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FEMALE LABOUR SUPPLY IN AN URBANISING ECONOMY

by

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PREFACE

This paper is part of a study of female labour force participation in Jamaica. The other paper with which it is directly related is entitled, "Female Labour Force Participation in Historical Perspective". The present paper develops a micro-behavioural approach to the analysis of labour supply; the second paper attempts to explain the development of the Jamaica labour force, and the factors that have shaped the pattern of labour commitment.

Introduction

In many low-income societies women have been eased out of the labour force as the economy has become more commercialised, more urbanised, and more industrialised. They have tended to become 'secondary workers', intermittently in the labour force but primarily involved in domestic activities. This has applied much more in some societies than in others, and of course in many women have traditionally been relegated to subservient domestic roles. In individual societies it has also applied to certain groups of women more than to others. Yet in all cases the potential implications of patterns of labour force participation are considerable. For instance, it will affect the distribution of household as well as individual income, and it has often been argued that female participation in the labour force encourages a reduction of fertility and population growth. A growing proportion of women available for and committed to non-domestic employment in itself encouragesthe growth of female employment, since the greater commitment and availability can be expected to break down discrimination and related institutional barriers to their employment, while the increasing numbers are likely to lead to women entering formerly 'male jobs', thereby expanding female employment opportunities and gaining access to new ranges of occupations.

In the present study one of the main objectives is to identify the principal behavioural determinants of female labour force participation in urban Jamaica to provide a test of the household decision-making model in circumstances where the conventional concept of a household is hard to apply. In doing so it has three other objectives: (i) To incorporate the notion of "tastes" for income into the labour supply function; (ii) To refine the notion of human capital as a measure of the opportunity wage; and (iii) To test several alternative experimental measures of labour supply, in part to determine whether or not it is possible to obtain a more appropriate index or set of indices of supply than the conventional measures and to see whether or not the estimationof labour supply functions is sensitive to changes in the measurement of labour supply. The conventional

concept of labour supply is unclear since it embodies no reference to time, nor to aspirations or expectations, nor to the degree of commitment to any particular 'level' of supply. The term supply is really only a loose comprehensive concept, and empirical measures of supply are often questionable. For instance, in many empirical studies of labour force participation the dependent variable is either a dichotomous one based on some notion of activitiy status or some continuous variable such as hours worked. Yet neither activity status nor the number of hours worked are real measures of labour supply. To create an index of supply one should have some knowledge of the individual's actual preferences and some indication of the intensity and realism of those preferences, or at least be in a position to make some reasonable assumptions about them.

A Behavioural Model of Female Labour Supply

The probability of a woman entering or remaining in the labour force and the amount of time which she allocates to non-domestic activities will be conditioned by the expected opportunity costs of time spent in economic activity and time spent in domestic activity. The higher the opportunity cost of economic inactivity the higher the probability of participation, and the higher the opportunity cost of economic activity the lower the probability of participation. This is the basic premise underlying recent analysis of labour force participation.

The opportunity cost of economic inactivity will be a function of expected market income and perceived needs, or the demand for income. As a first approximation of the opportunity cost, the expected market wage, or opportunity wage, is the wage rate a woman would receive if employed discounted by the probability of securing a job which yielded that wage or some equivalent income.[1] The opportunity wage will therefore be a

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[1] This is only an approximation since the cost would actually be somewhat below the opportunity wage to the extent that a woman would be able or inclined to invest in augmenting her future expected earnings while outside the labour force. On the other hand, unlike physical capital, human capital has a negative user cost so that the opportunity wage may understate the cost of inactivity. The term human capital is really a misnomer, but its use in this paper is due in part to its conventional usage and in part to the fact that as utilised in what follows it does not involve any assumed relationships between productivity and schooling.

positive function of productivity in market activity - at least to the extent that the wage reflects productivity - and a negative function of the cost of securing an income-earning opportunity. The wage, productivity, and job-search costs can all be regarded as functions of human capital, which has several component parts. The most common index of human capital is education since education involves a process of personal investment involving costs from which returns accrue in the form of a greater lifetime earnings stream. But, of course, years of schooling, which is the index of human capital typically used in studies of labour force participation, is only one aspect of human capital. A measurement of the potential productivity of an individual should reflect both qualitative and quantitative elements of education as well as the individual's capacity to work, as measured by the individual's physical condition, and training for work. Particularly in a low income country many children ostensibly spend years in school only to emerge as illiterate or semi-literate, which makes years of schooling a dubious proxy for human capital or the individual's opportunity wage, particularly to the extent that education acts as a screening device in the allocation of jobs. What is vital is, first, the attainment of functional literacy, and second, the acquisition of some certificate of quality in the form of examination passes. At that stage human capital tends to become cumulative, since the attainment of literacy and examination success facilitates access to training opportunities and then on-the-job experience, which further raise the individual's productivity and expected earnings.

Therefore education, or in its wider sense human capital investment, tends to raise the opportunity cost of economic inactivity in so far as it is positively related to the opportunity wage. Indeed it does so by its direct effect on the wage a woman could expect to earn and by reducing the costs of searching for employment, both to the extent of reducing expected duration of job-search and reducing the cost of gathering market information.[1]

While the opportunity cost of inactivity is a positive function of the opportunity wage, it will also be a function of the perceived need for market income, which will determine the real value to the individual or household of a given opportunity wage. The need for income has usually been depicted as being inversely related to the

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[1] For a more detailed discussion of the relationships between education and labour supply, see Guy Standing, "Education and Female Labour Force Participation", International Labour Review, November/December 1976.

husband's or "other family income" and positively related to the number (and sometimes the age) of dependents for whom a given income is expected to provide. A crucial assumption is invariably slipped in at this stage of the analysis, often implicitly: 'tastes' are assumed to be constant. But even though many studies have circumvented the potential significance of this factor by making the implausible assumption that the observed population is homogeneous as regards tastes for market income, no model of labour force participation can be entirely satisfactory unless tastes are incorporated into the analysis. The formation of tastes for income will reflect in part actual needs - though even this is partly subjective - and in part expectations and aspirations. This may be seen as a direct correlate of education, and in fact some studies of labour force participation have used education as a measure of both potential earnings and tastes for income. Thus Bowen and Finegan justified their inclusion of years of education as a factor contributing to the rise in female economic activity in the US by claiming, "In short, we view education as both a proxy for "pure" preference for market work and as one factor which influences tastes for participation in the labour market."[1] Education tends to broaden consumption horizons and raise the value of time spent in any activity. For this reason assuming consumption involves a "time cost" as well as a "goods cost", there will tend to be a substitution of goods for time in consumption activities in relatively educated

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[1] W.G. Bowen and T.A. Finegan, The Economics of Labour Force Participation, Princeton, 1969, p.22. Also W.G. Bowen and T.A. Finegan, "Education and Labour Force Participation", American Economic Review, May 1966, pp.567-82. Gramm states categorically, "Formal education tends to increase the quantity of labour supplied because it is market oriented. In other words, formal education tends to raise the productivity of labour in the market more than the productivity at home." W.L. Gramm, "Household Utility Maximisation and the Working Wife", American Economic Review, March 1975, p.91. This assertion is dubious on two counts: there is no reason for assuming on the basis of deterministic neo-classical economic theory that education should increase the quantity of labour supplied, and nobody has demonstrated a clear association of education with productivity, per se, only income. Often education has no relevance for the jobs for which the education is 'required'.

households, since a rise in education will tend to reduce the price of goods relative to the price of time.[1] To further complicate the problem of 'tastes', it cannot be assumed that the desire for market income will be independent of income, since expectations and aspirations are conditioned by experience.[2]

The effect of "other family" income on the woman's supply of time to the labour market will therefore be indeterminate a priori. However, it has usually been assumed that, other things equal, the higher the husband's income - or rather the higher his long run or 'permanent' income - the lower the probability of a woman being in the labour force, because the higher income implies less need for a supplementary income. This assumption has been supported by empirical findings, in the US most notably, and

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[1] For some witty and perceptive comments on the increasing goods-intensity of time, see S. Linder, The Harried Leisure Class, 1970.

[2] In a low income economy, particularly one characterised by chronic unemployment and under-employment co-existing with wide income disparities between the affluent and the remainder, many forms of behaviour will take on a cumulative and ultimately "dualistic" basis. A household which has already achieved some financial security will tend to develop higher aspirations, whereas an impoverished household will tend to restrict them. For instance, the assurance of a high income tends to lower the individual rate of time preference, or the discount rate, and lower the risk premium attached to longer term commitments, whether as a consumer or in the labour market. Seen in the context of the evolution of a dual labour market the poor, with less certainty about the benefit from investment in education and less information about the labour market, will tend to regard education as something close to risky speculation, so that for them investment in human capital will involve a high risk premium which has to be added to the high discount rate. Therefore, contrary to those in wealthier, more secure households, the poor will tend to continually under-invest in education, leading to a divergent pattern of skills and earnings.

elsewhere.[1] Even so the husband's wage is not an entirely satisfactory indicator of the need for a woman to earn an income, even ignoring the question of tastes, because the value of the income depends on the number of dependents for whom the income has to provide and should therefore be expressed in some per equivalent adult form.

To give an independent status to the influence of tastes for income, one can start by making the sociological assumption that the expected living standards of a family are set by the wife or her surrogate and that, because tastes are a direct function of education, these standards will tend to be higher the higher the woman's education.[2] In that case the husband's ability to meet the family consumption standards without the necessity of the wife working would depend on the relationship between his income and her education and, therefore, for a given family income, the expected inverse association between the woman's labour supply and the husband's earnings will be greater in the case of a relatively uneducated woman than in the case of a more educated woman. In short, if the woman's education is relatively low, her correspondingly low level of expectations will make a given income more likely to satisfy the family's perceived financial needs.[3] Not least of the reasons for

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[1] For instance, R. Rossett, "Working Wives: An Econometric Study", in T. Dernberg, et. al. (ed.), Studies in Household Economic Behaviour, 1958, pp.53-99; J. Mincer, "Labour Force Participation of Married Women", in NBER, Aspects of Labour Economics, 1962; G. Cain, Married Women in the Labour Force, 1966, Table II, p.48, and Table 15, p.59; Bowen and Finegan, op.cit. 1969, pp.161-62, 172-74, 190. But Oppenheimer later noted that the inverse relationship was becoming less uniform. V. Oppenheimer, The Female Labour Force in the US, 1970, p.29. This is significant since it coincided with a reduction in sex-related earnings differentials and moves towards equality of educational opportunities for men and women.

[2] This is an assumption for which there seems to be some empirical support. See J. Morgan, et. al., Income and Welfare in the US, 1962, pp.107-139. In an empirical study Freedman concluded, "Changes in tastes and attitudes brought about by education may have more influence on the family's readiness to adopt new forms of consumption", D. Freedman, "Consumption of Modern Goods and Services and its Relation to Fertility: A Study in Taiwan", Journal of Development Studies, Vol. 12, October 1975, No. 1, p.102.

[3] To express this in equivalent units one could depict
(footnote continued on next page)

expecting this to be the case is the tendency for a relatively high income before she married, which may well mean that she experienced a drop in living standards after her marriage, which if one assumes that income expectations reflect past experience, will tend to raise the woman's probability of participation subsequently.

In incorporating the potential influence of tastes for market income into the analytical framework, the opportunity cost of inactivity (I) can be expressed as a function of the woman's opportunity wage or the human capital embodied in her (HC), the 'objective' need for income (N) and the 'subjective' need or 'taste' for income (T), where human capital is a function of education, health and training, objective needs are a function of per equivalent adult "other family" income, and subjective needs a function of education. Therefore:

$$I = f(HC, T, N) \qquad \ldots(1)$$

where in a female labour force participation function:

$$\frac{\partial I}{\partial HC} < 0 \quad ; \quad \frac{\partial I}{\partial T} \lesseqgtr 0 \quad ; \quad \frac{\partial I}{\partial N} < 0$$

This relationship summarises the principal factors affecting the opportunity cost of economic inactivity; it remains to examine the determinants of the opportunity cost of activity, or the shadow price of time spent in economic activity, which, in general terms, will be a positive function of domestic productivity. This will reflect most notably the demand for childcare time which will be a negative function of age of children, a positive function of numbers of children for whom care is required, and a negative function of the availability of childcare substitutes. The relationship between a woman's domestic productivity and household income and her education are somewhat more complicated.

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the woman's education as exposing her to a higher level of money expenditures, so that the actual relationship is between the aspiration level of expenditures and the husband's income. It is the ratio of these two which acts as the 'tastes' determinant of her propensity to participate in the labour force.

