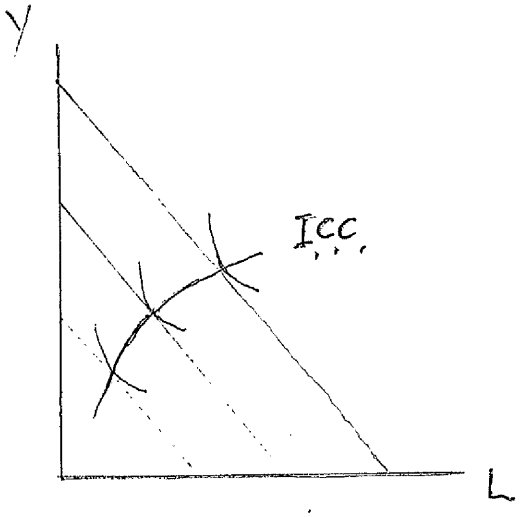
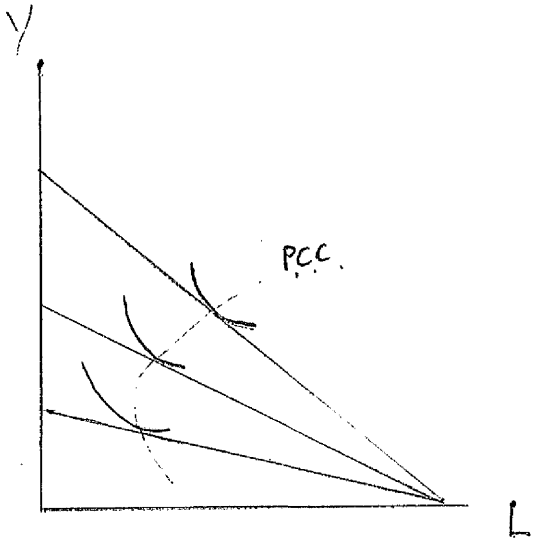


Fig. XIV



There is however another way in which asymmetry could arise, namely if the magnitude of the substitution effect is a function of the budget. But if the magnitude of the substitution effect is a function of the budget, the magnitude of the income effect is also a function of the marginal wage rate.

Let H be hours worked

W be wage rate (relative to the price of leisure ≡ 1)

U be the maximum attainable utility given the budget constraint

$X_1, \ldots X_n$ variables on which H may depend, not functions of W or U

and let $H = H(W, U, X_1, \ldots, X_n)$

then if $\frac{dH}{dU} = c(U, X_1, \ldots, X_n)$ i.e. not a function of W*

$$\frac{d^2H}{dWdU} = 0$$

Suppose $\frac{dH}{dW} = b(W, U, X_1, \ldots, X_n)$ i.e. a function of U

$$\frac{d^2H}{dUdW} = \frac{db}{dU} \neq 0 \quad \text{ex hypothesi}$$

But $\frac{d^2H}{dUdW} = \frac{d^2H}{dWdU}$ assuming continuous differentiability

Therefore b cannot be a function of U if c is not a function of W

similarly c cannot be a function of W if b is not a function of U

Result proved: either $\frac{dH}{dU}$ (income effect) depends on wage rate and

$\frac{dH}{dW}$ (substitution effect) depends on budget constraint

or income effect does not depend on wage rate and

substitution effect does not depend on budget constrain

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* Budget lines can be kinked such that a change in the budget can occur independently of W.

Note: income and substition effects are here interpreted as partial derivatives (as Slutsky).

This kind of asymmetry is shown in Figs. XV and XVI

Fig. XV

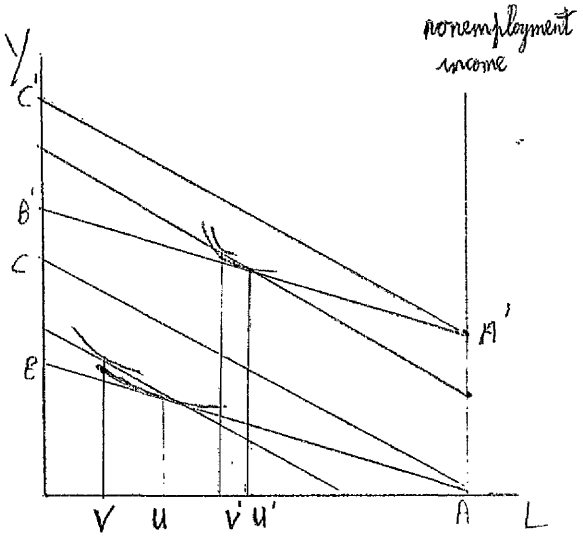
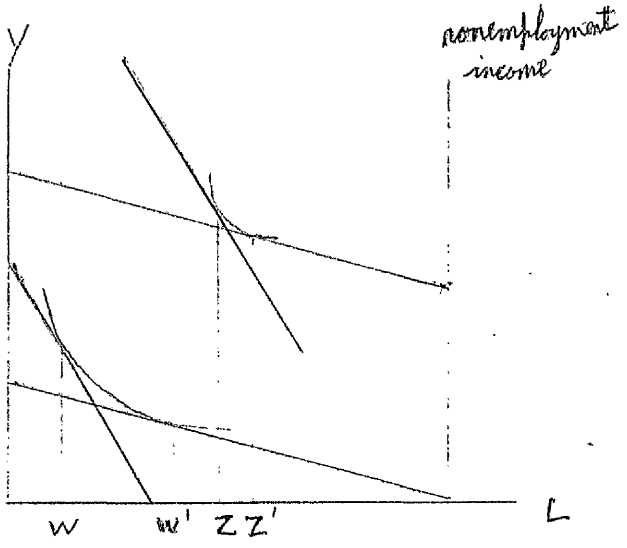


Fig. XVI



where the magnitude of the substitution effect UV for a change in the wage rate from AB to AC falls as a function of the budget, and the magnitude of the income effect WZ rises (absolute value) as a function of the relative prices of Y and L.

This type of asymmetry could of course operate in the opposite direction as shown in Figs. XVII and XVIII where the magnitude of the substitution effect UV for a change in the wage rate from AB to AC rises as a function of the budget, and the magnitude of the income effect WZ falls (absolute value) as a function of the relative prices of Y and L.

Fig. XVII

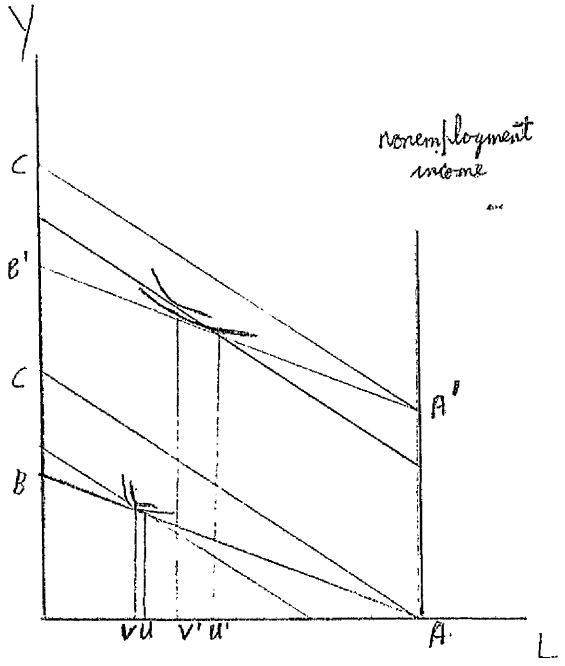
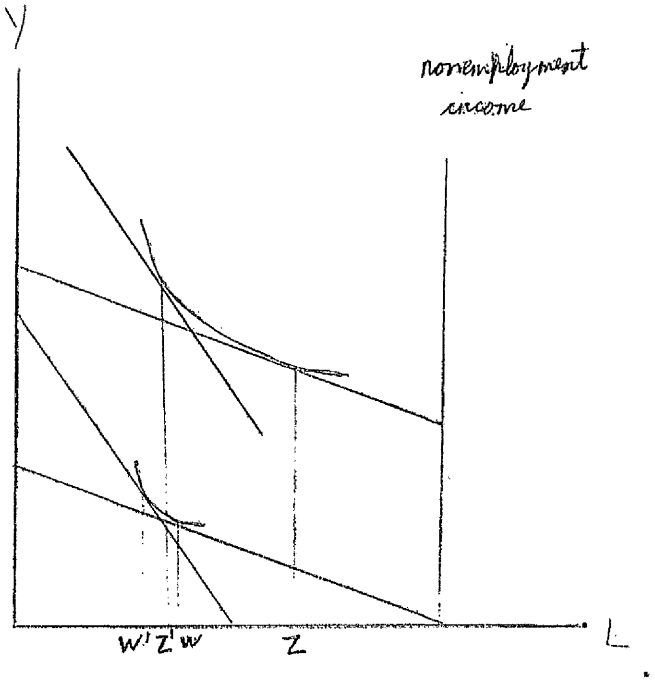


Fig. XVIII



The inadequacy of the empirical work based on the Kosters model in revealing this kind of asymmetrical relationship between the higher paid and the lower paid is shown below in Fig. XIX and XX.

Fig. XIX

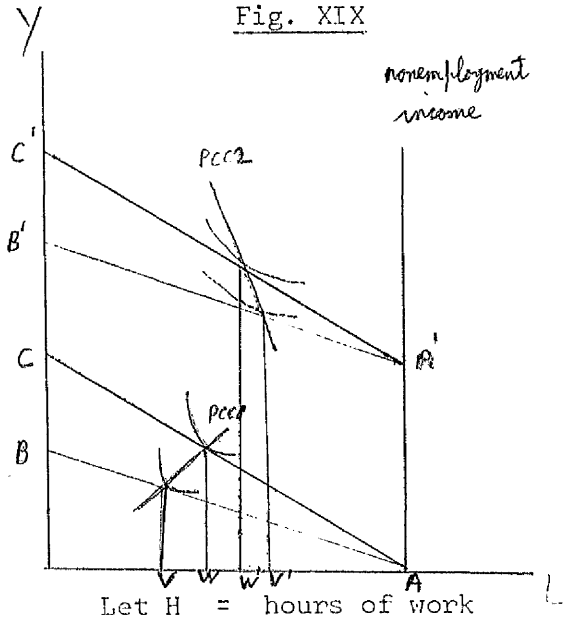
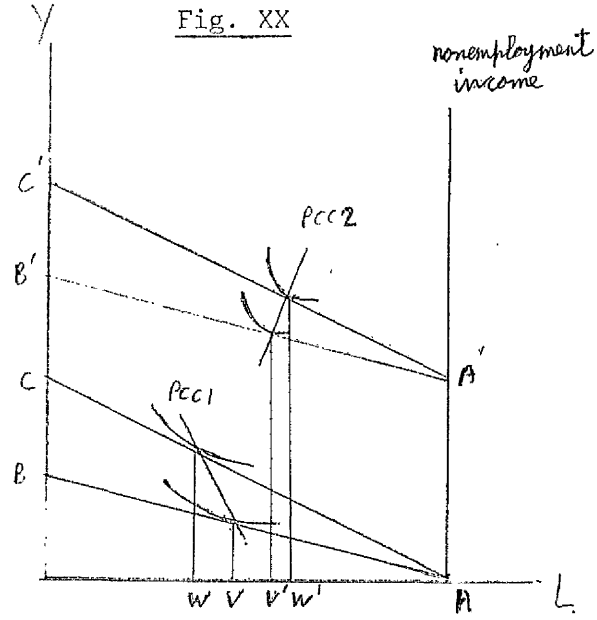


Fig. XX



Let H = hours of work

NEY = non employment income

W = wage rate

In the regression $H = a + b\,NEY + cW$, the coefficient c will show the change in hours worked for a change in the wage rate i.e. the price consumption curve, and the coefficient b will show the change in hours worked for a change in non-employment income. It is evident from the diagrams above that the change in hours worked VW for a change in the wage rate from AB to AC (=A'B' to A'C') is a function of the level of non-employment income. Thus in order to test for asymmetry where the substitution effect varies as a function of the budget and the income effect varies as a function of the marginal wage rate, it would be necessary to introduce interaction between the wage rate and non-employment income into the model.

R A Musgrave[16] was aware of the significance of such a relationship for tax policy ..... "If the marginal rate of substitution for leisure for income is high for people with large incomes and low for people with small incomes, the substitution of a progressive rate structure will be least favorable to work effort; and it will be most favourable if this relationship is reversed." Nevertheless almost all researchers* employing the conventional procedures to estimate labour supply used a functional form which did not allow the magnitude of the substitution effect to be a function of the level of non-employment income, and this ommission therefore reduced the tax policy relevance of this research, most of which had been undertaken with a view to estimating the effect of income maintenance schemes on labour supply.

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16. R. A. Musgrave The Theory of Public Finance p. 244, McGraw-Hill 1959.

* A notable exception which did interact Price effort with non-employment income is given in M. Cohen, S Rea and A. Lerman - A Micro Model of Labor Supply, B.L.S. Staff Paper 4. U.S. Dept. of Labor. Bureau of Labor Statistics, 1970.

Conclusion

A priori economic theory cannot predict the effect of a change in the wage rate on hours worked and empirical research based on the Kosters model has produced equally unsatisfactory results. It is of course legitimate to argue that these unsatisfactory empirical results have arisen because the simple text-book theory on which the Kosters model is based is just too simple insofar as it does not take account of participation, effort, family labour supply, job satisfaction, constraints and misconceptions. Nevertheless even if these problems did not exist, the conventional procedures used to estimate the labour supply function based on the Kosters model are econometrically unsound, and suffer severe measurement difficulties both of a conceptual and practical nature associated with non-employment income. It has been argued that the estimated price effect given by the non-employment income coefficient is biased and this means that the estimated substitution effect is obtained by subtracting the biased income effect from the biased price effect. Furthermore, in a world with non-linear wage opportunity lines arising from overtime premiums and a non-linear tax system, the conventional procedure is theoretically incorrect because there is in general no functional relationship between hours, average wage rate and non-employment income. Finally the functional form used has been too restrictive given the ultimate goal of estimating the effects of income maintenance schemes on labour supply.

Clearly some new technique is required to estimate price income and substitution effects using procedures which are theoretically correct, econometrically sound, measure the income effect without using non-employment income, and employ a functional form such that estimated price income and substitution effects can vary over the income distribution. An improved procedure is discussed in the next chapter.

CHAPTER II

A NEW PROCEDURE FOR ESTIMATING LABOUR SUPPLY

Introduction

In this chapter a new procedure to estimate labour supply is discussed in which hours worked is regressed on marginal wage rate, average wage rate and non-employment income. The new model proposed represents a significant improvement over the conventional procedure based on the Kosters model which regresses hours worked on the average wage rate and non-employment income, because it is theoretically correct in a world with non-linear wage lines. Furthermore, the new method can be used to estimate price income and substitution effects independently of the non-employment income coefficient and can employ a functional form which is not highly restrictive, but only one of the two econometric problems associated with the endogenous average wage rate can be overcome.

Theoretical Validity of the Average Marginal Procedure

The theoretical difficulty associated with the conventional procedure based on the Kosters model which regresses hours worked on the average wage rate and non-employment income is that in a world of non-linear wage lines there is in general no functional relationship between hours worked, average wage rate and non-employment income. The first problem to be overcome is therefore to define a functional relationship between the dependent variable hours worked and the non-linear wage opportunity lines which prevail in the real world empirical data available. In the last chapter it was argued that a given average wage rate AB and non-employment income (zero) does not uniquely define hours worked shown in Fig. I below.

Note however that a given net average wage rate, a given net marginal wage rate and non-employment income (zero) does uniquely define hours worked, except where leisure is an inferior good. Thus in

Fig. I, average wage rate

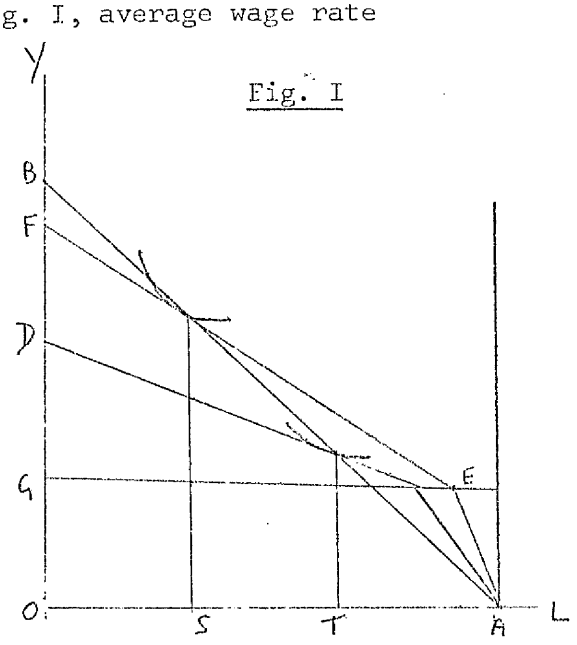


Fig. I

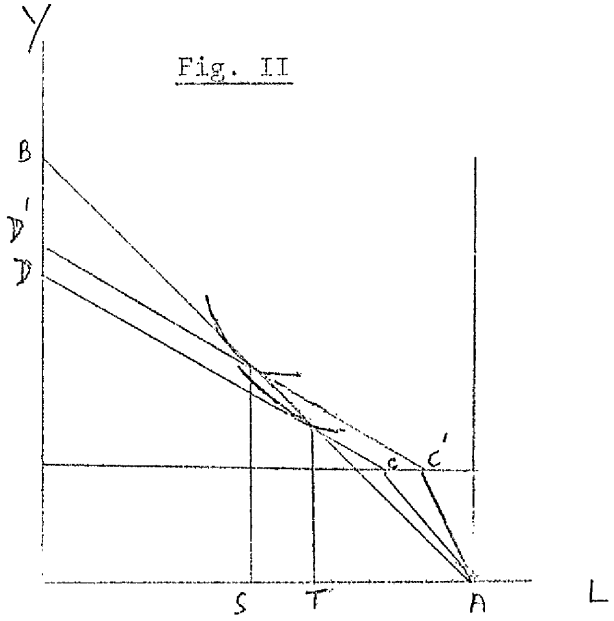


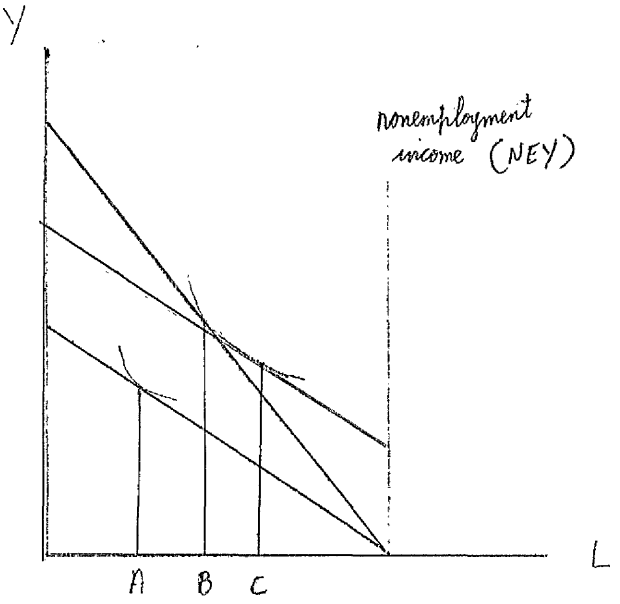
Fig. II

AB, non-employment income (zero) and the slope of the marginal wage rates CD and EF uniquely define hours worked AT and AS respectively, i.e. there is a unique value for hours worked associated with any particular values of average wage rate, marginal wage rate and non-employment income. The only case in which average wage rate, marginal wage rate and non-employment income would not uniquely define hours worked is where leisure is an inferior good. An example of this is shown in Fig. II where the average wage rate AB, non-employment income (zero) and the slope of the marginal wage rate CD = C'D' is consistent with more than one value for hours worked, but this cannot occur if Y and L are normal goods. This if we assume that Y and L are normal goods there is an underlying functional relationship between hours worked (H) and the average wage rate (A), the marginal wage rate (M) and non-employment income (NEY), and it is therefore theoretically correct to regress H on A, M and NEY, because H = f(A, M, NEY). Henceforth this procedure will be referred to as the average/marginal procedure.

Measurement of Income and Substitution Effects in the Average Marginal Procedure.

In a simple world in which the wage line is linear, price income and substitution effects can be clearly defined. For example in Fig.III

Fig. III

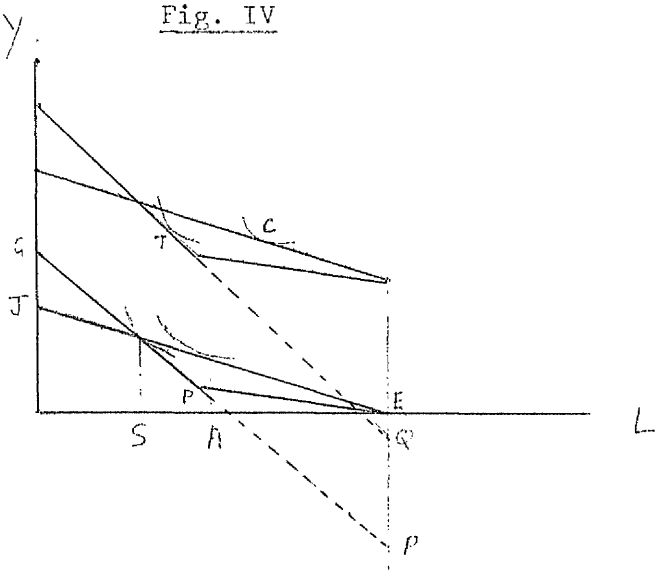


the price effect AB is given by $\frac{dH}{dAWR}$, the income effect AC is given by $\frac{dH}{dNEY}$, and the substitution effect BC by $\frac{dH}{dAWR} - H\frac{dH}{dNEY}$.

In a world with non-linear wage lines any particular average wage rate and non-employment income levels is consistent with many different combinations of hours worked and marginal wage rates, and as a result the definitions of price income and substitution effects become somewhat obscure. For example in Fig. IV there are two individuals, with wage opportunity lines EJ and EPG respectively. Both have zero non-employment income and both have the same average wage rate in equilibrium at A and S respectively. It is not clear whether the income effect $\frac{dH}{dNEY}$ increases leisure by AC or ST where AC $\neq$ ST.

There are essentially two different ways of dealing with this problem. One approach would be to abandon the concepts of price income and substitution effects as being ambiguous in a world in which the wage opportunity line is non-linear, and to argue that the labour supply function and the effects of taxation on labour supply can be adequately defined in terms of average and marginal wage rate effects without using

Fig. IV



the non-employment income coefficient, thereby avoiding the problems associated with this variable. The essence of this approach is that holding non-employment income constant any change in the tax transfer system will alter net income, hours worked and the net marginal wage rate, therefore the change in the tax system will alter average and marginal wage rates. If the derivatives of hours with respect to average and marginal wage rates are known, the effect of the change in the tax system on hours worked could also be estimated.

The second approach[1] removes ambiguity associated with the concepts of price income and substitution effects by linearising the non-linear wage opportunity line. The crux of this approach is that "however the individual might in practice have chosen a certain combination of leisure and income we can always find some value for non-employment income and competitive wage rate such that the individual's choice could be described as being made as if he were maximising utility subject to a simple budget constraint

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1. The author wishes to thank David Ulph for both the idea and the formulae of the second approach, a response to the author's concern at the apparently ambiguous nature of price income and substitution effects

defined by these "as if" values of non-employment income and wage rate."[2] Thus ST shows the income effect $\frac{dH}{dNEY}$ for an individual with a linear wage rate PG and "as if" non-employment income EP while AC shows the income effect $\frac{dH}{dNEY}$ for an individual with linear wage rate EJ and zero non-employment income.

The price income and substitution effects can be calculated using the average marginal procedure from the formulae:-

$$\text{Income Effect} = Y = \frac{dH/dAW}{(H + (AW-MW)\frac{dH}{dAW})}$$

$$\text{Substitution Effect} = S = \frac{dH}{dMW}(1 - (AW-MW)Y)$$

$$\text{Price Effect} = P = S + HY$$

where H = hours worked

AW = average wage rate

MW = marginal wage rate

These formulae are derived in the following way. Suppose

$$H = \sigma(\omega, I)$$

represents the supply function of the simple text-book model for an individual with non-employment income I and competitive wage rate ω, and

$$H = f(AW, MW, NEY)$$

represents the relationship between hours worked and an average employment wage rate AW, a marginal wage rate MW and non-employment income NEY which prevails in a more complex world. Then the "as if" wage rate and

---

2. This idea has been used as the basis for another method of correcting invalid conventional procedures based on the Kosters model. Full details are given in C. V. Brown, E. Levin and D. T. Ulph "On Taxation and Labour Supply", University of Stirling Discussion Paper No. 30, October 1974, and "On Estimating Labour Supply" University of Stirling Discussion Paper No. 31, December 1974.

non-employment income corresponding to a given AW, MW, NEY are respectively $W = MW$, $I = (AW - MW)H + NEY$ and hence

$$f(AW, MW, NEY) \equiv \sigma(MW, (AW - MW)H + NEY) \qquad (1)$$

Differentiating (1) with respect to AW gives

$$\frac{dH}{dAW} = \sigma_2 \left(H + (AW - MW) \, {}^{dH}/_{dAW}\right)$$

$$\text{i.e. } Y = \sigma_2 = \frac{{}^{dH}/_{dAW}}{H + (AW - MW)\frac{dH}{dAW}}$$

while differentiating with respect to MW gives

$$\frac{dH}{dMW} = \sigma_1 - H\sigma_2 + \sigma_2 (AW - MW) \frac{dH}{dMW}$$

$$\text{and so } S = \sigma_1 - H\sigma_2 = -\frac{dH}{dMW}(1 - (AW - MW)Y)$$

(from Slutsky/Hicks equation, $P = S + HY$)

Note that when using the average marginal procedure the income effect can be estimated independently of non-employment income unlike the conventional procedure which is forced to rely on the non-employment income coefficient in order to estimate the income effect. This represents a significant improvement insofar as the insurmountable problems associated with the measurement of the non-employment income discussed in the last chapter are no longer of central importance because this variable is no longer essential to the measurement of the income effect.

A Non-Restrictive Functional Form using the Average Marginal Procedure

It has been demonstrated that

$$H = f(AW, MW, NEY)$$

where H = hours worked

AW = average wage rate

MW = marginal wage rate

NEY = non-employment income

is theoretically valid and that price income and substitution effects can be estimated from this functional relationship using the derivatives of hours with respect to AW and MW. It would of course be possible to run the regression

$$H = a + bMW + cAW + dNEY$$

but this imposes intolerable restrictions on the underlying utility function for income and leisure. There is no reason to believe that the partial derivative $\frac{dH}{dAW}$ is linear and examples of non-linearity are given in Figs. V and VI in which $\frac{dH}{dAW}$ rises (Fig. V) and falls (Fig. VI) as a function of the AW level.

