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Labor Force Participation of Married Women: A Study of Labor Supply

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Introductory: Statement of the Problem

On the assumption that leisure time is a normal good, the standard analysis of work-leisure choices implies a positive substitution effect and a negative income effect on the response of hours of work supplied to variations in the wage rate. An increase in the real wage rate makes leisure time more expensive and tends to elicit an increase in hours of work. However, for a given amount of hours worked, an increase in the wage rate constitutes an increase in income, which leads to an increase in purchases of various goods, including leisure time. Thus, on account of the income effect, hours of work tend to decrease. In which direction hours of work change on balance, given a change in the wage rate, cannot be determined a priori. It depends on the relative strengths of the income and substitution effects in the relevant range. The single assumption of a positive income elasticity of demand for leisure time is not sufficient to yield empirical implications on this matter.

An empirical generalization which fills this theoretical void is the "backward-bending" supply curve of labor. This is the notion that on the average the income effect is stronger than the substitution effect, so that an increase in the wage rate normally results in a decreased amount (hours) of work offered by suppliers of labor. Extreme examples of such behavior have been repeatedly observed in underdeveloped countries. On the American scene, several kinds of empirical evidence apparently point to the same relationship:[1] the historically

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[1] The pioneering works of research and interpretation in this area are well known. See: Paul H. Douglas, *The Theory of Wages*, Macmillan, 1934; John D. Durand, *The Labor Force in the U.S.*, Social Science Research Council, 1948; Clarence D. Long, *The Labor Force under Changing Income and Employment*, Princeton University Press for National Bureau of Economic Research, 1958.

declining work week in industry; historically declining labor force participation rates of young and old males; an inverse relation between wages of adult males and labor force participation rates of females by cities in cross sections; an inverse relation between incomes of husbands and labor force participation of wives, by husbands' incomes, in budget studies. Similar phenomena have been reported from the experience of other modern economies.

The secular negative association between the length of the work week, participation rates of males, and rising real incomes is clearly consistent with the backward-bending supply curve.[2] Whether this is also true of cross-sectional data on males is a question which has as yet received little attention. Superficially, the cross-sectional behavior of females seems similarly capable of being rationalized in terms of a backward-bending supply response, or at least in terms of a positive income elasticity of demand for leisure. Such views, however, are immediately challenged by contradictory evidence in time series. One of the most striking phenomena in the history of the American labor force is the continuing secular increase in participation rates of females, particularly of married women, despite the growth in real income. Between 1890 and 1960 labor force rates of all females fourteen years old and over rose from about 18 per cent to 36 per cent. In the same period rates of married women rose from 5 per cent to 30 per cent, while real income per worker tripled.[3]

The apparent contradiction between time series and cross sections has already stimulated a substantial amount of research. The investigation reported in this paper is yet another attempt to uncover the basic economic structure which is, in part, responsible for the observed relations.

The study starts from the recognition that the concepts of work, income, and substitution need clarification and elaboration before they can be applied to labor force choices of particular population groups, in this instance married women. The resulting analytical model, even though restricted to two basic economic factors, seems capable of explaining a variety of apparently diverse cross-sectional behavior patterns. It also, in principle, reconciles time series with cross-section behavior, though further elaboration is needed for a proper explanation

[2] For a rigorous statement, see H. Gregg Lewis, "Hours of Work and Hours of Leisure," *Proceedings of the Industrial Relations Research Association*, 1957.

[3] Based on Long, *The Labor Force*, Table A-6; and *Employment and Earnings*, Bureau of Labor Statistics, 1960.

of the former. The empirical focus of the paper is a reinterpretation of old cross-section materials, and an investigation of newly available data generated by the 1950 BLS Survey of Consumer Expenditures.

Conceptual Framework

WORK

The analysis of labor supply to the market by way of the theory of demand for leisure time viewed as a consumption good is strictly appropriate whenever leisure time and hours of work in the market in fact constitute an exhaustive dichotomy. This is, of course, never true even in the case of adult males. The logical complement to leisure time is work broadly construed, whether it includes remunerative production in the market or work that is currently "not paid for." The latter includes various forms of investment in oneself, and the production of goods and services for the home and the family. Educational activity is an essential and, indeed, the most important element in the productive life of young boys and girls. Work at home is still an activity to which women, on the average, devote the larger part of their married life. It is an exclusive occupation of many women, and of a vast majority when young children are present.

It is, therefore, not sufficient to analyze labor force behavior of married women in terms of the demand for leisure. A predicted change in hours of leisure may imply different changes in hours of work in the market depending on the effects of the causal factors on hours of work at home. Technically speaking, if we are to derive the market supply function in a residual fashion, not only the demand for hours of leisure but also the demand for hours of work at home must be taken into account. The latter is a demand for a productive service derived from the demand by the family for home goods and services. A full application of the theory of demand for a productive service to the home sector has implications for a variety of socioeconomic phenomena beyond the scope of this paper.