The younger a child the more continuous and intense the time needed for childcare, and even though there may be economies of scale in childcare time with greater numbers of children, the total time required and the intensity of childcare will tend to rise if more children are involved. In other words, holding constant the age of the youngest child, while the total will rise, the marginal time cost of caring for children will be a decreasing function of number of children and could conceivably become negative if older children could care for younger ones. But in addition to the effect of the quantity and intensity of childcare time, domestic productivity will reflect the need and desire of the family to influence the quality of children, since children represent a form of human investment as well as the equivalent of "consumer durables".[1] Without delving into the analysis of the interaction between child quality and quantity, which will form part of the analysis in the accompanying paper on fertility, it can be noted that the productivity of a woman's time in childcare will be positively related to the need for her to act as an informal educator (or "quality raiser") and more importantly still, her ability to do so. Therefore, and particularly in a low income economy where institutional educational facilities are poor, a woman's domestic productivity will be higher if the woman is educated herself and if there is a "modern" (education-requiring) job structure which encourages the expectation of a high rate of return on child-quality investment. If the pattern of employment is "traditional" the domestic productivity of an educated woman may not be any higher than that of an uneducated woman, at least not in so far as children are involved.

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[1] This description may understandably continue to offend sensibilities, but the treatment of children as consumer goods involving a flow of child services composed of "quantity" and "quality" has been presented in a number of recent studies of fertility. See, for instance, R. Willis, "A New Approach to the Economic Theory of Fertility Behaviour", Journal of Political Economy, Vol.81, No.2, Part II, March/April 1973, pp. 514-564.

The demand for childcare time and indeed a woman's domestic productivity in general will also be related to the availability of substitute labour. This in turn will tend to be directly related to the woman's opportunity wage and to household income since the employment of domestics will largely be restricted to families with high incomes and, probably, their own homes. For this reason, as well as for others already mentioned, a highly educated woman will tend to allocate more time to economic than to domestic activities. But of equal importance is the implication for the relationship between husband's or 'other family' income and the woman's labour supply. If the plausible assumption is made that men with relatively good education and capable of earning high incomes marry women with a good education and commensurate earnings opportunities, such women will tend to have access to prestigious and attractive jobs which will encourage a substitution of paid domestic labour for the wife's domestic labour and/or a capital-for-labour substitution in the household production function.[1]

Apart from the fact that the opportunity to make this substitution only arises as household income increases, this substitution process is a far more important determinant of the allocation of a woman's time in a low income economy than in an affluent one where most of the technologically practicable substitutions have become part of the normal way of life. Seen in this context a high family income will tend to lower

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[1] At one level this might imply a substitution of finished goods (tinned foods, for example) for intermediate goods (e.g. flour for making meals), and at another the substitution of domestic water supplies for a woman's time spent walking to the nearest source of running water.

the marginal opportunity cost of time spent outside the labour force and, via the process of capital-labour substitution, lead to a re-allocation of time by the wife away from domestic towards economic activities even though her average domestic productivity per unit of time will have risen.[1] For this reason a woman's opportunity cost of activity will tend to fall as the household income rises, so that the effect of 'other family' income on the woman's supply of time to economic activity becomes even more indeterminant than implied by the analysis of the determinants of the opportunity cost of inactivity. To the extent that the higher family income facilitates certain non-marginal changes in the household production function, it will tend to raise rather than lower the woman's propensity to participate in economic activity.[2]

In sum, the opportunity cost of activity (A) will be an inverse function of household income and a direct function of the demand for childcare services (C) which will be a function of the number (CH) and age of children (AYC) and the availability of substitute domestic labour, which in turn is a direct function of household income (Y) and the woman's opportunity wage (W^e) and by direct implication the woman's human capital. In other words,

$$A = f\ (Y,\ CH,\ AYC,\ W^e) \qquad ...(2)$$

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[1] Unless the elasticity of demand for domestic time is at or above unity, which is sometimes implied. That may be the case in societies in which a high average level of affluence has already been achieved. However, there is a difference between finding 'work' to fill idle time and a situation in which the demand for time rises *pari passu* with the 'production' of domestic output.

[2] Again, one has to be cautious about drawing macro-economic implications from micro-economic relationships. At the macro level the capital-labour substitution process may lead to, first, a substitution of paid labour for the wife's domestic labour and then, secondly, or concurrently, a substitution of capital goods for the domestic labour. If those now employed as domestics have a low probability of employment in other sectors of the economy - a low opportunity wage - the long-term result may be a decline in the aggregate female labour force participation rate, *ceteris paribus*.

where the partial derivatives are all negative with the exception of $\frac{\delta A}{\delta CH}$ which is probably greater than zero. A negative sign implies that the effect would be to increase the supply of time to economic activity, and a positive sign to decrease it. Recalling equation (1), in which any change which effectively increased the opportunity cost of inactivity could be expected to lead to a shift towards economic activity, the effect of increased household income was negative (probably) and a higher opportunity wage positive. Therefore putting (1) and (2) together suggests that the effect of higher household income need not be negative and may indeed be positive in a low-income economy. Since one of the conclusions drawn from empirical studies showing a negative association is that differential female labour force participation by income of head of household indicates a means by which income inequality is ameliorated, the possibility that there might be a positive association suggests a means by which income inequality is increased.

Female Labour Force Participation in Kingston, Jamaica.

The Jamaican economy was founded on slavery and plantation agriculture, and later bolstered by the use of imported indentured labour. This historical fact has produced a society characterised by a 'loose' family structure which has been both cause and effect of the prominent economic role played by women in many occupations and industries. Slavery systematically undermined the status of the male as family head and led, it is often argued, to a lack of concern over illegitimacy as well as to a lack of paternal authority.[1] Despite repeated attempts to convert working class Jamaicans to formal marriage, attempts which have included 'marriage drives' led by governors' wives and other middle class dignitaries, the legal marriage rate has remained very low, and indeed in recent years the divorce rate has increased faster than the marriage rate. Formal polygamy has always been practically non-existent, but it is quite common for a woman to have children by a number of different men, and for a man to support or 'visit' a number of different women.

The 'new home economics' which underlies much of the recent economic-demographic model-building has to be handled with great caution in such a society since, as in many other non-industrialised economies, the concept of a household is peculiarly flexible, perhaps even inappropriate, especially as anthropological research on West Indian family structure has failed to produce a standard family type.[2] Most crucially

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[1] See Ruth Landes, "Negro Slavery and Female Status", in Les Afro-Américains, Institut Français d'Afrique Noire (Dakar), 1952, pp. 265-66. A number of reasons why Caribbean slave owners discouraged formal family development when American slave owners were encouraging it are discussed in a recent controversial study: R.W. Fogel and S.L. Engerman, Time on the Cross: The Economics of American Negro Slavery, 1974. Even so some observers have noted the persistence of historical tendencies in the US similar to those found in the Caribbean. For instance, Bernard noted, "At least one element of the old plantation family pattern persists even in the urban slum family of today: the relatively greater value attached to motherhood than to wifehood." J. Bernard, Marriage and Family Among Negroes, 1966, p.104.

[2] Among the pioneering studies, see A. Clarke, My Mother Who Fathered Me, 1966 edition; M.G. Smith, West Indian Family Structure, 1962. For an interesting historical study of household types among slaves, see B.W. Higman, "Household Structure and Fertility on Jamaican Slave Plantations: A Nineteenth Century Example", Population Studies, Vol. 27, No.3, November 1973, pp.527-50.

marriage is not really a dichotomy of two mutually exclusive states, married or single, but a range of types of union distinguished in part by expected duration of cohabitation. In this context, formal legal marriage, as contrasted with 'visiting' and longer-term consensual unions, is in a real sense a lifetime consumption goal for many working class Jamaicans, and in fact marriage, if it takes place at all, often occurs long after a couple have had and raised children. As a result, about three out ofevery four children are born illegitimately.

The Jamaican economy is still basically agricultural but Jamaican agriculture, with its historical connections with slavery and the restrictions of plantation life, has had relatively little appeal for Jamaicans, and for many years there has been a steady drift away from the countryside.[1] Large numbers of men, and more recently women, have gone abroad, while many women, in particular, have migrated to the capital, Kingston-St. Andrew, where the growth of modern, capital intensive industry and commerce has failed to absorb the growing number of job-seekers. While in recent years, according to official data, the city has experienced an unemployment rate of well over 20 per cent,women have been disproportionately affected, young women most acutely.[2] The unemployment level is, of course, merely a statistical artifact but as increasing reliance has been placed on wage employment in the urban area, it can be accepted as realistically reflecting the severity of the labour surplus there. Yet despite the chronic problem of open unemployment women have been taking on increasing proportion of non-agricultural jobs, partly because girls in Jamaica have been able to take somewhat greater advantage of primary and secondary educational facilities than boys.[3]

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[1] Though the ownership of a piece of land has always been a cherished goal.

[2] Labour Force Survey, 1973, Department of Statistics, Government of Jamaica, Kingston, 1974.

[3] Guy Standing, "Educational, Training and Female Employment : The Jamaican Experience", paper delivered to conference on 'Investment in Women', organised by the Overseas Development Ministry, Emmanuel College, Cambridge, April 1975.

Thus, in Jamaica, the level and pattern of labour force participation has to be considered in the context of a loose family structure coupled with high fertility, rapid urbanisation without commensurate industrialisation, chronically high unemployment, a large flow of migrant women to the urban areas, and circumstances which have produced relatively favourable educational opportunities for females. With a tradition of working class women, notably young single women from the rural areas, working as low wage domestic servants or eking out an impoverished existence as higglers, the level of female labour force participation in Jamaica is high relative to many other low income, as well as industrialised countries.

Accordingly, to study the pattern and determinants of female labour force participation in urban economic activities a stratified random sample survey of 540 women was carried out in the Kingston Metropolitan Area in November 1974. Although the sample size was small, the data generated by the survey can be used to test a model of labour force participation in which the determinants of the allocation of time to economic activity and the labour 'supply' of women in Kingston are analysed within the behavioural framework developed earlier, in which the propensity to participate in the labour force is a function of the respective opportunity costs of activity and inactivity.

An Empirical Analysis of Female Labour Force Participation

The dependent variables

One of the principal objectives of the survey was the development of an appropriate index - or series of indices - of labour supply, which almost all studies purporting to analyse supply conspicuously lack. In fact there are at least eight indices of labour supply which can be identified by the data, some of which only have relevance for those in employment and some only for those not in employment, but in this and the following sections the analysis will concentrate on the over-all labour supply function as expressed by the propensity to participate in the labour force.

Briefly, the approach adopted in this study was to ask the respondents a series of questions about their past labour market participation, present activity, future intentions and degree of participation. From these questions it is possible to formulate a number of different indices of economic activity. Thus to get, first, an index of the conventional 'activity status' variable (ACTIVE) all the respondents who were working for one day or more in the past week and all those without work who had made some positive (identified) effort to seek work in the previous two weeks were listed as economically active, the remainder being classified as economically inactive.[1] The inclusion of those who have sought work in the previous two weeks merely reflects the reasonable assumption that to be economically active in a low-income urban labour

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[1] Those who were not working were asked several questions about their attempts to seek work, if any. One of the questions sought the time which had elapsed since an effort to seek work had been made; another referred to the type of job-seeking method that had been adopted. By this means, inter alia, 'passive' job-seekers could be distinguished from 'active' job-seekers, as well as the actively unemployed from the economically inactive. The conditional probability of being active if unemployed is analysed briefly in another paper.

market does not necessitate continuous job-seeking and that, therefore, making an effort to obtain work in the previous two weeks is to be preferred to one in which effort in the past one week is the criterion for inclusion. Nonetheless, an alternative concept, ECON, was also adopted, in which those who had made an effort to find work in the previous week were counted as economically active.

Two other dichotomous participation concepts were also considered, both of which could be regarded as indices of potential supply rather than short-term activity measures. The first of these, NOTIONAL, included all those who were not working who expressed a willingness or desire for employment regardless of whether or not they had made an active effort to secure work in the past two weeks. As would be expected, this gave a much higher measure of the propensity to work in the labour force than either ACTIVE or ECON. The second and related concept, POTENTIAL, merely extends the first to include as potential workers those women who were not currently available or wanting employment but who planned to seek work within the next month.