Fig. V.

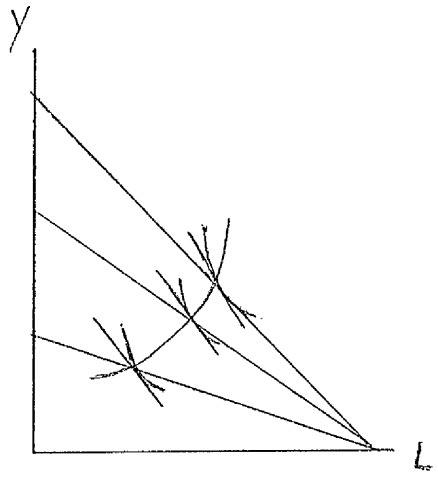
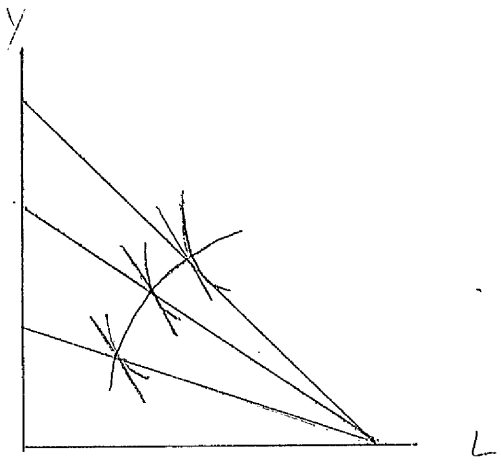


Fig. VI



In these examples the AW coefficient is itself a function of AW, i.e.

$$H = a + bMW + cAW + dNEY \qquad (1)$$

$$\text{But} \quad c = e + fAW \qquad (2)$$

Substituting (2) into (1)

$$H = a + bMW + cAW + fAW^2 + dNEY \qquad (3)$$

There is also no reason to believe that the partial derivative $\frac{dH}{dMW}$ is linear and examples of non-linearity are given in Figs. VII and VIII in which $\frac{dH}{dMWR}$ rises (Fig. VII) and falls (FIg. VIII) as a function of the MW level.

Fig. VII

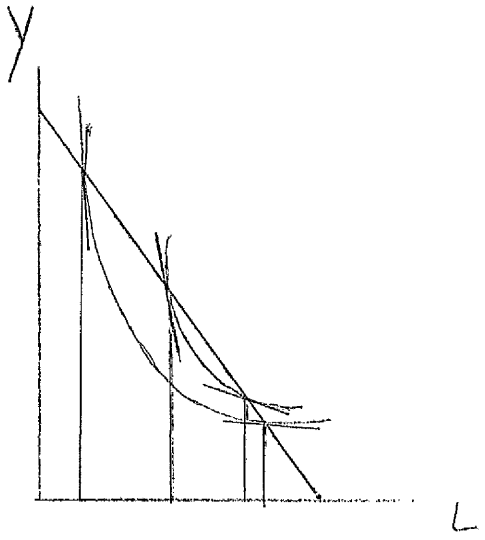
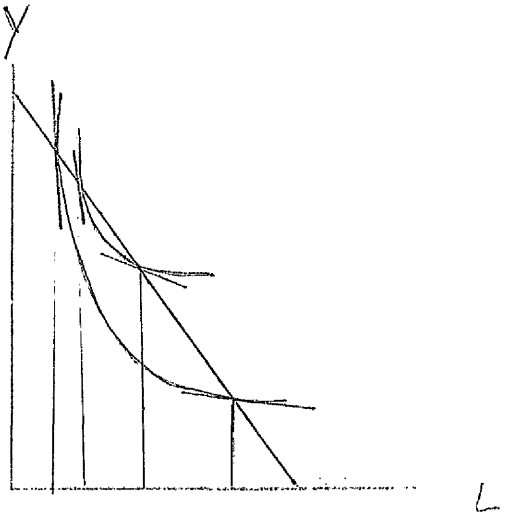


Fig. VIII



In these examples the MW coefficient is itself a function of MW level, i.e. in Equation (3)

$$b = j + k\ MWR \qquad (4)$$

Substituting (4) into (3)

$$H = a + jMW + kMW^2 + cAW + fAW^2 + dNEY \qquad (5)$$

It was pointed out in the last chapter that any empirical derivation of a labour supply function which is going to be useful for tax policy must establish the presence and direction of any systematic relationship between the budget level and the magnitude of the substitution effect.[3] It was also proved that any such relationship would necessarily imply that the magnitude of the income effect would be a function of the marginal wage rate level.[4] The partial derivative $\frac{dH}{dAW}$ measures the income

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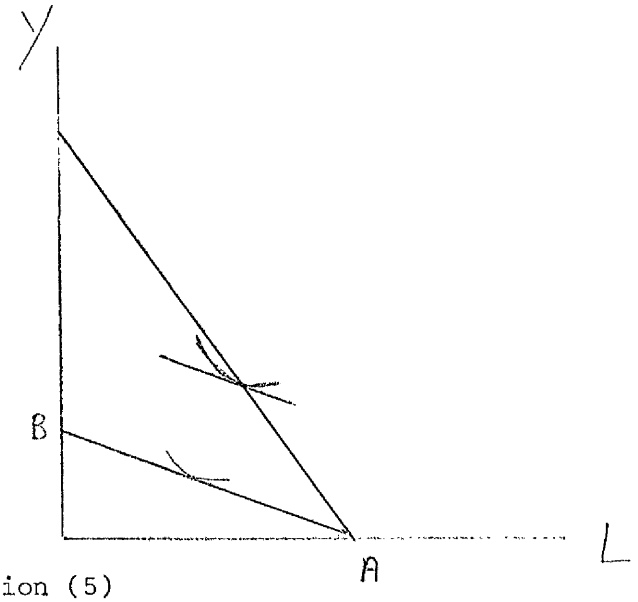
3. See page 29

4. See page 26

effect as shown in Fig. IX.

Fig. IX



If, in Equation (5)

$$c = h + jMW \qquad (6)$$

Substituting (6) into (5)

$$H = a + hMW + cMW^2 + dAW + cAW^2 + jMW.AW + fNEY \qquad (7)$$

Thus equation (7) allows hours worked to be regressed on average wage rate, marginal wage rate and non-employment income in order to estimate a labour supply function using a model which is theoretically correct insofar as there is an underlying functional relationship, and employing a functional form which is not highly restrictive such that price income and substitution effects can vary over the population, and that these effects can be estimated without using the non-employment income coefficient.

Statistical Bias in the Average Marginal Procedure

Thus far it has been demonstrated that the new average/marginal procedure is capable of dealing with a number of basic problems associated with the conventional procedures used to estimated labour supply. One problem remains, namely statistical bias associated with the average wage rate.

The first problem of statistical bias arises from any error in the measurement of hours worked resulting in a spurious negative correlation between the dependent variable hours worked and the independent variable average wage rate. If hours worked for a respondent is too high (low) because of some error in the data, average wage rate will be too low (high), because average wage rate is defined as income divided by hours worked. It is important to note that the cause of this spurious negative correlation is not simply that there may be some errors in the measurement of hours worked, but that for each case in the data set the same error appears in the dependent variable hours worked and the denominator of the independent variable average wage rate. If errors in the measurement of hours worked appearing in the dependent variable were not the same errors as those appearing in the denominator of the average wage rate, the problem of spurious negative correlation between hours worked and the average wage rate would disappear.

One way round this problem would be to collect data yielding two independent measurements of hours worked, each measure presumably having different errors. Such a procedure is adopted in the empirical analysis in the next chapter in which the dependent variable hours worked is defined as total hours worked in all paid jobs, but the denominator of the independent variable average wage rate is defined as main job hours + second job hours. Although these two definitions of hours worked should in principle be identical it is very unlikely that they will have the same errors, and therefore will greatly reduce the risk of spurious negative correlation.

The problem of spurious negative correlation between hours worked and the average wage rate arising from error in the measurement of hours worked will be largely but not entirely eliminated by this method of dealing with the problem because there might still be a relationship between errors in the two separate measurements of the same variable for some individuals.

For example, if an individual wishes to impress an interviewer by his ability to work long hours he might deliberately overestimate his hours worked on the two separate measurements of the same variable and this would result in spurious negative correlation between hours worked and average wage rate. Thus if errors in the measurement of hours worked arise from people telling lies about how many hours they work, the method of using separate measurements of hours worked will not solve the problem of spurious negative correlation, but if people tell lies about their work behaviour there is no way of accurately estimating labour supply using any technique. If on the other hand errors in the measurement of hours worked arise because of genuine error on the part of respondent, interviewer, coder or punch operator, the technique of using two separate measurements of the same variable hours worked should adequately resolve the awkward problem of spurious negative correlation discussed in Chapter I.

The second problem of statistical bias associated with the average wage rate arises from the fact that when average and marginal wage rates are not equal, the independent variable average wage rate will itself be determined by hours worked. Thus the average wage rate will itself be an endogenous variable and an example of this problem was presented in Chapter I. For this reason the average/marginal procedure for estimating labour supply is unable to claim that the independent variable average wage rate is truly independent of hours worked.

Of all the criticisms intrinsic to the conventional procedure for estimating labour supply, this is the one problem which cannot be overcome* using the average/marginal procedure.

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* New procedures have recently been devised in response to this remaining problem with the average marginal wage rate procedure, in which all of the criticisms intrinsic to the conventional procedure are resolved. For details see C. V. Brown, E. Levin and D. T. Ulph "On Estimating Labour Supply" University of Stirling Discussion Paper No. 31, December 1974.

Thus far it has been established that a labour supply function can be estimated using the average/marginal procedure from the regression:-

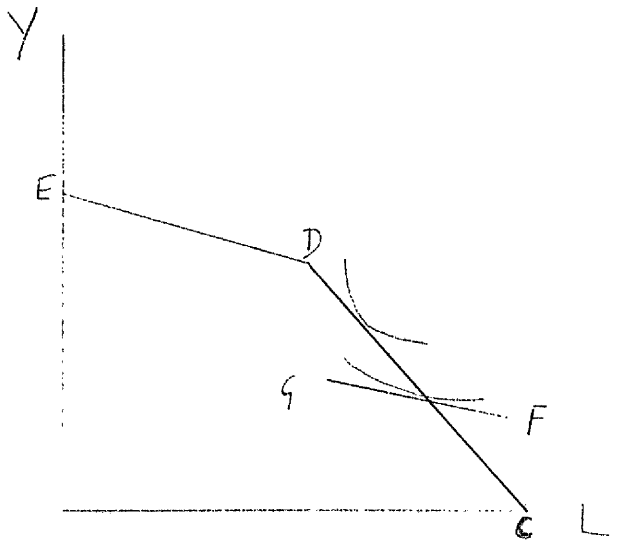
$$H = a + bMW + cMW^2 + dAW + cAW^2 + fAW.MW + gNEY$$

which overcomes all but one of the problems intrinsic to the conventional procedures based on the Kosters model. There are a number of other problems to be considered before turning to the empirical analysis.

The Effect of Misconceptions on the Marginal Wage Rate and the Average Marginal Procedure

It was argued at the beginning of this chapter that there is an underlying functional relationship between hours worked (H) and the average wage rate AW, the marginal wage rate (M) and non-employment income (NEY), but this will only be correct if there are no misconceptions about the marginal rate of tax.

Fig. X



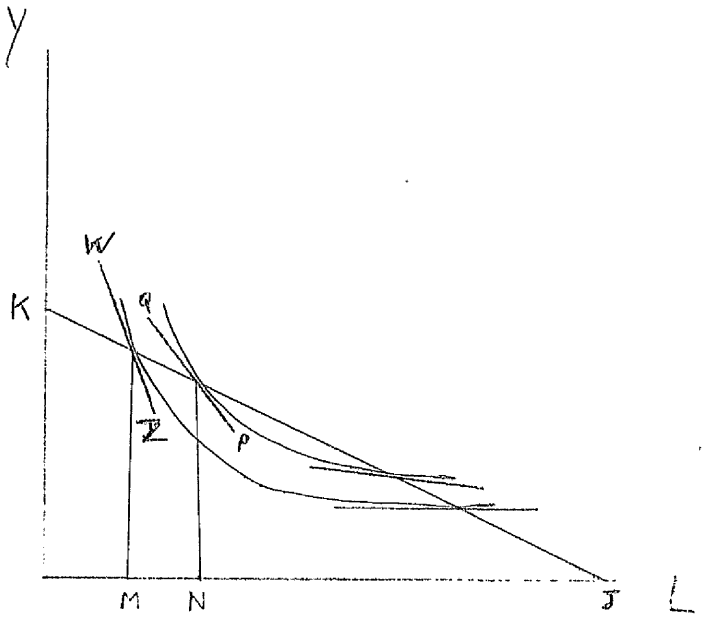
For example in Fig. X, A and B are two individuals who are identical in every respect with net wage opportunity lines CDE except that person A wrongly believes that his marginal tax rate is 50% with a net perceived marginal wage rate FG, while person B believes correctly that his marginal tax rate is 0% with a net perceived marginal wage rate CD. Persons A and B will work

different hours even though they have the same average wage rate, objective marginal wage rate and non-employment income (zero).

There will however be a functional relationship between average wage rate, perceived net marginal wage rate and non-employment income. This conclusion follows from the basic premise that the rational individual will equate his perceived net marginal wage rate with his marginal rate of substitution of income for leisure.

Thus, assuming Y and L are normal goods, for any particular levels of the average wage rate and perceived marginal wage rate, say JK and PQ respectively in Fig. XI, there is a unique value for hours worked ~~JM and~~ JN.

Fig. XI



It therefore follows that in a world in which there may be misconceptions about the marginal rate of tax, the definition of the marginal wage rate in the average marginal procedure is the net perceived marginal wage rate.*

* If there are no misconceptions this definition would still be correct insofar as the net perceived and net objective marginal wage rates would be identical.

The labour supply estimates derived would give price income and substitution effects for perceived changes in the variables, i.e. any predictions based on the regression estimates would assume that changes in the wage rate variables are in fact, fully perceived.

Constraints

It could be argued that the whole analysis rests on the assumption that individuals are free to work as many or as few hours as they wish and that constrained respondents should therefore be excluded from any empirical analysis of labour supply.

Whether or not constrained workers should be excluded depends on how labour supply is to be defined. For policy purposes the main interest lies in predicting changes in actual hours worked resulting from a change in the tax system, and not hours offered.

There is however another reason for not excluding constrained respondents from the analysis. Whether or not constrained workers should be eliminated depends on whether constraints are viewed as being exogenous or endogenous. In the case of an exogenous constraint, the person cannot adjust his hours in either direction, the whole theoretical indifference curve analysis becomes irrelevant and that person should be eliminated from the analysis. In the case of an endogenous constraint, the person may be constrained by his employer to work not less than a certain minimum number of hours and not more than a certain maximum number of hours, with freedom to adjust his behaviour between these limits. Such a person (with for example a high marginal wage rate) may be constrained because he wants to work very long hours. In this case the elimination from the analysis of such a person would "throw out the baby with the bath water" and distort the results of the study. There is no a priori reason for either preferring the exogenous

or endogenous interpretation of constraints. This study has chosen the endogenous interpretation partly because in the long run people can change their jobs in order to obtain or avoid overtime, and also because people can take second jobs. This implies that very few people who are experiencing an exogenous constraint could not if they so wished, take action to move nearer their equilibrium position in the long run.

It is for these reasons that the empirical analysis presented in the next chapter does not exclude respondents who are constrained. The problem may not be as serious as it appears bearing in mind that 30% of the whole sample chose their job in order to obtain or avoid overtime, and that 14% of the subsample used in the analysis had second jobs.

Cross Section Analysis - holding the indifference map constant

An analysis using cross section data can only make sense if we assume that all of the respondents have approximately the same indifference map or utility function for income and leisure.

For example, suppose that respondents with low average wage rates have indifference maps for income and leisure as shown in Fig. VII A while those with high average wage rates have indifference maps as shown in Fig. VII B.

Fig. VII A

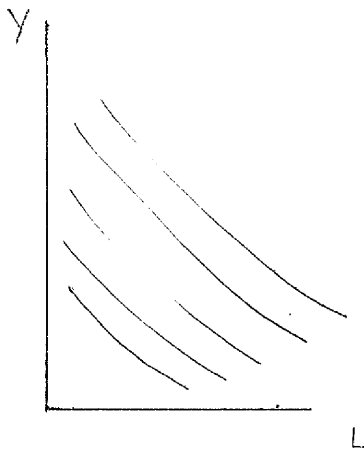


Fig. VII B

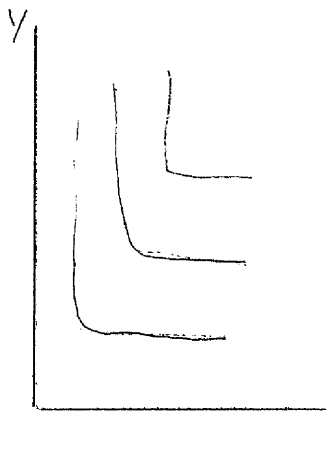
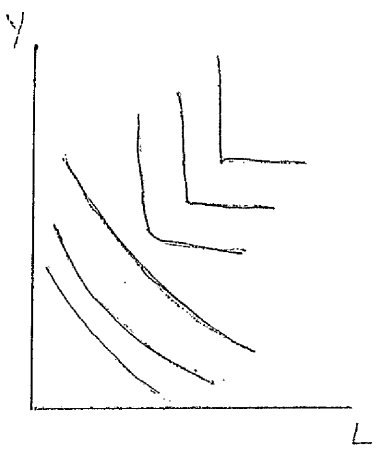


Fig. VII C



such that the shape of the map is systemmatically related to the level of the average wage rate. The labour supply function is estimated using cross section data in effect by looking at the hours worked by different people with different wage lines who are at different points of their indifference maps for income and leisure, and the labour supply estimates from this analysis would be based on the assumption that everybody had an underlying utility function for income and leisure as shown in Fig. VII C. To the extent that this assumption is evidently wrong the labour supply estimates would be completely misleading.

There are several reasons why the indifference map for income and leisure is not likely to be the same for everybody and these are discussed below together with proposals for "holding the indifference map constant". Before discussing this it should be emphasised we do not have to assume that everybody has exactly the same indifference map for income and leisure when using cross section data. We do have to assume that the differences between different people's indifference maps are normally distributed about a "mean" indifference map and that the variation about this "mean" indifference map is unrelated to any of the variables used in the estimation. The labour supply estimates would hold good with the caveat that the coefficients refer only to the behaviour of an average person and not to any particular individual.

The first reason why indifference maps may vary is that different people have different tastes even when objective circumstances are held constant.

Secondly people with the same tastes are subjected to different objective circumstances which will shift the indifference map. Some examples of this and the way in which it is proposed to overcome these difficulties are set out below. This second reason as to why people's indifference maps

will differ is in effect because other things do not remain equal.

Job Satisfaction (the marginal utility of work)

A man will work to the point where the marginal utility of an extra hour of leisure time is equal to the marginal utility of income from an extra hour's work plus the marginal utility (positive or negative) derived from an extra hour spent working. Therefore if two men have the same tastes and wage rates but different levels of job satisfaction, they will work different hours. The point is that we are primarily concerned with the indifference map for income and leisure, but leisure can only be traded off for income via work, therefore job satisfaction must be held constant in the analysis otherwise the indifference map will show not income and leisure, but income + work and leisure. It is therefore evident that the regression requires a term to hold job satisfaction constant while investigating the effect of the financial variables on hours worked. Robinson, Athanasiou and Head[5] compared the features of a dozen authors' scales designed to measure job satisfaction on criteria of statistical procedures, freedom from Response Set, cross-validation, reliability, item wording and simplicity. They decided that the Job Descriptive Index (JDI) by Patricia Cain Smith[6] was the best on the above criteria. The instrument consists of 72 items - 18 in each of work, supervision and people subscales, and nine each in pay and promotion subscales. Each of the 5 subscales consists of a list of adjectives or descriptive phrases.* Each respondent

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5. John P. Robinson, Robert Athanasiou & Kendra B. Head, Measures of Occupational Attitudes and Occupational Characteristics, Survey Research Center, Institute for Social Research, The University of Michigan.

6. Patricia C. Smith, et al., Cornell Studies of Job Satisfaction: I to VI, Mimeo, Cornell University, circa 1965.

* See Appendix II p 160 for details of JDI Scales.

was asked to write Y for "Yes", N for "No" or ? for "Don't know" against each item on the subscales describing the 5 dimensions of work above. The JDI scales for work, supervision, promotion, and people could be used to hold the marginal utility for work constant. The empirical analysis uses the JDI work subscale to hold the marginal utility of work constant.

Need for and Sources of Income

The more dependents a respondent has, the greater will be his need for money income, i.e. his indifference map will alter as his marginal utility of money schedule shifts to the right. Likewise if there are several members of the family working the respondent would need to contribute less of his income to the family budget and his marginal utility of money schedule would shift to the left. Because cross-section data is tested, it is essential to the analysis that we assume a distribution of indifference maps for income and leisure, normally distributed about a "mean" indifference map, and that the dispersion about the mean is in no way related to objective or subjective differences in needs or sources of income. For this reason several variables were put into the regression to "hold the indifference map constant".

A (crude) measure of the person's energy level (ENERGY), and whether the respondent was off sick or not in the last 4 weeks (SICK) were put into the regression to take account of the possibility that low energy or sick people might have low wage rates and indifference maps for Y and L different from the "mean" indifference map. Other income coming into the household (OTHER Y); perceived need for income (SUBJECTIVE Y NEED), job satisfaction (JDI WORK), weekly saving to buy something + weekly rent or mortgage + weekly HP commitments + c ost of maintaining family defined using Supplementary Benefits levels (OBJECTIVE Y NEED), and finally the

standard working week (STD. WEEK) were entered into the regression to take account of different objective circumstances when tastes are the same. As a final step to try to hold the indifference map constant, it was thought desirable to include only married men in the analysis, because it seems likely (on purely intuitive grounds) that tastes are likely to differ between single and married men.

In view of the discussion in this chapter the regression equation deemed most suitable given the objects of the exercise is:-

$$H = a + bAW + cAW^2 + dMW + eMW^2 + fAW.MW + {}_gSUBJECTIVE\ Y\ NEED + hOTHER\ Y + jSICK + kENERGY + lJDI\ WORK + mOBJECTIVE\ Y\ NEED.*$$

Conclusion

In this chapter the average marginal procedure to estimate labour supply was explained and justified on the grounds that it is theoretically superior to the conventional procedures used and avoids problems associated with the measurement of non-employment income in the estimation of income and substitution effects. A functional form was derived which is not highly restrictive and a solution to one of the two econometric problems associated with the average wage rate was discussed. Thus all but one of the intrinsic difficulties associated with the conventional procedures for estimating labour supply have been resolved in the average/marginal regression proposed. The average/marginal procedure was enlarged to take account of misconceptions about the marginal rate of income tax, and the problem of constraints was considered. Finally the importance of "holding the

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* Detailed definitions of the variables are given in Appendix I.

indifference map constant" when using cross-section data was discussed and a number of variables were added to the proposed regression in order to deal with this problem.

Thus the regression using the average/marginal procedure represents a substantial improvement over the conventional procedures from theoretical, econometric and data measurement viewpoints. Nevertheless there are a large number of problems which are not tackled, e.g. problems associated with payment by results schemes and the intensity of effort, unpaid work, intra-household labour substitution, promotion, job mobility, labour supply over the life cycle and labour participation are not included in the model, and it must therefore be emphasised that the analysis presented is not the final solution to the problem of estimating labour supply. Nevertheless the proposed regression using the average/marginal procedure represents a substantial improvement over the conventional procedures from theoretical, econometric and data measurement viewpoints and is therefore a few small though important steps towards the day when a complete labour supply function can be estimated.

CHAPTER III

EMPIRICAL RESULTS USING THE AVERAGE MARGINAL PROCEDURE

Introduction

In this chapter the average/marginal procedure is used to obtain labour supply estimates for a cross-section sample of British weekly paid married men. Price, income and substitution effects are calculated at nine different combinations of average and marginal wage rates to observe the effect of the flexible functional form used in allowing price income and substitution effects to vary over the population. This is found to have a profound effect on the results. The regression estimates are also used to derive the underlying utility function for income and leisure implied by the regression and a skeleton indifference map is shown and discussed.

The Data

The cross-section data used in this study was obtained in 1971 from 2068 weekly paid workers in Great Britain normally working at least 8 hours each week who had been at work sometime in "the last 7 days" and who were not self-employed. The survey, financed by the Social Science Research Council was carried out by the British Market Research Bureau Ltd. on behalf of Professor C. V. Brown who is currently working on a study of the alleged disincentive effects of taxation. The method of data collection used was a questionnaire schedule devised by Professor Brown and the author and administered by professional interviewers. The sample was drawn from British Market Research Bureau's Master Sample of 200 Constituencies, with two areas being randomly selected in each Constituency, giving a total of 400 areas excluding north of the Caledonian Canal. There were 24 addresses to be visited in each of the 400 areas and a procedure was adopted at each address to see if there was anyone eligible for interview.* This procedure

* See Appendix II, p 94 for details.

ensured that every person who was paid weekly had an equal chance of being selected irrespective of household size and composition. Thus the sample was self-weighting. There were 2965 people eligible for interview and a total of 2068 interviews were obtained, i.e. a response rate of 69.7%. Great care was taken to ensure that the data would be of high quality, e.g. the author was present at the pilot interviews, interviewer briefings, and remained at British Marketing Research Bureau's Head Office checking samples of the completed schedules and coding throughout the fieldwork period. The data cards were all verified, and several check programs were used on the computer to search for errors. These checks showed the data to be of high quality.*

Non Response Bias

A major difficulty with any survey is the possibility that the non-respondents may be in some way different from those of the sample population who agree to be interviewed. In fact, the response rate was fairly good, about the same as that achieved by the Government Social Survey in the Family Expenditure Survey. However, the probability of bias resulting from the non-respondents is increased in an analysis which is attempting to explain hours worked as it seems likely that non-response would be correlated with hours worked inasmuch as persons who work very long hours would be less easy to contact at their homes and might well be less willing to give up an hour of their leisure time for the interview.