FAMILY CONTEXT

The analysis of market labor supply in terms of consumption theory carries a strong connotation about the appropriate decision-making unit. We take it as self-evident that in studying consumption behavior the family is the unit of analysis. Income is assumed to be pooled, and

total family consumption is positively related to it. The distribution of consumption among family members depends on tastes. It is equally important to recognize that the decisions about the production of goods and services at home and about leisure are largely family decisions. The relevant income variable in the demand for home services and for leisure of any family member is total family income. A change in income of some family member will, in general, result in a changed consumption of leisure for the family as a whole. An increase in one individual's income may not result in a decrease in *his* hours of work, but in those of other family members. The total amount of work performed at home is, even more clearly, an outcome of family demand for home goods and for leisure, given the production function at home. However, unlike the general consumption case, the distribution of leisure, market work, and home work for each family member as well as among family members is determined not only by tastes and by biological or cultural specialization of functions, but by relative prices which are specific to individual members of the family. This is so, because earning powers in the market and marginal productivities in alternative pursuits differ among individual family members. Other things equal (including family income), an increase in the market wage rate for some family member makes both the consumption of leisure and the production of home services by that individual more costly to the family, and will as a matter of rational family decision encourage greater market labor input by him (her). Even the assumption of a backward-bending supply curve would not justify a prediction of a decrease in total hours of work *for the particular earner*, if wages of other family members are fixed.

Recognition of the family context of leisure and work choices, and of the home-market dichotomy within the world of work, is essential for any analysis of labor force behavior of married women, and perhaps quite important for the analysis of behavior of other family members, including male family heads. For the present purpose of constructing a simple model of labor force behavior of married women it will be sufficient to utilize these concepts only insofar as they help to select and elucidate a few empirically manageable variables to represent the major forces of income and substitution contained in the market supply function.

WORK CHOICES

Let us consider the relevant choices of married women as between leisure, work at home, and work in the market. Income is assumed to have a positive effect on the demand for leisure, hence a negative effect on total amount of work. With the relevant prices fixed, increased family income will decrease total hours of work. Since the income effect on the demand for home goods and services is not likely to be negative,[4] it might seem that the increased leisure means exclusively a decrease in hours of work in the market. Such a conclusion, however, would require a complete absence of substitutability between the wife and other (mechanical, or human) factors of production at home, as well as an absence of substitution in consumption between home goods and market-produced goods. Domestic servants, laborsaving appliances, and frozen foods contradict such assumptions. Substitutability is, of course, a matter of degree. It may be concluded therefore that, given the income elasticity of demand for home goods and for leisure, the extent to which income differentially affects hours of work in the two sectors depends on the ease with which substitution in home production or consumption can be carried out. The lesser the substitutability the weaker the negative income effect on hours of work at home, and the stronger the income effect on hours of work in the market.

Change in this degree of substitutability may have played a part in the historical development. At a given moment of time, the degree of substitutability is likely to differ depending on the content of home production. Thus substitutes for a mother's care of small children are much more difficult to come by than those for food preparation or for physical maintenance of the household. It is likely, therefore, that the same change in income will affect hours of market work of the mother more strongly when small children are present than at other times in the life-cycle.

While family income affects the total amount of work, the market wage rate affects the allocation of hours between leisure, the home, and the market. An increase in the real wage rate, given productivity in the home, is an increase in prices (alternative costs) of home production as well as of leisure in terms of prices of wage goods. To the

[4] Fragmentary cross-sectional data on food preparation at home indicate a negligible income elasticity. The demand for other home goods and services (including care of children, and their number) may be more income elastic.

extent of an existing substitution between home goods and wage goods such a change will lead to an increase in work supplied to the market. Again, the strength of the effect is a matter of the degree of substitution between wage goods and home production.

TEMPORAL DISTRIBUTION OF WORK

In a broad view, the quantity of labor supplied to the market by a wife is the fraction of her married life during which she participates in the labor force. Abstracting from the temporal distribution of labor force activities over a woman's life, this fraction could be translated into a probability of being in the labor force in a given period of time for an individual, hence into a labor force rate for a large group of women.

If leisure and work preferences, long-run family incomes, and earning power were the same for all women, the total amount of market work would, according to the theory, be the same for all women. Even if that were true, however, the *timing* of market activities during the working life may differ from one individual to another. The life cycle introduces changes in demands for and marginal costs of home work and leisure. Such changes are reflected in the relation between labor force rates and age of woman, presence, number and ages of children. There are life-cycle variations in family incomes and assets which may affect the timing of labor force participation, given a limited income horizon and a less than perfect capital market. Cyclical and random variations in wage rates, employment opportunities, income and employment of other family members, particularly of the head, are also likely to induce temporal variations in the allocation of time between home, market, and leisure. It is not surprising, therefore, that over short periods of observation, variation in labor force participation, or turnover, is the outstanding characteristic of labor force behavior of married women.