Table I

Economic Activity Rate (per cent active): Women Aged 18-65

'ECON'	46.7
'ACTIVE'	47.9
'NOTIONAL'	75.7
'POTENTIAL'	76.1

A second index of participation which can be derived from the survey is one designed to indicate labour force participation over a more extended period, namely the proportion of the past year spent in employment (LFPYR). In an economy where participation is likely to be somewhat

erratic because of the prevalence of casual employment, fluctuating demand, seasonal factors, high unemployment, and the like, it may be desirable to utilise a longer term concept. However, it is evident that this variable does not overcome the crucial problem of identification since the observed participation will reflect the possession of requisite skills, for instance, as much as the desire for employment. Accordingly, micro-data relating to this measurement of participation can only be used to analyse the probability of being employed rather than individual 'supply' responses.

A third index of participation (HRSUPPLY) which does go at least some way towards being an index of labour supply is one which measures how many hours per week the individual would be prepared to work and at the same time takes account of the intensity of that desire by cross-checking this measure by efforts made to secure the desired outcome where it would involve a change from current activity. Thus those in employment were asked (a) whether they were satisfied or dissatisfied with their present job, (b) if not, what job they would like and be capable of doing and how many hours they would be prepared to work per week, (c) whether they would or would not like to work more hours than the average they worked per week over the previous month, and (d) if so, how many additional hours they would be prepared to work. Those not working were asked (a) how many hours a week they would be prepared to work, (b) what occupation they were seeking, (c) what efforts they had made to secure that occupation, (d) how long since an effort had been made to obtain employment, (e) what was the minimum income they would require to accept employment in the stipulated occupation for the stipulated number of hours. This series of questions

yields a composite index of labour supply, expressed in hourly units, which while not ideal since intentions are notoriously pliable, does represent a more valid measure of supply than is typically available.[1]

Finally, a variant of HRSUPPLY was considered which ignored the woman's activity status. In the case of HRSUPPLY some identifiable effort to seek employment was necessary for the unemployed to be considered as supplying the number of hours they were prepared to work. An alternative possibility would be to ignore this activity criteria and to count the number of hours regardless of the steps taken to get work. This measure, which will be labelled PREPARED, is probably a less useful and valid index of current supply than HRSUPPLY, simply because it ignores actual behaviour, and accordingly most of the succeeding analysis will concentrate on the latter.

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[1] Simply constructing such an index indicates the difficulty of deriving an adequate measure of labour supply. Incidentally a number of variants are possible. Thus a question was addressed to non-participants which sought to discover if future labour force activity was planned and if so, when.

The Independent Variables

For convenience, the household and personal factors influencing female labour supply can be described as either demographic or socio-economic variables, although it is evident that this distinction is somewhat crude as the overlap is considerable. The principal demographic variables which will be used in the empirical study of female labour supply in the following section are age, union status and family structure, as represented by the age and number of children.

1. Age

The relationship between age and female labour force participation remains unclear since international comparative studies have indicated that widely varying age patterns exist which defy generalisations.[1] In some contexts female economic activity appears to peak among teenage women, declining thereafter. In other countries, particularly industrialised economies and until recently conspicuously so in the US, two peaks exist, one in the early 20's and one in the mid-40's.[2] But these are only two of the observed patterns, so that to speak of the life cycle of female labour force participation is a misnomer and likely to be misleading. The relationship between age and participation will depend on such factors as the nature of the economy and the type of employment opportunities, as well as on the pattern of marriage, the average age of child-bearing and the spacing and number of children, factors which in themselves necessarily form

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[1] An early but still useful study is UN, "Sex and Age Patterns of Participation in Economic Activity", Population Studies, No.33, 1962. The report in general is marred by misaggregation.

[2] For the M-shaped pattern characteristic of the US in recent years, see Bowen and Finegan, 1969, op. cit., pp.541-50. In the US the influence of age, when other factors are controlled, seems to be negative under 20 and over 40, but the rationalisation of the age effect is unclear, to the extent that an age variable is really a catchall variable. See J.A. Sweet, Women in the Labour Force, 1973, pp. 51-2.

part of a longer term economic-demographic system of relationships in which the societal pattern of child-spacing, average age at marriage and average age of childbearing are all determined, in part, by the extent and pattern of female employment. The determinants of the age-distribution of female labour force participation and labour supply, while not an issue in this paper, have yet to be adequately explained. Of course, in analysing the effect of age per se, one of the inherent difficulties in any macro-economic analysis of participation and labour supply is the need to control for family formation factors which in themselves are related to age. Equally the full effect of other family and personal characteristics can probably only be reliably assessed if control for the effect of age is introduced.

The influence of age on the probability of being in the labour force and on a woman's labour supply reflects a number of different factors. Age is related to the life cycle need for income and it reflects in part an individual's capacity for work. But equally important, some generations of women will have had greater exposure to labour market opportunities than others because of historically changing levels and patterns of employment opportunities. Thus one age cohort of women may have entered the labour force at a time when job opportunities were relatively favourable, so that their lifetime work profile was greater than for another generation whose lack of early opportunities had led them to orient their lives towards domestic-familial activities. The effect of the Second World War on the labour force participation rates of women in the UK and the USA has often been expressed in these terms, the suggestion being that it generated a new set of habits and expectations of economic activity.

In a country such as Jamaica, where the median age of the population is a little over 17, age can be expected to have an important bearing on an individual's probability of employment, which will have a direct impact on the propensity to participate in the labour force.[1] Thus a young job-seeker, for a given occupation and degree of skill, will tend to face much greater competition for employment than a somewhat older woman, especially if the latter belongs to an age group whose average propensity to participate in the labour force is low due to family commitments. In response to their bleak employment prospects the more youthful will also be inclined to resort to parastitial forms of informal "education" and/or "training" as alternatives to further active job-seeking. As noted earlier, the wretched experience of prolonged unemployment produces a prevalent sense of discouragement, resentment and anomie, and an accompanying bias among employers in favour of hiring older workers.[2]

On the other hand, beyond a certain age, perhaps about 40, a woman's probability of employment as well as her productivity and capacity for work will decline with age as a result of which her propensity to participate in the labour force and potential labour supply will tend to diminish. Furthermore, in a traditionally agrarian economy

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[1] One could hypothesise that, inter alia, the age pattern of female labour force participation would be a function of the age distribution of the population.

[2] The much mooted possibility that in many urban areas open unemployment and the attendant withdrawal from the labour force by the young reflect "voluntary unemployment", as Berry contends, or simply a "bourgeois problem" as Myrdal has depicted the situation in parts of South East Asia, would be a grossly inaccurate description of the situation in Jamaica. It would also be irrational for the educated to indulge in long periods of voluntary idleness. However, if this phenomenon exists to any significant extent it merely suggests another reason for expecting the labour force participation rate to be relatively low for teenagers in so far as they may well have the assurance of financial assistance as well as few financial commitments. Still it is debatable whether prolonged economic idleness is a very rational form of behaviour, despite the arguments of Blaug, et. al. relating to Indian graduate unemployment.

rapidly being transformed into a modern, technologically advanced one, older women will tend to be faced with some resistance to their employment because in general they will tend to lack some of the skills required in modern, bureaucratic industry, and thus resistance will exist regardless of whether or not the woman in question possesses those skills.[1]

The expected age pattern of female economic activity in urban Jamaica is predicated on the assumption that labour force participation is determined in part by the probability of securing an income-earning activity, which is one aspect of the opportunity wage. It is a pattern which is likely to be characteristic of an urban economy subject to chronic unemployment, a skewed age distribution, and wage-labour accounting for a large proportion of employment opportunities. In all probability a very different pattern would emerge in an economy dominated by subsistence activities where the division of labour between economic and non-economic activities within households would be determined by relevant productivities at the differing effort price of labour for family members of the various age groups. In the context of a rapidly growing urban labour market such as Kingston, where open unemployment is chronically high, the former pattern is likely to prevail.

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[1] In other words a form of prejudice or discrimination will exist and age will become a screening device in the recruitment of labour. The important point is that this discrimination effect, some of which will be "self-imposed", some the straightforward result of employer discrimination, will not be captured by objective differences in human capital. Thus whereas traditional informal industry relies on personal oral communication (probably in patois), modern industries with greater division of labour and mechanisation tend to place a high premium on written communications and formally defined working relationships. In the latter case older workers are likely to face difficulties partly on account of their lack of literacy and partly because it will be presumed that they lack that literacy or the ability to adjust to the new working conditions.

The influence of age can be gauged by use of either a continuous measure or a set of dummy variables. Since it is to be expected that the age-effect will be non-linear, two variables are required if the continuous measure is adopted, namely,

Age = years of age completed

Age^2 = years of age squared

Alternatively :

AA = a dummy variable with a value of 1 if the woman is aged less than or equal to 21, zero otherwise

GG = a dummy variable with a value of 1 if the woman is aged over 30 and less than or equal to 45

E = a dummy variable with a value of 1 if the woman is aged over 45 and less than or equal to 55

D = a dummy variable with a value of 1 if the woman is aged over 55, zero otherwise

In the latter case, the control group consists of women aged between 22 and 30. A variant of this set of dummy variables which was applied in the case of married women only defined A as taking a value of 1 if the woman was aged under 26, zero otherwise, and defined G as taking a value of 1 if the woman was aged between 26 and 35. In that case, the control group consisted of women aged 36-45.

2. Fertility, Childcare and Union Status

The various relationships between childcare, fertility and female labour force participation, which have been discussed earlier in the review of the opportunity cost paradigm, have received a good deal of attention in empirical studies.[1] In practice, of course, it is impossible to

[1] Within the ILO-WEP research, these relationships have figured prominently in studies of Chile by Peter Peek, and the Philippines by José Encarnación, in particular. J. Encarnación, "Fertility and Labour Force Participation : Philippines 1968", WEP 2-21/WP.2, March 1974; P. Peek, "Family Composition and Female Employment: The Case of Chile", WEP 2-21/WP.13, May 1975. See also Pang Eng Fong, "Labour Force Growth, Utilisation and Determinants in Singapore", WEP 2-21/WP.22, July 1975.

analyse the influence of children, or fertility, apart from the treatment of union status.[1]

As noted earlier, formal marriage tends to be a lifetime consumption goal for working class Jamaicans, so that while marriage among the educated takes place before children are born many working class women go through a succession of partnerships, often of progressively increasing duration and stability, during which time they typically have children by more than one partner. Therefore, in the analysis of female labour force participation and labour supply, a distinction has to be made between type of union and the legitimacy status of children. It is usually assumed that being married, whether in the legal or common-law sense, will be associated with a relatively low probability of participation and diminished labour supply. But formal marriage, with its greater income-maintenance and security, might be expected to have a greater negative effect than some common law union, which is almost by definition a somewhat more tenuous relationship. Moreover, a longer-lasting common-law union, which will have gathered a sense of permanency, will be more likely to be associated with a low propensity to participate in the labour force than a shorter-term or visiting union.

Even so, these arguments are not conclusive. A married woman may have more income security than a single woman but she is also likely to have greater need for income, partly because her family's consumption planning will involve greater long-term commitments. Moreover, the supply differential by type of union will be attenuated by the fact that the personal attributes which increase the probability of a woman becoming legally married (controlling for age) also tend to increase the probability of her participation in the labour force. Formal marriage in Jamaica has a

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[1] Underlying this trite remark is the implicit assumption that marriage and the nuclear household taken as the model in the new home economics cannot be assumed to be a norm in low income economies. In fact, one could argue that formal stable marriage should be regarded as the deviant case, considering the economic marginality of most of the population. L.R. Peattie, The View from the Barrio, 1968, p.47.

considerable cost - imposed in part by the social norms associated with marriage - which acts as a deterrent to marriage for low-income working-class couples who are almost by definition the low-skilled and least-educated. Therefore, since the uneducated and unskilled have a low probability of employment, common law wives could be expected to have a lower probability of labour force participation than formally married women.

Furthermore, where a broad range of types of unions co-exist the inter-relationships between fertility and female labour force participation is likely to be less clear than is often assumed in descriptive and econometric studies which are based on the monogamous nuclear household, because it becomes essential to distinguish between children who are legitimate and living with their fathers (or 'permanent' surrogates), illegitimate but living in an otherwise nuclear household consisting of "common-law" partners, and those living with a woman who merely has "visiting", short-term partners.