There is no infallible method of accurately finding out the extent of non-response bias, but some crude checks were used to give a guide as to the extent that non-respondents differed from the respondents. The first

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* Some 80 errors were revealed out of 30,000 cards, each card containing about 40 bits of information. Full details of the survey are given in Appendix II.

check for non-response bias consisted of comparing answers to some key questions obtained from respondents on the first wave with those obtained from respondents on the second wave of the fieldwork. The rationale behind this comparison is that the second wave of fieldwork consisted of trying to (and in 155 cases succeeding) obtain interviews from those who had refused to give interviews or had not been able to be contacted on the first wave. Thus the second wave respondents would more closely resemble those who never gave any interview at all than would those who agreed to be interviewed on the first wave. For example if mean hours worked by second wave respondents (i.e. those who had been non-respondents in the first wave) was greater than mean hours worked by first wave respondents, then it is likely that those who never gave any interview at all worked even longer hours. In fact these comparisons between first and second wave respondents revealed no statistically significant differences in mean hours worked, gross pay, age, sex or number in the household; indeed the means on all of these variables were almost identical in both groups.

The second check for non-response bias consisted of comparing wave 1 respondents, wave 2 respondents and non-respondents on other variables. This was possible because if an eligible person refused to be interviewed on wave 2, the interviewers were instructed to complete a substitute questionnaire* in which the respondent was asked just two questions on the doorstep, and the interviewer had in addition to fill in some nine pieces of information, which also appeared in an interviewer section at the end of the main questionnaire. This check suggests that households with no children may be underrepresented because of non-response bias, this inference being drawn from Table I. below. The two questions which the non-respondents

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* See Appendix II p. 164 – 166

TABLE I

Interviewer Assessment	Wave 1 %	Wave 2 %	Non-Respondent Substitute Questionnaire
Neighbourhood - poor	16	25	24
- average	70	55	50
- middle class	12	14	16
Home Kept - clean	74	57	57
- fair	20	30	27
- untidy	5	8	16
Prosperity -			
expensive furniture, etc.	12	14	8
average " "	77	68	75
old " "	10	15	17
Children - yes	55	60	65
- no	45	40	35
Number of adults			
- 1	4	9	6
- 2	48	46	57
- 3	26	25	24
- 4	22	21	12

were asked on the doorstep are excluded from Table I on the grounds that no comparison can be made. The reason for this is that although wave 1, wave 2 and non-respondents were all asked these two questions, the stimuli are different for these three groups insofar as the non-respondents had not been asked preceding questions which the respondents had been asked and comparisons are therefore invalid.

The Regression

$$H = a + bAW + cAW^2 + dMW + eMW^2 + fAW.MW + g \text{ SUBJECTIVE Y NEED} + h\text{OTHER Y} + j \text{ SICK} + k \text{ ENERGY} + b\text{JDI WORK} + m \text{ OBJECTIVE Y NEED} + n \text{ STD. WEEK}$$

was run on married men aged under 65 years, who worked more than 20 hours in all paid jobs last week, whose net income exceeded £8.00 and whose main job perceived marginal wage rate and average net wage rate was greater than zero.

The dependent variable hours worked "last week" for which the respondent was paid (H) was regressed on average net wage rate (AW) and net perceived marginal wage rate (MW) with squared wage rates and an interaction term added in (AW^2, MW^2, AW.MW) such that labour supply estimates can be derived using a functional form which is not highly restrictive. An attempt was made to "hold the indifference map constant" by including variables which are intended to hold constant subjective differences in tastes (SUBJECTIVE Y NEED), differences in objective circumstances (OBJECTIVE Y NEED), job satisfaction (JDI WORK), health differences (SICK and ENERGY), institutional conventions (STD. WEEK) and finally sources of income coming in to the family other than the respondents' earned income (OTHER Y). This last variable which includes not only any true non-employment income but also wife's income, means tested benefits and pensions coming into the household is required to hold the respondents' budget level constant for any particular

values of respondent's average and marginal wage rates. Detailed definitions are given in Appendix I.

The results for this regression are shown below in the table below.

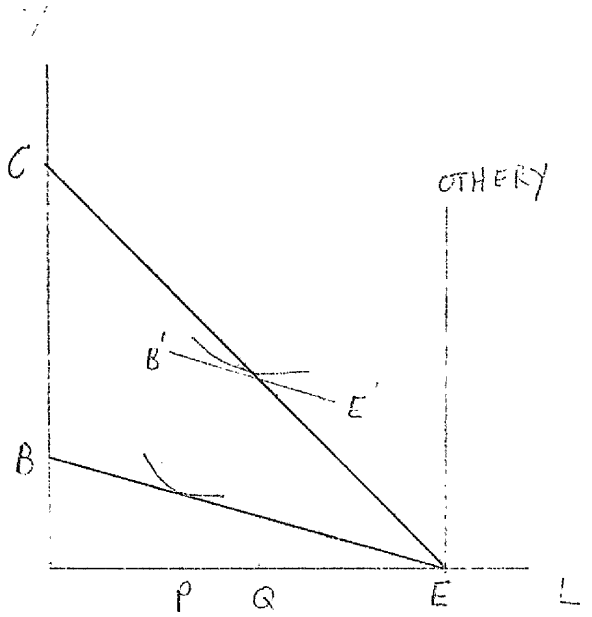
All Married Men Dependent Variable: Hours worked last week in all paid jobs

Variable	B	Beta	Std. Error B	F
AW	-0.66439	-1.12637	0.10711	38.475
AW^2	0.00368	0.86892	0.00113	10.604
MW	0.15432	0.48096	0.06912	4.985
MW^2	-0.00015	-0.10122	0.00015	0.998
AW.MW	-0.00200	-0.52660	0.00101	3.878
SUBJECTIVE Y NEED	0.00370	0.21448	0.00082	20.159
OTHER Y	-0.00188	-0.21361	0.00038	24.399
SICK	-3.96098	-0.11126	1.48270	7.137
ENERGY	0.86773	0.09595	0.38275	5.140
JDI WORK	0.07674	0.08208	0.03919	3.835
OBJECTIVE Y NEED	0.00266	0.17123	0.00071	13.980
STD. WEEK	0.49920	0.17309	0.12821	15.160
(constant)	33.62665			

R^2 = 0.37047 N = 382 F = 18.09585 (Printout Ref 29/4/74 p.14

On first inspection the results for the average marginal procedure are very encouraging, insofar as the negative sign on the average wage rate coefficient and the positive sign on the marginal wage rate coefficient are consistent with economic theory. This is illustrated in Fig. I in which, holding OTHER Y constant at zero and the net perceived marginal wage rate MW constant, i.e. EB = E'B', hours worked falls from EP to EQ

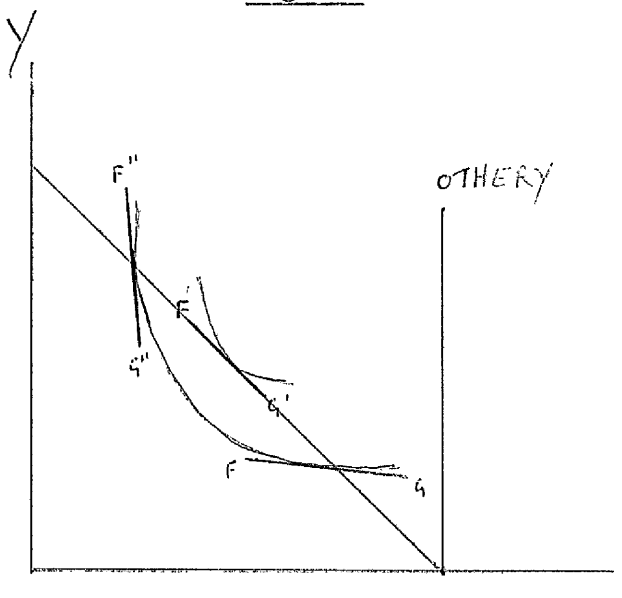
Fig I



as the average wage rate rises from EB to EC because of the pure income effect where Y and L are normal goods.

In Fig. II holding OTHER Y constant at zero, and the average wage rate AW constant at EB, hours worked rise with the marginal wage rate FG shown by heavy short lines.

Fig. II



The signs on the other variables' coefficients are also very plausible. Hours worked is positively related to the subjective need for income, general energy level, job satisfaction, objective need for income and standard working week, and negatively related to other sources of income coming into the family and sickness.

The R^2 for the regression is .37, fairly high considering that cross-section data was used and the regression as a whole, and all of the variable except MW^2 and JDI WORK are significant at the 5% level.

The object of the squared and interaction wage rate terms was to use a functional form which would permit labour supply estimates to vary over the population and in Table II price income and substitution effects are calculated at the means and one standard deviation above and below mean average and marginal wage rates using the formulae derived in Chapter II*:-

$$\text{Income Effect} = Y = \frac{\frac{dH}{dAW}}{(H + (AW - MW)\ \frac{dH}{dAW})}$$

$$\text{Substitution Effect} = S = \frac{dH}{dMW}\ (1 - (AW - MW)\ Y)$$

$$\text{Price Effect} = P = S + HY$$

where $\frac{dH}{dAW} = -0.66439 + 2 \times 0.00368 \times AW - 0.002 \times MW$

and $\frac{dH}{dMW} = 0.15432 - 2 \times 0.00015 \times MW - 0.002 \times AW$

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* See pages 35-36

TABLE II

Marginal wage rate \ Average Wage Rate	Mean less one standard deviation 37.35p	Mean 53.85p	Mean plus one standard deviation 70.35p
Mean plus one standard deviation 84.04p	P-.3412 Y-.0068 S+.0371 H55.630	P-.3247 Y-.0072 S+.0168 H 47.43	P-.2951 Y-.0069 S-.0105 H 41.24
Mean 53.70p	P-.3755 Y-.0080 S+.0552 H 53.84	P-.3473 Y-.0081 S+.0305 H 46.64	P-.2847 Y-.0068 S-.0028 H 41.45
Mean less one standard deviation 23.36p	P-.3954 Y-.0095 S+.0965 H 51.78	P-.3464 Y-.0087 S+.0501 H 45.58	P-.2398 Y-.0060 S+.0085 H 41.39

P = Price Effect, Y = Income Effect, S = Substitution Effect

H = Hours worked.

From Table II it can be seen that at the sample means for average and marginal wage rates the income effect is negative and the substitution effect is positive as predicted by economic theory.

Secondly, from Table II it can be seen that for any particular value of the marginal wage rate the magnitude of the substitution effect decreases as a function of the budget, a consequence of the negative coefficient on the AW.MW interaction variable which is significant at the 5% level in the regression. The magnitude of the income effect decreases (absolute value) as a function of the marginal wage rate, a consequence of the positive AW^2 term in the regression.

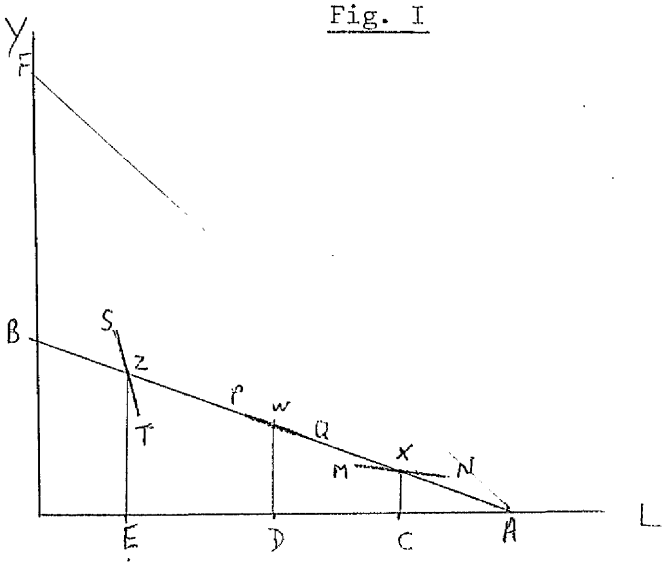
Something has gone wrong in the column of results in Table II where average wage rate is equal to mean plus one standard deviation. The

positive substitution effect which decreases as a function of the average wage rate has turned negative above mean average wage but below one standard deviation above the average wage rate, while the magnitude of the income effect, unlike the other average wage rate columns shown, increases in absolute value as a function of the marginal wage rate.

In order to find out exactly what has happened at high average wage rates well within the sample range, a skeleton of the underlying indifference map for income and leisure can be derived from the regression. The first step is to produce tables showing hours worked at different combinations of net average and perceived net marginal wage rates from the regression and this is shown in Table III.

Table III can now be used to construct an "indifference map". We know (or assume) that the slope of the perceived net marginal wage rate is equal to the slope of an indifference curve at the hours which the person chooses to work. The location on the indifference map is uniquely defined by hours worked and the net average wage rate, and the slope of the indifference curve at that point is given by the net perceived marginal wage rate. Thus for example in Fig. I, if we know that at average wage

Fig. I



rate AB, hours worked is AC at a marginal wage rate of MN, AD at a marginal

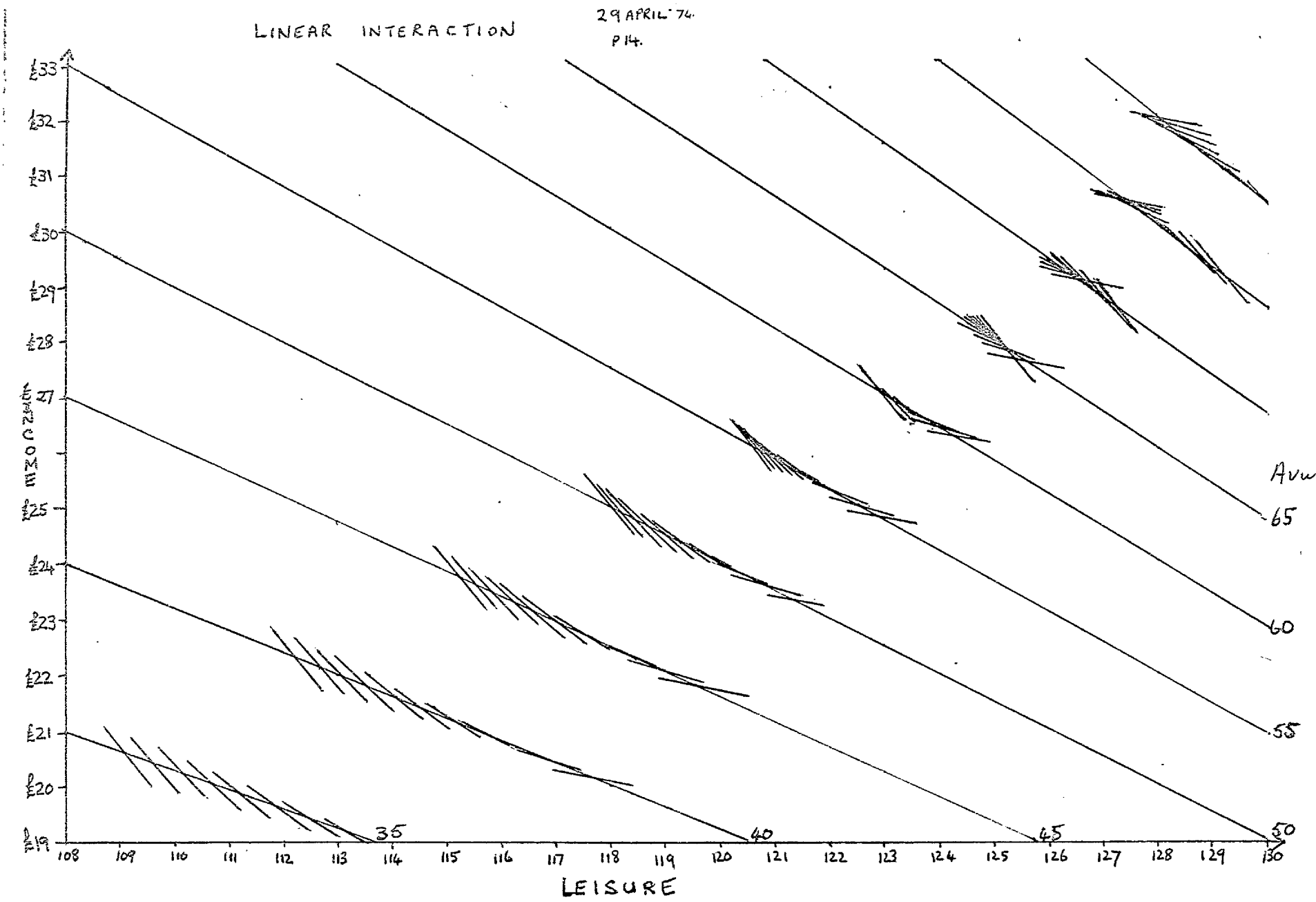
TABLE III HOURS WORKED AT DIFFERENT COMBINATIONS OF AVERAGE AND PERCEIVED MARGINAL WAGE RATES

Net Average wage rate in pence \ Net Perceived Marginal wage Rate in Pence	20	30	40	50	60	70	80	90	100	110	120
35	52.56	53.32	54.06	54.77	55.45	56.10	56.71	57.30	57.86	58.39	58.89
40	50.41	51.08	51.72	52.33	52.91	53.45	53.97	54.46	54.92	55.35	55.74
45	48.46	49.02	49.56	50.07	50.55	51.00	51.41	51.80	52.16	52.49	52.79
50	46.48	47.15	47.59	48.00	48.37	48.72	49.04	49.33	49.59	49.82	50.01
55	45.09	45.46	45.80	46.11	46.38	46.65	46.85	47.04	47.20	47.33	47.42
60	43.69	43.95	44.19	44.40	44.58	44.73	44.84	44.93	44.99	45.02	45.02
65	42.46	42.63	42.77	42.87	42.96	43.00	43.02	43.01	42.97	42.89	42.80
70	41.43	41.49	41.53	41.54	41.52	41.47	41.38	41.27	41.13	40.96	40.76
75	40.57	40.54	40.48	40.39	40.26	40.11	39.93	39.72	39.48	39.21	38.90
80	39.90	39.77	39.61	39.42	38.94	38.94	38.66	38.35	38.01	37.64	37.23

wage rate of PQ, and AE at a marginal wage rate of ST, then we know both the slope and position of the indifference curves at points X, W and Z. The operation can then be repeated at a different average wage rate say AF, and a skeleton indifference map for income and leisure will emerge. This procedure was used to produce the map shown overleaf from the information in Table III which was derived from the regression in Table I.

Inspection of this map reveals quite clearly why the labour supply estimates in Table II look peculiar at higher budget levels. The revealed "indifference map" implied by the average/marginal regression estimates of labour supply is consistent with a priori economic theory up to an average wage rate of about 10p above the mean average wage rate for the sample, and this is encouraging insofar as labour supply estimates based on the conventional Kosters procedures have in many cases estimated negative substitution effects at the sample mean. On the other hand at average wage rates beyond this level the "indifference map" looks depressingly wrong insofar as the indifference curves intersect and satiation occurs at an implausibly low average wage rate.

These findings raise a number of questions. First, the labour supply estimates given in Table II show the magnitude of the substitution effect decreasing as a function of the average wage rate, but it is not clear exactly what reliance can be placed on this relationship, or indeed on any of the estimated income substitution or price effects. Second, if it is true that the magnitude of the substitution effect does in fact decrease as a function of the budget level should this finding simply be treated as an empirical fact or does this tell us something fundamental about the psychological determination of a utility function for income and leisure. If the latter were true this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would suggest that the relationship is more likely to hold true over time. Third, if it is true that the magnitude of the substitution effect does in fact decrease as a function of the average wage rate or budget level, what, if any, policy implications would be implied by such a relationship ? The first two of these questions is discussed in the remainder of this chapter and the third is treated in the final chapter.

Validity of the Estimates

The interaction and squared wage rate terms were included in the regression in order that labour supply estimates could vary over the population. Thus the functional form used was not highly restrictive insofar as the interaction term (AW.MW) allowed the derivative of hours worked with respect to the marginal wage rate to vary as a linear function of the average wage rate. A positive coefficient on AW.MW would have implied that the substitution effect increases as a linear function of the average wage rate, while a negative coefficient on AW.MW would have implied that the substitution effect decreases as a linear function of the average wage rate.

The regression, in fact, produced a negative coefficient* on AW.MW

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* See Table I, page 56

which was significant at the 5% level but it is this coefficient which is responsible for $\frac{dH}{dMW}$ turning negative at high average wage rates, and the question must be asked as to why this interaction was so powerful that it decreased $\frac{dH}{dMW}$ to below zero within one standard deviation above the sample mean average wage rate. The regression also produced a negative coefficient* on the MW^2 term (which was not significant at the 5% level) and it appears to be this coefficient which is responsible for intersecting indifference curves, and it is important to find out why this theoretically impossible result might have occurred.

Mis-specification

The first possibility is that although the average marginal procedure is an improvement in comparison with the conventional Kosters procedure, it is still a mis-specified model of labour supply because it is incomplete i.e. it does not deal with participation, effort, family labour supply, life cycle effects, etc., and that any results must therefore be viewed with extreme caution. While this conclusion is absolutely correct, this does not account for the statistical significance of the AW.MW interaction term and is therefore a somewhat unsatisfactory explanation, particularly as this relationship is significant on different subsamples and cannot be treated as a fluke result.

Statistical Bias

A more likely reason for these results may be found with reference to the econometric problem intrinsic to the Kosters procedure which the average marginal procedure is unable to solve, namely that the average wage rate is an endogenous variable whenever net average and objective net marginal wage rates differ. In Chapter 1** an example demonstrated

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* See Table I, page 56

** See page 22

that if there was a variable which was positively (negatively) related to hours worked and was missing from the regression, this would result in spurious negative (positive) correlation between hours worked and the net average wage rate if the objective net marginal wage rate is less than the average wage rate, and vice versa if the objective net marginal wage rate is greater than the average wage rate. Although R^2 in the regression is high in comparison with other studies using cross-section data to estimate labour supply, 63% of the variance is unaccounted for, and there must be many variables both positively and negatively related to hours worked which are not included in the regression. The possibility therefore exists that spurious positive or negative correlation exists between the net average wage rate and hours worked arising from the fact that net average and objective net marginal wage rates are not equal. If a spurious negative correlation exists between hours worked and the net average wage rate, the net average wage rate coeffficient would be spuriously decreased and the interaction term AW.MW which includes the net average wage rate would also be spuriously decreased. It is therefore possible that the strong negative interaction term in the regression is greater (absolute value) than the true value of the coefficient for AW.MW. The effect of this would be to depress estimates of $\frac{dH}{dMW}$ as well as to exaggerate the rate at which $\frac{dH}{dMW}$ decreases as a function of the average wage rate and if there was spurious negative correlation between hours worked and the average wage rate, this would explain both the intersecting indifference curves and the low satiation for income and leisure. It is however impossible to say a priori whether statistical bias arising from the inequality of average and marginal wage rates will result in a spurious positive or negative correlation between hours worked and the average wage rate because the sample includes respondents whose objective net marginal wage rates are greater than as well as less than their average wage rates, and

we do not know whether the variables not included in the regression which would explain the unaccounted 63% of the variance are positively or negatively correlated with hours worked. It is however possible to argue that there should be little or no spurious negative correlation between hours worked and the average wage rate arising from error in the measurement of hours worked because separate measurements of the same variable hours worked were used for the dependent variable hours worked and the denominator of average wage rate defined as net income divided by hours worked.

The Functional Form

The reason that the implausible areas of labour supply estimates and "indifference map" were able to occur above an average wage of 60p per hour was that a functional form was used which was not highly restrictive such that labour supply estimates (and therefore the implied utility function for income and leisure) could vary fairly freely over the sample population. Nevertheless the functional form used did have some restrictions. For example, the derivative of hours worked with respect to the net perceived marginal wage rate is constrained to be a linear function of the net average wage rate, and this could explain the obviously wrong labour supply estimates at higher net average wage rates. If for example the true utility function for income and leisure was such that $\frac{dH}{dMW}$ was a non-linear function of AW, it is possible that $\frac{dH}{dMW}$ rapidly decreases as a function of AW at low average wage rate levels but that this effect diminishes at higher average wage rate levels. The linear restriction imposed by the functional form used could conceivably impose constraints such that incorrect labour supply estimates are derived from the regression. Thus it could be argued that the functional form used was sufficiently non-restrictive to reveal that there is a relationship between the magnitude of the substitution effect and the average wage

rate level and to give its sign, but that the functional form was too restrictive to give the magnitude of this relationship accurately. It would have been possible to run a full scale polynomial regression but this would have led to problems of multicollinearity between the wage rate variables resulting in insignificant coefficients. The functional form which was actually used has five wage rate terms in which both average and marginal wage rates appear three times.

There is another way of dealing with the possibility that the functional form used is too restrictive. Rather than adopting the rather crude blunderbuss empirical approach of running a large polynomial regression, it is worth considering on a priori grounds just why the magnitude of the substitution effect might decrease as a function of the budget, and construct a new functional form which has some theoretical basis, and it is this approach which is adopted in the next section.

Weber/Fechner Laws of the Relationship between Objective Stimuli and Sensation

A priori economic theory states that indifference curves are convex to the origin and do not intersect, but the theory says nothing on the question as to whether the magnitude of the substitution effect increases, decreases or remains unchanged as a function of the budget. Indeed the simple linear interaction term AW.MW was used in the empirical analysis because a priori theory gives no guidance whatsoever concerning this relationship.

The empirical results suggest that this relationship is important in the determination of labour supply estimates and that consideration of a theoretical reason for this may provide reason to re-estimate labour supply using a theoretically based interaction between AW and MW

employed in the regression.

The theoretical gap may well be filled by Fechner's Law[1] which was derived from Weber's Law. Weber's Law states that equal relative increments of stimuli are proportional to equal increments of sensation i.e. $\delta\gamma$ remains a constant when $\frac{\delta\beta}{\beta}$ remains constant where

γ = sensation

β = stimulus.

For example it may be possible to tell the difference between the weights of two objects when one weighs 1 lb and the other weighs $1\frac{1}{2}$ lbs but it is impossible to tell the difference between two objects when one weighs 10 lbs and the other weighs $10\frac{1}{2}$ lbs. Weber's Law emerged from a series of experiments in which he found that at the "just noticeable difference" between two stimuli (i.e. $\delta\gamma$), $\frac{\delta\beta}{\beta}$ was a constant. This "fundamental formula" (as it came to be called) did not presuppose the measurement of sensation; it simply expressed the relation holding between small relative stimulus increments and sensation increments.