To the extent that the temporal distribution of labor force participation can be viewed as a consequence of "transitory" variation in variables favoring particular timing, the distinction between "permanent" and current levels of the independent variables becomes imperative in order to adapt our model to family surveys in which the period of observation is quite short.

An Econometric Model for Cross Sections

"PERMANENT" LEVELS OF VARIABLES AND AREA REGRESSIONS

The simplest specification of a labor-market supply function of married women to which the theoretical considerations lead is:

$$m = \beta_p \cdot y + \gamma w + u \quad (1)$$

where m is the quantity of labor supplied to the market, y is a "potential permanent level" of family income[5] computed at a zero rate of leisure and of home production, w is the wife's full-time market wage or market earning power, and u reflects other factors or "tastes." Since family income so computed is a sum of market earning powers of family members plus property income, we may write $y = x_p + w$, where x_p stands for the permanent level of income of the family which does not include earnings of the wife. For empirical convenience we shall identify x_p with income of the husband. This creates some inaccuracy, to the extent that contribution to family income of family members other than head and wife is important.

It is useful to rewrite equation 1 in terms of income of the husband since most data relate labor force behavior of wives to incomes of husbands. Indeed, the use of observed family income in empirical study of the supply relation would be inappropriate. Instead of serving as a determinant of labor force behavior, it already reflects such decisions.

Substituting for y into (1):

$$m = \beta_p (x_p + w) + \gamma w + u = \beta_p x_p + \alpha w + u \quad (2)$$

Since $\alpha = \beta_p + \gamma$, equation 1 can be estimated by means of equation 2.

In equation 1 parameter β_p represents the effect of "permanent" family income on the wife's market labor input, keeping her market earning power constant; γ represents the effect of the wife's market earning power, keeping family income constant. The theoretical expectation is that $\beta_p < 0$ and $\gamma > 0$.

The statement of the hypothesis $\beta_p < 0$ in equation 2, when applied to cross sections is: Given a group of women with the same market earning power, and tastes for leisure assumed independent of husbands' earning power, there will be, on the average, a negative relation be-

[5] The definition of "permanent" and "transitory" components of income follows that stated by Friedman in his consumption theory. Permanent income is income in the long-run sense, measuring income status or normal income position. Transitory income is the difference between current and permanent income. See Milton Friedman, *A Theory of the Consumption Function*, Princeton for NBER, 1957.

tween husbands' income and hours of market work of wives.[6] This is so because, in this statement, a higher income of husband means a higher family income and, on the assumption that leisure is a normal good, this implies a lesser total amount of work of the wife, at home and in the market.

On the assumption that, in cross sections, productivities of women in the market are unrelated to their productivities in the home, w measures the relative price of labor in the two sectors. In equation 1 γ is therefore a pure substitution effect, hence a positive number reflecting the attractive power of the wage rate in pulling women into the labor market. Parameter a in equation 2 is a relative price effect not compensated by a change in income. The question of its sign can be stated as follows: Given a group of women whose husbands have the same earning power, what is the effect of a difference in the female wage rate on hours of work on the market? Clearly, a higher wage rate will shift women from the home sector and from leisure to the market sector. However, since in this case family income increases as a result of the increase in the wives' earning power, *total* hours of work will tend to decrease. Whether hours of work in the market will increase or decrease depends on whether the job shift from home to market adds more hours of work to the market sector than is subtracted from it by a possibly increased consumption of leisure. Whether the net outcome is a positive or negative sign of a is, therefore, an empirical question. It is certainly incorrect to predict that the income effect of the wage rate on market work exceeds the substitution effect by analogy to the backward-bending supply curve. The two substitution effects involved in this comparison are quite different; the strength of substitution between wage goods and leisure time has no bearing on the strength of substitution between home production and wage goods. If anything, one would intuitively expect the latter to exceed the former.

Equation 2 was specified in terms of long-run magnitudes, such as earning power of husband and wife which also implies a long-run concept of hours of work on the left-hand side. Such specification is inappropriate for most empirical data in which individual families report current annual income and labor force participation of the wife during a survey week, or her work experience during a year. One set

[6] To the extent that women with strong tastes for leisure tend to seek out rich husbands, the true income effect (keeping tastes fixed) is overestimated in cross sections.