It is evident, as noted earlier, that if a woman has childcare responsibilities the opportunity cost of economic activity will be relatively high, but equally the possession of children, particularly for a woman living in a potentially precarious union, will tend to raise the opportunity cost of economic inactivity. A priori, the net effect cannot be predicted, since either the income (need-for-income) or substitution (need-for-domestic-time) effect could predominate. Similarly, the effect of "children" on the woman's labour supply will not be a simple linear function of numbers of children. While an increasing number of children might tend to have a greater substitution (negative) effect on the woman's propensity to participate in the labour force and the labour supply, the net effect will also depend on the ages of the children. In this regard, it can be postulated that the substitution effect will tend to dominate the income effect when a child is very young but that this tendency

will be reversed as the child's age rises. And in circumstances where income-earning opportunities exist for older children there may well be an S-shaped relationship, whereby the economic activity of the older children is substituted for that of the mother. But while this is a theoretical possibility which might well apply in rural areas of Jamaica, it is not relevant in Kingston.[1]

With the data from the Kingston survey union status and fertility measures can be readily computed. The union status variables consist of :

Maried = a dummy variable with a value of 1 if the woman was legally married and living with her husband, zero otherwise

Visit = a dummy variable with a value of 1 if the woman had been living with a partner for not more than one year in what is commonly described as a "common-law union", zero otherwise

Consens = a dummy variable with a value of 1 if the woman had been living with a common-law partner for more than a year, zero otherwise

Separated= a dummy variable with a value of 1 if the woman was married but no longer living with her husband, zero otherwise

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[1] For the rural situation, cf. M.G. Smith, Labour Supply in Rural Jamaica, 1956

With these variables the control status is taken as being single and not living with a partner at the present time.

While it is possible to specify several union status variables it is necessary to counter a somewhat larger number of variables to encompass the various fertility and "childcare" factors. In addition to a pregnancy status variable these consist primarily of indices of both numbers and ages of children. Thus:

Pregnant = a dummy variable with a value of 1 if the woman was pregnant, zero otherwise.

To control for size of family:

Children = number of children under 14 in the household.

Or, effectively testing for possible non-linearity:

FAMSIZE = a dummy variable taking a value of 1 if there were one or two children, zero otherwise

FOURCHILD = a dummy variable taking a value of 1 if there were three or four children, zero otherwise

BIGFAM = a dummy variable taking a value of 1 if there were more than four children, zero otherwise.

In the latter case, where dummy variables are used, those with no children were taken as the control group.

"Childcare" is more closely related to the age of children and in particular to whether a woman has a young child. To account for this factor two further groups of dummy variables were defined, the first being:

Baby = a dummy variable, 1 if the woman's youngest child living in the household was two years old or younger, zero otherwise

Young = a dummy variable, 1 if the youngest child was over two but not over five years old, zero otherwise

Youth = a dummy variable, 1 if the youngest child was aged over five years old, zero otherwise.

Again the control group consists of women without children living in their household. Following preliminary computations the relationship between age of youngest child and female labour supply and her probability of participation appeared to be linear and to involve a sharp contrast between those with very young children and others. As a result the variables YOUNG and YOUTH were dropped from subsequent computations.

This first approach to measuring the effect of infant-care ignores the interaction with union status, whereby the "child-effect" on the supply of labour by a woman with an illegitimate child might differ significantly from the observed effect on the labour force behaviour of a married woman. Therefore the second approach used three dummy variables to replace the single variable, BABY. These, somewhat whimsically, are defined as follows:

TOT = a dummy variable with a value of 1 if the woman was legally married and living with her husband and had a child two years old or younger, zero otherwise

TINY = a dummy variable with a value of 1 if the woman was unmarried and living with a common-law partner and had a child two years old or younger, zero otherwise

TITCH = a dummy variable with a value of 1 if the woman was not living with a partner or husband but who had a child two years old or younger, zero otherwise.

These three variables complete the list of "demographic" variables. It remains to define the more purely "economic" determinants of labour supply.

3. Socio-Economic Factors

In the earlier discussion of the opportunity cost paradigm the principal economic factors in the labour supply function were the woman's opportunity wage, the "taste" for income and the need for income. If this paper can lay any claim to originality it lies in the formulation of variables which attempt to capture the influence of these factors.

Most studies of women's labour force participation have emphasised the role of the husband's or other family income and typically in empirical models the variable used has been the male wage rate, husband's income, or household income less the wife's contribution.[1] Whatever variable is adopted there are certain common difficulties, some of which are particularly relevant when the analysis applies to low income "surplus labour" economies. First, there is the problem of taking account of the value of non-monetary incomes, which is likely to pose severe constraints on the usefulness of income information in rural areas of low-income economies.[2] The second objection to

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[1] See Cain, 1966, op. cit.; Bowen and Finegan, 1969, op. cit.; J.A. Sweet, Women in the Labour Force, 1973, et. al. Some studies have used one of several possible 'peer group' approaches. Thus Mincer and Cain express income in terms of income adequacy relative to some long-run, permanent, or future income level, whereas Easterlin relates family income adequacy to the income of the previous generation. Freedman relates it more specifically to the expected income of the individual's or family's occupation class. Cf. R.A. Easterlin, "On the Relation of Economic Factors to Recent and Projected Fertility Changes", Demography, Vol. 3, No.1, 1966, pp. 131-53; D. Freedman, "The Relation of Economic Status to Fertility", American Economic Review, Vol. 53, No.3, June 1963, pp. 414-26. As expressed by Freedman her approach is probably quite consistent with the permanent-transitory income approach utilised by Mincer and Cain.

[2] It is after all one of the ironies of so-called development in recent decades that the systematic under-recording and under-valuing of non-monetary subsistence income has had the effect of grossly inflating growth rates and changes in per capita incomes.

the straightforward use of partner of "other household" income is that this measure is likely to be biased in so far as the relevant variable should at the very least be expressed in per capita terms, preferably on a per equivalent adult basis. The third problem, which in a sense is a primarily practical one, is that in a low income urban area afflicted by severe "underutilisation" of labour average weekly income is often hard to estimate because income fluctuates considerably either because the man's work schedule is so variable, or because he only works intermittently as a casual labourer, or because he works in several occupations at different times depending on the availability of work.

Therefore in considering the income variable, it is essential to be both cautious and humble since whatever measure is adopted it is certain to be deficient. The construction of an other-family income variable in the present study really only attempts to overcome the second of the objections to the standard approach; it assumes the first problem is relatively unimportant in the Kingston labour market and/or that the non-money income element is proportional to actual money incomes; work on the third problem is continuing but at least it is considered in so far as the basic other-family income variable is expressed in terms of average weekly earnings in dollars over the previous month. To adjust this to a per equivalent adult basis the income was weighted by a factor reflecting an estimate of the consumption requirements of each family member, which can be expected to vary according to their age.[1] All those over the age of 15 were assumed to count as an adult and to take a value of unity. Those under the age of 15 were weighted as follows:

Less than five	= 0.4
Over five, less than ten	= 0.6
Aged ten to fifteen	= 0.8

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[1] E. Kleiman, "A Standardised Dependency Ratio", Demography, Vol. 4, No.2, 1967, pp. 876-893.

However, a further plausible assumption is made that there are financial economies of scale associated with increasing numbers of children, simply because the expenses involved in raising two children would almost certainly be less than twice those involved in raising only one. Therefore, while it is only an approximation, all children under the age of fifteen are weighted by the factor appropriate for the youngest child. Then dividing the income by the number of "adult equivalents" gives the desired variable, other family income per adult equivalent ($^{Y}/_{P}$).

This is only the first stage of the computation of an appropriate measure which encompasses both the objective (subsistence) need and the subjective need for income. As discussed earlier, the relevant determinant of the woman's labour force participation is not income per se but the income relative to the woman's education which conditions the family's consumption standards and aspirations.[1] Therefore the variable adopted was the income divided by the number of years of education (INCSUFF) on the expectation that the higher the level of other family income for any given level of education the lower the woman's labour supply and the lower the probability of her participation in the labour force. Finally, a given level of income will have a different sufficiency value depending on the age of the recipients. For instance, a young man and 'wife' earning $100 a week are less likely to be satisfied with that income than an older man and wife, because in the former case current income is likely to be below the expected long run or permanent income whereas for the older family the reverse is likely to be the case. A young man and woman will tend to be forming their lifetime consumption standards whereas older couples will probably have a desired income for consumption purposes which does not exceed or even

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[1] In addition the taste for income will have been formulated by the woman's background, including her parental socio-economic status. But this in turn will be directly related to education.

equal their actual income. For this reason the income sufficiency variable should take account of the age, and since it is assumed that it is the woman who establishes the household's level of consumption INCSUFF is multiplied by a relative age index, thus

$$\text{PERMINC} = \left(\frac{Y}{P} \cdot \frac{1}{EDUC}\right) \cdot \left(\frac{AGE}{\overline{AGE}}\right)$$

In other words, for a given level of education, the higher the age the more likely a given level of income will represent a level of sufficient income, and the greater the value of PERMINC the lower the probability that the woman will be in the labour force and the lower her labour 'supply'.

Several alternative measures were considered, such as one which allowed for possible non-linearity in the development of tastes for market income with increments of education and one which made some qualitative adjustment to the education variable, but the straightforward variable was retained because it gave marginally more significant results.

The desire for income (d*) can be expressed as a negative function of the household's level of "income-sufficiency", but it will also be an inverse function, if anything, of household wealth (A), since wealth could be expected to have a pure income (negative) effect on labour supply even if the effect is eroded by the tendency for tastes for assets to rise with the acquisition of assets.[1] The desire for income function is, therefore:

$$d^* = f\left(\left(\frac{Y}{P} \cdot \frac{1}{ED} \cdot \frac{AGE}{\overline{AGE}}\right), A\right)$$

where $\frac{\partial d^*}{\partial Y^*} < 0$, $\frac{\partial d^*}{\partial ED} > 0$, and $\frac{\partial d^*}{\partial A} \lesseqgtr 0$

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[1] For a brief analysis of wealth effects on aggregate labour 'supply', see H. Kasper, "Assets and the Supply of Labour: A Note", Southern Economic Journal, Vol. XXXIII, No.2, October 1966, pp. 245-251.

The desire for income can be simply translated into a labour supply function, so that to add to the "income sufficiency" variable one should consider some measure of proxy for wealth. In Jamaica, even more than in most countries, the major symbol of wealth is ownership of a house and, therefore, although it is only a crude approximation, this can be taken as an index of wealth :

OWN = a dummy variable with a value of 1 if the house was owned by the household, zero otherwise.

Since those households which did not own their own dwellings were liable to pay some form of rent the expected inverse association between home-ownership and female labour force participation can be compared with an expected positive association between rent-paying and labour supply, as the payment of rent definitionally lowers family income available for non-housing costs of living.

On the other hand, to the extent that house-ownership involves mortgage payments, it may exert a positive influence on the woman's participation propensity. But equally, since it is a criterion used by mortgagors, the granting of mortgage loans is an indicator of the typically male head of household's expected lifetime earnings. In terms of theanalysis of current economic activity house-ownership can be depicted as an exogenous, predetermined variable, but in a lifetime model of female labour supply home ownership might be endogenous. Since the woman's earnings are rarely taken into account in the granting of mortgages, this may be of minimal significance.[1]

4. The Opportunity Wage : Indices of Human Capital

The need-for-income variables have to be complemented by an appropriate measure of the woman's opportunity wage, which is probably the most important determinant of female labour force participation. Most studies have used years of schooling as a proxy for the woman's opportunity wage, though it has also been used

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[1] Home ownership is also a proxy for size of dwelling which tends to be positively related to the amount of time devoted to housework, ceteris paribus. See, for example, A. Girard, "Le Budget-temps de la Femme Mariée dans les Agglomerations Urbaines", Population, 13, October-December 1958, pp. 591-618.

as an index of tastes for market work and as proxy for health.[1] If this single measure is supposed to capture several different effects it is hard, if not impossible, for it to isolate the effect of the woman's opportunity wage. But probably of greater significance is the fact that years of education is not an adequate index of human capital or the woman's opportunity earnings, particularly in a low-income economy where years of schooling characterised by irregular attendance may have little bearing on actual educational attainment.[2] In short, it is essential to derive a composite index of human capital which at least makes some attempt to take account of quality of education as well as post-school training and on-the-job experience. Treating the physical capacity for labour separately, the index of human capital (PERSCAP) to be used in the present study is based on six elements - years of schooling (EDUC), literacy (LIT), exam success (EXAM), training (TRAINED), type of training (TYPE), and age. Human capital could be expressed as a simple linear combination of the first four of these elements:

$$PERSCAP = EDUC + LIT + EXAM + TRAINED$$

But it is evident that a weighting problem exists since it is impossible to express each of the elements in comparable units. Nor is it intuitively apparent that PERSCAP should be a simple linear additative function. Therefore an alternative construct was employed. It will be convenient to deal with this in three stages, starting with EDUC and LIT. In the primary data information exists on number of years of schooling, whereas the question on literacy coded the respondents as being illiterate, semi-literate or fully literate. It seems appropriate to reclassify the responses on literacy so as to have two groups, those who were functionally literate and those who were not. Furthermore, if a woman spent seven years at school without achieving literacy those years of schooling

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[1] Bowen and Finegan, 1966, op. cit. and 1969, op. cit. W.G. Johnson and M.F. Berkowitz, "Health and Labour Force Participation", Journal of Human Resources, Vol. IX, No.1, Winter 1974, pp. 117-128.