Fechner pointed out that the relationship between objective stimulus and sensation could be derived from Weber's Law whereby

$$\gamma = \log \beta$$

Boring[2] has subsequently concluded that although this relationship is not in fact absolutely correct (especially at very high and very low intensities of stimulus), it is more nearly correct to equate the just

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1. G.T. Fechner, "Elements of Psychophysics in 1860" translated and reprinted in W. Dennis, Readings in the History of Psychology, Appleton -Century-Crofts Inc. pp 206-213.

2. E G Boring, Sensation and Perception in the History of Experimental Psychology, D. Appleton-Century-Crofts Inc. 1942.

noticeable difference in sensation with a proportional difference in the stimulus than to equate it to any constant stimulus difference.

Thus "it follows that every given increment of stimulus causes an ever decreasing increment in sensation in proportion as the stimulus grows larger and that at high values of the stimulus it is no longer sensed, while on the other hand, at low values it may appear exceptionally strong."[3]

What then is the relevance of Weber's Law and Fechner's Law which states a more precise relationship between stimulus and sensation than its cousin, Marshall's Law of Diminishing Marginal Utility which states a relationship between stimulus and satisfaction?

The stimulus could be viewed as the level of activities produced by combining income and leisure in a production function. After a compensated change in the relative prices of income and leisure the increment to the stimulus would be the amount of extra activity the person could enjoy if he alters his combination of time and money inputs such that the new price line is tangential to a higher isoquant curve. In the real world people do not have isoquant maps or indifference maps which they consult in their efforts to maximise satisfaction. It follows therefore that a different strategy must be adopted by a person choosing between different combinations of income and leisure in the production of an activity, and between different combinations of different pairs of activities. The most reasonable hypothesis is that the extent to which there will be a

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3. G.T. Fechner, "Elements of Psychophysics 1860" translated and reprinted in W. Dennis, Readings in the History of Psychology, Appleton-Century-Crofts Inc. page 212.

change in behaviour for a compensated change in price will be a function of the likelihood of there being a perceptible increase in the level of activities (i.e. a just noticeable difference) as a consequence of the changed behaviour.

This "different strategy" together with the Weber/Fechner Laws provides a plausible a priori explanation as to why people might become less responsive to compensated changes in the marginal price of leisure as the budget rises. The "different strategy" plus the Weber/Fechner Laws also implies that there is no such thing as an indifference map in the real world. There is a behaviour map which would differ from an indifference map in as much as the individual will always "maximise" his satisfaction if he knows his indifference map, whereas the individual who does not know his indifference map will adopt a different strategy in which he can only "satisfice" because of the Weber/Fechner Laws. Putting it rather crudely, it is not worth the effort making marginal adjustments to your behaviour in response to marginal price changes if the increment to the level of activities is not noticeable. The probability that such an increment will not be noticeable rises with the budget or activities level.

This reason as to why the magnitude of the substitution effect might be a function of the budget level is rather appealing because it is based in Psychological theory which is relevant to the fundamental assumptions of Economic Consumer Theory.

The functional form used in the regression constrained $\frac{dH}{dMW}$ to be a linear function of the average wage rate. But the Weber/Fechner laws discussed above suggest that $\frac{dH}{dMW}$ is a logarithmic function of the budget.

Thus instead of saying

$$H = a + bMW + cAW$$

but $b = d + eAW$

therefore by substitution $H = a + dMW + eAW.MW + cAW$

we now say $H = a + bMW + cAW$

but $b = d + e \log AW$

therefore by substitution $H = a + dMW + e(\log AW).MW + cAW$

In order to test this hypothesis the regressions were run again using the same sub-sample and the same variables except that the(logAW).MW was substituted for AW.MW.

The results for this regression are shown below in Table III. The F value of the interaction term has increased from 3.878 in the earlier regression to 6.515, while R^2 and the F value for the regression as a whole has increased, lending support to the hypothesis that behaviour is affected by the Weber/Fechner laws such that $\frac{dH}{dMW}$ decreases as a logarithmic function of average wage rate. However $\frac{dH}{dMW}$ becomes negative at an average wage rate of about 70p per hour and so the hypothesis that satiation occurred at an implausibly low budget level because the interaction term should have been (log AW).MW instead of AW.MW based on the Weber/Fechner laws is not supported by the evidence.

All Married Men Dependent Variable: Hours worked last week in all paid jobs

Variable	B	Beta	Std. Error B	F
AW	-0.50111	-0.84955	0.10072	24.754
AW^2	0.00257	0.60530	0.00072	12.741
MW	0.60700	1.89177	0.22629	7.195
MW^2	-0.00015	-0.10099	0.00015	1.010
(LOG AW).MW	-0.32642	-1.88671	0.12788	6.515
Subjective Y need	0.00367	0.21308	0.00082	20.265
OTHER Y	-0.00186	-0.21141	0.00038	24.045
SICK	-3.87590	-0.10887	1.47838	6.873
ENERGY	0.85850	0.09493	0.38143	5.066
JDI WORK	0.07517	0.08040	0.03905	3.706
Objective Y need	0.00263	0.16901	0.00071	13.799
STD. WEEK	0.51130	0.17729	0.12787	15.988
(Constant)	28.04309			

R^2 = 0.37489 N = 382 F = 18.44134 (Printout Ref. 29/4/74, p.16)

Conclusions

The average/marginal procedure was used to estimate price income and substitution effects for a sample of 382 British weekly paid married men using cross-section survey data collected in 1971. Estimated price income and substitution effects have signs consistent with economic theory over a substantial range of sample wage rates and the magnitude of the substitution effect was found to decrease as a function of the average

wage rate. This relationship was so strong that the substitution effect became negative at net average wage rates in excess of around 60p per hour i.e. within one standard deviation above the mean net average wage rate. An "indifference map" for income and leisure was derived from the regression estimates to illustrate the utility function for income and leisure implied by the regression and also to show how the substitution effect decreased as a function of the average wage rate level, changing from positive through zero to negative above an average wage rate of about 63p per hour.

Possible explanations of this finding were considered and it was concluded that endogeneity of the average wage rate could cause positive or negative spurious correlation between hours worked and the average wage rate and that spurious negative correlation if present could explain this relationship. A second plausible explanation is that the functional form is sufficiently non-restrictive to reveal the presence and direction of the relationship between the substitution effect and the average wage rate level, but is too restrictive to give the correct magnitude insofar as the relationship is constrained to be linear. An alternative functional form based on Psychological Theory was tried, but this did not yield plausible labour supply estimates over the whole population either, although these results implied some improvement. Whichever of these explanations is correct, very little reliance can be placed on anybody's estimates of labour supply as long as the problem of endogeneity remains unsolved and until all the other factors affecting labour supply (e.g. intensity of effort and joint family labour supply determinants) are built into a fully specified labour supply model. On the brighter side it is encouraging to see that the average/marginal procedure which, after all, ought to yield better results insofar as it is superior to the conventional procedures from theoretical and econometric points of view,

does in fact produce labour supply estimates with the correct signs at the sample means and over a fairly large range of average and marginal wage rates. In the next chapter the possible implications of the labour supply estimates are discussed on the assumption that they are correct in terms of the directions of the relationships if not in terms of the exact magnitudes.

CHAPTER IV

Income Maintenance Proposals and Labour Supply

Introduction

In this chapter the implications of the estimated labour supply function with respect to income maintenance schemes are discussed, using alternative negative income tax schemes on a hypothetical population to illustrate the issues.

Finally, the strengths and weaknesses of the average/marginal approach to the estimation of labour supply are reviewed and some suggestions are made for future research.

Taxation and the Distribution of Income

Taxation has been used as a tool to achieve a transfer of income from the rich to the poor, yet attempts by Government to eliminate poverty through transfer using taxation are claimed to have greatly impeded the incentive to work because the effect of means tested social benefits to the poor can be to raise their marginal rate of taxation to well over 100% at low levels of income.[1] This line of argument has led to several suggestions[2] for "guaranteed income" or "negative income tax" schemes which struggle to achieve simultaneously:

1) a low marginal tax rate (to maintain efficiency)

2) the elimination of poverty by a guaranteed income (to achieve a "good" distribution).

Although much of the empirical work based on the Kosters model has been

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1. A. R. Prest, Social Benefits and Tax Rates, IEA Research Monograph No. 22, 1970.

2. A. B. Atkinson, Poverty in Britain and the Reform of Social Security, Dept. of Applied Economics Occasional Papers 18, Cambridge Univ. Press, 1969.

undertaken with a view to helping policymakers estimate the effect of introducing an income maintenance or negative income tax scheme on labour supply, the net effect of such schemes on the incentive to work is unknown. One feature common to all redistributive schemes is that there are both net gainers who usually have relatively low incomes and net losers who usually have relatively high incomes. The income effect would probably result in the net gainers in the scheme working less as their incomes rise, but the net losers would work more as their incomes fall. The substitution effect could result in the gainers and/or losers working less or more, depending on whether their marginal rates of deductions increase or decrease when the scheme is implemented. This assumes that such a scheme would be a substitute for rather than an addition to the existing tax/transfer system.

The results of the average marginal regressions suggest that the magnitude of the substitution effect decreases as a function of the average wage rate, while the magnitude of the income effect decreases as a function of the marginal wage rate. Little reliance can be placed on either this relationship or any other empirical estimate of price income or substitution effects until a fully specified labour supply model is evolved which does not contain any endogenous variables. Having made this caveat, it is nevertheless interesting to note the implications of the empirical findings using the average/marginal procedure. The really interesting point is that income and substitution effects are not going to be the same for net gainers and net losers in a redistributive negative income tax scheme, and that the asymmetry of the magnitudes for income and substitution effects as between net gainers and net losers could be important in choosing the tax rate schedule.

The notion of asymmetry does implicitly enter the income maintenance

controversy as those opposed to redistribution will simultaneously argue that redistribution from the higher paid to the lower paid will act as a disincentive to the higher paid because of high marginal tax rates (substitution effect > income effect) and a disincentive to the lower paid because if you give them money they don't need to go out to work (income effect > substitution effect).

Likewise those in favour of redistribution will simultaneously argue that redistribution from the higher paid to the lower paid will not be a disincentive to the higher paid because of higher marginal rax rates (income effect > substitution effect), and will not be a disincentive to the lower paid because the existing high marginal rates of deductions caused by the poverty trap will be lowered (substitution effect > income effect).

The question of asymmetry between "donors" and "recipients" is evidently of considerable importance in any discussion of income maintenance and labour supply. The significance of these observations can be seen if we take a real-world example. The proposed Tax Credit Scheme[3] prompted George and Priscilla Polanyi[4] to suggest that a higher marginal tax rate be imposed at the lower end of the income distribution in order to achieve an "inexpensive" high minimum income guarantee. Professor Kaldor[5] strongly urged precisely the opposite, i.e. he wanted marginal tax rates to rise with income. Let us assume that the objective is to minimise the loss of

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3. Proposals for a Tax Credit System, Cmnd 5116, H.M.S.O. Oct. 1972

4. George and Priscilla Polanyi, "Tax Credits: A Reverse Income Tax", National Westminster Bank Quarterly Review, Feb. 1973, p. 31.

5. Professor N. Kaldor, Select Committee on Tax Credit, Minutes of Evidence Thursday 29th March 1973, p. 217.

national income for a given level of assistance to the worst off person. R. A. Musgrave's[6] claims that "If the marginal rate of substitution of leisure for income is high for people with large incomes and low for people with small incomes, the substitution of a progressive rate structure will be least favourable to work effort; and it will be most favourable if this relationship is reversed." Thus it would appear that the labour supply estimates which show the magnitude of the substitution effect diminishing as a function of the budget, ought to favour the Kaldor proposals in which marginal tax rates rise as a function of the level of income.

This hypothesis can be tested by assuming a hypothetical population of four people A, B, C and D with gross linear wage rates of 30p, 40p, 50p and 60p respectively. Estimated hours worked together with price income and substitution effects at these points are shown in Table I.

Table I

	Gross wage rate	Hours worked	Gross Income	Price Effect	Income Effect	Substitution Effect
A	30	55.75	16.725	-0.4181	-0.0090	0.0853
B	40	51.72	20.688	-0.3877	-0.0087	0.0623
C	50	48.00	24.000	-0.3572	-0.0083	0.0393
D	60	44.58	26.748	-0.3265	-0.0077	0.0163
	National Income	=	88.161			

Now suppose this population decided that the distribution of income was too wide and wished to redistribute income using a self financing negative income tax system with a tax credit of say £2.00 financed by a tax on

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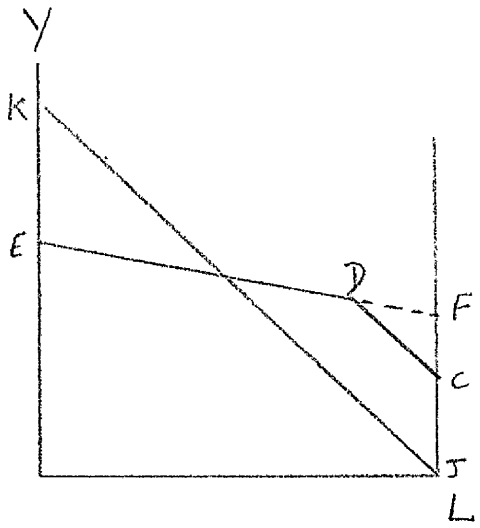
6. R. A. Musgrave, The Theory of Public Finance, McGraw-Hill, 1959 p.244

earned income. They could simply impose a tax credit and a linear income tax schedule on themselves, or the tax schedule could have marginal tax rates rising or falling as a function of income.

Two such alternative schemes are considered in Tables II and III in which both have the same tax revenue after labour supply adjustment of £8 to finance a tax credit of £2, and both systems are self-financing.

The computation of the change in hours worked resulting from the negative income tax on person C who faces rising marginal tax rates is illustrated in Fig. I.

Fig. I



JK is the gross wage rate before tax, 50p per hour. JC is the tax credit or minimum income guarantee, £2.00. The net wage rate is given by CDE i.e. the first £21.05 is taxed at 0% therefore CD is parallel to JK. Income earned in excess of the first £21.05 is taxed at 90%, therefore the slope of DE is one tenth the slope of CD. The effect of this negative income tax system on hours worked consists of an income effect arising from the credit JC, a price effect arising from the change in the net wage rate, and another income effect arising from the kink

in the net wage line CDE. Thus the negative income tax changes hours worked by (JC + CF) times the income effect, plus the change in the slope of JK to DE times the price effect. The income effect of the tax and credit and the price effect of the tax are computed for the other individuals on the same principle illustrated for person C.

Tables II and III show that the effect of the negative income tax system with a minimum income guarantee of £2.00 is to reduce national income by approximately 1% for the hypothetical population using the average marginal labour supply estimates. Contrary to R. A. Musgrave's prediction and the author's expectation, the negative income tax system with the progressive rate schedule in Table II reduces both national income and total hours worked by more than the regressive rate schedule in Table III. It is however worth noting that although these two schemes both provide the same minimum income guarantee of £2.00 and are therefore in some sense equivalent schemes, the amount by which the worst off person A is made better off (assuming no change in his hours of work) is not identical in both schemes.

In the progressive rate scheme in Table I person A pays no tax at all therefore he benefits by the full amount of the £2.00 tax credit, whereas in the regressive rate scheme in Table II, although person A would also receive a £2.00 credit, he would also pay £1.67 tax at his original hours therefore reducing the net benefit to 33p.

It is for this reason that the effect of another self-financing income tax system is given in Table IV which has a regressive rate structure but which yields person A a net gain of £2.00 at his original hours, unlike

TABLE II 0% Tax on First £21.05 and 90% on Income Earned Thereafter. Credit = £2.00

	Original Income	Original Hours	Income Effect of Tax & Credit	Price Effect of Tax	New Hours	New Gross Income	Tax Revenue	Tax Credit
A	16.725	55.75	-.0090*200	0	53.95	16.19	0	2.00
B	20.688	51.72	-.0087*200	0	49.98	19.99	0	2.00
C	24.000	48.00	-.0083*2094.5	+.35716*45	46.69	23.34	2.06	2.00
D	26.748	44.58	-.0077*2094.5	+.32652*54	46.08	27.65	5.94	2.00

Original national income = 88.16

Original Hours = 200.05

New National Income = 87.16

New Hours = 196.70

Net Benefit to Person A at his Original Hours = £2.00

TABLE III 10% on First £21.42 of Income and 0% on Income Earned Thereafter Credit £2.00

	Original Income	Original Hours	Income Effect of Tax & Credit	Price Effect of Tax	New Hours	New Gross Income	Tax Revenue	Tax Credit
A	16.725	55.75	-.0090*200	+.4181*?	55.20	16.56	1.66	2.00
B	20.688	51.72	-.0087*200	+.3877*4	51.53	20.61	2.06	2.00
C	24.000	48.00	-.0083*(-14.2)	0	48.12	24.06	2.14	2.00
D	26.748	44.58	-.0077*(-14.2)	0	44.69	26.81	2.14	2.00

Original National Income = 88.16

Original Hours = 200.05

New National Income = 88.04

New Hours = 199.54

Net benefit to person A at his original hours = 33p

TABLE IV 55.6% on first £22.665 of Income and 0% on Income Earned Thereafter Credit = £11.30

	Original Income	Original Hours	Income Effect of Tax & Credit	Price Effect of Tax	New Hours	New Gross Income	Tax Revenue	Tax Credi
A	16.725	55.75	-.0090*1130	+.4181*16.68	52.55	15.77	8.77	11.3
B	20.688	51.72	-.0087*1130	+.3877*22.24	50.51	20.20	11.23	11.3
C	24.000	48.00	-.0083*-130.174	0	49.08	24.54	12.60	11.3
D	26.748	44.58	-.0077*-130.174	0	45.58	27.35	12.60	11.3

Original National Income = 88.16

Original Hours = 200.05

New National Income = 87.86

New Hours = 197.73

Net Benefit to Person A at his original hours = £2.00

Table III. Once again a comparison between Tables II and IV shows that holding constant the net benefit to the worst off person at his original hours, the progressive rate scheme in Table II reduces national income and hours worked by more than the regressive rate scheme in Table IV.

Part of the explanation of these unexpected results lies in the fact that although the magnitude of the substitution effect for a compensated change in the wage rate is smaller at higher income levels, the actual change in the wage rate is much greater under the progressive rate schedule compared with the regressive rate schedule. Thus in the progressive rate system in Table II:-

	$\Delta w/r$	* substitution effect	= ΔH resulting from substitution effect	Change in National Income
A	0	* .0853	= 0	
B	0	* .0623	= 0	
C	45	* .0393	= 1.7685	*50 = 0.88
D	54	* .0163	= 0.8802	*60 = 0.53
reduction in H because of substitution effect			2.6487	reduction in Nat. Income because of substitution effect. 1.41

whereas, in the regressive rate system in Table IV:-

	$\Delta w/r$	* substitution effect	= ΔH resulting from substitution effect	Change in National Income
A	16.68	* .0853	= 1.4228	*30 = 0.43
B	22.24	* .0623	= 1.3856	*40 = 0.55
C	0	* .0393	= 0	
D	0	* .0163	= 0	
reduction in H because of substitution effect			2.8084	reduction in Nat. Income because of substitution effect. 0.98

Hours lost because of the substitution effect are greater under the regressive rate system but when these hours lost are valued at their gross wage rates, the reduction in national income because of the substitution effect is greater under the progressive rate system.

The main reason for the unexpected results is that the progressive tax structure implies an income effect reducing work effort, while the regressive tax structure implies an income effect increasing work effort, quite apart from the income effect arising from the tax credit.

Fig. III

Progressive rate schedule

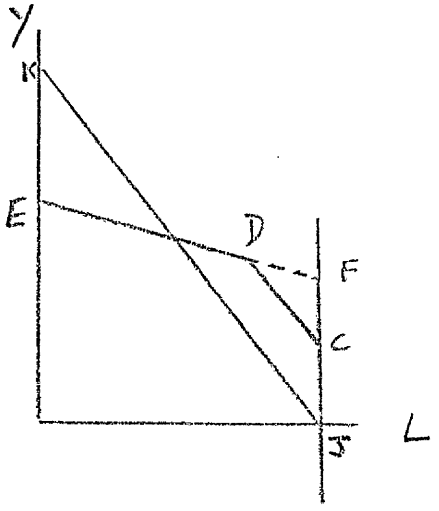
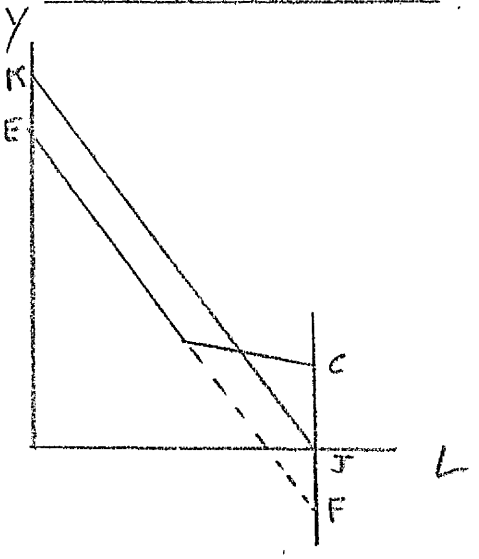


Fig. IV

Regressive rate schedule



In Figs. III and IV the gross wage rate is given by JK, the tax credit by JC and the net wage rate by CDE. The effect of the tax credit systems on hours worked consists of the price effect times the change in the slope of the marginal wage rate, plus the income effect times JF. Note that under the progressive tax schedule the income effect decreases hours worked by more than the credit JC times the income effect, while under the regressive rate schedule the income effect JF actually increases work effort.

Thus the apparently obvious statement by R. A. Musgrave that if the magnitude of the substitution effect decreases with income level, a progressive rate structure will be more favourable to work effort than a regressive rate structure is, to say the least, misleading.

Obviously it is not possible to draw any valid conclusions by generalising this finding to the Kaldor and Polanyi proposals for a tax credit system insofar as the labour supply estimates used data referring to weekly paid married men and are therefore unrepresentative of the British population as a whole. Furthermore the labour supply model used is too simple to deal with all the relvant relationships in the real world, and in any case even if the labour supply estimates were correct they would have to be applied to the actual distribution of wage rates in Britain instead of a hypothetical population of four people.

Nevertheless, the simple analysis presented here does suggest that when debating the relative merits of alternative negative income tax systems such as the Polanyi and Kaldor schemes, the debate ought to consider not only whether negative income tax systems in general will affect labour supply, but also how different types of tax schedules will affect labour supply and national income. It was with this in mind that the interaction term (average wage rate multiplied by marginal wage rate) was included in the regression, thus allowing the substitution effect to increase or decrease as a function of the budget level. The knowledge that <u>on average</u> the income effect outweighs the substitution effect or vice versa or even that there is no net effect is not going to help a policymaker faced with this kind of decision. There is in fact a strong case for estimating the effects of different tax transfer systems using the actual wage rate distribution in Britain and assuming a range of plausible labour supply estimates, until the day when truly reliable and

valid empirical estimates of labour supply are available, but this is moving away from the central theme and is therefore not pursued any further in this dissertation.

Conclusions

The estimation of a labour supply function is a matter of considerable importance, not only because a priori Economic Theory cannot provide unambiguous answers but also because of the policy implications for income maintenance schemes.

The conventional procedures used to date to estimate labour supply have been shown to be wholly unsatisfactory. The new average/marginal procedure represents a marked improvement insofar as:

a) it is theoretically correct,

b) it avoids theoretical, econometric and data measurement problems associated with non-employment income in the measurement of income effects,

c) uses a less restrictive functional form to allow the labour supply estimates to vary over the income distribution, and

d) ought not to suffer from spurious negative correlation between hours worked and the average wage rate arising from error in the measurement of hours worked.

However, the problem of endogenous average wage rates where average and marginal wages are unequal remains unsolved in the average marginal procedure. Until this problem is properly resolved* the labour supply estimates must be viewed with extreme caution.

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* Discussion of the endogenous average wage rate problem at Stirling University after the average marginal analysis was completed has led to an alternative and superior procedure which is able to overcome this problem. For details see C.V. Brown, E. Levin and D.T. Ulph, "On Estimating Labour Supply", University of Stirling Discussion Paper No.31, December, 1974.

Furthermore there are a whole range of problems which must be incorporated into a fully specified model of labour supply before anyone can claim to have estimated a valid labour supply function. These problems include intensity of effort under piece-rate schemes*; intra-household substitution between family members*, constraints, life-cycle effects and labour participation.

Nevertheless it can be claimed that the average/marginal procedure does include a number of important improvements over the conventional procedure and although there are numerous problems still to be overcome it is not beyond the bounds of possibility that a truly valid labour supply function will be estimated within the next decade.

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* An attempt to incorporate this into the model when estimating labour supply is currently being undertaken at Stirling University.

Definitions of the Variables

AVWR = actual take-home pay from main job + normal net pay from second job (if any) divided by main job hours + second job hours

SQAVWR = AVWR multiplied by AVWR

MWR = For those who had a second job MWR was defined as the net average wage rate for the second job unless the net perceived marginal wage rate for the main job was greater than the net average wage rate for the second job and the respondent was unconstrained[1] in his main job. In this case MWR was defined as the net perceived marginal wage rate for the main job. For those who did not have a second job MWR was defined as the net perceived marginal wage rate for the main job.

SQMWR = MWR X MWR

AVWR.MWR = AVWR X MWR

(LOGAVWR).MWR = (LOGAVWR).MWR

Subjective Y NEED = The subjective need for income - the money "you reckon you need to take home in your pocket each week from work".

OTHERY = normal weekly family income from all sources minus the respondent's net income from his main job for the week under review and normal net second job income.

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1. Respondents were defined as unconstrained unless either:-
   (a) they did not work overtime and did not have the opportunity to work overtime and would work overtime next week if they did have the opportunity, or
   (b) they did work overtime but would have worked more overtime if it had been left to them to decide.

/

SICK = code 0 for not off work because of illness in the last 4 weeks
code 1 for off work because of illness in the last 4 weeks

ENERGY = Interviewer assessment of respondent energetic/active/bright/alert = 1, average = 0, dull/passive/tired/apathetic = -1 plus respondent self completion question "I could work harder at my job than I do without making myself ill" agree = 1, neither = 0, disagree = -1.

JDIWORK = Job Descriptive Index by Prof. P.C. Smith (work score).

Objective Y NEED = Objective need index = £9.45 for the man and his wife + £3 for each child aged 13 to 15, £2.45 for children aged 11 to 12, £2 for children aged 5 to 10, £1.70 for children aged under 5, + weekly rent or mortgage + weekly H.P. + weekly saving to buy something.

STD.WEEK = standard working week.