of data, however, is usable without adapting the model to the distinction between "permanent" and current magnitudes: These are area statistics which were heavily utilized by Douglas and Long mainly because of the absence of more detailed disaggregations. Even with such data currently available, which are much richer on the individual level, the area averages have special advantages for the purpose of estimating the coefficients of equation 2. First, the data provide information on average earning power of employed females, which can be used as a proxy for w. The second and basic merit of the community averages is that they can be interpreted as approximations to the long-run or permanent levels of the relevant variables.[7] Given that the age and family-type mix in different communities is rather similar at a given time,[8] average income and labor force figures could be considered equivalent to average magnitudes over the life-cycle, when secular trends in population and income are disregarded. At any rate, these averages are free from short-run "transitory" deviations of individual incomes from their normal levels. However, the community averages contain a transitory deviation common to the whole group. In other words, some areas may at a given time be below or above their normal levels of economic activity. The labor force response to such a transitory deviation should be clearly distinguished from the response to an individual difference in a group. Abnormally low or high levels of economic activity in a community create different employment opportunities, and, broadly speaking, cyclical variations in wage rates. On that account, rational timing of market work would be pro-cyclical. On the other hand, a cyclical decline means a loss in husbands' incomes and employment which may induce an opposite labor force response of wives. The controversy centering around the "added worker hypothesis"[9] is a debate about the net outcome of these two different forces for groups over the business cycle. Responses to individual short-run income variations *within* a group at a given time are motivated

[7] This strategy has been employed with some success in the analyses of consumption behavior. See Margaret G. Reid, "Consumption and the Income Effect" (unpublished manuscript); also R. Eisner, "The Permanent Income Hypothesis: Comment," *American Economic Review*, Dec. 1958, pp. 972-980.

[8] Labor force rates by cities, standardized for age, differ negligibly from unstandardized ones.

[9] According to that hypothesis, the labor force increases in depressions because unemployment of the main breadwinner induces other family members to seek employment. See W. S. Woytinsky, *Additional Workers and the Volume of Unemployment in the Depression*, S.S.R.C., 1940. For a critical analysis see Long, *The Labor Force*, Chapter 10.

by only one of the forces, since the cyclical level is fixed for the whole group. Knowledge of this response to transitory income of the family provides, by itself, no answer to the question posed by the "added worker" controversy.

Table 1 provides estimates of the coefficients of equation 2 as well as coefficients for the equation expanded to include 5 independent

TABLE 1

AREA REGRESSIONS OF LABOR FORCE RATES OF MARRIED WOMEN, ALL NORTHERN STANDARD METROPOLITAN AREAS OF 250,000 OR MORE POPULATION IN 1950

	INDEPENDENT VARIABLES					
	X_1	X_2	X_3	X_4	X_5	R^2
	(thousands of dollars)			(per cent)		
Regression coefficients and standard errors	−0.62 (0.21)	+1.33 (0.11)	+0.12 (0.27)	−0.41 (0.53)	−0.24 (0.61)	0.62
Regression coefficients	−0.53	+1.52				0.51
Elasticities at means	−0.83	+1.50				

NOTE: See text for description of independent variables.

SOURCE: *U.S. Census of Population 1950*, Vol. II, *Characteristics of the Population*, Tables 86, 88, 183; Special Report, *General Characteristics of Families*, Table 41; and Gertrude Bancroft, *The American Labor Force, Its Growth and Changing Composition*, New York, Wiley, 1958, Table D-11.

variables. The regression analysis was restricted to 57 largest Standard Metropolitan Areas (population, 250,000 and over) in the North. It was felt that the SMA approximate labor markets more properly than cities. Southern areas were excluded because of the desire to exclude color differentials, which need to be studied separately. The dependent variable is the labor force participation rate (in per cent) of married women with husband present during the census week early in 1950. X_1 is the median income in 1949 of male family heads, wife present; X_2 is the median income of females who worked 50 to 52 weeks in 1949. These are the empirical proxies for x_p and w in equation 2. Three independent variables were added to help in the interpretation. Since areas differ by educational composition, which may affect as well as reflect tastes for market work or for its continuity, this variable was represented by the per cent of population age 25 and over with completed high school education or more (X_3). The position of the community relative to its normal levels of economic activity (group transi-

tory) was represented by the male unemployment rate (X_4). Finally, to take care of the more important differences in demand for work at home, the per cent of families with children under 6 years of age was represented by (X_5).

The coefficients in Table 1 are informative: Judging by the coefficient of determination (R^2), the male income (X_1) and female wage rate (X_2) variables alone explain a half of the observed variation in labor force participation rates among areas in 1950. The effect of husbands' incomes is negative,[10] as theoretically expected. The effect of wives' earning power is positive, and indeed stronger than the effect of income. This result is quite suggestive with regard to time series, though not directly applicable.[11] The introduction of a measure of educational level (X_3) into the equation attenuates the wage rate effect somewhat, though not significantly in a statistical sense. Unemployment (X_4) is seen to have a discouraging effect on labor force participation. This appears to be a contradiction of the added worker hypothesis, though the information is not sufficient to yield statistical significance.[12] Finally, the presence of small children (X_5) has an effect in the expected direction, though again statistical significance is lacking.