[2] Moreover, a brighter pupil may leave school earlier than a less intelligent one simply because he or she can get through the work and exams quicker.

hardly deserve to be treated as of any 'productive' value. Indeed one of the striking statistics available on Jamaican education is the extremely low attendance rate, which has been low since the nineteenth century.[1] Therefore a nominal number of years of schooling may represent an actual number which is a very small fraction of that total in terms of attendance, and if the child only rarely attended without learning to read and write it is appropriate to disregard that 'education'. Moreover in computing an index of human capital it is inappropriate to give the number of years of schooling a greater weight than given to exams and training. Therefore the years of schooling is represented as some fraction of the mean number of years attended (8) and that fraction treated as zero if the women emerged from her school-years functionally illiterate.

There is an additional consideration in the treatment of schooling in that a given number of years of education and the achievement of literacy could be expected to have had a much greater impact on a woman's opportunity wage, and therefore by implication on her labour force participation, for an older generation of women than would be the case for a younger generation.[2] This is simply because the spread of education and the secular rise in the attainment of literacy has meant that a given level of education which had once been sufficient to be a facilitating condition for employment has been superseded by a higher level.[3] For this reason it is appropriate to incorporate an age-related interaction effect into the schooling component of the personal capital function. Although the major justification for this is that a low level of

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[1] For a discussion of this phenomenon, which applies at all levels of schooling, as well as a summary of the data, see Guy Standing, "Education, Training and Female Employment: The Jamaican Experience", 1975 (mimeo).

[2] A common 'ecological error' arises in the following type of statement: Literate women have a higher labour force participation rate than illiterate women, so with the growth of literacy the aggregate female participation rate should rise.

[3] Mitigating this, albeit only slightly, is the fact that a modern job structure places a much higher premium on literacy than a traditional job structure.

education (within the context of the observed profile) achieved by a woman belonging to an older age group would have reflected a higher relative opportunity wage for such a woman at the time when she was entering the labour force and gaining a foothold in employment than the same level achieved by a woman of a younger generation, the interaction effect also reflects the influence of on-the-job and related labour market experience, partly because older women, ceteris paribus, will tend to have had more work experience and partly because the education, by hypothesis, will have been positively related to the extent of their lifetime labour force participation. Accordingly the first component of PERSCAP can be expressed as follows:

$$\text{PERSCAP} = \left(\frac{\text{AGE}}{\overline{\text{AGE}}} \cdot \frac{\text{EDUC}}{\overline{\text{EDUC}}} \cdot \text{LIT}\right) + \text{EXAM} + \text{TRAINED}$$

where $\overline{\text{AGE}}$ and $\overline{\text{EDUC}}$ are the respective mean values of the age and years of schooling of the women and where LIT takes a value of zero if a woman was not literate and 1 if she was literate.

The second component of the personal capital function is a quantitative index of post-literacy education, EXAM. The information on this question refers to the highest exam passed. The majority of women had passed no exam at all, as expected, while others had passed exams of widely varying standards. In Jamaica at its present stage of development two threshold levels of exams are discernable - the passing of any school-leaving exam or some low-level equivalent, and the attainment of 'O' level passes.[1] On this rule-of-thumb EXAM is given a value of 0, 1, or 2 according to the following classification:

0 = no exams passed
1 = JSC 1st, 2nd and 3rd Jam. Local, commercial exams
2 = 'O' levels, 'A' levels, Diploma, degree

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[1] See, Standing, 1975, op. cit.

Finally the third component of PERSCAP recognises, albeit crudely, the significance of training on the woman's subsequent opportunity wage. First, TRAINED takes a value of 1 if the woman had received some job-related training, zero if she had not, but defined in this way the variable makes no allowance for the type of training, which represents a rough guide to the quality or value of the training received. Therefore the TRAINED dichotomous variable is converted to the following three values:

TRAINED: 0 = not trained
1 = trained informally, on-the-job
2 = trained, institutionally, or in a formal apprenticeship.

Since the extent to which women - or men - have passed exams or received training has been little if any greater in recent years than in earlier times, it may well be unnecessary to weight EXAM and TRAINED by the age-interaction factor, but two variants of PERSCAP were computed, one in which the interaction factor was only applied to EDUC and one in which it applied to EXAM and TRAINED as well.[1]

So far the treatment of personal capital has emphasised qualifications for employment which have a positive bearing on the opportunity wage. Account should also be taken of an equally or more important factor influencing the opportunity wage, the capacity for labour as reflected by a woman's health. This can either be incorporated into the index of personal capital, PERSCAP, or treated separately. In any event a variable reflecting physical capacity, HEALTH, should be incorporated into the analysis. Thus, although it is only a crude approximation:

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[1] Literacy and nominal years of schooling have been on an upward trend for some years, but for an explanation of the failure of Jamaican workers to gain increasing exam success and access to training, see Standing, loc. cit.

HEALTH = a dummy taking a value of 1 if the woman reported she suffered from some long-term disability or illness, zero otherwise.[1]

It is a moot point whether or not the age-interaction factor should be applied to this capacity-for-labour index. Regardless of any identifiable illness or disability, that capacity will in any case be a declining function of age, but if younger and middle-aged women workers have higher productivity potential than older women then disability or illness will have a greater absolute negative effect on the former's opportunity wage. Accepting the latter argument,

$$AGHLTH = HEALTH.(\frac{AGE}{\overline{AGE}})$$

This can be added as a fourth element (or rather subtracted from the remainder) in PERSCAP or treated separately.[2] (When health is incorporated into the human capital index it will be referred to as PERSHLTH.)

5. Migrant Status

One of the most conspicuous phenomena in Jamaica is the high rate of internal migration of women, and there are several reasons for expecting migrant women to have a relatively high rate of labour force participation. Ester Boserup, in her analysis of women's role in economic development, argued that

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[1] Although there was a follow-up question for those who stated that they did suffer from some disability or illness and the interviewers were instructed to use their discretion and judgement where necessary the vagueness of such a question has several advantages - one on grounds of expedience since health-related questions touch a sensitive area, and the other on the grounds that it is as much the subjective perception of incapacity as the objective reality which has a bearing on the woman's labour supply and opportunity wage.

[2] Although there is some weak negative association between EDUC and HEALTH or AGHLTH the extent of association certainly does not warrant the assumption that education is a proxy for health, cf. Johnson and Berkowitz, op. cit.

women's participation would tend to decline with their move to urban areas because, as she depicted the process, migration to the city involves a "tremendous psychic strain".[1] Shultz et. al. also seems to expect migrants to have difficulty in getting assimilated into the urban labour force, arguing "The migrant...is likely to be excluded initially by his lack of urban skills and connections."[2] Herrick took a more eclectic line in his study of migration in Chile: "The migrants' rate of participation in the labour force might be hypothesised to be either higher or lower than the natives' rate. Higher, if it is thought that migrants as a whole are somehow more energetic, and spirited than the natives; lower, if the migrants are thought to be lazier or more easily discouraged by the complexities of city life."[3] But the argument for expecting a higher rate for migrants is stronger than suggested by Herrick's remarks. First, if migration is regarded as an individual act of personal 'investment' then the migrant's propensity to be economically active, so as to earn a return on that investment, will tend to be high.[4] Secondly, the 'selectivity' of migration is likely to mean that migrants are highly over-oriented and are, in one or more senses of the term, 'creamed' from the population living outside the city or urban area in question.[5] Thirdly, migrants

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[1] Boserup, op. cit. (p.157). Later (p.185) she claimed "women's participation in economic activities outside the domestic sphere is likely to decline rather than increase after migration to town."

[2] R.R. Nelson, et. al., Colombia, 1971, p.57.

[3] B. Herrick, Urban Migration and Economic Development, 1965, p.80.

[4] Necessarily, one could argue. The migration-as-investment view found explicit expression in L. Sjastaad, "The Costs and Returns of Human Migration", Journal of Political Economy, Vol. 70, No.5, October 1962.

[5] This and other aspects of the migration-participation relationship are discussed in more detail in a chapter of the book on labour force participation, in preparation.

are less likely than long-term urban dwellers to have a network of friends and relatives on whom to rely for support. Fourthly, as is discussed in another paper, migrants can be expected to have relatively low income expectations and aspirations and be expected to be prepared to work more hours in employment because of their experience of incomes and work outside the city.[1] Fifthly, following the move away from close relatives and friends in a village community to an area in which there is greater emphasis on 'individualism', where anonymity is possible or even 'normal', there tends to be relatively little disapprobation cost to taking menial degrading labour which in turn tends to raise participation as the range of available employment opportunities is broadened.[2]

Thus it can be postulated that migrant women, ceteris paribus, will have a higher propensity to be economically active and a higher propensity to work than non-migrant or long-term urban residents, and to test this expectation the following variable was adopted:

RECENT = a dummy variable having a value of 1 if the woman had been in the city for less than ten years, 0 otherwise.

If the woman had come to Kingston before leaving school or to attend school there she was counted as a non-migrant since her perceptions of the labour market and income expectations would, it is assumed, have been formed while at school, whereas the expected behavioural differences are by hypothesis the result of different labour market experience. In general, the characteristics of migrant women as a group will be discussed in an appendix.

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[1] Guy Standing, "Aspiration Wages, Migration and Female Employment", Population and Employment Working Paper No.23, October 1975.

[2] The concept of disapprobation cost is due to Adam Smith, The Theory of Moral Sentiments.

This completes the description of the independent variables which allow a fairly comprehensive test of the main elements of the opportunity cost behavioural model outlined earlier. In order to test the significance of the variables as determinants of female labour supply and the probability of labour force participation, two techniques will be adopted. In the case of the several labour supply functions where the dependent variable is continuous (e.g. HRSUPPLY, PREPARED) ordinary least squares regressions can be used. But in the case of the probability of labour force participation a dummy, dichotomous dependent variable is utilised (e.g. ACTIVE, ECON). In those cases, it is desirable to specify a logit function, for which maximum likelihood is the appropriate statistical technique.[1] Thus, the empirical tests which follow are based on OLS and maximum likelihood regressions as appropriate.

Empirical Results

The empirical findings to be discussed in this section are of interest for two basic reasons. First, of course, they provide a test of the explanatory significance of the theoretical framework outlined earlier. Second, by using different measures of labour supply, it is possible to observe the sensitivity of the results to changes in the definition and meaning of the dependent variable representing labour supply.

The nearest approximation to short-term labour supply is HRSUPPLY, for which a number of variants of the function are presented in Table I. In arriving at the results presented in Table I, and those for related dependent variables, a choice necessarily had to be made as to which combination of independent variables was most appropriate and which gave the statistically most satisfactory results. Thus, for instance, one can either control for type of union status and examine the effect on labour supply of having a child under two years old or one can analyse the different effects of the demand for childcare controlling for the legitimacy status of the child.

The various results for HRSUPPLY, as presented in Table I, are consistent in the sense that altering the combination of independent variables nowhere alters the signs of particular

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[1] See the Appendix for a brief discussion.

The Independent Variables

Age Variables

Age = years of age completed

Age^2 = years of age squared

AA = dummy; 1 if woman less than 26, 0 otherwise

GG = dummy; 1 if woman aged between 26 and 35, 0 otherwise

E = dummy; 1 if woman aged 46 to 55, 0 otherwise

D = dummy; 1 if woman over 55, 0 otherwise.

Union Status Variables

VISIT = dummy; 1 if woman in short term union, 0 otherwise.

CONSENS = dummy; 1 if woman in long term union, 0 otherwise

MARRIED = dummy; 1 if legally married and living with partner, 0 otherwise

SEPARATED= dummy; 1 if not living with husband, 0 otherwise.

Childcare Variables

CHILDREN = number of children under 14 living in household.

FAMSIZE = dummy; 1 if one or two children,0 otherwise

FOURCHILD = dummy; 1 if three or four children, 0 otherwise

BIGFAM = dummy; 1 if more than four children, 0 otherwise

PREGNANT = dummy; 1 if woman pregnant, 0 otherwise

BABY = dummy; 1 if youngest child was two years old or younger, 0 otherwise

TOT = dummy; 1 if BABY equal 1 and woman married, living with husband, 0 otherwise

TINY = dummy; 1 if BABY equal 1 and woman living with common-law partner, 0 otherwise

TITCH = dummy; 1 if BABY equal 1 and women not living with partner or husband, 0 otherwise

Socio-Economic Variable

PERMINC = a measure for demand for income; other family income per equivalent adult controlling for educational level of woman and age

VISPERM, CONPERM, HUSPERM, OTHPERM = values of PERMINC if woman living in 'visiting' relationship, more stable common law partnership, with husband, or with neither husband nor partner.