DIRECT TAXATION AND INCENTIVES TO WORK

TECHNICAL DOCUMENT

FEBRUARY, 1972

Prepared for PROF. C.V. BROWN, UNIVERSITY OF STIRLING

by THE BRITISH MARKET RESEARCH BUREAU LIMITED

LONDON

BMRB/JAS/9100

CONTENTS

1. Introduction

This document presents the technical notes on a research project undertaken on behalf of Professor C.V. Brown of the Department of Economics, University of Stirling. The project represented the data collection stages of a research programme designed to study the effect of direct taxation on the incentive to work.

2. Research Design

The universe for study was employees who receive their pay weekly who usually work a total of eight or more hours in a week and who had been to work at some time in the seven days prior to the date of interview.

The sampling of this universe was undertaken in the following way:

(i) A representative sample of 200 constituencies was selected. These were in fact the specific 200 that constitute BMRB's 'Master Sample'. The Master Sample is composed of constituencies which have been selected with probability proportional to size after grouping all constituencies South of the Caledonian Canal by descending order of percentage labour vote within standard region.

(ii) Within each constituency two areas (wards in urban constituencies, parishes in rural constituencies) were selected with probability proportional to size of electorate.

(iii) Within each area 24 addresses were selected with probability proportional to the number of people listed in the electoral register using a random starting point and fixed sampling interval.

(iv) An address list was prepared for each area listing each address, the names of all electors at each address and two numbers for each address. The first number was equal to the number of people listed for that address in the electoral register and was called the interval number. The second number called the starting number, was a random number between 1 and the interval number.

(v) An interviewer called at each address and using a special contact sheet she listed all the people aged 15 or over living there. She then obtained various occupational details about the people and eliminated all those who did not fulfil the conditions of inclusion in the universe (i.e. normally working 8 hours a week, worked sometime in the past 7 days, an employee, receives pay weekly).

(vi) She then numbered all the people who had not been eliminated on grounds of non-eligibility in strict alphabetical order (surnames, then christian names, using 'the person whose birthday occurred last' as the criteria for breaking any remaining ties).

(vii) She attempted to interview the person listed against the starting number. She then added the interval number to the starting number and if there was a person listed against this number he or she was also eligible for interview.

(viii) In cases where more than one interview was required arrangements were made for the interviews to be taken simultaneously by interviewers and supervisors to avoid any contamination effects.

This design represents a method of obtaining an entirely self-weighting sample of the universe.

3. The Pilot Operations

Two pilot operations were undertaken with the joint purpose of testing the contact procedure and the questionnaire itself. Prior to these two pilot operations the questionnaire had been piloted in a number of versions by the client.

A dynamic piloting procedure was adopted for both operations. A team of two interviewers plus a client and agency researcher set off with an address list and a draft of the questionnaire. Each interviewer was accompanied by a researcher and the whole team met up after each interviewing session to discuss their experiences - where the questionnaire layout was confusing, where question wording was ambiguous or confused respondents and so on. The documents were then modified in the light of the discussion and a further field session took place. All the field documents were subjected to considerable modification as a result of the pilot surveys, in particular the contact procedure was streamlined and the questionnaire was reduced in length and simplified.

All of the interviewers working on the pilot surveys were fully trained women interviewers from our General Field Force. The first pilot took place in Nottingham on 25th/26th August 1971 and the second pilot in West London on 1st/2nd September 1971.

4. The Main Survey

Having arrived at a viable contact procedure and questionnaire, field documents were drawn up for the main survey. These comprised:

Address Lists
Contact Sheets
Questionnaires (comprising a main questionnaire and five self-completion sheets)
Prompt Cards (including a special cartoon-prompt card)
Appointment Cards (for leaving with respondents)
Lettersof introduction (explaining the purpose of the survey)
Thank-You letters (given to respondents after the interview)
Employer's Letters (for obtaining respondents' permission to contact employers regarding their income)
Pens stamped 'University of Stirling' (Gifts for respondents)
Comprehensive Interviewer Instructions.

Copies of each of the documents are to be found in section 8.

All the interviewers and supervisors working on the project were fully trained members of our General Field Force who attended a personal briefing. The content of the briefings was as follows:

Session 1:	Introduction Purpose of Survey Explanation of Contact Procedure Practice Examples of Contact Procedure
Session 2:	Detailed explanation of questionnaire
Session 3:	Taped interview as practice

Five briefings were held in Glasgow, Birmingham, Manchester, London and Bristol between 29th September and 5th October 1971. All the briefings lasted about six hours and were conducted by the same team of three people (client, agency researcher and agency field director).

The main fieldwork took place between 4th October and 6th November 1971. A total of 1913 interviews was achieved. This was a somewhat disappointing response and after discussion a second wave of fieldwork was undertaken between 6th and 24th December 1971. In this wave of fieldwork addresses were re-issued for 103 constituencies. Each constituency was worked by an interviewer who had been briefed but had worked in a different area on the main wave of fieldwork. For this second wave, where an interviewer was unable to obtain an interview (for reasons other than non-eligibility) she completed a "Substitute" questionnaire, a copy of which is to be found in section 8.

A list of all the constituencies used on the survey with an asterisk against those which were also used on the second wave, is given in section 7.

5. Analysis of Response

The three tables which follow set out the detailed analysis of response for the survey. The first table shows the analysis for Wave 1, the second for Wave 2, and the final table gives the final combined analysis of response.

6. Processing of Questionnaires

Where a respondent had given permission for his employer to be contacted, a letter was sent to his employer requesting details about his income. Employers who did not reply to the initial letter were sent a reminder approximately 10 days later, and if a reply was still not received, a second reminder was sent out.

After the fieldwork all questionnaires were coded and edited in our own Analysis Department. Coding and editing instructions were drawn up by client and agency representatives in consultation and a client representative was on hand throughout the coding period for consultation on any queries that arose.

Punching took place in our own Punching Department and all punch cards were subjected to a 100% verification.

ANALYSIS OF RESPONSE

WAVE 1

TOTAL NUMBER OF ADDRESSES ISSUED	9593	100%
Premises demolished/empty	242	3%
Premises not traced	21	*
REVISED NUMBER OF ADDRESSES	9330	100%
ø No reply at 3 or more calls	208	2%
ø No responsible adult at 3 or more calls	4	*
ø Not available during fieldwork period	37	*
ø Illness/death in family	4	*
ø Severe language problems	4	*
ø Refusal to give household information	232	2%
ø Address to be completed at Wave 2	22	*
ø Other non-response	2	*
TOTAL NUMBER OF ADDRESSES CO-OPERATING AT CONTACT STAGE	8817	95%
TOTAL NUMBER OF ADDRESSES CO-OPERATING	8817	100%
Not eligible for interview	6006	68%
Number of addresses yielding one person eligible for interview	2742	31%
Number of addresses yielding 2 people eligible for interview	68	1%
Number of addresses yielding 3 people eligible for interview	1	*
TOTAL NUMBER OF PEOPLE ELIGIBLE FOR INTERVIEW	2881	100%
Out at 3 or more calls	94	3%
Not available during fieldwork period	37	1%
Illness/death in family	29	1%
Severe language problems	8	*
Refusal	774	27%
Addresses to be completed at Wave 2	21	1%
Other non-response	5	*
TOTAL NUMBER OF INTERVIEWS	1913	66.3%

ADJUSTED RESPONSE RATE

ø Should have yielded 168 people eligible for interview

$$\therefore \text{response rate} = \frac{1913}{2881 + 168} = 62.7\%$$

* = less than 0.5%

ANALYSIS OF RESPONSE

WAVE 2

	TOTAL		CLASSIFICATION AT WAVE 1:										
			TO COLLECT HOUSEHOLD INFORMATION:					TO INTERVIEW SELECTED RESPONDENT:					
			No reply	Not available	Illness/death	Refusal	Completed at Wave 2	Out/no reply	Not available	Illness/death	Refusal	Other	Completed at Wave 2
TOTAL NUMBER OF ADDRESS ISSUED	901	100%	130	15	1	144	22	43	27	17	479	2	21
Premises empty at both waves	3	*	3	-	-	-	-	-	-	-	-	-	-
REVISED NUMBER OF ADDRESSES	898	100%	127	15	1	144	22	43	27	17	479	2	21
No reply at 3 or more calls	37	4%	22	2	-	11	2	-	-	-	-	-	-
Refusal to give household information	51	6%	-	-	-	51	-	-	-	-	-	-	-
Occupants left address since Wave 1	6	1%	3	2	-	1	-	-	-	-	-	-	-
TOTAL NUMBER OF ADDRESSES CO-OPERATING AT THE CONTACT STAGE	804	90%	102	11	1	81	20	43	27	17	479	2	21
TOTAL NUMBER OF ADDRESSES CO-OPERATING	804	100%	102	11	1	81	20	43	27	17	479	2	21
Not eligible for interview	134	17%	61	10	-	48	15	-	-	-	-	-	-
Number of addresses yielding one person eligible for interview	654	81%	41	1	1	30	5	42	27	17	467	2	21
Number of addresses yielding two people eligible for interview	16	2%	-	-	-	3	-	1	-	-	12	-	-
TOTAL NUMBER OF PEOPLE ELIGIBLE FOR INTERVIEW	686	100%	41	1	1	36	5	44	27	17	491	2	21
Out/no reply	55	8%	3	-	-	2	-	7	3	2	36	-	2
Not available during fieldwork period	11	2%	1	-	-	-	-	1	2	2	5	-	-
Illness/death in family	8	1%	-	-	-	-	-	1	-	2	5	-	-
Refusal	417	61%	12	-	1	22	2	14	11	5	343	-	7
Eligible at Wave 1 but not at Wave 2	18	3%	-	-	-	-	-	2	-	-	15	1	-
Left address since Wave 1	15	2%	-	-	-	-	-	2	1	-	10	1	1
Substitute interview only as full interview with another member of household	7	1%	-	-	-	2	-	1	-	-	4	-	-
TOTAL NUMBER OF FULL INTERVIEWS	155	22.6%	25	1	-	10	3	16	10	6	73	-	11

ANALYSIS OF RESPONSE

WAVE 1 + WAVE 2

TOTAL NUMBER OF ADDRESSES ISSUED	9593	100%
Premises demolished/empty	245	3%
Premises not traced	21	*
REVISED NUMBER OF ADDRESSES	9327	100%
ø No reply at 3 or more calls	115	1%
ø No responsible adult at 3 or more calls	4	*
ø Not available during fieldwork period	22	*
ø Illness/death in family	3	*
ø Severe language problems	4	*
ø Refusal to give household information	139	1%
ø Occupants left address since Wave 1	6	*
ø Other non-response	2	*
TOTAL NUMBER OF ADDRESSES CO-OPERATING AT CONTACT STAGE	9032	97%
TOTAL NUMBER OF ADDRESSES CO-OPERATING	9032	100%
Not eligible for interview	6140	68%
Number of addresses yielding one person eligible for interview	2820	31%
Number of addresses yielding two people eligible for interview	71	1%
Number of addresses yielding three people eligible for interview	1	*
TOTAL NUMBER OF PEOPLE ELIGIBLE FOR INTERVIEW	2965	100%
Out at 3 or more calls	105	4%
Not available during fieldwork period	21	1%
Illness/death in family	20	1%
Severe language problems	8	*
Refusal	700	24%
Eligible at Wave 1 but not at Wave 2	18	1%
Left address since Wave 1	15	1%
Substitute interview only as full interview with another member of household	7	*
Other non-response	3	*
TOTAL NUMBER OF INTERVIEWS	2068	69.7%

ADJUSTED RESPONSE RATE

ø Should have yielded 98 people eligible for interview

$$\therefore \text{response rate} = \frac{2068}{2965 + 98} = 67.5\%$$

* = less than 0.5%

7. List of Constituencies (grouped within Standard Region)

North

Berwick-upon-Tweed
Hexham
Teesside Stockton
Houghton-le-Spring
*Teesside - Middlesbrough
*Teesside - Thornaby
The Hartlepools
*Darlington
Newcastle-upon-Tyne East
Wallsend
*Gateshead East
Sunderland South

Yorkshire and Humberside

*Brigg
Normanton
*Leeds East
Batley & Morley
*Halifax
Shipley
*Pudsey
*Sheffield Hallam
York
*Kingston-upon-Hull East
Sheffield Brightside
*Dearne Valley
Don Valley
Ripon
*Harrogate
*Dewsbury
Barnsley
Bradford West

East Midlands

*Harborough
Rutland & Stamford
*Carlton
Rushcliffe
Belper
*Kettering
Mansfield
*Nottingham North
Nottingham East
Nottingham West
*Wellingborough
Northampton North
*Leicester South

* = Re-issued at Wave 2

East Anglia

*Lowestoft
Isle of Ely
*Sudbury & Woodbridge
S.W. Norfolk
*N. Norfolk
*N.W. Norfolk

South East

Brighton Kemptown
*Hove
*Epsom & Ewell
Shoreham
Canterbury
*Reigate
Tonbridge & Malling
*Chertsey & Walton
Dartford
Eastleigh
*Basingstoke
*Wycombe
Reading South
*Beaconsfield
*Isle of Wight
Bournemouth East
Poole
Havant & Waterloo
*Eton & Slough
Spelthorne
*Southend East
*Watford
Hitchin
Bedford
*Hertford & Stevenage
*Hemel Hempstead
Welwyn & Hatfield
Harwich
*Worthing
Horsham & Crawley
Royal Tunbridge Wells
*Braintree
*Basildon
Christchurch & Lymington

Greater London

*Havering, Upminster
*Bromley, Beckenham
*Bromley, Ravensbourne
Hillingdon, Ruislip-Northwood
*Richmond-upon-Thames, Twickenham
*Sutton, Carshalton
Barnet, Chipping Barnet

* = Re-issued at Wave 2

Greater London (cont'd)

*Harrow Central
*Merton, Wimbledon
Hillingdon, Uxbridge
Bexley, Sidcup
*Hounslow, Brentford & Isleworth
Ealing Acton
*Kensington & Chelsea - Kensington
*Wandsworth, Tooting
*Waltham Forest, Walthamstow
*Greenwich
Islington North
*Islington Central
*Newham South
*Hackney North & Stoke Newington
*Southwark Peckham
*Barking
Barking, Dagenham
*Tower Hamlets, Stepney & Poplar
*Sutton & Cheam
*Croydon South
Croydon North East
*Haringey, Tottenham
Lambeth - Streatham

South-West

Bristol S.E.
Exeter
*Bath
Bodmin
Chippenham
*Tiverton
Wells
*Salisbury
Taunton
*Yeovil
*S. Gloucestershire
*W. Gloucestershire
*N. Devon
Devizes

Wales

East Flint
*Conway
*Denbigh
Brecon & Radnor
Monmouth
Cardiff West
Aberavon
*Ogmore
*Ebbw Vale
Barry

* = Re-issued at Wave 2

West Midlands

Walsall South
Birmingham Ladywood
*Birmingham Northfield
Birmingham Handsworth
*Birmingham Hall Green
*Birmingham Smallheath
Birmingham Erdington
Cannock
*Halesowen & Stourbridge
*Stoke-on-Trent South
*Coventry South West
The Wrekin
*Lichfield & Tamworth
*Warwick & Leamington
Shrewsbury
Stratford-upon-Avon
*West Bromwich - West
*Coventry North West
Stafford & Stone

North-West

*South Fylde
North Fylde
*Runcorn
Ormskirk
*Chorley
St. Helens
*Barrow-in-Furness
Preston South
Blackpool North
*Macclesfield
*Rochdale
*Middleton & Prestwich
*Stockport North
Bolton West
*Newton
M'ster Ardwick
*M'ster Gorton
*M'ster Openshaw
Crosby
*Liverpool Walton
*Liverpool Garston
Liverpool Wavertree
Wirral
*Oldham East
City of Chester

Scotland

Glasgow Shettleston
*Glasgow Queen's Park
*Coatbridge & Airdrie

* = Re-issued at Wave 2

Scotland (cont'd)

Bothwell
Hamilton
Rutherglen
*E. Dunbartonshire
W. Dunbartonshire
Edinburgh South
*Edinburgh North
Dundee West
Dunfermline
Central Fife
*East Fife
*Dumfries
Midlothian
*Kinross & W. Perthshire
*Greenock & Port Glasgow
E. Aberdeenshire

* = Re-issued at Wave 2

6. Field Documents

UNIVERSITY OF STIRLING SURVEY

J.N. 52204

CONSTITUENCY _____ Interviewer _____ Area Code

ADMIN.AREA _____ Code Number _____

WARD/PARISH _____

Address Serial No.	ADDRESS	ELECTORS	Starting No.	Interval No.	Living Here	Working	Receives Pay Weekly	NOT

107

JH 52204

UNIVERSITY OF STIRLING SURVEY

CONTACT SHEET

Address _____

_____

_____

_____

Interviewer _____

Constituency _____

Area Code | | | | | |

Address Serial Number | | | |

Code No. _____

A. RESULT OF CALLS TO COLLECT HOUSEHOLD INFORMATION

No.	TIME	DATE	RESULT	INTERVIEWER CODE NO.
1				
2				
3				
4				
5				

WHEN YOU HAVE CONTACTED A RESPONSIBLE ADULT EXPLAIN:

I am from the University of Stirling. We are doing a National Study to find out how people feel about their jobs.

THEN COLLECT HOUSEHOLD INFORMATION OVERLEAF

B. RESULT OF CALLS TO OBTAIN INTERVIEW

No.	TIME	DATE	RESULT	INTERVIEWER CODE NO(S

Starting Number ☐ Interval Number ☐

ENTER NAMES FROM ADDRESS LIST

SURNAME	CHRISTIAN NAMES	1. Still living here?	2. Normally working 8+ hours a week?	3. Worked sometime in past 7 days?	4. Employee?	5. Paid Weekly?	6. Number in alphabetical order

A. 1. Does ... still live here?
2. Does ... normally work a total of 8 hours or more over a week?
3. Has ... been to work sometime in the past 7 days?
4. Is ... an employee (that is not self-employed)?
5. Does ... receive his pay weekly?

For each question:
If Yes - ✓
If Don't know - D.K.
If No - Cross out name
Only ask remaining questions for names you have not crossed out.

B. Now check whether there is anyone else who is aged 15 or over who lives at the address. For each such person enter surname and christian names and ask A.2-5.

C. Now number the respondents whose names are not crossed out in alphabetical order, starting with 1.

D. Have you used the starting number Yes ☐ No ☐ → No interview at this address.

IF YES ←

E. The person listed against the starting number is eligible for interview.

F. NOW ADD the interval number to the starting number.
Is there a person listed against the new number? Yes ☐ No ☐ → No further interview.

IF YES ←

G. The person listed against this new number is eligible for interview.

CONTINUE ADDING INTERVAL NUMBER UNTIL YOU GET TO A NUMBER THAT YOU HAVE NOT USED.
REMEMBER IF MORE THAN ONE PERSON IS ELIGIBLE YOU MUST MAKE ARRANGEMENTS FOR A DOUBLE INTERVIEW.

STRICTLY CONFIDENTIAL JN. 52204

IBM 619 Questionnaire No. [ ] 6
78/79/80 (2/3/4/5)

CARD 1: 7. (0) 8. (1)

Address serial no. Constituency _____

Respondent no. Area Code [ ][ ][ ][ ][ ] 9 10 11 12 13

Interviewer _____

Supervisor _____ Interviewer's Code No. [ ][ ][ ][ ] 14 15 16 17

Date _____ 1971

Number of calls made at this address [ ] 18

INTRODUCTION

I am from the University of Stirling. We are doing a national study to find out how people feel about their jobs. You know there's a lot of talk about productivity these days. (We're trying to find out what they like and what they dislike about their jobs; what makes work pleasant or unpleasant; and what it is that makes some people work more than others.) We would appreciate it if you would let me ask you some questions. This study is completely confidential and your answers are wanted for statistical purposes.

CHECK QUESTIONS

Can I just check:

		Yes	No	
(a)	Do you normally work a total of 8 hours or more over a week?	A	E	IF 'No' TO ANY QUESTION RESPONDENT IS NOT ELIGIBLE FOR INTERVIEW
(b)	Have you been to work some time in the past 7 days?	B	F	
(c)	Are you an employee?	C	G	
(d)	Do you receive you pay weekly	D	H	

TIME OF STARTING INTERVIEW _____

STRICTLY CONFIDENTIAL

1. How long does it usually take you to get from you home to work?

_____hours_____mins
Don't know A

19 20

2. Do you enjoy your work or do you find it a bit dull?

	21.
Enjoy	2
Neither	3
Dull	4
Don't know	1

(21) 0

3(a) What type of firm or organisation do you work for?
(STATE TYPE OF FIRM, WHAT FIRM MAKES/ DOES, ect.)

(b) What job do you actually do?

IF IN CIVIL SERVICE, FORCES, POLICE, etc.

(c) What is your rank or grade?

22.

IF "OTHER"

(d) Do you hold any particular position in the organisation? (e.g. foreman, typing supervisor, office manage, company secretary, etc.)

23 24

IF PROPIETOR or BUSINESS OR A MANAGER

(e) Roughly how many people work at the place where you work? (INCLUDE RESPONDENT)

25 or more _____
10-24 _____
Less than 10_____
(STATE NUMBER)

ASK ALL

(f) Have you any qualifications? (Such as apprenticeships, diplomas, etc.)
(STATE WHAT QUALIFICATIONS HELD)

25 26

4. Everybody has some things they like about their jobs and other things they don't like about their jobs. What do you dislike most about your present job? TAKE EXACT ANSWER.

_____ 27.
_____ 28.
_____
_____ 29.
_____
_____ 30.

5. What do you like most about your present job? TAKE EXACT ANSWER

_____ 31.
_____ 32.
_____
_____ 33.
_____
_____ 34.

6. Now I'd like to ask you a few questions about your previous employment

(a) Have you had a full-time job with another employer in the last five years?

Yes	2	35.
No	3	GO TO Q.7.
Don't know	1	GO TO Q.7.

(35) 0.

IF 'Yes'

(b) Why did you leave your last job? TAKE EXACT ANSWER

_____
_____
_____
_____ 36.
_____ 37.
_____

(c) Is there any other reason? 38.

_____ 39.
_____
_____
_____

7. The next few questions are for married employees only.

May I ask if you are married?

Married women	2	40. CONTINUE
Married man	3	GO TO Q.10
Single woman	4	GO TO Q.14
Single man	5	GO TO Q.14
Widowed/divorced/ separated	6	GO TO Q.14

(40) 0

FOR MARRIED WOMEN ONLY

8(a) Why do you go out to work?

41.
42.

(b) Any other reason?

43.
44.

9. Did your mother work after she was married?

Yes 45. 2
No 3
Don't know 1

GO Q.11

(45) 0

FOR MARRIED MEN ONLY

10(a) Does your wife work?

Yes 46. 2
No 3 — GO Q.11
Don't know 1 — GO Q.11

(46) 0

IF 'Yes'

(b) Why does she go out to work?

47.
48.

(c) Any other reason?

49.
50.

NOW GO TO Q.13

11(a) Has your wife ever had a job since you were married?

Yes	2	51.
No	3	GO TO Q.12
Don't know	1	GO TO Q.12

(51) 0

IF 'Yes'

(b) Why did she stop work when she did?

_____ 52.

_____ 53.

_____

_____

_____

_____

(c) Is there any particular reason why she doesn't work now? 54.

_____ 55.

_____

_____

_____

_____

NOW GO TO Q.13

12. Is there any special reason why your wife does not work?

_____ 56.

_____

_____ 57.

_____

_____ 58.

_____ 59.

13. Did your mother-in-law work after she was married?

Yes	2	60.
No	3	
Don't know	1	

(60) 0

STRICTLY CONFIDENTIAL

ASK ALL

14(a) We hear a lot of talk these days about the need for higher productivity. What do you think is the most important thing that could be done to help people to work more efficiently in the country as a whole?

_____ 61.
_____ 62.
_____ 63.
_____ 64.
_____

(b) And what could be done to increase efficiency in the work you yourself do?

_____ 65.
_____ 66.
_____ 67.
_____ 68.
_____

NOW GIVE RESPONDENT SELF-COMPLETION SHEETS 'A' (PINK) TO FILL IN, AND SPECIAL PEN. EXPLAIN:

Think of your present work. What is it like most of the time. Then in the space beside each word, circle 'Y' for 'yes' if it describes your work; circle 'N' for 'no' if it does not describe your work: and circle '?' if you cannot decide.

HELP RESPONDENT WITH FIRST ITEM.

THEN SAY: We don't want you to think much about each item - put down your first impression. (If you don't have a first impression circle 'neither').

Now I'd like to ask you a few questions about how long you work.

15 How long is your basic working week at work, that is, not counting lunch breaks and with no overtime?

____hours

Don't know A [ ][ ]

69 70

STRICTLY CONFIDENTIAL

16(a) If you were offered a rise which you were allowed to take in the form of either higher wages or shorter hours but not both, which would you prefer?

High wages	71. 2	
Shorter hours	3	
Don't know	1	GO TO Q.17

(71) 0

CARD 2 7. 0 8 2

IF 'higher wage/shorter hours'

(b) Why .... rather than ....?

9.
10.
11.
12.

17(a) If you had a choose, would you prefer higher pay or longer holidays?

Higher pay	13. 2	
Longer holidays	3	
Don't know	1	GO TO Q.18

(13) 0

IF 'higher pay/longer holidays'

(b) Why ..... rather than .....?

14.
15.
16.
17.

18. These days many people can afford to take the odd bit of time off. Apart from any holiday, have you taken any time off work in the last four weeks?

	18.
Has not taken time off	2
Taken time off but offers illness of self or another as a reason without prompting	3
Forced to work short time	4
Taken time off	5
Don't know	1

(18) 0

19 If you did work longer hours than the basic working week would you be paid any extra for that week?

	19.
Think would be paid extra	2 - CONTINUE
Not paid extra	3 GO TO Q.31 ON PAGE
Time off in lieu	4
Don't know	1

(19) 0

20 Suppose you had worked one more hour last week than you actually did in your main employment. What would the weekday overtime rate have been - for example, basic time, time and a half, double or what?

	20.
Basic	2
Time and a quarter	3
Time and a third	4
Time and a half	5
Double time	6
Other - CODE AND STATE: _____	E
Don't know	1

(20) 0

STRICTLY CONFIDENTIAL

21(a) Thinking of your workmates who do the same sort of job, do you put in more or less overtime hours than most of them?

	21.	
Respondent works more overtime	2	ASK Q.21b,c
Respondent works less overtime	4	
Respondent works the same amount	3	ASKQ.21d,e
Nobody does overtime here	6	GO TO Q.24
Has no workmates who do the same job	5	GO TO Q.22
Other (CODE AND STATE) _____	E	
Don't know	1	

(21) 0

IF 'more/less overtime'

(b) Why is that?