ADAPTATION OF THE MODEL TO ANALYSIS OF FAMILY SURVEYS

When labor force behavior (reported for a week or for the preceding year) of wives is related to current income of husbands in family surveys, the observed relation is a compound of two effects which it is important to distinguish: the responsiveness of labor force behavior (1) to husbands' long-run income positions, and (2) to current deviations of that income from its normal level.[13]

[10] This stands in contrast to Long's finding that the negative relation between earnings of males and labor force rates of females, by areas, which was observed by Douglas and Long in other census periods, seems to have vanished in 1950. Such an impression, however, is based on a gross regression between the two variables and is not confirmed, when the other relevant variable, the female wage rate, is included in the equation. Table 1 indicates no basic change in the structure of the labor force relation between 1940 and 1950: A comparable two-variable regression in 1940 showed an income elasticity of -0.91 and a wage rate elasticity of $+1.26$. The change in the *gross* regression from negative to positive is due to a larger positive intercorrelation between male and female earnings in 1950 ($r = +.8$) than in 1940 ($r = +.4$).

[11] See section on cross sections and time series, below, for a discussion of time series.

[12] For a further discussion of the "added worker" question, see section on secular and cyclical effects of transitory components, below.

[13] For present purposes, a similar distinction between current and "permanent"

How the two factors, if distinct, may affect empirical results is easily discernible: Assume, for example, that, other things equal, wives' market activities are geared to long-run or permanent income, and are not affected in quantity or in timing by current deviations from it. Compare two groups of families, standardized for other characteristics, and with the same observed distribution of husbands' incomes in each. If differences among incomes are purely transitory in one group, and of a lasting nature in the other, an inverse relation between income of husband and participation of wife will be observed in the second group, but not in the first. Exactly the opposite result is obtained if we assume that wives respond to transitory, but not to permanent income. More generally, the observed negative relation will be steeper in the first group, if labor force behavior is more responsive to transitory than to permanent levels of income, and conversely if it is more responsive to permanent levels. Thus, survey observations may yield slopes of varying steepness in different bodies of data, depending on the differential responsiveness of labor force behavior to the two components of income, and on the extent to which the current income variation in the observed groups is "made up" of the two components.

A basic question, at this point, is whether a response to transitory income does exist at all. It is not obvious that temporal variation in family income makes it worthwhile to change the timing of market activities of wives. Such a hypothesis, however, may be derived from several considerations:

According to the simplest version of consumption theory, the absolute income hypothesis, current consumption responds to changes in current income. Hence, as income declines, leisure declines, and work increases. If the temporary change in family income, say a decline, is due to a change in employment (of head), and the family finds itself with an excess amount of "leisure," an attempt is made to restore equilibrium by increased market work of the wife. This is particularly likely, if unemployment is not general, and if the husband to some extent helps out at home.

This theory does not explicitly recognize distinctions between consumption responses to short-run and long-run income variation. Such a distinction is basic to the permanent income theory. According to that

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levels of the female wage rate is not formally introduced. Short-run variations in it, or rather in employment opportunities, are largely a matter of industry differences among communities. We may assume that such differences are much less important in family surveys than in area comparisons.

theory, aggregate family consumption is determined even in short periods by long-run levels of family income. Adjustment between planned consumption and income received in the short period of observation (current, or measured income) takes place via saving behavior, that is, via changes in assets and debts. However, if assets are low or not liquid, and access to the capital market costly or nonexistent, it might be preferable to make the adjustment to a drop in family income on the money income side rather than on the money expenditure side. This is so because consumption requiring money expenditures may contain elements of short-run inflexibility such as contractual commitments. The greater short-run flexibility of nonmoney items of consumption (leisure, home production) may also be a cultural characteristic of a money economy. Under these conditions, a transitory increase in labor force participation of the wife may well be an alternative to dissaving, asset decumulation, or increasing debt. One useful empirical implication of this hypothesis for labor force behavior is that it should be inversely related to the level of family assets, both in the life-cycle and in the short-run sense.

The proper interpretation of survey data, therefore, requires a specification of transitory income (x_t) in addition to permanent income (x_p) which was included in equation 2. The model becomes:

$$m = \beta_p \cdot x_p + \beta_t \cdot x_t + a \cdot w + u \quad (3)$$

Two avenues are open for empirical utilization of equation 3. One is an attempt to estimate the coefficients, particularly the new coefficient β_t. Another is the exploration of the implications of equation 3 for observable relations in various bodies of survey data. Both approaches are used. In both cases the major substantive interest is focused on the relative sizes of β_p and β_t, as well as on those of β_p and a.