OWN = dummy index of wealth; 1 if household owned house, 0 otherwise.

RECENT = dummy; 1 if woman in city for less than ten years, 0 otherwise.

Human Capital Variables

PERSCAP = measure of human capital encompassing literacy, years of schooling, exam success, training, type of training and age.

HEALTH = dummy; 1 if woman reported serious ill-health or disability, 0 otherwise.

$$AGHLTH = HEALTH \cdot \left(\frac{AGE}{\overline{AGE}}\right)$$

PERSHLTH = measure of human capital including health (ability to work) variable, i.e. PERSCAP + AGHLTH

TABLE 1

HRSUPPLY: Short-Run Labour Supply Function

	HRSUPPLY	β	HRSUPPLY	β	HRSUPPLY	β	HRSUPPLY	β	HRSUPPLY	β	HRSUPPLY	β	HRSUPPLY	β
Const	33.6459		32.6868		-3.0786		-0.3047		-2.4369		34.1357		-8.4489		34.2049	
AA	-13.3072***	-0.1693	-13.0433***	-0.1660							-13.0149***	-0.1656			-14.3055***	-0.2059
Age					2.1774***	1.2019	2.0174***	1.1136	2.0197***	1.1148			2.4927***	1.3811		
GG	-4.5884	-0.0893	-4.4867	-0.0873							-4.8618	-0.0946			-2.3531	-0.0460
Age^2					-0.0339***	-1.5377	-0.0317***	-1.4370	-0.0311***	-1.4106			-0.0363***	-1.6285		
E	-15.7074***	-0.2366	-16.1787***	-0.2437							-16.4378***	-0.2476			-11.8362***	-0.1680
D	-25.7943***	-0.3328	-27.7388***	-0.3579							-31.2802***	-0.4036			-24.0672***	-0.3014
TOT	-16.3729**	-0.1286	-16.2886**	-0.1281					-13.5705**	-0.1066	-17.4663**	-0.1372			- 6.4148	-0.0552
BABY					-5.2300	-0.0986	-5.1484	-0.0970					-2.4678	-0.0460		
TINY	-11.3092**	-0.1439	-11.1930**	-0.1424					-10.0847**	-0.1283	-10.9330**	-0.1391			-8.2970**	-0.1098
TITCH	1.5643	0.0231	1.5556	0.0230					1.3278	0.0196	0.8988	0.0133			3.1587	0.0435
CHILDREN					-1.8547**	-0.1482					-3.2635*	-0.2608	-1.5770***	-0.1319		
FAMSIZE	- 0.9629	-0.0195	- 1.0665	-0.0216			-1.2860	-0.0260	- 1.4771	-0.0299					-0.5553	-0.0113
FOURCHILD	-9.8709***	-0.1681	- 9.7801***	-0.1666			-10.2063***	-0.1738	- 9.5142**	-0.1620					-7.5928**	-0.1319
BIGFAM	-7.6037	-0.1020	- 7.4969	-0.1006			-8.6539*	-0.1161	- 8.4692*	-0.1136					-7.9659**	-0.1063
AGHLTH	-6.9671**	-0.1242													-6.9955**	-0.1178
PERSCAP	3.4047***	0.1689													2.0805**	0.1110
PERSHLTH			3.8526***	0.2034	3.6033***	0.1903	3.7279***	0.1968	3.8975***	0.2058	3.7993***	0.2006	2.3444***	0.1314		
OWN	-1.5403	-0.0262	-1.8918	-0.0322			-2.8241	-0.0481	-2.4043	-0.0409	-2.8940	-0.0493	-1.7283	-0.0297	-0.8918	-0.0153
PREGNANT	-2.7588	-0.0226	-2.2653	-0.0185			-4.2218	-0.0346					-7.2864	-0.0670	-7.5670	-0.0695
RECENT	4.5411	0.0795	4.7224	0.0827	4.2649	0.0747	4.9546	0.0867	5.1085*	0.0894	4.0172	0.0703	2.9692	0.0527	2.7801	0.0493
PERMINC	-1.9700**	-0.1228	-2.0553**	-0.1281					-2.0627**	-0.1285						
OTHPERM					1.3293	0.0305	1.3666	0.0334			2.1100					
VISPERM					-4.9764**	-0.1177	-5.0382**	-0.1192			-4.5668**	-0.1080				
CONPERM					-3.9654**	-0.1303	-3.8431**	-0.1263			-2.7968	-0.0919				
HUSPERM					-2.1706**	-0.1127	-2.0198	-0.1049			-1.5611	-0.0810				
CHLDRNSQ											0.3178	0.1548				
VISIT													-8.7716**	-0.1109	-6.2443	-0.0790
CONSENS													-10.9591***	-0.1697	-7.9249**	-0.1227
HUSBAND													-11.1032***	-0.1863	-9.6372***	-0.1617
$\bar{R}^2$	0.23		0.23		0.22		0.23		0.24		0.23		0.18		0.19	
F	6.53		6.89		9.38		7.18		8.59		6.38		9.95***		6.67***	

coefficients. Moreover, several interesting relationships clearly emerge. First there appears to be a clear non-linear relationship between age and the woman's labour supply. Controlling for the demand for income, wealth, the opportunity wage, health, the demand for childcare time, and migrant status women aged between 46 and 55 were prepared to supply about 16 fewer hours per week to labour force activities than women aged between 22 and 30, but at the same time women under 21 were prepared to supply 13 fewer hours than those aged between 22 and 30. Reasons for this pattern have been suggested earlier and will be compared later with the pattern found when the 'activity' element of labour supply is relaxed.

As expected, the demand for childcare time does act as a constraint on labour supply, but the deterrent effect depends crucially on the legitimacy status of the child. Thus, the results suggest that, on average, among legally married women, a small child reduced the labour supply by about 16 hours a week, whereas if a woman was in a common-law partnership the corresponding reduction was approximately 11 hours, and if the woman was not living with a man on a regular basis either as a common-law partner or wife, a small child had no observable effect on labour supply and, in fact, the sign of the coefficient was consistently positive. Comparing the beta-coefficients suggests that a child had a greater proportionate effect on labour supply for common-law wives than for legally married women, which was evidently due to the lower average number of hours the former 'supplied' to the labour market.[1]

The number of children was non-linearly related to labour supply, suggesting that with large families the demand-for-income effect began to cancel out the demand-for-childcare effect, although the latter remained dominant.[2]

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[1] This is probably due to the greater degree of 'inactivity' among non-employed common-law wives resulting from discouragement and lower opportunity wages.

[2] A regression was run in which separate dummies were created for each specific number of children up to six, with all those having seven or more children being grouped. The result corroborated the observed non-linearity, the largest beta-coefficients being for those with four, three and five children in that order.

As expected, health had a pronounced impact on labour supply, while PERSCAP had a strong positive effect. In fact, the relative size of the beta-coefficients for the opportunity wage or 'human capital' indices in the HRSUPPLY functions in general suggest that, apart from age, this factor had the greatest effect on supply.

The only other variable to be statistically significant was the demand for income variable, PERMINC, which consistently had a negative coefficient, supporting the hypothesis that the higher other family or partner income relative to the woman's level of education, the lower the number of hours she was actively prepared to work in non-domestic employment. When the interaction of marital status (or marital type) and the demand-for-income was introduced it appeared that the negative effect was greatest for women in consensual unions, but this was partly due to the correlation of HUSPERM and OWN, since house-ownership was positively related to being legally married and to the incomes of husbands. Furthermore, since house-ownership is associated with the employment of domestics, the negative income effect associated with HUSPERM and OWN is weakened. Similarly, married couples can be expected to have greater socially-acquired and socially-expected (or normalised) tastes for market incomes, savings and commodities, all of which reduce what might otherwise be a strong negative effect of household income.

If the results for HRSUPPLY are compared with those found when 'potential' labour supply is encompassed by the definition of labour supply some notable differences emerge. The main patterns found when PREPARED - or the "longer-run" supply index - was the dependent variable are contained in Table II.

Perhaps of most interest is the smaller coefficient and observed decline in statistical significance of the human capital or opportunity wage variable. Whereas in the short-run labour supply functions the education-training element of the human capital factor was the major element, the highly significant coefficient for PERSHLTH in the longer-run function was largely due to the health or capacity for work element. This would seem to support the view that education

and training are facilitating conditions for labour force participation rather than precipitating conditions, acting directly through its effect on employment opportunities and indirectly through the demand for income. The most likely explanation for the observed difference in the human capital coefficients is that those women with a high opportunity wage were least likely to be discouraged workers, or passively unemployed; although women with relatively little education and training were not noticeably less willing to work they were not included as economically active in the short-run, active supply schedule, HRSUPPLY. This indicates the difficulty of interpreting and specifying a supply schedule without making reference to the time period over which the 'supply' is meant to refer or to the objective market conditions facing the potential workers. This is further borne out by a comparison of the age-dummy coefficients for HRSUPPLY and PREPARED. In the case of the 'more active' supply schedule the coefficients for AA are negative, large and statistically significant, implying that older women were prepared to work more than the young were. But when the 'passive' suppliers are included in the supply index, these negative coefficients fall dramatically and are no longer statistically significant. Thus, the low work propensity among the younger age group was due to a lack of active searching, resulting probably from discouragement, rather than from any significant unwillingness to work. As argued earlier, a pervasive sense of discouragement and resultant passive unemployment would certainly be consistent with the fact that young women have by far the highest rate of overt unemployment in the Jamaican economy.[1]

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[1] 1973 Labour Force Survey, Kingston, 1974, op. cit.

TABLE II

PREPARED: "Longer Run" Labour Supply Function

	Prepared	β	Prepared	β	Prepared	β	Prepared	β	Prepared	β	Prepared	β
Const	38.6287		37.0294		5.1068		36.3742		-2.6678		39.5179	
AA	-2.9204	-2.9204	-2.4954	-0.0371			-1.5939	-0.0237	2.6664***	1.7060	-5.0922*	-0.0846
Age					2.2754***	1.4673						
GG	-0.5674	-0.0129	-0.3996	-0.0091			-0.6162	-0.0140	-0.0394***	-2.0406	1.5548	0.0351
Age^2					-0.0359***	-1.9014						
E	-5.9799*	-0.1052	-6.6936*	-0.1178			-6.6223*	-0.1165			-3.8169	-0.0626
D	-27.1138***	-0.4087	-30.0736***	-0.4534			-33.8837***	-0.5108			-25.7398***	-0.3723
TOT	-8.6955	-0.0798	-8.5773	-0.0787								
BABY					-3.4742	-0.0765	-4.0005	-0.0881			0.3262	0.0070
TINY	-5.4950	-0.0817	-5.3332	-0.0793								
TITCH	0.6472	0.0112	0.6048	0.0104								
CHILDREN									-0.7277	-0.0703		
FAMSIZE					-0.8192	-0.0194					-0.2587	-0.0061
FOURCHILD	-5.4332**	-0.1081	-5.1965*	-0.1034	-6.1182	-0.1217					-2.9930	-0.0600
BIGFAM	-1.2586	-0.0197	-0.9924	-0.0156	-3.0306	-0.0475					-3.3369	-0.0514
PERSCAP	1.6642*	0.0964									0.9204	0.0567
PERSHILTH			2.3671***	0.1460	2.0169**	0.1244	2.2824***	0.1408	1.3244**	0.0857		
AGHLTH	-7.1960***	-0.1499									-6.8646***	-0.1335
PREGNANT	-7.6869	-0.0735	-6.9303	-0.0663	-7.7796	-0.0744	-7.2697	-0.0696	-9.0079**	-0.0956	-9.7661***	-0.1036
OWN	-1.5821	-0.0315	-2.1205	-0.0422	-1.6028	-0.0319		0.1175	-2.8320	-0.0562	-2.9038	-0.0576
RECENT	5.8895**	0.1204	6.1835**	0.1265	5.6486**	0.1155	5.7448**		5.0497**	0.1034	5.2796**	0.1081
PERMINC	-1.1436	-0.0833	-1.2833*	-0.0934								
OTHPERM					2.1626	0.0617	3.4699*	0.0990				
VISPERM					-2.9052	-0.0803	-3.4558*	-0.0955				
CONPERM					-2.3709	-0.0910	-2.4287*	-0.0932				
HUSPERM					-1.2864	-0.0780	-1.5777*	-0.0957				
VISIT									-3.4750	-0.0507	-3.3392	-0.0488
CONSENS									-8.9232***	-0.1595	-8.5342***	-0.1526
HUSBAND									-6.9744***	-0.1351	-6.6900***	-0.1296
$\bar{R}^2$	0.26		0.25		0.29		0.26		0.26		0.23	
F	7.97***		8.22***		9.45***		9.51***		16.45***		9.58***	

It is also noteworthy that the presence of a child appears to affect supply primarily by reducing job-search activity rather than by reducing the willingness to work. This isunderstandable since the opportunity costs of job-search are highest for those women, but it indicates that the potential labour supply of that group is not really constrained by family commitments. Even the family size variables have much smaller coefficients when the activity criterion is relaxed.