_____

(c) Any other reason?

_____

IF 'same amount'

(d) I wonder why it is that you all happen to work the same amount of overtime?

_____

(e) Any other reason?

_____

22.
23.
24.
25.
26.
27.
28.
29.

22. In how many weeks of the last four you worked, did you put in any overtime? EXCLUDE WEEKS WHICH WERE WHOLLY HOLIDAY OR WHERE REPONDENT WAS OFF WORK FOR THE WHOLE WEEK.

	30.	
None	2	CONTINUE
1,2 or 3 weeks	3	GO TO Q.26
4 weeks	4	
Don't know	1	

(30) 0

STRICTLY CONFIDENTIAL

THOSE WHO DID NOT WORK OVERTIME

23(a) Did you have the opportunity to work any overtime in the last four weeks?

Opportunity of overtime	31. 2	
No opportunity of overtime	3	GO TO Q.24
Don't know	1	

(31) 0

IF 'opportunity of overtime'

(b) Why didn't you work overtime?

32.
33.
34.

(c) Is there any other reason?

35.

NOW GO TO Q.25

24(a) If there was the opportunity of overtime next week would you work it, or would you turn it down?

Would work overtime	36. 2	GO TO Q.30
Turn it down	3	
Don't know	1	

(36) 0

IF 'turn it down/don't know'

(b) Why would you not work any overtime?

37.
38.
39.

(c) Is there any other reason?

40.

25. Would you work overtime if it were paid at double time?

Would work overtime	41. 2	
Would not work overtime	3	GO TO Q.30
Don't know	1	

(41) 0

STRICTLY CONFIDENTIAL

THOSE WHO WORKED ANY OVERTIME

26(a) How many hours overtime have you worked in the last 7 days, that is since last .... (day of week)?

_____ hours overtime (42 43)

Don't know A

(b) And the 7 days before that?

_____ hours overtime (44 45)

Don't know A

27. If it had been left to you to decide, would you have worked more or less overtime over the last 2 weeks?

Less 4 (46) — GO TO Q.29

About the same 3

More 2 — CONTINUE

Don't know 1

(46) 0

28(a) And would you have worked more or less overtime than you did if all overtime had been paid at single time rate?

Less 4 (47) — GO TO Q.29

About the same 3

More 2

Don't know 1

(47) 0

IF 'same/more/don't know'

(b) Could you tell me why that is? TAKE EXACT ANSWER.

_____ 48.

_____ 49.

_____ 50.

_____ 51.

29(a) And would you have worked more or less overtime than you did if all overtime had been paid at double time?

More 2 (52) — GO TO Q.30

About the same 3

Less 4

Don't know 1

(52) 0

IF 'same/less/don't know'

(b) Could you tell me why that is?

_____ 53.

_____ 54.

_____ 55.

_____ 56.

SHOW CARD A:

30(a) So summing up, which of the statements on this card applies to you?

Always work overtime when the opportunity arises	57.	2
Sometimes work overtime when the opportunity arises		3
Never work overtime when the opportunity arises		4
No opportunities for overtime		5
Don't know		1
	(57)	0

(b) Can you tell me why?

_____ 58.

_____

_____ 59.

_____

_____ 60.

_____ 61.

_____

ASK ALL

31 Now I'd like to ask you how you manage on your income.
HAND RESPONDENT SELF-COMPLETION SHEET 'B' (BUFF)
Could you look at this sheet and put a tick in the boxes which refer to you. You put a tick in each row.
CHECK TO ENSURE THAT THERE IS ONE AND ONLY ONE TICK IN EACH ROW.

32(a) To come back to your job, have you thought about leaving your present employer recently?

Thought about leaving	62. 2	
Not thought about leaving	3	GO TO Q.33
Don't know	1	GO TO Q.34

IF 'thought about leaving'

(b) Is there any special reason

(62) 0

63. _____
64. _____
65. _____
66. _____

(c) What have you done about getting a new job?

Applied for another job	67. 2	
Looked round/made enquiries	3	
Done nothing		
Other - CODE AND STATE	4	GO TO Q.34
_____		
_____	E	
Don't know	1	

(67) 0

THOSE WHO HAVE NOT THOUGHT OF LEAVING EMPLOYER

33. Is there any special reason?

68. _____
69. _____
70. _____
71. _____

CARD 3 7. (0) 8. (3)

ASK ALL

34. If you were offered promotion in your job, is there anything special that would worry you about it?

9. _____
10. _____
11. _____
12. _____

35. Have you been unemployed and looking for work for more than a month at any one time in the last five years?

Been unemployed longer than a month	13. 2	
Not been unemployed longer than a month	3	
Don't know	1	

(13) 0

36. Now I'd like to ask you about work you may do about the house.

SHOW CARD B

(a) Would you look at this card and tell me if you have done any of these things in the last 7 days, that is since last ..... (day of week)?
GO THROUGH LIST AND CODE 'Yes' OR 'No' FOR EACH ITEM.

FOR EACH ACTIVITY CODED 'Yes'

(b) How many hours did you spend at .....(activity) in the last 7 days?
STATE NUMBER OF HOURS OPPOSITE ACTIVITY.

(c) And did you do any of these things in the 7 days before that?
GO THROUGH LIST AND CODE 'Yes' OR 'No' FOR EACH ITEM.

FOR EACH ACTIVITY CODED 'Yes'

(d) How many hours did you spend at ....(activity) in that 7 days?
STATE NUMBER OF HOURS OPPOSITE ACTIVITY

	Q.36a	Q.36b	Q.36c	Q.36d
	Done in last 7 days	No. of hours - last 7 days	Done in previous 7 days	No. of hours - previous 7 days
	Yes No		Yes No	
Painting/wallpapering	A L		A L	
Plastering/plumbing	B M		B M	
Joinery/carpentry	C N		C N	
Electrical work	D O		D O	
Repair or service car	E P		E P	
Gardening	F Q		F Q	
Sewing/knitting	G R		G R	
Cooking/baking	H S		H S	
Cleaning/housework	I T		I T	
Other work about the house (STATE TYPE OR 'None')				

14 15 16 17

37. Taking these two weeks together, was this more or less than usual, or was it the usual amount of time you spend on these kinds of work about the house?

More than usual	18.	2
Usual amount		3
Less than usual		4
Don't know		1

(18) 0

SHOW CARD B:

38. Do you do any of these things for other people nowadays?

Yes 2
No 3
Don't know 1

(19) 0

39. It's becoming increasingly common for people to do extra work in their spare time. Do you do this at all?

Does extra work 2 — CONTINUE
No extra work 3 — GO TO Q.46

(20) 1
0

40(a) What kind of work do you do?

21.

(b) So what is it you do exactly?

OBTAIN FULL DETAILS OF NATURE AND TYPE OF WORK

22 23

24 25

41. Do you have a boss for this work or are you self-employed?

Self-employed 2
Has boss 3 — CONTINUE
Not paid work mentioned without prompting 4 — GO TO Q.45
Other (CODE AND STATE) _____ E — CONTINUE
Don't know 1

(26) 0

42. On average, how many hours a week do you usually spend at this kind of work?

_____ hours
Don't know A

27 28

43. How much does that bring in a week?

£ _____ . _____ p OR £ . / . / d

Not paid/paid in kind A — GO TO Q.45
Don't know B — GO TO Q.45

29 30 31 32

STRICTLY CONFIDENTIAL

44(a) Are there any deductions?

Yes	33. 2	
No	3	GO TO Q.45
Don't know	1	

(33) 0

IF 'Yes'

(b) What would be deducted? STATE TYPE OF DEDUCTION AND AMOUNT DEDUCTED.

	Type	Amount	
1.	_____	£____.____p OR £__/__/__d	34 35 36 37
2.	_____	££____.____p OR £__/__/__d	38 39 40 41

45(a) Why did you originally take on this work?

_____

_____

_____

_____

_____

_____

42.
43.

44.
45.

(b) Any other reason?

_____

_____

_____

_____ NOW GO TO Q.49

46. Have you ever thought about taking on a second job?

Thought about	46. 2
Not thought about	3
Don't know	1

(46) 0

47. Is there any special reason why you have not taken a second job?

_____

_____

_____

_____

_____

_____

47.
48.

49.
50.

48. Have you ever held a second job in addition to your main job in the past?

Held second job	51. 2	
Never held second job	3	GO TO Q.49
Don't know	1	

(51) 0

IF 'held second job'

(b) Why did you give up this second job?

52.
53.
54.
55.

ASK ALL

49(a) Coming back to your main job, is there an hourly rate used in making up your basic pay?

Hourly rate	56. 2	
Weekly salary	3	GO TO 0.50
Other (CODE AND STATE): _____	E	
_____		
Don't know	1	

(56) 0

IF 'hourly rate'

(b) What is your basic rate per hour in you main employment?
IF 'Don't know' ASK: About how much?

£_____._____p OR £___/___/___d per hour

57 58 59

50. Are you on a bonus or piece-rate or incentive scheme in addition to your basic weekly pay?

On bonus/incentive/ piece-rate	60. 2	CONTINUE WITH Q.5
Not on bonus/incentive/ piece-rate	3	GO TO Q. 61 PAGE 19
Don't know	1	

(60) 0

51(a) Does the bonus, incentive or piece-rate you receive depend on your effort alone or is it based on the effort of a group of workmates?

My effort alone	61. 2	GO TO Q.53
Group of workmates	E	CONTINUE
Other answers	5	GO TO Q.52
Don't know	1	

IF 'Group'

(b) How many people are there in the group?

10 or less	(61) 3	
11 or more	4	GO TO Q.53
Don't know	1	

(61) 0

52. So how exactly does this incentive scheme work?

62.

63.

53(a) Does your bonus, incentive or piece-rate system make you work harder or does it not really affect your effort?

Work harder	64.	2
Not effect effort		3
Don't know		1
	(64)	0

(b) Why is that?

65.

66.

67.

68.

54. Thinking of the bonus/incentive/piece-rate payment does the management explain it clearly, only fairly clearly or not clearly at all?

Explain clearly	69.	2
Explain fairly clearly		3
Not clearly at all		4
Don't know,		1
	(69)	0

55. If you worked harder to boost your earnings would you be asked to work more or less overtime or what?

More overtime	70.	2
Same overtime		3
Less overtime		4
Don't know		1
	(70)	0

56. Is the way in which your pay is made up fair or not?

Fair	71.	2
Non-commital		3
Not fair		4
Don't know		1
	(71)	0

57. If you all worked harder in your department to boost your earnings, do you think the management would leave the rate unchanged or would they cut the rate of pay?

Leave rate unchanged	72.	2
Cut bonus rate		3
Other (CODE AND STATE)		
_____		E
Don't know		1

(72) 0

CARD 4 | 7 | (0) | 8 | (4)

58(a) By how much does the bonus/incentive/piece-rate scheme increase your basic earnings before deductions?

IF 'Don't know' ASK: Approximately how much?

£_____.____p OR £ / / d

9	10	11	12

Unable to estimate A - GO TO Q.59

(b) What period does this cover?

			13	14
An hour	A	A	0	2
A day	B	B	0	3
A week	C	C	0	4
2 weeks	D	D	0	5
4 weeks	E	E	0	6
1 calendar month	F	F	0	7
3 calendar months	G	G	0	8
A year	H	H	0	9
Other (CODE AND STATE)				
_____	E			
Don't know	J	J	0	1
			0	0

59(a) Thinking of the workmates who do the same job as you do, do most of them make more or less bonus than you do?

Workmates make more	15.	2
Workmates make same		3
Workmates make less		4
		CONTINUE
Has no workmates/no one does same job		5
Don't know		1
		GO TO Q.60

(15) 0

(b) Why is that?

_____ 16.

_____ 17.

_____ 18.

_____ 19.

60(a) Just suppose you had worked twice as hard last week without working longer hours than you did, how much extra would you have earned before deductions?

£_____._____p OR £ / / d [20][21][22][23]

Don't know A

(b) And how much would this have been after deductions?

£_____._____p OR £ / / d [24][25][26][27]

Don't know A

ASK ALL

61. Now I would like to ask you a question about what would happen if you worked longer hours

(a) If you did work an extra hour next week (in your main job) how much extra would you earn before deductions?

£_____._____p OR £ / / d [28][29][30][31]

Don't know A

Nothing B - GO TO Q.62

(b) And how much would this be after deductions?

£_____._____p OR £ / / d [32][33][34][35]

Don't know A

62. NOW GIVE RESPONDENT SELF-COMPLETION 'C' (GREEN) AND EXPLAIN HOW TO COMPLETE IT

ADD: Please put down your first reactions without thinking too much about each statement.

AT THE END OF SELF-COMPLETION 'C' - TAKE THIS QUESTION SLOWLY

63. Now we come to a question we're particularly interested in. People have different ideas about the way deductions affect the amount of work they do.

SHOW CARTOON CARD

POINT TO MR. A: Here you see is one point of view. The man says that high deductions from his pay mean that he doesn't work much overtime because it's not worthwile.

POINT TO MR. B: But the other man argues that the high deductions mean he has to work more overtime to make ends meet.

Now statements 4 and 19 were about this - would you look at your answers and explain why you answered as you did to these two statements? TAKE EXACT ANSWER.

_____ 36.

_____ 37.

_____

_____ 38.

_____ 39.

NOW TAKE BACK SELF-COMPLETION 'C'

64. Have you yourself put in longer hours, or have you put in shorter hours because of income tax, or has it had no effect?

Longer hours	40. 2	
Shorter hours	4	GO TO Q.66
No effect/no choice	3	GO TO Q.67
Don't know	1	
	(40) 0	

THOSE WHO WORK LONGER HOURS

65(a) Apart form income tax was there any other reason why you decided to work longer hours?

No other reason	41. 2	
Was another reason	3	
Don't know	1	
	(41) 0	

(b) Could you go into more detail about that?

	42.
	43.
	44.
NOW GO TO Q.67	45.

THOSE WHO WORK SHORTER HOURS

66(a) Apart from income tax was there any other reason why you decided to work shorter hours?

No other reason	46. 2	
Was another reason	3	
Don't know	1	
	(46) 0	

(b) Could you go into more detail about that?

	47.
	48.
	49.
	50.

(c) Have you actually refused an offer of overtime because of income tax?

Yes	51. 2	GO TO Q.67
No	3	CONT
Don't know	1	
	(51) 0	

(d) Well, could you explain how income tax has made you work shorter hours?

	52.
	53.
	54.
	55.

ASK ALL

67. Leaving the number of hours you work to one side, has income tax had any effect on how much effort you put into the work, that is, not hours but effort?

Had effect	56. 2	CONTINUE
No effect	3	GO TO Q.71.
Don't know	1	GO TO Q.71.

(56.) 0

THOSE WHOSE EFFORT IS AFFECTED

68. Again leaving the number of hours to one side have you put in more effort or less effort because of income tax?

More effort	57. 2	CONTINUE
Less effort	3	GO TO Q.70.
Don't know	1	GO TO Q.71.

(57.) 0

THOSE WHO PUT IN MORE EFFORT

69.(a) Apart from income tax was there any other reason why you decided to work harder?

No other reason	58. 2	
Was another reason	3	
Don't know	1	

(58.) 0

(b) Could you go into more detail about that?

	59.
	60.
	61.
NOW GO TO Q.71.	62.

THOSE WHO PUT IN LESS EFFORT

70.(a) Apart from income tax was there any other reason why you decided to work less hard?

No other reason	63. 2	
Was another reason	3	
Don't know	1	

(63.) 0

(b) Could you go into more detail about that?

	64.
	65.
	66.
	67.

ASK ALL

71. Has income tax ever made you change your main job?

Changed job due to tax	68. 2	CONTINUE
Not changed job due to tax	3	GO TO Q.73.
Don't know	1	GO TO Q.73.

(68.) 0

THOSE WHO CHANGED JOB

72.(a) Did you change your job because of income tax only or was there also some other reason?

No other reason	69. 2	CONTINUE
Was another reason	3	
Don't know	1—GO TO Q.73.	

(69.)0

(b) Could you tell me about that?

_____	70.
_____	71.
_____	
_____	72.
_____	73.
_____	

CARD 5; 7 ⓪ 8 ⑤

ASK ALL

73. Has income tax ever stopped you from changing your main job?

Kept from changing	9. 2	—CONTINUE
Not kept from changing	3	GO TO Q.75.
Don't know	1	

(9.)0

THOSE KEPT FROM CHANGING

74.(a) Did you stay put in your job because of income tax only or was there also some other reason?

No other reason	10. 2	CONTINUE
Was another reason	3	
Don't know	1—GO TO Q.75.	

(10.)0

(b) Can you tell me about that?

_____	11.
_____	12.
_____	
_____	13.
_____	14.
_____	

ASK ALL

75.(a) If you were to earn one extra pound next week, how much of it would be taken off in income tax?

_____P

OR _____s_____d

NOW CHECK THAT THERE HAS BEEN NO CONFUSION: That means you would be left with ... (pence/shillings) after income tax

15 16

Don't know A - GO TO Q.76.

(b) Is this less or more than the amount of tax taken off each pound of your total income or what?

Less	17. 2	
More	4	
Same	3	
Don't know	1	

(17.)0

(c) You said if you earned one extra pound next week ... (READ OUT AMOUNT FROM Q.75(a)) would be taken off in income tax:

Can you tell me how you reached that figure - was it:

Something you read or heard about	18. 2	CONTINUE
Something you worked out from your own pay slip	3	
or something else	4	
Don't know	1	GO TO Q.76.

(18.)0

(d) Can you go into a bit more detail or give me an actual example?
TAKE FULL DETAILS

_____

_____

_____ 19.

_____ 20.

_____

_____

76.(a) If you earned an extra pound next week some of it could go in income tax. Can you think of anything else you might lose if you earned an extra pound?

Yes 2 → 21.
No 3
Don't know 1 → GO TO Q.77.

(21.)0

IF 'Yes'

(b) What else would you lose?
STATE TYPE OF LOSS AND AMOUNT

	Type	Amount	
1.	_____	£___.___p	22 23
		OR £ / / d	24 25 26 27
2.	_____	£___.___p	28 29
		OR £ / / d	30 31 32 33
3.	_____	£___.___p	34 35
		OR £ / / d	36 37 38 39

77. Leaving aside things which are deducted from your pay packet, is there anything else at all that you might lose if you earned an extra pound? STATE TYPE OF LOSS AND AMOUNT

	Type	Amount	
1.	_____	£___.___p	40 41
		OR £ / / d	42 43 44 45
2.	_____	£___.___p	46 47
		OR £ / / d	48 49 50 51
3.	_____	£___.___p	52 53
		OR £ / / d	54 55 56 57

78. Although some people find it quite easy to understand the tax system, many others find it quite difficult. What do you understand by the term 'earned income relief'? TAKE EXACT ANSWER.

58.

GIVE RESPONDENTS SELF-COMPLETION SHEET 'D' (BLUE) TO FILL IN.

79. NOW CHECK ITEM 'M' STANDARD RATE OF INCOME TAX

IF TICKED IN 'unchanged/don't know' GO TO Q.80

IF TICKED IN 'went up' OR 'went down' CONTINUE.

I see you've ticked that the standard rate of income tax went ... (up/down); by how much was that?

_____p OR _____s_____d

Don't know A

59. 60.

80. What is the standard rate of income tax in the pound now?

_____p or % OR _____s_____d

Don't know A

61. 62.

81. The amount of money you need and the amount of money you get are often two different things. In your circumstances how much money do you reckon you need to take home in your pocket each week from work?

£ _____._____p OR £ _____/_____/_____d

Don't know A

63. 64. 65. 66.

82. Does your actual take home pay vary by more than £1 each week or does it remain fairly steady?

Fluctuates	67. 2
Remains steady	3
Don't know	1

(67.)0

STRICTLY CONFIDENTIAL

In this last section we would like to have some details about your family's circumstances so that we can compare the answers of people in different situations. This information is wanted for statistical purposes only and will be treated with the strictest confidence.

COMPLETE HOUSEHOLD COMPOSITION

IF RESPONDENT IS MARRIED, CODE SPOUSE AS PERSON NO.2

CODE ADULTS FIRST, THEN CHILDREN.

Person No.	Relationship to Respondent	Office Use	Sex		Age last birthday	Marital Status			Work		Actual hours worked last week in all paid jobs
			M	F		S	M	Wid/ Div/ Sep	Working at all	Not Working at all	
1	Respondent										
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											

NOW CHECK THAT YOU HAVE INCLUDED ALL BABIES, CHILDREN AND RETIRED MEMBERS IN THE HOUSEHOLD.

SHOW CARD C

83. The amount that any one person works sometimes depends on how much money is coming into the house from all sources. Could you show me the group on this card that gives the total amount of money normally coming into the house each week, counting all wages and salaries after deductions and other things like family allowances, pensions and so on. If anyone is paid monthly can you divide by four when adding it in?

				68.	69.
A.	£0	A	A	0	2
B.	over £0 up to £5	B	B	0	3
C.	over £5 up to £10	C	C	0	4
D.	over £10 up to £15	D	D	0	5
E.	over £15 up to £20	E	E	0	6
F.	over £20 up to £30	F	F	0	7
G.	over £30 up to £40	G	G	0	8
H.	over £40 up to £50	H	H	0	9
I.	over £50 up to £60	I	I	1	0
J.	over £60 up to £80	J	J	1	1
K.	over £80 up to £100	K	K	1	2
L.	over £100	L	L	1	3
	Don't know	M	M	0	1
				0	0

CARD 6: 7 (9) 8 (6)

9. 10. 11.

12. 13. 14.

15. 16. 17.

18. 19. 20.

SHOW CARD D

84. (a) Now could you tell me if in the last 12 months you or any member of your household has received any of the allowances on this card? PROBE: Any other items on the card? CODE BELOW

FOR EACH ALLOWANCE RECEIVED

(b) Would ... (allowance) be reduced or lost if you earned one extra pound each week?

		Q.84(a)	Q.84(b)		
		Received	Reduced/ lost	Not reduced/ lost	Don't Know
02	Rent rebate	A	2	3	1
03	Rate rebate	B	2	3	1
04	Maintenance allowance for school pupils over 15 years old/ free school dinners/contribution towards school uniform	C	2	3	1
05	Contribution towards essential clothing for work	D	2	3	1
06	Day nursery for young children at reduced cost	E	2	3	1
07	Student grant	F	2	3	1
08	Local authority subsidised boarding education for child	G	2	3	1
09	Direct grant school fees subsidy	H	2	3	1
10	Local authority home help	I	2	3	1
11	Legal aid	J	2	3	1
12	Family allowances	K	2	3	1
13	Family income supplement	L	2	3	1
14	Supplementary benefit (national assistance)	M	2	3	1
15	None	N			
01	Don't know	O			

85. At what age did you complete your full-time schooling?

14 and under	21.	2
15 but under 16		3
16 but under 17		4
17 but under 18		5
18 and over		6
Don't know		1
	(21.)	0

86. How many rooms do you and your family occupy solely? EXCLUDE BATHROOM, GARAGE AND KITCHENETTE, BUT INCLUDE KITCHEN BIG ENOUGH TO EAT IN.

1 room	22.	2
2 rooms		3
3 rooms		4
4 rooms		5
5 or more rooms		6
Don't know		1
	(22.)	0

87. Do you and your family rent this house, own it, or have it rent free from somebody?

Rents	23.	3—CONTINUE
Owns		2—GO TO Q.
Rent free		4 — GO TO Q.90
Don't know		1 — GO TO Q.90
	(23.)	0

THOSE WHO RENT

88. (a) How much is the rent for this house/flat?

£_____._____p OR £_____/_____/_____d

24.	25.	26.	27.	28.	

Don't know A —GO TO Q.90

(b) How long a period does this cover?

1 week	29.	2
2 weeks		3
4 weeks		4
1 calender month		5 — CONTINU
3 calender months		6
Others (CODE AND STATE)		
_____		E
Don't know		1 — GO TO Q.90
	(29.)	0

(c) Does the rent include rates?

Yes	30.	2
No		3 — GO TO Q.90
Don't know		1 — GO TO Q.90
	(30.)	0

THOSE WHO OWN

89. (a) Do you or your family own this house with a mortgage or is it paid up?

Mortgage	31. 2	-CONTIN
Paid up	3	GO TO Q.90
Don't know	1	GO TO Q.90

(31.) 0

(b) (Do you know) how much was the last mortgage payment?

£_____._____p OR £ ____/____/____p

32. 33. 34. 35.

Don't know A - GO TO Q.90

(c) How long a period did this cover?

1 week	36. 2
4 weeks	3
1 calender month	4
3 months	5
Other (CODE AND STATE) _____	E
Don't know	1

(36.) 0

90. Now I would like to ask you about your leisure time.

SHOW CARD E

(a) Would you look at this card and tell me if you have done any of these things in the last 7 days, that is since last ... (day of week)? CODE 'Yes' OR 'No' FOR EACH ITEM.

FOR EACH CODED 'Yes'

(b) How many hours did you spend at ... in the last 7 days? STATE OPPOSITE ACTIVITY.

FOR EACH CODED 'Yes' EXCEPT T.V. AND READING

(c) And how much did it cost you ... for that number of hours - I mean how much did you pay out of your own pocket altogether? STATE OPPOSITE ACTIVITY.

	Q.90(a) Done in last 7 days Yes	Q.90(a) No	Q.90(b) No. of hours	Q.90(c) Money Cost
Watching T.V.	A	L		
Reading	B	M		
Visiting friends	C	N		£_____p OR £ / /
Entertaining friends	D	O		£_____._____p OR £ / /
Playing a sport	E	P		£_____._____p OR £ / /
Watching a sport	F	Q		£_____._____p OR £ / /
Attending meetings of clubs unions etc.	G	R		£_____._____p OR £ / /
Drinking (in pubs etc.)	H	S		£_____._____p OR £ / /
Going on trips	I	T		£_____._____p OR £ / /
Visiting parks, walks	J	U		£_____._____p OR £ / /
Going to cinema	K	V		£_____._____p OR £ / /
Other hobby (STATE TYPE OR 'None') _____				£_____._____p OR £ / /
_____				£_____._____p OR £ / /

37. 38. 39. 40. 41. 42.

91. Now I would like to ask you about your spending plans.

(a) Are you yourself or the family saving to buy anything special during the next 12 months?

Yes A

No/don't know B - GO TO Q.92

IF 'Yes'

(b) What is that? STATE BELOW

FOR EACH ITEM

(c) How much do you expect ... will cost? STATE OPPOSITE ITEM.