Equation 3, if correct, points out two major reasons for the difficulties in understanding the usual cross-sectional findings.[14] No information is available on the extent to which current income represents long-run income. When labor force rates of wives are classified by characteristics of husbands, little or no information is given on characteristics of wives. Since the newly available data from the 1950 BLS Survey of Consumer Expenditures are less deficient in these respects, we turn first to them for an empirical analysis.

[14] Comprehensive summaries of census findings are provided by Gertrude Bancroft, *The American Labor Force, Its Growth and Changing Composition*, New York, Wiley, 1958, and by Long, *The Labor Force*.

BLS Survey of Consumer Expenditures

The more systematic testing of the analytical model (equation 3) and estimation of its parameters, particularly of β_t, the coefficient of transitory income, were made possible by cards especially prepared by the Bureau of Labor Statistics from its 1950 Survey of Consumer Expenditures. The cards contain information on economic and other characteristics of individual earners cross-classified by a number of such characteristics of the urban consumer units of which they are members. In what follows, employment status of wives is related to income and work experience of husbands, roughly standardized by age, education, and family type.

For the purpose of this study, the data were restricted to white husband-wife families, excluding units of which heads were self-employed or not gainfully occupied. The excluded population subgroups are known to exhibit differential patterns of labor force behavior. Separate analyses and comparisons are therefore required. The resulting homogeneous sample contained 6,766 consumer units. It was stratified by age and education of head, as well as by presence or absence of young children in the younger age group.[15] The 12 strata so obtained (shown in Table 2) were in turn subdivided into units with heads working full time year-round, and heads not fully employed during the year. Whenever analytically convenient, these subgroups within strata were merged.

The first three columns in Table 3 provide information on average labor force responses of wives to empirical approximations of the permanent levels of the independent variables given by weekly earnings of fully employed heads and by weekly earnings of employed wives. The female labor force rates[16] (column 3) can be interpreted as such response only within each of the four age-family type groups. Differences between groups are influenced by life-cycle phenomena.

Within each of the age-family type groups, except the first, average labor force behavior of wives is consistent with the findings in the area regression. That is, the positive effect of the female wage rate outweighs the negative effect of heads' income power. Indeed, the positive

[15] Preschool children are not important numerically in the older age groups. Unfortunately, time and budget considerations did not permit more detailed stratifications.

[16] Strictly speaking, these are employment rates, that is, the proportion of wives who were employed at any time during the survey year. Labor force rates are, therefore, somewhat underestimated.

TABLE 2

STRATIFICATION AND SAMPLE SIZES OF HUSBAND-WIFE URBAN CONSUMER UNITS, 1950 BUREAU OF LABOR STATISTICS DATA

Age of Head	*Education of Head* Elementary (8 years or less)	High School (9-12 years)	College (13 years or more)
Less than 35, oldest child less than 16	139 75	747 216	283 119
Less than 35, no small children	55 15	258 59	45 43
35-54	851 287	1,308 280	618 139
55 and older	491 221	232 113	117 25

NOTE: Upper figures for each group refer to family units with heads working full time year-round. Lower figures refer to units with heads working less than a full year.

TABLE 3

LABOR FORCE RATES OF WIVES OF FULLY EMPLOYED HEADS, BY HEADS' AGE, EDUCATION, INCOME, AND BY WIVES' WEEKLY EARNINGS

Heads' Age	*Heads' Education*	Heads' Earnings per Week (dollars) (1)	Wives' Earnings per Week (dollars) (2)	*Wives' Labor Force Rate*[a] Average (per cent) (3)	When Head Earned $2,000-$3,000 (per cent) (4)
Less than 35, oldest child less than 16	Elementary	62.5	41.2	27	19
	High school	71.6	44.2	23	27
	College	83.6	47.1	18	36
Less than 35, no small children	Elementary	63.3	44.7	62	62[b]
	High school	66.7	46.3	69	65
	College	80.1	50.5	69	83[b]
35-54	Elementary	70.0	41.1	31	37
	High school	79.5	45.9	33	45
	College	115.3	52.4	38	56
55 and older	Elementary	65.8	38.6	16	21
	High school	85.6	41.1	20	38
	College	122.5	58.1	23	38[b]

SOURCE: 1950 BLS data.

[a] Husbands employed full time year-round.