Finally, the demand-for-income variables, while remaining negative, are less significant in the PREPARED function. This suggests that those in relative affluence feel less pressure to enter the labour force and actively search for work; ceteris paribus, for them the opportunity cost of inactivity is relatively low.

Not surprisingly there are also notable differences between the results of the two labour supply functions and those in which the dependent variable was some measure of the probability of being in the labour force. The maximum likelihood equations, as tested with the four measures of probability, are presented in Tables III, IV, V and VI. Comparing the results for ACTIVE with those for HRSUPPLY - the measure of labour supply corresponding to it in terms of activity status - suggests that the only notable difference is the statistically significant negative coefficient for home-ownership, or wealth, in the participation function. It would appear that women who are members of families with their own homes are either economically inactive or are willing to work relatively long workweeks. As a result, in the supply function the net effect of the ownership-wealth variable is insignificant. This result is certainly consistent with the casual observation that in Jamaica middle-class married women living in their own house tend to make non-marginal substitutions of full-time domestic wage labour for their own time in the home, a substitution which has long been facilitated by the extremely low wages paid to domestic servants. On the other hand,

Table III

Maximum Likelihood Results: Probability of Labour Force Participation (ACTIVE)

Const	0.4773**	0.3984*	-2.0141**	0.4554**	0.5691***	0.6506***	0.5698***
AA	-0.6330**	-0.6132**		0.6012	-0.7995***	-0.8289***	-0.8087***
Age			0.1501***				
GG	-0.0677	-0.0614		-0.0871	-0.0036	-0.0633	-0.0662
Age^2			-0.0022***				
E	-0.6632***	-0.7013***		-0.7119***	-0.5444***	-0.6141***	-0.6556***
D	-1.2850***	-1.4152***		-1.4457***	-1.4559***	-1.5299***	-1.6762***
TOT	-0.9830**	-0.9903**	-0.9090**	-0.9929**	-0.4167	0.8254	0.8296
BABY						-1.3599**	-1.3649**
TINY	-0.4571*	-0.04418*	-0.3865*	-0.4487*	-0.4247**	0.8083*	0.8247*
TITCH	0.3949*	0.3964*	0.3732*	0.3939*	0.3526**	1.5481***	1.5471***
CHILDREN			-0.1178***	-0.1071**	-0.1063***	-0.1031***	-0.0982***
FAMSIZE	-0.0006	-0.0117					
FOURCHILD	-0.3406*	-0.3414					
BIGFAM	-0.7744***	-0.7537**					
PERSCAP	0.1714**				0.1243**	0.1275***	
PERSHLTH		0.2103***	0.2063***	0.2108***			0.1567***
AGHLTH	-0.4943**				-0.4997**	-0.5033**	
PREGNANT	-0.3058	-0.2680	-0.2466	-0.2102	-0.3937*	-0.5201**	-0.5029**
OWN	-0.5334***	-0.5647**	-0.6146***	-0.6080***	-0.5407***	-0.5700***	-0.5819***
RECENT	0.0224	0.0409	0.0274	0.0375			
PERMINC	-0.0920**	-0.0991**	-0.0898**	-0.0900**	-0.0780*	-0.0938**	-0.0764 *
VISIT					-0.2212	-0.3335*	-0.3337*
CONSENS					-0.3060*	-0.2918*	-0.3337*
HUSBAND					-0.4259**	-0.4510**	-0.4509**
Pseudo R^2	0.31	0.30	0.31	0.29	0.27	0.28	0.27
Likelihood Ratio	78.94	77.48	79.03	74.15	100.92	105.66	103.00

Table IV

Logit Model, Maximum Likelihood Results: Probability of Participation (ECON)

Const	0.5222**	0.4298*	-1.17199**	0.5216**	0.6413***	0.7001***
AA	-0.4437*	-0.4215*		-0.4139*	-0.6562***	-0.6743***
Age			0.1411***			
GG	-0.1282	-0.1197		-0.1423	-0.0251	-0.0685
Age^2			-0.0022***			
E	-0.7606***	-0.8022***		-0.8152***	-0.6080***	-0.6566***
D	-1.3405***	-1.4873***		-1.5366***	-1.3563***	-1.4079***
TOT	-1.0442**	-1.0485**	-0.9923**	-1.0482**	-0.4702*	0.3330
BABY						-0.8907*
TINY	-0.4788**	-0.4618**	-0.4175*	-0.4716**	-0.4259**	0.3813
TITCH	-0.0620	-0.0601	-0.0202	-0.0353	0.1351	0.9151***
CHILDREN			-0.1033**	-0.0876**	-0.0889***	-0.0859***
FAMSIZE	0.0845	0.0742				
FOURCHILD	-0.2895	-0.2887				
BIGFAM	-0.5815**	-0.5564**			0.0793*	0.0803*
PERSCAP	0.1469**					
PERSHLTH		0.1902***	0.1786***	0.1853***		
AGHLTH	-0.5240**					
PREGNANT	-0.3736	-0.3294	-0.2948	-0.2717	-0.5119**	-0.6079**
OWN	-0.4137**	-0.4500**	-0.4816**	-0.4958***	-0.3534**	-0.3711**
RECENT	0.0592	0.0818	0.0533	0.0644	-0.1611	-0.1750
PERMINC	0.0725*	-0.0805*	-0.0695*	-0.0676*		
VISIT					-0.2152	-0.2902
CONSENS					-0.3817**	-0.3747**
HUSBAND					-0.5409***	-0.5587***
Pseudo R^2	0.28	0.27	0.28	0.26	0.24	0.24
Likelihood Ratio	69.85	67.85	71.43	64.90	88.04	90.34

TABLE V:

Probit (Logit) Model of Probability of Participation (NOTIONAL)

Const	1.1382***	0.9701***	-0.4806	1.1073***	1.1042***	0.9274***
AA	0.2640	0.3190		-0.1557	-0.1550	0.0738
Age			0.1271***			
GG	-0.0323	-0.0635		0.1561	0.1601	0.1845
Age^2			-0.0022***			
E	-0.5705**	-0.6253**		-0.2567	-0.2565	-0.1715
D	-1.9191***	-2.0701***		-1.7241***	-1.7216***	-1.5715***
TOT	-0.9120**	-0.9086**	-1.300***	-0.1639	-0.2014	
BABY					0.0402	-0.0108
TINY	-0.2005	-0.2373	-0.4170	0.1153	0.0830	
TITCH	-0.0065	0.0153	-0.0664	0.1707	0.1369	
CHILDREN			-0.0507	-0.0335	-0.0336	-0.0352
FAMSIZE	0.1222	0.1252				
FOURCHILD	-0.3525	-0.3359				
BIGFAM	-0.1030	-0.0624				
PERSCAP	0.1533			0.1134**	0.1135**	0.1119**
PERSHLTH		0.2411***	0.2058**			
AGHLTH	-0.5502***			-0.5477**	-0.5475***	-0.5655***
PREGNANT	-1.0323***	-1.0157***	-1.0023***	-0.9015***	-0.8983***	-0.9523***
OWN	-0.3777*	-0.4456**	-0.3847**	-0.5002***	-0.4993***	-0.5049***
RECENT	0.6571**	0.6797**	0.5837**	0.4736**	0.4740**	0.3914**
PERMINC	-0.0314	-0.0426	-0.0271			
VISIT				-0.1712	-0.1665	
CONSENS				-0.5449**	-0.5453**	
HUSBAND				-0.3690**	-0.3682**	
COMMON						0.0002
MARRIAGE						-0.0010*
Pseudo R^2	0.43	0.43	0.45	0.37	0.37	0.35
Likelihood Ratio	99.56	97.44	104.13	126.91	126.92	120.99

Table VI

Probit (Logit) Model of Probability of Participation (POTENTIAL)

	(1)	(2)	(3)	(4)	(5)
Const	1.1694***	1.0147***	-0.3706	1.1264***	1.1210***
AA	0.2368	0.2661		-0.1919	-0.1906
Age			0.1224***		
GG	-0.1579	-0.1429		0.1222	0.1257
Age^2			-0.0022***		
E	-0.6538**	-0.7046**		-0.3000	-0.2961
D	-2.0503***	-2.1872***		-1.7847***	-1.7803***
TOT	-0.2909	-0.2614	-0.4847	0.2325	0.1613
BABY					0.0759
TINY	-0.2293	-0.2058	-0.3758	0.1357	0.0681
TITCH	-0.0173	0.0059	0.0484	0.1813	0.1169
CHILDREN			-0.0744*	-0.0476	-0.0477
CHLDRNSQ					
FAMSIZE	0.0953	0.0905			
FOURCHILD	-0.4516*	-0.4413*			
BIGFAM	0.2319	-0.1971			
PERSCAP	0.1992**			0.1298**	0.1299**
PERSHLTH		0.2793***		0.2417***	
AGHLTH	0.5417**			-0.5420***	-0.5417***
PREGNANT	-0.0937***	-1.0368***	-1.0231***	-0.9107***	-0.9057***
OWN	-0.3646*	-0.4256**	-0.3668*	-0.4698***	-0.4692***
RECENT	0.6331**	0.6552**	0.5607**	0.4617**	0.4617**
PERMINC	-0.0235	-0.0330	-0.0182		
VISIT				-0.1769	-0.1680
CONSENS				-0.5371**	-0.5379**
HUSBAND				-0.3784**	-0.3769**
Pseudo R^2	0.44	0.44	0.46	0.37	0.37
Likelihood Ratio	100.69	99.14	105.51	128.36	128.37

among the working class ownership of a home tends to be associated with marriage and the perceived ability of the husband to support an economically inactive wife.

In most other respects the results for the comparable measure of the probability of participation are consistent with those found in the short-run labour supply function, though the number of children seems to be linearly related to the probability of participation and the illegitimate, unsupported child variable has a statistically significant positive influence. But the non-linear age pattern is reproduced and the importance of the opportunity wage and demand for income variables further supported. Moreover if the criterion for inclusion of the job-seeking unemployed in the economically active category is tightened to encompass only those who had searched actively for employment in the previous week, broadly similar results emerge. The exception is that the sign of the coefficient of the illegitimate-unsupported child variable becomes negative, although it is far from being statistically significant. This merely suggests that those women with illegitimate children tend to search for employment only intermittently, presumably because of their high opportunity costs of job-search. Similarly those from low-income households are likely to belong to a category of workers whose job opportunities are low and whose search costs relative to prospective benefits relatively high.

A feature of the probit equations is that the demand for income variable tends to become statistically insignificant when type of union status is controlled directly. This is because the degree of permanency associated with a specific type of union is a direct function of income adequacy. Because of the multicollinearity implicit in this relationship separate equations were tested in which the union status variables were included and the income-adequacy variable dropped. As can be seen this gave the intuitively plausible result that the degree of permanency

associated with formal marriage was negatively related to the probability of labour force participation, and women living in long-duration consensual unions were more likely to be economically inactive than those in less stabilised relationships. Since the latter characterise the young and the poor one can clearly identify a major factor explaining their high rates of participation despite chronic levels of unemployment and low opportunity wages. As for the differential effects of the demand for childcare time, controlling for union status suggests that for married women the possession of a small child is not a major constraint on economic activity. This highlights a major institutional feature of Jamaican life. Since young married women are generally relatively highly educated and their husbands earn sufficient to buy a house, not only are the wife's potential earnings quite likely to be several times as large as the cost of hiring a full-time domestic but the employment of a domestic will be a status symbol associated with pecuniary success and a middle-class life-style.[1]

Comparing the results of Tables III to VI the childcare constraint can be seen to be acting primarily through its effect on the intensity of job searching by the unemployed. The opportunity costs of searching for employment are lower than the expected returns to active searching. But this brings into question the hypothesis, so often reiterated in the literature, that the demand for childcare reduces female economic activity in terms of availability for employment. Thus, when union status is controlled directly, the coefficients for childcare variables in the 'longer run' participation functions tend to become insignificant.