	Q.91(b) DESCRIPTION OF ITEM	Q.91(c) EXPECTED COST
1.		£_____._____p OR £ / / d
2.		£_____._____p OR £ / / d
3.		£_____._____p OR £ / / d

T/U 43. 44. 45. 46. 47

B/N 48. 49. 50. 51. 52.

T/S 53. 54. 55 56. 57.

92. (a) Are you yourself or the family paying instalments just now for any goods or services bought on H.P. or credit facilities?

DO NOT INCLUDE MORTGAGES OR (TV) RENTAL

Yes 58. 2

No 3 GO TO Q.93

Don't know 1

(58.)0

IF 'Yes'

(b) What is that for? STATE BELOW

FOR EACH ITEM

(c) How much was the last payment? STATE OPPOSITE ITEM

(d) And what is the period between payments? STATE OPPOSITE ITEM

	Q.92(b) DESCRIPTION OF ITEM	Q.92(c) LAST PAYMENT	Q.92(d) PERIOD BETWEEN PAYMENTS
1.		£_____._____p OR £ / / d	
2.		£_____._____p OR £ / / d	
3.		£_____._____p OR £ / / d	
4.		£_____._____p OR £ / / d	
5.		£_____._____p OR £ / / d	

T/U 59. 60. 61. 62. 63

B/N 64. 65. 66. 67. 68

T/S 69. 70. 71. 72. 73

93. Do you or the family here own or have the use of:

		Own or have use of	Neither own nor have use of	Don't know	Office
READ OUT:					
A car	9.	2	3	1	0
A refrigerator	10.	2	3	1	0
A television with BBC 2	11.	2	3	1	0
A washing machine	12.	2	3	1	0
A telephone	13.	2	3	1	0
An inside W.C.	14.	2	3	1	0
Central heating	15.	2	3	1	0
Cheque book	16.	2	3	1	0

94(a) Can you tell me if the tax man does anything to make things easier for people to save?

Yes	17.	2
No		3 → GO TO Q.95
Don't know		1 → GO TO Q.95
	(17)	0

IF 'Yes'

(b) What does he do to make it easier to save?

_____ 18.

_____ 19.

_____

_____

_____

_____

95. Leaving aside people who are self-employed, can employees claim tax relief for:

		Yes	No	Don't know	Office
READ OUT:					
H.P. Interest	20.	2	3	1	0
Expense of travelling to work	21.	2	3	1	0
Mortgage interest	22.	2	3	1	0
Life assurance premiums	23.	2	3	1	0
Baby sitter while the wife works	24.	2	3	1	0
Cost of protective clothing or uniform	25.	2	3	1	0

96. How much can a married woman earn before she has to pay income tax:

£____.____p OR £ / / d PER WEEK

£____.____p OR £ / / d PER YEAR

26	27	28	29

Don't know A

97. Out of each pound of income, do rich people pay more or less of it in income tax, or do all tax payers pay the same?

Rich pay more	30. 2
All pay same	3
Rich pay less	4
Varies/depends	5
Don't know	1

(30.)0

EXPLAIN:

Some people have said that taxation makes it so difficult to make ends meet, that they have to find ways of making more money. Other people say it's not worthwhile working because taxation is so heavy.

GIVE RESPONDENT SELF-COMPLETION SHEET 'E' (YELLOW)

Would you look at this final sheet and tick in the box that applies to you on each line.

98. (a) (Many people in Britian think that it's not worchwhile working overtime because taxes are so high. Before making any recommendations about the taxation of extra earnings we need to know exact details of hours, pay and deductions.) As deductions vary from week to week, it is almost impossible to remember exact figures. On a strictly confidential basis could you tell me from your latest payslip what your deductions were on your most recent pay day?

Last payslip produced 31. 2

Not produced 3—ASK RESPONDENT TO ESTIMATE FOLLOWING DETAILS

(31.)0

RECORD FOLLOWING DETAILS FROM THE PAYSLIP FOR THE LAST PAY DAY

Income Tax	£____.____p	32 33 34 35
National Insurance	£____.____p	36 37 38 39
National Insurance Graduated Contribution (Government Pension Scheme)	£____.____p	40 41 42 43
Any other deductions	£____.____p	44 45 46 47
Tax code number	____	48 49 50
Actual hours worked (CONFIRM 'Actual hours')	____	51 52
Gross pay before deductions	£____.____p	53 54 55 56
Take home pay after deductions	£____.____p	57 58 59 60
Date of most recent pay received	/ /71	61 62

(b) Can I just check that these items cover one week?

Yes - a week 63. 2

Others (STATE)

_____

(63.)0

99. Do you pay income tax every week, some weeks or never?

Every week 64. 2

Some weeks 3

Never 4

Others (CODE AND STATE)

_____ E

Don't know 1

(64.)0

100. It is not possible to measure the effects of taxation on the incentive to work unless complete and accurate information is known for more than a single week. We would like your permission to ask your employer about your deductions and earnings.

HAND LETTER TO RESPONDENT:

Would you sign this letter? You can see the letter to your employer overleaf.

Signed letter	65.	2
Refused		3

(65.) 0

101. (Some people say that this year's budget has improved the general climate of opinion and made it more worthwhile to work. Others disagree.) Would you say that the budget changes have improved or worsened general attitudes towards work in Britain or what?

Has improved attitudes	66.	2
No effect		3
Has worsened attitudes		4
Don't know		1

(66.) 0

102. Would you say that the changes made in this year's budget made you yourself work harder, less hard, or that they have had no effect?

Work harder	67.	2
No effect		3
Less hard		4
Don't know		1

(67.) 0

103. (a) Which taxes would you prefer to be cut: income tax, or tax on things you buy?

Income tax	68.	2 → CONTINUE
Things you buy		3 → CONTINUE
Don't know		→ CLOSE INTERVIEW

(68.) 0

(b) Why ... rather than ....?

69. _____

70. _____

71. _____

72. _____

CLOSE INTERVIEW

TIME INTERVIEWED FINISHED _____ (73) (74) (75)

STRICTLY CONFIDENTIAL

TO BE COMPLETED BY INTERVIEWER ALONE

CARD 8: 7 (0) 8 (3)

1. Neighbourhood:
   - Poor working class — 9. 2
   - Average working class — 3
   - Middle class — 4

2. Briefly evaluate the respondent in terms of:

   (a) Energy level:
   - Energetic, active, bright, alert — 10. 2
   - Average — 3
   - Dull, passive, tired, apathetic — 4

   (b) Way home it kept:
   - Clean, tidy — 11. 2
   - Fair — 3
   - Untidy — 4

   (c) Level of prosperity:
   - Expensive clothes, carpets, new furniture, fittings, etc. — 12. 2
   - Average clothes, carpets, furniture, fittings etc. — 3
   - Old worn out clothes, carpets, furniture, fittings, etc. — 4

3. Was anyone else present at the interview?
   - None — 13. 2
   - Pre-school children — 3
   - Older children — 4
   - Husband/wife — 5
   - Other relatives — 6
   - Other — 7

If someone else present - what part, if any, was played in the interview?

_____ 14.

_____ 15.

_____ 16.

17.

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4. Respondent's attitude at beginning of interview:

Very interested	18. 2	
Interested		3
Not very interested		4

Antagonistic		5
Nervous, uncertain		6

If antagonistic, nervous please explain:

19.

5. Respondent's attitude at end of interview:

No change	20. 2	
More interested, helpful		3
Less interested, helpful		4

Hurrying to get it over		5
Other		6

6. Are there any particular questions in the questionnaire where you feel the responses were not representative of what the respondent thinks?

21.
22.
23.
24.
25.
26.

7. Any other comments helpful in interpreting this interview:

27.
28.
29.
30.

Department of Economics, Head of Department: Professor C V Brown

UNIVERSITY OF STIRLING STIRLING SCOTLAND | TELEPHONE: STIRLING (0786) 3171

Dear Sir or Madam

University of Stirling Work Survey

I would like to thank you for your co-operation in the University of Stirling Work Survey. I very much appreciate your willingness to give your time in answering all of our questions. I am sure you agree that it is important for us all to have a better understanding of how taxation affects people's work.

I would like to assure you that the information you have given us will, under no circumstances, be given or shown to anyone not working on the study. The answers you have given will be combined with the answers of hundreds of others from all over the country and it will be completely impossible for anyone to identify your answers.

It is my hope that this study will lead to a better understanding of the British tax system and of the way that it affects people. The time you have given in making this possible is very much appreciated.

Yours faithfully

C. V. Brown

C V Brown

Department of Economics, Head of Department: Professor C V Brown

Our Ref:

UNIVERSITY OF STIRLING STIRLING SCOTLAND | TELEPHONE: STIRLING (0786) 3171

CONFIDENTIAL

Dear Sir

UNIVERSITY OF STIRLING TAXATION STUDY

We are engaged in a national study of the effects of personal taxation on the incentive to work in the U.K. Some people say that employees won't work late because it's not worthwhile after tax, while other people say that employees work more overtime to make up the earnings they have lost in tax. For this study we need accurate data of the gross and net income and tax deducted for the current tax week and tax year of a representative cross-section of employed persons.

One or more persons in our sample is an employee of your firm and has given his or her permission for you to release the information to us. Overleaf please find the letter of authorisation from your employee.

We shall of course treat the information which is wanted for statistical purposes only, with the strictest confidence.

We think that greater knowledge of the British tax system and of its defects is well worthwhile and hope you will agree, and that you will be willing to provide us with the information we need. A stamped addressed envelope is enclosed for your convenience in replying.

If the records are not kept at this address, we would be grateful if you would forward this correspondence to the appropriate office.

May we thank you in advance for your co-operation.

Yours faithfully

C. V. Brown

Professor C V Brown

Weekly wage/salary paid to employee on / /71 or last pay day before / /71. (Include any holiday payments.)		Total for tax year up to date opposite
tax week no. _____		
total income gross	£____.____	£____.____
net income tax paid	£____.____	£____.____
net income tax refund	£____.____	£____.____
National insurance flat rate	£____.____	£____.____
National insurance graduated pension	£____.____	£____.____
Other deductions	£____.____	£____.____
net income after all deductions	£____.____	£____.____
tax code no. _____		
basic hourly rate (if any)	£____.____	
no. of hours in basic working week	_____	
total no. of hours actually worked including overtime (if any)	_____	
gross bonus/incentive/piecerate, earnings (if any)	£____.____	
gross overtime earnings (if any)	£____.____	

Department of Economics, Head of Department: Professor C. V. Brown

Our Ref:

UNIVERSITY OF STIRLING STIRLING SCOTLAND | TELEPHONE: STIRLING (0786) 3171

CONFIDENTIAL

Area Code ☐☐☐☐☐

Serial No. ☐☐

Respondents Code No. ☐

PLEASE PUT YOUR EMPLOYER'S NAME AND ADDRESS IN BLOCK CAPITALS HERE ——→

TO _____

_____

_____

Dear Sir

The University of Stirling is conducting a study on work attitudes and the effects of taxation on the incentive to work. My name has been selected at random for this sample.

They need to know, in strictest confidence, about my deductions and pay. Would you please give them the information asked for overleaf.

Yours faithfully

Please sign here ——→ _____

Please write your name in BLOCK CAPITALS here ——→ _____

Please write your section or employee number here to help your employer identify you exactly ——→ _____

SELF-COMPLETION 'D'

PLEASE TICK IN ONE BOX ON EACH LINE

IN 1971 THESE MEASURES CAME INTO EFFECT:

		WENT UP		UNCHANGED/DON'T KNOW		WENT DOWN	
A. PURCHASE TAX	58.	☐	-2	☐	-3	☐	-4
B. NATIONAL INSURANCE CONTRIBUTIONS	59.	☐	-2	☐	-3	☐	-4
C. SELECTIVE EMPLOYMENT TAX	60.	☐	-2	☐	-3	☐	-4
D. EARNED INCOME RELIEF (under £4,000 p.a.)	61.	☐	-2	☐	-3	☐	-4
E. EARNED INCOME RELIEF (over £4,000 p.a.)	62.	☐	-2	☐	-3	☐	-4
F. WIFE'S EARNED INCOME RELIEF	63.	☐	-2	☐	-3	☐	-4
G. PERSONAL ALLOWANCES	64.	☐	-2	☐	-3	☐	-4
H. CHILD ALLOWANCE	65.	☐	-2	☐	-3	☐	-4
I. OLD-AGE PENSION	66.	☐	-2	☐	-3	☐	-4
J. SUPPLEMENTARY BENEFITS	67.	☐	-2	☐	-3	☐	-4
K. DUTY ON BEER, SPIRITS	68.	☐	-2	☐	-3	☐	-4
L. DUTY ON TOBACCO	69.	☐	-2	☐	-3	☐	-4
M. STANDARD RATE OF INCOME TAX	70.	☐	-2	☐	-3	☐	-4

Area Code ☐☐☐☐☐

Address Serial No. ☐☐

Respondent No. ☐

SELF-COMPLETION 'E'

Tax has made me give up a second job or paid sideline	Doesn't apply/ neither	Tax has made me take a second job or paid sideline
Tax has made me work more overtime	Doesn't apply/ neither	Tax has made me work less overtime
Tax has made me work less hard on a bonus scheme	Doesn't apply/ neither	Tax had made me work harder on a bonus scheme
Tax has made me seek promotion	Doesn't apply/ neither	Tax has made me not seek promotion
Tax has made me look for another job with better pay	Doesn't apply/ neither	Tax has made me not look for another job with better pay
Tax has made me postpone early retirement	Doesn't apply/ neither	Tax has made me seek early retirement

Area Code

Address Serial No.

Respondent No.

71.
72.
73.
74.
75.
76.

		agree a lot	agree a little	Doesn't apply/ neither	disagree a little	disagree a lot
15. My standard of living has risen in the last 5 years	44.	-2	-3	-4	-5	-6
16. I could work harder at my job than I do without making myself ill	45.	-2	-3	-4	-5	-6
17. If I work harder I am offered less overtime	46.	-2	-3	-4	-5	-6
18. I feel under pressure from my nearest workmates to work faster	47.	-2	-3	-4	-5	-6
19. High deductions from my pay mean that I have to work overtime to make ends meet	48.	-2	-3	-4	-5	-6
20. I have to work overtime because it's difficult to say 'no' to my boss	49.	-2	-3	-4	-5	-6
21. I feel under pressure from my nearest workmates to work slower	50.	-2	-3	-4	-5	-6
22. I have to do odd jobs at home in order to save on decorations and repairs etc.	51.	-2	-3	-4	-5	-6
23. My neighbours are better off than I am	52.	-2	-3	-4	-5	-6
24. I wish I had more leisure time after work	53.	-2	-3	-4	-5	-6
25. I chose this job because I knew I would not have to work overtime here	54.	-2	-3	-4	-5	-6
26. The overall level of taxation was lowered in the April budget	55.	-2	-3	-4	-5	-6
27. If I work less hard I am offered more overtime	56.	-2	-3	-4	-5	-6
28. I can control how much work I do each day	57	-2	-3	-4	-5	-6

SELF-COMPLETION 'C'
(i)

Below is a list of statements about work. Please put a tick in the box that comes closest to how you feel about the statement. For example:-

	agree a lot	agree a little	Doesn't apply/ neither	disagree a little	disagree a lot
* I like my work	☐	☑	☐	☐	☐

Use the box marked neither if you are not sure whether you agree or not or if the statement does not apply to you. Please put down your first reactions without thinking too much about each statement.

		agree a lot	agree a little	Doesn't apply/ neither	disagree a little	disagree a lot
1.	I chose this job because I knew that I could get overtime here	30. ☐ -2	☐ -3	☐ -4	☐ -5	☐ -6
2.	I am liable to lose my friends at work if I work faster	31. ☐ -2	☐ -3	☐ -4	☐ -5	☐ -6
3.	I do not really want promotion	32. ☐ -2	☐ -3	☐ -4	☐ -5	☐ -6
4.	High deductions from my pay mean that I don't work much overtime because it's not worthwhile	33. ☐ -2	☐ -3	☐ -4	☐ -5	☐ -6
5.	My work group is in favour of a piecework incentive scheme	34. ☐ -2	☐ -3	☐ -4	☐ -5	☐ -6
6.	I enjoy doing odd jobs about my house	35. ☐ -2	☐ -3	☐ -4	☐ -5	☐ -6
7.	I have to work overtime because I need the money	36. ☐ -2	☐ -3	☐ -4	☐ -5	☐ -6
8.	I worry sometimes about redundancy	37. ☐ -2	☐ -3	☐ -4	☐ -5	☐ -6
9.	I feel better off since my last rise	38. ☐ -2	☐ -3	☐ -4	☐ -5	☐ -6
10.	If I see the work being badly organised I keep quiet about it	39. ☐ -2	☐ -3	☐ -4	☐ -5	☐ -6
11.	I soon get bored if I have a lot of free time after work	40. ☐ -2	☐ -3	☐ -4	☐ -5	☐ -6
12.	Management is considerate to the employees	41. ☐ -2	☐ -3	☐ -4	☐ -5	☐ -6
13.	If we all worked harder in our department we could work ourselves out of a job	42. ☐ -2	☐ -3	☐ -4	☐ -5	☐ -6
14.	The friends I mix with in my leisure time are worse off than I am	43. ☐ -2	☐ -3	☐ -4	☐ -5	☐ -6

Area Code ☐☐☐☐☐ Address Serial No. ☐☐

Respondent No. ☐

STRICTLY CONFIDENTIAL

SELF-COMPLETION 'B'

PLEASE TICK ONE BOX ON EACH LINE

		I manage easily		I manage		I just manage		I find it very difficult to manage		I can't make ends meet		Doesn't apply to me	
With my income from my main job, but without working overtime	25.	☐	-2	☐	-3	☐	-4	☐	-5	☐	-6		
With my income from main job and with working overtime	26.	☐	-2	☐	-3	☐	-4	☐	-5	☐	-6	☐	-7
With all my income from my main job and all other paying sidelines and any other work	27.	☐	-2	☐	-3	☐	-4	☐	-5	☐	-6	☐	-7
With my income from all paid work I do plus contributions made by other working members of the family living here	28.	☐	-2	☐	-3	☐	-4	☐	-5	☐	-6	☐	-7

		The family manages easily		The family manages		The family just manages		The family finds it very difficult to manage		The family can't make ends meet		Doesn't apply	
With the total income that the family has as a result of all the jobs worked by all the members of my family living here.	29.	☐	-2	☐	-3	☐	-4	☐	-5	☐	-6	☐	-7

Area Code ☐☐☐☐☐

Address serial No. ☐☐

Respondent No. ☐

SELF-COMPLETION 'A'
(v)

Think of the majority of the people that you work with now or the people you meet in connection with your work. How well does each of the following words describe these people? In the space beside each word below, circle:

Y if it describes the people you work with

N if it does NOT describe them

? if you cannot decide

PEOPLE ON YOUR PRESENT JOB

	YES	NEITHER	NO	
Stimulating	Y	?	N	71.
Boring	Y	?	N	72.
Slow	Y	?	N	73.
Ambitious	Y	?	N	74.
Stupid	Y	?	N	75.
Responsible	Y	?	N	76.
Fast	Y	?	N	77.
Intelligent	Y	?	N	CARD 10: 7 (1) 8 (0) 9.
Easy to make enemies	Y	?	N	10.
Talk too much	Y	?	N	11.
Smart	Y	?	N	12.
Lazy	Y	?	N	13.
Unpleasant	Y	?	N	14.
No privacy	Y	?	N	15.
Active	Y	?	N	16.
Narrow interests	Y	?	N	17.
Loyal	Y	?	N	18.
Hard to meet	Y	?	N	19.

SELF-COMPLETION 'A'
(iv)

Think of the kind of supervision that you get on your job. How well does each of the following words describe this supervision? In the space beside each word below, circle:

Y if it describes the supervision you get on your job

N if it does NOT describe it

? if you cannot decide

. . . . . .

SUPERVISION ON PRESENT JOB

	YES	NEITHER	NO	
Asks my advice	Y	?	N	51.
Hard to please	Y	?	N	52.
Impolite	Y	?	N	53.
Praises good work	Y	?	N	54.
Tactful	Y	?	N	55.
Influential	Y	?	N	56.
Up-to-date	Y	?	N	57.
Doesn't supervise enough	Y	?	N	58.
Quick tempered	Y	?	N	59.
Tells me where I stand	Y	?	N	60.
Annoying	Y	?	N	61.
Stubborn	Y	?	N	62.
Knows job well	Y	?	N	63.
Bad	Y	?	N	64.
Intelligent	Y	?	N	65.
Leaves me on my own	Y	?	N	66.
Around when needed	Y	?	N	67.
Lazy	Y	?	N	68.

Please go on to the next page

Think of the opportunities for promotion that you have now. How well does each of the following words describe these? In the space beside each work circle:

Y for 'Yes' if it describes your opportunities for promotion

N for 'No' if it does NOT describe them

? if you cannot decide

OPPORTUNITIES FOR PROMOTION	YES	NEITHER	NO	
Good opportunities for promotion	Y	?	N	40.
Opportunity somewhat limited	Y	?	N	41.
Promotion on ability	Y	?	N	42.
Dead-end job	Y	?	N	43.
Good chance for promotion	Y	?	N	44.
Unfair promotion policy	Y	?	N	45.
Infrequent promotions	Y	?	N	46.
Regular promotions	Y	?	N	47.
Fairly good chance for promotion	Y	?	N	48.

Go on to the next page

SELF-COMPLETION 'A'
(ii)

Think of the pay you get now. How well does each of the following words describe your present pay? In the space beside each word, circle:

Y if it describes your pay

N if it does NOT describe it

? if you cannot decide

PRESENT PAY

	YES	NEITHER	NO	
Income adequate for normal expenses	Y	?	N	29.
Satisfactory profit sharing	Y	?	N	30.
Barely live on income	Y	?	N	31.
Bad	Y	?	N	32.
Income provides luxuries	Y	?	N	33.
Insecure	Y	?	N	34.
Less than I deserve	Y	?	N	35.
Highly paid	Y	?	N	36.
Underpaid	Y	?	N	37.

Now please turn to the next page

STRICTLY CONFIDENTIAL

SELF-COMPLETION 'A'

(i)

Think of your present work. What is it like most of the time? In the space beside each word given below, circle:

Y for 'Yes' if it describes your work

N for 'No' if it does NOT describe it

? if you cannot decide

. . . . . .

CARD 9 7. (0) 8. (5)

WORK ON PRESENT JOB	YES	NEITHER	NO	
Fascinating	Y	?	N	9.
Routine	Y	?	N	10.
Satisfying	Y	?	N	11.
Boring	Y	?	N	12.
Good	Y	?	N	13.
Creative	Y	?	N	14.
Respected	Y	?	N	15.
Hot	Y	?	N	16.
Pleasant	Y	?	N	17.
Useful	Y	?	N	18.
Tiresome	Y	?	N	19.
Healthy	Y	?	N	20.
Challenging	Y	?	N	21.
On your feet	Y	?	N	22.
Frustrating	Y	?	N	23.
Simple	Y	?	N	24.
Endless	Y	?	N	25.
Gives sense of accomplishment	Y	?	N	26.

Go on to the next page ....

Area Code [ ][ ][ ][ ][ ]

Address Serial No. [ ][ ]

Respondent No. [ ]

CARD E

Watching T.V.

Reading

Visiting friends

Entertaining friends

Playing a sport

Watching a sport

Attending meetings of clubs, unions, etc.

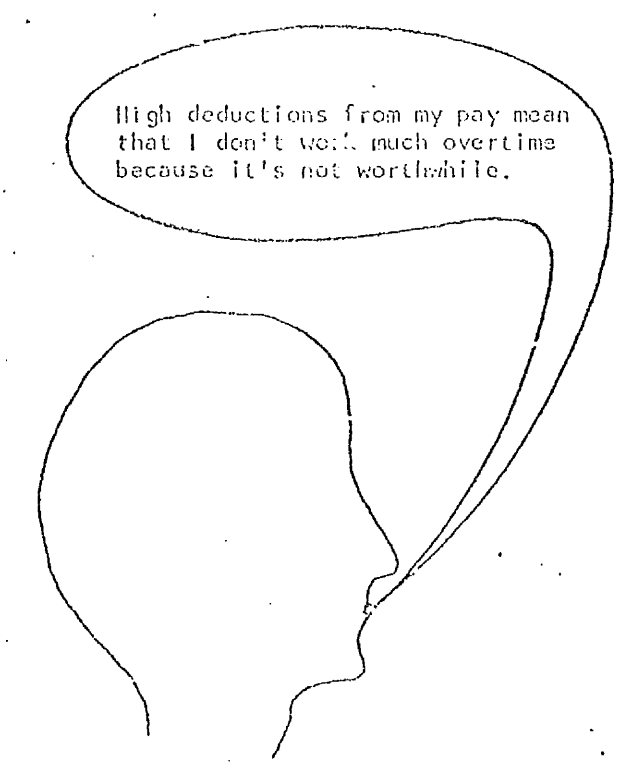
Drinking (in pubs etc.)

Going on trips

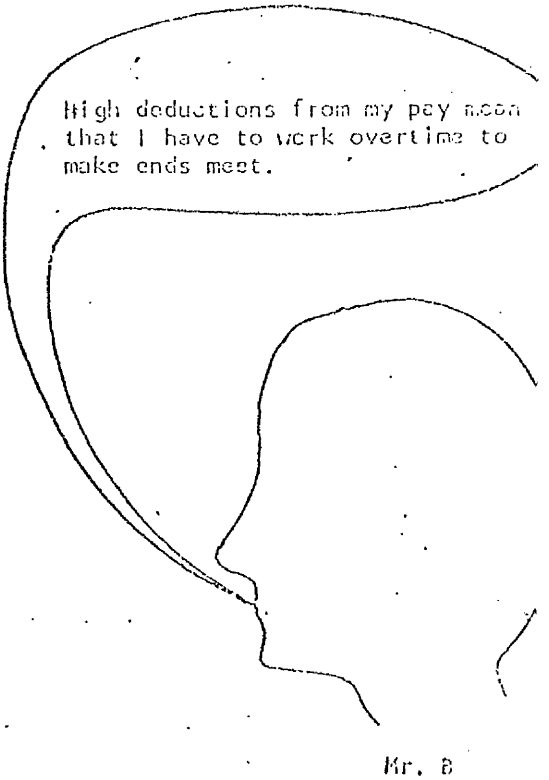
Visiting parks, walks

Going to cinema

Other hobby



Mr. A



Mr. B

CARD A

I always work overtime when the opportunity arises

I sometimes work overtime when the opportunity arises

I never work overtime when the opportunity arises

There are no opportunities for overtime in my job

CARD B

Painting/wallpapering

Plastering/plumbing

Joinery/carpentry

Electrical work

Repair or service car

Gardening

Sewing/knitting

Cooking/baking

Cleaning/housework

Other work about the house

CARD C

A. £0

B. over £0 up to £5

C. over £5 up to £10

D. over £10 up to £15

E. over £15 up to £20

F. over £20 up to £30

G. over £30 up to £40

H. over £40 up to £50

I. over £50 up to £60

J. over £60 up to £80

K. over £80 up to £100

L. over £100

CARD D

Rent rebate

Rate rebate

Maintenance allowance for school pupils over 15 years old/free school dinners/contribution towards school uniform

Contribution towards essential clothing for work

Day nursery for young children at reduced cost

Student grant

Local authority subsidised boarding education for child

Direct grant school fees subsidy

Local authority home help

Legal aid

Family allowances

Family income supplement

Supplementary benefit (national assistance)

Department of Economics, Head of Department: Professor C V Brown

UNIVERSITY OF STIRLING STIRLING SCOTLAND | TELEPHONE: STIRLING (0786) 3171

Dear Sir or Madam

University of Stirling Work Survey

This letter will introduce M who is working for me on a national study of attitudes towards work. I would very much appreciate it if you would answer the questions she will ask on my behalf.