[b] Based on less than 20 observations.

wage rate elasticity must be more than twice as large as the negative income elasticity since, moving from lower to higher education and income levels in each group, the per cent increase in wives' weekly earnings is less than half the per cent increase in husbands' earnings. Over the life cycle as a whole, this excess of the wage rate elasticity over the income elasticity is not so great, since the young group with small children exhibits what seems to be a stronger negative income effect or a weaker positive wage rate effect, or both. The theoretical likelihood of such behavior of units at the time when small children are present was discussed before.[17]

Differences in labor force behavior between the age-family type groups are caused largely by life-cycle differences in family responsibilities. The low rates in the open-ended oldest age group probably reflect retirement age, as well as effects of larger property income and of greater contributions to family income by members other than head and wife. This is supported by the fact that the percentage difference between full time earnings of heads and total family income increases after age 35 despite the declining labor force rates of wives.[18]

The last column of Table 3 suggests a response of labor force behavior to transitory components of income. At the same low current earnings of husbands ($2,000-3,000 in this illustration), labor force rates of wives increase with the heads' education, hence with their permanent income. The increase in rates is much more pronounced at the fixed income level than for the group averages. Clearly, the higher the education of the head, the larger the (negative) difference between the fixed current income figure and his expected or long-run income position. In other words, in column 4, negative income transitories increase as we move from lower to higher education levels of heads in each age-family type group. To sum it up, figures in column 3 reflect the fact that, in each age group, the discouraging effect of husbands' normal earning power is more than outweighed by the positive effect of the female wage rate. The latter effect is augmented in column 4 by the negative transitory components of husbands' income exerting an additional push into the labor market.

More evidence on the influence of transitory components of family income on wives' labor force behavior is provided in Table 4. Rates for

[17] See section on Work Choices, above.

[18] See Table III in the author's "Labor Supply, Family Income, and Consumption," *Proceedings of the 1959 Annual Meeting of the American Economic Association, American Economic Review*, May 1960, p. 577.

TABLE 4

LABOR FORCE RATES OF WIVES, BY EARNINGS AND EMPLOYMENT OF HEADS

AGE OF HEAD	EDUCATION OF HEAD: ELEMENTARY — Heads' Earnings	Heads' Weeks[a]	Labor Force Rates of Wives	HIGH SCHOOL — Heads' Earnings	Heads' Weeks[a]	Labor Force Rates of Wives	COLLEGE — Heads' Earnings	Heads' Weeks[a]	Labor Force Rates of Wives
Less than 35,	$3,253	52	27%	$3,724	52	23%	$4,346	52	18%
oldest child	2,329	38	33	2,772	40	30	2,527	41	39
less than 16	−29	−27	+22	−26	−23	+30	−42	−21	+117
Less than 35,	3,291	52	62	3,467	52	69	4,166	52	69
no small	2,407	38	66	2,385	39	73	1,902	32	88
children	−27	−27	+6	−31	−25	+6	− 54	−39	+28
	3,636	52	31	4,135	52	33	5,996	52	38
35-54	2,395	36	44	2,871	39	49	3,442	42	52
	−37	−31	+42	−30	−25	+48	−43	−20	+37
	3,420	52	16	4,450	52	20	6,370	52	23
55 and older	1,792	28	27	2,139	30	27	2,950	34	16
	−47	−44	+68	−52	−42	+35	−46	−35	−30

SOURCE: 1950 BLS data.

NOTE: Upper figures for each age-family group refer to heads who worked full time year-round; figures on second line refer to heads who worked part period or part time, or both; figures on third line for each group are the percentage difference between upper and lower lines.

[a] Weeks paid for.

wives are higher when heads did not work a full year than when they did, in each of the 12 population groups except in the oldest with highest education level. The higher labor force rates in the second line for each group may have been expected in view of the lower annual earnings of heads. However, the differences between earnings within each group are of a quite different nature than those between groups. To the extent that the family units within each group have been made homogeneous by the stratification, income differences within them are of a transitory nature.

The extent to which the families within each group are homogeneous with respect to normal earnings of husbands can be inferred from the third line for each group. If the wage rate (weekly earning rate) were the same for the heads who were not fully employed as for those who were, the percentage "loss" of time worked (weeks not employed) would account for, and would exactly equal, all of the "decline" in the year's earnings. It is clear from Table 4, that (transitory) differences in weeks worked rather than (permanent) differences in wage rates account for the overwhelming part of the differences in the year's earnings between the 2 subgroups, particularly in the strata with elementary and high school education. In the college stratum, however, almost half of the drop is accounted for by permanent differences—the relative decline in earnings is almost twice as large as the relative decline in weeks worked. The heterogeneity of the group with respect to permanent income is not surprising: it lumps people with one year of college together with highly trained professionals.

Table 4 not only shows the existence of a negative labor force response to transitory income, but also suggests orders of magnitude of the elasticity. For each group ratios of percentage difference in labor force rates to percentage difference in earnings and to percentage difference in weeks worked provide rough alternative estimates of this elasticity. These estimates, shown in the last two columns of Table 5, generally exceed the estimate of the elasticity with respect to permanent income levels derived from the area regression (Table 1). A more rigorous test for the hypothesis that the labor force response to transitory income is stronger than the response to permanent income is developed in a procedure (Table 5) which also yields numerical estimates of the elasticities.[19]

[19] The elasticity estimates are equivalent to estimates of regression coefficients of equation 3 stated in terms of logarithms of its variables. They are used for purposes of comparability. In the following discussion the same symbols are used for elasticities as for slopes, but the distinction is made explicit in the text.