Finally, as with the respective labour supply functions, it is noticeable that the migrant status variable becomes statistically significant in the NOTIONAL and POTENTIAL

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[1] It was Veblen's classic example of conspicuous consumption. T. Veblen, The Theory of the Leisure Class, 1899.

participation functions, suggesting that while recent migrants have a relatively high propensity to work in non-domestic activities a significant proportion of the non-employed migrants were not actively searching for work. This can be explained largely by reference to the characteristics of the migrant group. In general they had a relatively low level of education and training, and for that reason alone could be expected to have a relatively low propensity to be economically active. That this is not the case lends some support to the hypothesised positive relationship between migrant status and economic activity.

Finally some labour force analysts have argued that an observed-work measure can be used as an indicator of labour supply. It is a strong contention here that such an assumption is unwarranted, but separate functions were tested in which the number of months worked in non-domestic activity in the previous year was used as the dependent variable. The most important determinant explaining the proportion of the previous year spent in non-domestic employment was the opportunity wage or personal capital variable, PERSHLTH.[1] Interpretation of the other coefficients, particularly those relating to union status, is complicated by the possibly conflicting influences of work opportunities and supply propensities. Thus although unmarried women who had been living with a man for three months or more tended to have worked fewer months than those who were formally married, the latter did not work any less than those in the most precarious unions. This is simply because women who were married were also among the most employable, formal marriage in Jamaica being a positive function of education for any given age. The 'disturbance' effect of opportunities would also seem to explain the low statistical significance of the income-sufficiency variable. In sum, women in their twenties and

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[1] In the equations presented in Table VII all those who were five or more months pregnant were excluded, as were migrants who had come to the city in the previous year.

TABLE VII: Months Worked in Past Year +

	Months	β	Months	β	Months	β	Months	β
Const	5.8522		5.7649		-2.3707		6.1092	
AA	-1.4272	-0.0834	-1.4038	-0.0820			-2.3313***	-0.1466
Age					0.5101***	1.2884		
GG	0.4585		0.4666	0.0413			0.3134	0.0281
Age^2					-0.0075***			
E	-1.9319**	-0.1323	-1.9776**	-0.1355			-2.4510***	-0.1613
D	-4.4946***	-0.2625	-4.6809	-0.2734			-5.2164***	-0.2993
TOT	0.0071		0.0137	0.0005				
BABY					-1.3232**	-0.1111	-1.3738**	-0.1154
TINY	-2.1262**	-0.1224	-0.1224	-0.1219				
TITCH	-0.0603	-0.0040	-0.0040	-0.0041				
CHILDREN								
FAMSIZE	-1.3997*	-0.1291	-0.4089**	-0.1300	-1.0931*	-0.1012	-1.0136*	-0.0938
FOURCHILD	-1.8806**	-0.1460	-1.8709**	-0.1453	-1.2294*	-0.0969	-1.2914*	-0.1017
BIGFAM	-2.3520**	-0.1449	-2.3416**	-0.1442	-0.7069	-0.0437	-0.6622	-0.0410
PERSCAP	0.9435***	0.2146			0.8977***	0.2191	0.8895***	0.2171
PERSHLTH			0.9845***	0.2386				
AGHLTH	-1.2698*	-0.1040			-0.5734	-0.0452	-1.0062	-0.0793
PREGNANT	0.9913	0.0373	1.0371	0.0390				
OWN	-1.3870*		-1.4164**	-0.1106	-1.1865	-0.0924	-1.1171*	-0.0869
RECENT	-0.4202	-0.0332	-0.4053	-0.0320	-0.3974	-0.0319	-0.3383	-0.0272
PERMINC	-0.1424	-0.0406	-0.1506	-0.0429				
VISIT					-1.6189**	-0.0938	-1.6689**	-0.0967
CONSENS					-1.9272***	-0.1345	-2.1492**	-0.1500
HUSBAND					-1.2843**	-0.0938	-1.3633**	-0.1057
$\bar{R}^2$	0.16		0.17		0.17		0.17	
F	0.58***		4.89***		7.71***		6.88**	

+ The results are based on all those who were not pregnant or less than 5 months pregnant and who had not come to Kingston during the past year.

thirties, either single or to a lesser extent formally married, who did not have a small child, and most importantly who had a relatively high opportunity wage were most likely to have worked all or most of the previous year.

In general, the results summarised in Tables I to VII are consistent with the theoretical model outlined earlier, but they do indicate that the coefficients are sensitive to changes in the definition of labour force participation and labour supply. This is particularly true of some of the 'demographic' constraints such as childcare and age. Most interestingly perhaps, the use of different labour force participation concepts sheds some light on the incidence and reasons for non-participation resulting from discouragement. Over-all, in Jamaican conditions it is evident that education and training are the major determinants of labour supply, almost certainly because women with higher 'human capital' values have greater opportunities for employment and higher incomes when working. In the main those with lower 'human capital' values do not have a low participation for that reason in itself but because bleak income-opportunities reduce their active job-searching.

Concluding Notes

This paper has presented a micro-economic model of labour force participation and labour supply applicable to the specific conditions of urbanising Jamaica. The opportunity cost paradigm can be adapted to circumstances in which the family-household as presented in most 'new home economics' models provides at best only a loose conceptual framework for analysis.[1] The model as applied

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[1] Much of the recent research into the new home economics, particularly as it relates to fertility and earnings is contained or summarised in T.W.Schultz (ed.) Economics of the Family, 1974.

in this paper has attempted several extensions of previous work: first, it has attempted to provide a genuine index of labour supply; second, it has developed and refined an index of 'personal endowments' that has introduced explicitly health, training and some measure of educational ability as well as years of schooling which has been the index usually adopted; and third, it has attempted to introduce the notion of differential preferences into the other-income variable.

From an empirical point of view this specification of several variants of labour supply, in an attempt to explicitly introduce the time element in labour supply responses, clearly indicates that any labour supply function is sensitive to the definition of labour force participation and supply. As emphasised earlier, this is not an unimportant point though it is one glossed over in most analyses of supply elasticities. When one attempts to define labour supply rigorously one finds that it is not only an elusive concept but that the usual emphasis on observed current behaviour is liable to be inadequate, both because observed behaviour is a poor reflection of actual desired supply and, as a corollary, because the emphasis on the activity status of an individual is likely to lead to a systematic underestimate of potential labour supply.

The model itself has highlighted the primary importance of personal 'relative endowments' such as education, training, and health, in determining active female labour force participation in Jamaica. It has also suggested that the fertility demand-for-childcare constraint, which has been found to be important in other countries, is not very strong. Since the majority of children are born to women living in visiting or consensual relationships the lack of a reasonably secure and stable source of income is no doubt a major factor in this weak relationship, as much as the proverbial 'grandmother' of Jamaican folklore. On the other hand, for a middle-class married woman, typically capable of securing relatively attractive, well-paid and

undemanding work, the opportunity cost of her continued employment if she has a small child demanding full-time care is measured by the cost of hiring a domestic, who for her part will probably have recently arrived from the country prepared to accept such work and the associated shelter for a fraction of what the married middle-class women could be expected to earn.

This point illustrates an inherent limitation of models of the type used in this paper; for while the static opportunity cost framework can legitimately explain the incidence of labour force participation and the pattern of supply at a given moment it can only provide a partial explanation of changing patterns and levels of participation which will be a function of both the level and structure of the demand for labour, as well as the imposition of behavioural norms in the course of socio-economic development. Thus, for instance, the high labour force participation of married women in Jamaica, even those with small children, can be explained in part by reference to the wage structure and in particular the relatively small earnings differential associated with sex compared with that found in other countries and the large differentials associated with education and occupation.

Besides having a direct concern with labour supply, micro-models of the sort applied in this paper have implications for the pattern of unemployment and the distribution of personal incomes. Since relatively educated women are more likely to be in the active labour force and are more likely to be married to men earning high incomes their employment will tend to widen household income distribution.[1] Their participation might reduce the earnings differentials

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[1] Though it is probably superfluous to add that this relationship is not obvious it is perhaps worth recalling that, as a result of observing nineteenth century patterns of living in the US and elsewhere, Veblen saw the role of relatively educated middle-class women as "vicarious consumers" for their husbands. T. Veblen, The Leisure Class, 1899.

associated with education and skill via the effect on relative supply; but this seems most unlikely since there has long been a chronic 'excess supply' of low-skilled workers in Jamaica coupled with perceived bottlenecks for skilled and educated workers. Of course, if the shortage of skilled workers was due in part to the non-participation of educated and skilled women in the labour force the approach adopted in this paper could identify the reasons for their non-participation. Moreover if one had a policy of maximising the employment opportunities of women, then altering the structure and level of demand for female labour would need to be coupled with policies which overcome non-labour market constraints identified by such a model, such as lack of childcare facilities and the incidence of ill-health. In short, even if it must be supplemented by historical and macro-economic models that concentrate on demand factors and the formation of behavioural norms which condition the whole age-sex structure of economic activity, the type of model developed in this paper continues to be a useful tool of analysis.

Appendix

Labour Force Participation Functions when the Dependent Variable is Dichotomous

In the case of the labour supply function where the dependent variable is continuous ordinary least squares regressions can be used, but in the case of labour force participation (e.g. ACTIVE) a dummy dichotomous dependent variable is utilised.[1] In the latter case, in which quantal responses are involved, the dependent variable is a probability such that $0 \leqslant P \leqslant 1$. And so where the nature of the dependent variable is dichotomous a transformation is required to ensure that P does lie at or between 0 and 1. Moreover with a dummy dependent variable the OLS regression method is inappropriate because the disturbance term in the equation used to estimate the behavioural response will not have a normal distribution but a discrete one. Where the disturbance term is heteroscedastic the OLS estimators will not be efficient though the equations will be statistically unbiased since the expected value of the coefficients will be equal to the true parameters.[2]

In correcting for heteroscedasticity it is necessary to transform the model, or equation, to be tested so that the transformed disturbance term has constant variance. In the case of quantal responses the appropriate transformation concerns the dependent variable and involves a monotonic transformation of the probability limits such that the

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[1] In the study of labour force participation in terms of a dichotomy of two states, that of being in the labour force or outside it, one is dealing with quantal (all-or-nothing) responses which will depend on the intensity of stimuli. Below certain values of stimuli no response will occur, but when the value of a stimulus variable reaches a certain value a threshold will be reached and a response will occur. See D.J. Finney, Probit Analysis (Cambridge University Press, 1971 edition), p.8.

[2] For a discussion of the use of dummy dependent variables and heteroscedasticity, see J. Johnston, Econometric Methods, 1962, pp. 224-228; and H. Theil, Principles of Econometrics, 1971, pp. 628-633.

transform increases from $-\infty$ to ∞ as P increases from 0 to 1. The probability of response on a transformed scale can be measured by the normal equivalent deviate (NED).

$$P = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{Y} \exp\left(-\frac{1}{2}u^2\right) \delta u \qquad \text{(i)}$$

Thus the NED of any value of P, where $0 \leqslant P \leqslant 1$ is defined as the abscissa corresponding to a probability P in a normal distribution with mean 0 and variance 1. Although this does not correspond strictly to it this transformation is typically described as the probit transformation.[1] However where the probability of response to a given stimulus is quantal (all or nothing), rather than representing a tolerance distribution, the logistic function is a more appropriate transformation than the cumulated distribution function of the standardised normal deviate.[2] For this Berkson has shown that the logit transformation is appropriate, and can be defined as analogous to the probit transformation, replacing (i) by

$$P = \frac{e^Y}{1+e^Y} \qquad \text{(ii)}$$

The logit transformation provides for P moving from zero to ∞ as Y (the untransformed dependent variable) moves from 0 to 1. The usual statistical method for use with the logit function is maximum likelihood and it is this approach which will be adopted in the present study where the dependent variable is dichotomous as it is in the analysis of the propensity to participate in the labour force.[3]

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[1] For a thorough discussion, see Finney, op cit, p.22 ff.

[2] Finney, op cit, p.47.

[3] The maximum likelihood method chooses from among all possible estimates of the parameters those values which make the probability of obtaining the observed pattern as large as possible. An alternative approach to the maximisation of the likelihood function is the minimisation of X^2. See J. Berkson, "Maximum Likelihood and Minimum X^2: Estimates of the Logistic Function", Journal of the American Statistical Association, Vol. 50, 1955, pp. 130-162.

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