Your address is one of about 10,000 that have been picked at random from the electoral registers. If our study is to be truly representative of attitudes throughout the country, it is important that we obtain the views of people whose addresses have been picked and I would be most grateful for your co-operation.

I can assure you that your answers will be treated as STRICTLY CONFIDENTIAL. None of your answers will be given or shown to anyone not working on this project. It will never be possible for anyone to identify any of your answers in any way.

Thank you for your co-operation.

Yours faithfully

C. V. Brown

C V Brown

SUBSTITUTE QUESTIONNAIRE S2411

Serial No. _____ (2/3/4/5)

6. (1)

CARD 16: 7. (1) 8. (6)

Address serial no. [ ][ ]

Respondent no. (if any) [ ][ ]

Constituency _____

Area Code [ ][ ][ ][ ][ ] 9 10 11 12 13

Interviewer _____

Supervisor _____

Date _____ 1971.

Interviewer Code No. [ ][ ][ ][ ] 14 15 16 17

ASK OF PERSON WHO REFUSED ONLY IF HE/SHE IS SELECTED ELIGIBLE RESPONDENT

SHOW CARD A

A. Would you just tell me which of the statements on this card applies to you?

Always work overtime when the opportunity arises	18.	2
Sometimes work overtime when the opportunity arises		3
Never work overtime when the opportunity arises		4
No opportunities for overtime		5
Any other answer STATE _____ _____		
Don't know		1

B. SHOW CARTOON CARD

People have different ideas about the way deductions affect the amount of work they do. Here you see is one point of view (POINT TO MR.A). The man says that high deductions from his pay mean that he doesn't work much overtime because it's not worthwhile. (POINT TO MR.B). But the other man argues that the high deductions mean he has to work more overtime to make ends meet. Which would you agree with?

Agree with Mr. A	19.	2
Agree with Mr. B		3
Neither/doesn't apply		4

TO BE COMPLETED BY INTERVIEWER ALONE

REASON FOR REFUSAL

1. (a) Reason given for refusal

GET AS MUCH DETAIL AS POSSIBLE ESPECIALLY IF RESPONDENT CLAIMS LACK OF TIME

_____ 20.
_____ 21.

(b) Interviewer's interpretation of reason for refusal

_____ 22.
_____ 23.

DETAILS OF PERSON WHO REFUSED

2.	Sex:	Male	24.	2
		Female		3
3.	Estimated age:	Under 15	25.	2
		15 - 24		3
		25 - 44		4
		45 - 64		5
		65 or over		6

4. Briefly evaluate the person who refused in terms of:

(a)	Energy level:	Energetic, active, bright, alert	26.	2
		Average		3
		Dull, passive, tired, apathetic		4
		Don't know		1
(b)	Way home is kept:	Clean, tidy	27.	2
		Fair		3
		Untidy		4
		Don't know		1
(c)	Level of prosperity:	Expensive clothes, carpets, new furnjture, fittings, etc.	28.	2
		Average clothes, carpets, furniture, fittings etc.		3
		Old worn out clothes, carpets furniture, fittings etc.		4
		Don't know		1

5.(a) Is the person who refused the selected eligible person?	Yes	29.	2
	No		3
	Don't know		1
IF 'No'			
(b) Estimated relationship to eligible person:			
Person who refused is -	Husband	30.	2
	Wife		3
	Father		4
	Mother		5
	Brother/Sister		6
	Other		7
	Don't Know		1

DETAILS OF FAMILY/HOUSE

6.(a) Children in household?	Definitely, yes	31.	2
	Probably, yes		3
	Don't know		4
	Probably, no		5
	Definitely, no		6
(b) Estimated no. of adults in household	1 adult	32.	2
	2 adults		3
	3 adults		4
	4 or more adults		5
	Don't know		1
7.(a) Type of house	Detached	33.	2
	Semi-detached		3
	Terraced		4
	Flat		5
	Other		6
(b) Council or not	Definitely council	34.	2
	Probably council		3
	Don't know		4
	Probably not council		5
	Definitely not council		6
(c) Neighbourhood	Poor working class	35.	2
	Average working class		3
	Middle class		4

TAXATION J.R. 52204

INTERVIEWERS INSTRUCTIONS

DOCUMENTS TO BE USED ON THIS SURVEY

Address Lists
Contact Sheets
Questionnaires
Prompt Cards (one set, plus one separate card)
Appointment Cards
Letters of Introduction
Pens

PURPOSE OF THE SURVEY

This survey which we are conducting for the University of Stirling is to investigate the effect of direct taxation on the incentive to work - to see how much people know about the tax system and what effect income tax has on the hours they work, the effort they put in and so on.

As with most of our surveys, although we are able to tell you the reason for the survey, YOU MUST NOT REVEAL ITS PURPOSE TO THE RESPONDENT.

GENERAL SUMMARY OF YOUR TASK

Basically your task will be as follows:-

(1) You have been given a list of addresses. You must not interview anywhere else.

(2) At each address you contact a responsible adult and collect details about the employment of people living at that address.

(3) You then go through a selection procedure to establish which person, if any, you should interview.

(4) You then interview the selected person if he/she is present, or make an appointment to call back and see him/her.

THE CONTACT PROCEDURE

(1) Your Address Lists give for each address:

an Address Serial No.

a list of the people shown in the Electoral Register as living at the address

a "Starting No."

an "Interval No."

(You can ignore the columns headed living here/working/receives pay weekly).

(2) Before attempting contact at an address record on the front of the Contact Sheet the address, constituency, Area Code, Address Serial No. and your own name and code no.

Then turn to the back of the Contact Sheet. Record the Starting No. and Interval No. for that address, and fill in the surnames and christian names of the people listed on your Address List.

(3) Contact a responsible adult and use the introduction given on the front of your Contact Sheet. Note that you say you are from the University of Stirling, not BERB.

(4) Turn to the back of the Contact Sheet and collect the following information about the people you have listed for that address;

(A.1.) Go down the list of people, asking for each : 'Does.....still live here?' For people still living at the address put a tick in column 1 next to their name, and cross out the names of any people who no longer live at that address.

(A.2.) Go down the list of people whose names you have not crossed out, asking for each : 'Does....normally work a total of 8 hours or more over a week?'. Put a tick in column 2 against the names of those who do normally work a total of 8 hours or more over a week; cross out their names if they do not; and put 'D.K.' if your informant does not know.

(A.3.) Go down the list of people whose names you have not crossed out (including those with 'D.K.') asking for each. 'Has...been to work sometime in the past 7 days?' If 'Yes', tick; if 'No' cross out, and if 'don't know' put 'D.K.'.

(A.4.) Go down the remaining names, asking 'Is..... an employee (that is not self-employed)?' Tick, cross out or put 'D.K.' against each name.

(A.5.) Lastly go down the remaining names, asking 'Does...receive his/her pay weekly?'. Tick, cross out or put 'D.K.', against each name.

Note that you should go down the names each time rather than asking all the questions of one person and then going on to the next. This is because the information required becomes more personal towards the end of the series of questions and this personal information is best left until last.

(5) Next check whether there is anyone else aged 15 or over living at the address. If so, enter their surnames

and christian names on the Contact Sheet and ask questions A.2. to A.5. and follow the same procedure as you did for the other people.

It is IMPORTANT to remember when listing people at an address that your list should INCLUDE ALL ADULTS AGED 15 OR OVER LIVING AT THE ADDRESS, not just the people in the household to which you have been led by the surname on your Address List.

(6) Having obtained a complete list of adults living at the address, ignore any names which you have crossed out, and number the remaining names in alphabetical order starting with 1.

(7) Next check the Starting Number for the address. If you have used the Starting Number when numbering people in alphabetical order, then the person listed against the Starting Number is eligible for interview (e.g. if the Starting Number is 3 and you have numbered people up to 4, then the person to whom you gave the number '3' is eligible for interview). If you have not used the Starting Number when numbering people, then do not take an interview at that address (e.g. if the Starting Number is 3 and you have only been left with 2 people that you numbered).

(8) If you have someone listed against the Starting Number, continue by adding the Interval Number to the Starting Number and see whether there is anyone listed against this new number. If there is, then this second person is eligible for interview.

If you find a second person eligible for interview, add the Interval Number again and see whether there is anyone at the number you arrive at.

Continue adding the Interval Number until you arrive at the point where there is no one listed against the new number.

(9) Thus when you have completed the back of your Contact Sheet one of three possible situations will have emerged:

(i) You take no interview at that address. (The section 'Number and Results of Calls' tells you how to record this).

(ii) You find one person who is eligible for interview, in which case you should ask to speak to and attempt to interview, that person. If necessary make an appointment to call back, filling in and leaving an Appointment Card.

(iii) You find more than one person who is eligible for interview. (The Section 'Multiple Interviews' gives the procedure for such addresses).

NUMBER AND RESULTS OF CALLS

A. To collect household information

Unless you get co-operation or a refusal, you should make at least three calls at each address in order to try to get the household information which enables you to decide which person, if any, is eligible for interview. These should of course be on different days at different times.

On the front of your contact sheet you should record under section A ('Result of calls to collect Household information'), the time and date of each of these calls, your code number and the result of each call.

When recording the result of each call use one of the following set phrases, if possible:

(Successful and) interview obtained

(Successful and) appointment for . . . (date/time)

(Successful but) no interview required

(Successful but) 2 interviews required

Premises empty

Premises demolished

No reply

No responsible adult available

Occupants/selected person known to be away until . . . .

Household information incomplete

Refused to give household information

Refused interview with selected person

B. To obtain interview

Having selected a person for interview, you should make at least three further calls in order to try to obtain an interview with that person.

Record the details of these calls under Section B on the front of the contact sheet, using one of the following phrases to indicate the results :

Interview obtained

2 Interviews obtained

Further appointment for . . . . (date/time)

Respondent not eligible at Check Questions

No reply

Refused interview

MULTIPLE INTERVIEWS

At a small proportion of addresses it will be necessary to interview more than one person. In such cases the people selected must be interviewed simultaneously, otherwise the first person interviewed would be likely to reveal information to the second which could well influence the second person's answers.

At addrases where two people are selected for interview, explain to your contact that you would like to come back with another interviewer to interview both people. Do not make a definite time and date to call again, but ascertain alternative times when they are both likely to be at home together. If they are on the telephone, get their telephone number.

Then contact your Area Office who will make arrangements for another interviewer to go back with you.

It is possible, although unlikely, that more than two people are selected for interview at one address. What arrangements we make if this does occur will depend upon the particular circumstances, so contact your Area Office as soon as you can and we will see how we can best handle the situation.

It will, of course, help your Area Office to make arrangements for multiple interviews if you all keep the Office informed of the days on which you yourself are likely to be free.

(iv) Institutions

By institution we mean hotels, public houses, boarding houses or hostels; hospitals, old people's homes, nursing homes or prisons; schools, colleges and other similar establishments.

In most cases, if there is an institution on your Address List, you will have been given the name and address of the institution and a copy of the part of the Electoral Register which shows all the electors listed for the institution. In a few cases you may find a small institution has been listed on your address list in the normal way.

At an institution you should obtain a complete list of all adults aged 15 or over living there, and, as with homes that are divided into flats or flatlets, you do not need to get the working details of everyone. You just get the full list and select a person(s) using the starting number and interval number. Then you interview this person if he answers 'yes' to all the check questions when you actually contact him.

Please note that your list of adults should include all inmates and also owners / managers / caretakers etc. living at the institution.

Normally at an institution one of the people in charge will have a complete list of the people living there. Therefore, to make your task easier, you should first establish whether such a list exists and if so ask permission to inspect it. If no such list exists or you are unable to see it, you should use your copy of the list of electors as a basis from which to begin, crossing out and adding names to this list.

THE "14 DAY" RULE

In all that has been said so far we have talked about people "living at the address". In some circumstances, particularly with institutions like boarding houses and hotels, but also with people who are away from home, it will not be clear to the Respondent who should be counted as 'living at the address'. The rule here is that anyone counts at a particular address

(i) if they normally live there and are present when you make your call

(ii) if they normally live there, are away at present, but are expected to return within 14 days.

(iii) if they do not normally live there but are living there temporarily and are expected to go on living there for the next 14 days.

ADDRESSES WITH MORE THAN ONE HOUSEHOLD

In the normal run of cases you will find that the address you have been given is occupied by one household. However, there are four main exceptions:

(i) Tenements (Scotland only)

For tenements your Address list will give a description of the part of the tenement we are interested in (e.g. under 'ELECTORS' it will be identified at Houses 3/2). You should go only to the accommodation indicated. The first of the two figures indicates the floor and the second figure the number of the 'house' starting numbering from the left and continuing clockwise. Thus 3/2 means third floor, second 'house' on left going clockwise.

You should go to the 'house' indicated and treat it in the normal way, except that no names are given, so you will have to ask the person you contact to give you the names of all people aged 15 or over living at that 'house'.

(ii) Two households sharing a dwelling

Nowadays you find young married couples living with their parents. If the young couples take meals with their parents and pool the household expenses, they are considered one household. If, on the other hand, they budget and cater separately they form separate households.

Even if they form separate households, when completing your contact sheet you should list everyone at the address i.e. both households. In such a case you will probably be able to get all the details about both households from the person you contact.

(iii) A house subdivided into flats/flatlets

Where the flats have been given a separate number or letter in the Electoral Register, your Address List will direct you to a particular flat and you then list on your Contact Sheet only the occupants of that flat (e.g. Flat 1, 16 King Street, or 45A Queen Street).

However, where a house is subdivided into flats but the Electoral Register does not show separate numbers or letters for each flat, your Address List will direct you to the house and will list all the electors from every flat. In such cases we are interested in the whole address even if when you get there you find the flats are separately numbered or lettered.

However, the procedure at such an address is slightly easier for you. Here you obtain full information on who lives there but you do not need to obtain everyones' working details. Using your contact sheet you cross out anyone not living there and add in the names of anyone not listed who is aged 15 or over and lives there. Then, having numbered everyone in alphabetical order, you select for interview the person on the starting number. The add the interval number and if there is anyone against this number you select them for interview. However, whether you actually take an interview or not depends upon the person's answers to the check questions on the front of the questionnaire when you actually contact him.

THE QUESTIONNAIRE

The 'questionnaire' is really a set of documents which you will require during the interview.

(i) First is the main (white) questionnaire giving the questions which you are to ask of the respondent.

(ii) Then there are five self-completion questionnaires printed on coloured paper, which you will be giving to the respondent at various points in the interview.

(iii) Next is a letter which the respondent is asked to sign, giving permission for his employer to reveal certain details about his pay.

(iv) And lastly, there is a letter, which you leave at the end of the interview and which thanks the respondent for his co-operation.

The questionnaire, although perhaps longer than the majority which you use, is fairly straightforward but we would draw your attention to the following points:

Front page

(i) The first thing to notice about the front page of the questionnaire is that there is no place for you to record the name and address of the person you interview. This is intended to reassure the respondent that the answershe gives will remain anonymous.

Obviously, with no name and address, should the various documents relating to a respondent bec me detached at any stage we have to have some way of knowing which documents go together. We need three pieces of information to do this : the area code and address serial number which are given on your address lists, and the respondent number, which is the number which you gave to the respondent when numbering people on your contact sheet. IT IS THEREFORE IMPORTANT THAT THE AREA CODE, ADDRESS SERIAL NUMBER AND RESPONDENT NUMBER ARE RECORDED ON EVERY DOCUMENT.

(ii) Please note that the way your record your own code number is slightly different from normal. There are four boxes in which to record your four figure code number.

(iii) There is a box for you to record the number of calls made at the address. The number we would like you to record is not the total number of calls made, but is the number of extra calls you had to make to obtain an interview with the respondent after you had selected him/her as the person you wanted to interview. This is not as complex as it may sound because on the front of your contact sheet you will have recorded separately in section 'B' (Result of calls to obtain interview) any extra calls you had to make to interview the person you selected. Thus, in the box on the front of the questionnaire, give the number of calls which you have recorded under Section 'B' on the front of your contact sheet. If you were able to select a person and interview him/her straight away, then record '0' in the box on the questionnaire.

(iv) The Introduction on the questionnaire is fuller than that given on your Contact Sheet. One part of the Introduction appears in brackets and we leave it to your discretion as to whether or not you go into as much detail as is given in the bracketed part of the Introduction. What you do about this will probably vary

from respondent to respondent - if you feel the person you are talking to is reluctant and needs to be given a fuller explanation of the survey then use the whole of the Introduction.

Obviously, if the person you talk to at the contact stage is selected for interview, you need not necessarily repeat that you are from the University of Stirling.

(v) Before you begin the interview ask the 'check questions' to make absolutely sure that the person you are about to interview is, in fact, eligible for interview. This is important because in many cases the person you select for interview will not be the person from whom you collected details at the contact stage and so you could have been given some incorrect information. Do not take an interview if it emerges that the person is not eligibleafter all, and make it clear on your contact sheet that this has occurred.

(vi) Be sure to record the starting time before beginning the interview.

Open-ended questions

There are a number of open-ended questions in this questionnaire. We should like to emphasise how important it is on this survey to RECORD EXACTLY WHAT THE RESPONDENT SAYS. (Even missing out a word could make a great deal of difference to the way we classify the answer the respondent gave.) AND TO WAIT UNTIL YOU FEEL HE HAS SAID ALL HE WANTS TO SAY BEFORE GOING ON TO THE NEXT QUESTION.

Monetary questions.

At questions which require a monetary answer we have made provision for you to record either an answer in decimal currency or an answer in old £sd money. Please be careful to record answers in the appropriate places depending upon whether the respondent answers in £p or £sd terms.

Q.6a Please note that although some of the people you interview may be part-time workers, at Q.6. we are interested in any full time job which they may have had with another employer in the last 5 years.

Q.9-Q.13 Any type of paid work done by the respondent's wife/mother/mother-in-law should be included, even if she only worked a couple of hours each week or, if she took in some kind of work at home.

Self-completion 'A'
(Page 5 of questionnaire)

There are five pages to self-completion 'A' each of which covers a different aspect of the respondent's job.

Use the explanation given on the questionnaire, help the respondent with the first 'item' ("fascinating"), and then tell him : "We don't want you to think too much about each item - put down your first impression"

It is important that you do point out that we don't want him to think too much because we discovered from the pilot that some people can take quite a time to complete this section.

If you see the respondent pondering on a particular item for too long, remind him: "If you don't have a first impression circle 'neither'."

If you are sitting near to the respondent it can also help to speed things up if you turn the pages for him and/or direct his attention to the aspect of his work covered on the page he turns to (e.g. as he turns to page (ii), say "now your present pay").

Please ensure that the respondent does answer for each item, either by watching him as he goes through or checking when he has finished.

Q.15. Although this question tells the respondent not to count lunch breaks there are some people whose wages are quoted in such a way as to lead them to regard themselves as being paid for lunch breaks and hence they always think of their basic working week as including lunch breaks. Should it be apparent that this has occurred please make a note to this effect on the questionnaire.

Q.16. Note that the answer you code depends upon the reason the respondent gives for having time off BUT THIS DOES NOT MEAN THAT YOU SHOULD ASK FOR THE REASON OR SUGGEST A REASON TO HIM.

If he says he has taken time off and adds that this was because of illness you code position '3'; if he says he had to take time off because his employer made him work short time, you code postion '4'; but if he simply says he has taken time off or gives another reason apart from illness or short time, you code postion '5'.

Q.21 In order to obtain the reason for the amount of overtime that respondents do in comparison with their workmates we have had to use two slightly different questions:if the respondent works more or less overtime than his workmates ask part (b) 'Why is that?' then part (c); if the respondent works the same amount of overtime as his workmates ask part (d) 'I wonder why it is that you all happen to work the same amount of overtime?' and then ask part (e).

Q.26a The day of the week which you should ask about is the day of the week in which you are interviewing (e.g. If you are interviewing on a Tuesday: "that is since last Tuesday")

Self-completion 'B'
(Page 11)

Check that the respondent has put one tick against each item.

Q.41 This is another question where the list of answers which you can code anticipates a respondent saying that the extra work he does is not paid work, BUT YOU MUST NOT ASK HIM WHETHER OR NOT IT IS PAID WORK.

Q.44b We have not provided you with a place to code 'Don't know' as the respondent may know the type of deduction but not the amount, or may know how much is deducted but not know what it is for. If he does not know any of the details, simply write in 'D.K.' in the appropriate place.

Q.50 This is the first question in a series about bonus, piece-rate or incentive schemes. If the respondent is on this kind of scheme, after Q.50 refer to the scheme in the terms that he uses rather than repeating "bonus, piece-rate or incentive scheme" at each question.

Self-completion 'C'
(Page 19)

Check that the respondent has put one tick against each item.

Q.63 At this question you have a separate "cartoon" card to show, which is intended to help respondents to understand the two possible points of view, but please TAKE THIS QUESTION SLOWLY so that the respondent can follow the reasoning as you go through. Then ALLOW HIM PLENTY OF TIME to give you his answer.

Q.75a After the respondent has given you his answer check that there has been no confusion by deducting his answer from £1 and saying "that means you would be left with .....(pence/shillings) after income tax."

Allow him to change his answer if he realises he has made a mistake.

Q.75c You should read out the list of answers given at this question i.e. say "Can you tell me how you reached that figure - was it something you read or heard about, something you worked out from your own pay slip, or something else?"

Q.76,Q.77

If the respondent does not know any detail write in 'D.K.' in the appropriate place.

Self-completion 'D'
(Page 25)

Check that the respondent has put one tick against each item.

Household composition
(Page 26)

Be sure to check that the respondent has given you details of everyone in the household, whether or not they are working and no matter how young they are.

Q.83 If the respondent finds this difficult because there are monthly paid people in the household, please help him with his calculations.

Q89b Insert the phrase "Do you know" when you are not speaking to the head of the household.

Q.90 The activities listed here are not always mutually exclusive. For example, a respondent could be "entertaining friends" and "drinking in a pub", if he takes friends out for a drink. In such a case we do not mind which activity you code, as long as you only code

one so that the number of hours and cost are not double counted.

Self-completion 'D'
(Page 32)

Check that the respondent has put one tick against each item.

Q.98 You should code 'last payslip produced' only if the respondent produces the last payslip he received (not just the most recent one he can find).

When he gives you the hours he worked confirm that he actually worked that number of hours, since if the respondent worked overtime, say at double-time, his firm may double up the number of hours he actually worked in overtime to calculate how much he should be paid.

Time interview finished

Be sure to record this at the end of the interview

Thank you letter

Remember to give the respondent the "thank you" letter which appears at the end of your set of documents.

Page 35-37

This section deals with your assessment of the respondent and his circumstances and MUST NOT BE COMPLETED IN FRONT OF THE RESPONDENT.

At point 6, make a note of any questions where you feel the answer was not representative of what the respondent thinks and explain why you feel this is so. For example, you may feel he has deliberately misled you at some point or that despite repetition he has not fully understood the question.

Respondents with two jobs

Many of the questions refer to the respondent's 'work' or 'job'. (For example, the first question asks him how long it takes him to get from home to work). This poses no problem for the vast majority of people you will interview, since they will only have one job; or at most they will have a main job which they work at most of the time and a secondary job which they do in odd hours at the weekend, in the evening, etc., and when you ask them about their work they will talk about their main employment.

However, although rare, it is possible for someone to have two jobs which he regards as of equal importance. If this should occur it will become apparent very early in the interview - if it does not come up at the first question it will emerge at Q.3 when you ask for details of his work. In such cases you will have to make it clear which job we mean when we talk about his 'job' or 'main job', and the following rules should be applied to decide which job to count as his main job.

Firstly if only one of his jobs fulfils the conditions given in the 'check questions' on the first page it is, of course, the one which fulfils these conditions which we want to take as his main job.

If both of his jobs fulfil the conditions given in the 'check questions' then take the job at which he normally spends most hours in a week.

Finally if the two rules above still do not isolate his 'main job' ask him to talk about the job which he worked at last time he went to work.

Having established the 'main job' which you will be asking about for most questions, the other job held by the respondent should be covered at Q.39 to Q.45.

Special Circumstances

Having conducted a number of pilot interviews for this survey, we have been able to warn you of, and tell you how to handle, a few special circumstances which may arise during an interview. As with any survey peoples' circumstances vary so much that we cannot anticipate, and give you guidance on, every possible set of circumstances. Therefore, IF AT ANY POINT IN THE INTERVIEW YOU ARE IN DOUBT ABOUT A PARTICULAR ANSWER PLEASE MAKE A NOTE OF THE CIRCUMSTANCES ON THE QUESTIONNAIRE so that we can make a decision when we examine the interview.

DOCUMENTS FOR EACH ADDRESS

When sending back your work IT IS IMPORTANT THAT ALL DOCUMENTS RELATING TO A PARTICULAR ADDRESS ARE KEPT TOGETHER. With most addresses this simply means putting the 'tag' back through the white questionnaire, self completion sheets and employer's letter, and putting the contact sheet on the front.

If TWO INTERVIEWS are conducted at any address ENSURE THAT THE TWO INTERVIEWS ARE SECURELY ATTACHED TO EACH OTHER AND TO THEIR CONTACT SHEET. The easiest way is probably to put one of the 'tags' right through the two interviews.

LETTERS OF INTRODUCTION

You should fill in your own name on your 'Letters of Introduction'. These letters replace your BMRB identification cards, and should be used where you feel the respondent requires verification of who you are or what the survey is for.

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