TABLE 5

GROSS AND PARTIAL REGRESSION COEFFICIENTS OF LABOR FORCE RATES OF WIVES ON EARNINGS AND WEEKS WORKED BY HEAD

AGE OF HEAD	EDUCATION	SLOPES[a] b_{ms} (1)	$b_{ms.e}$ (2)	$b_{me.s}$ (3)	ELASTICITY ESTIMATES OF: β_p (4)	$\beta_t-\beta_p$ (5)	β_t (6)	Alternative Elasticity Estimates[b] of β_t (7)	(8)
Less than 35, oldest child less than 16	Elementary	−0.132	+0.035	−0.327	+0.04	−0.61	−0.57	−0.79	−0.82
	High school	−0.604	−0.503	−0.347	−0.80	−0.75	−1.55	−1.19	−1.33
	College	−0.520	−0.423	−0.453	−1.02	−1.26	−2.28	−2.76	−5.60
Less than 35, no small children	Elementary	−0.460	−0.438	−0.071	−0.22	−0.05	−0.27	−0.24	−0.22
	High school	−0.246[c]	−0.188[c]	−0.210[c]	−0.09	−0.15	−0.24	−0.19	−0.24
	College	−0.624	−0.577	−0.190[c]	−0.35	−0.14	−0.49	−0.51	−0.77
35-54	Elementary	−0.623	−0.568	−0.124	−0.68	−0.20	−0.88	−1.14	−1.35
	High school	−0.511	−0.433	−0.535	−0.61	−0.81	−1.42	−1.61	−1.92
	College	−0.086	−0.338	+0.915	−0.54	+1.21	+0.67	−0.86	−1.85
55 and older	Elementary	−0.402	−0.346	−0.139	−0.73	−0.43	−1.16	−1.45	−1.50
	High school	−0.205	−0.254	+0.213	−0.56	+0.53	−0.03	−0.67	−0.83
	College	−0.092	−0.143	+0.326	−0.40	+0.71	+0.31	+0.66	+0.85

SOURCE: 1950 BLS data.

[a] b_{ms} = slope of regression of labor force rate (per cent) on earnings of head (thousands of dollars).
$b_{ms.e}$ = slope of regression of labor force rate on earnings of head, keeping weeks worked constant.
$b_{me.s}$ = slope of regression of labor force rate on weeks worked, keeping earnings of head constant.

[b] Based on Table 4: Ratios of percentage difference in labor force rates to percentage difference in earnings (col. 7), and to percentage difference in weeks worked (col. 8).

[c] Not significantly different from zero, under a 5 per cent level.

After merging the two employment groups, in each of the cells, a simple and a 2-variable regression of labor force rates of wives on the year's earnings of husbands and on weeks worked by him yielded the gross and partial slopes listed in Table 5. The slope (b_{mx}) of the gross regression of wives' labor force rates on husbands' earnings (column 1) combines the effects of permanent and of transitory income. The partial slope of the same relation ($b_{mx.e}$ in column 2) keeps the number of weeks worked by the head constant. It, therefore, approximates the response to heads' normal earning power, rather than to their current income. Finally, $b_{me.x}$ (in column 3) represents the response to weeks worked by heads, keeping their total earnings constant.

The sign of the slope $b_{me.x}$ (column 3) provides a test for the difference between the strengths of the two income effects on labor force behavior of wives.

If the distinction between permanent and transitory income did not matter, a change in weeks worked by heads, with total earnings constant, would produce no labor force response. This hypothesis is rejected by the data. All slopes in column 3 are statistically significant, except those in the young group without small children. This exception is plausible: the stage in the life cycle represented by this group, namely the period between marriage and first child, is usually short, and during that time most of the wives are employed anyway; thus, there is very little scope for variations in timing of employment within that stage.

Now a decline in weeks, keeping total earnings constant, means a corresponding amount of increase in earning power, which is offset by a transitory loss of income of the same amount. The change in the permanent component of income is expected to bring about a *decrease* in labor force participation. The same change of the transitory component in the opposite direction is expected to stimulate an *increase* in market activities. The direction of the net outcome depends, therefore, on which income effect is stronger. Indeed, the negative sign of $b_{me.x}$ provides evidence that the effect of transitory income outweighs the permanent income effect!

An estimate of the labor force response to transitory income (coefficient β_t in equation 3) is obtained as follows: The partial regression $b_{me.x}$ measures the arithmetic difference in labor force rates of wives due to the equal (but of opposite sign) differences in permanent and in transitory components of income. Converting the arithmetic difference

in labor force rates into a percentage difference (using rates of wives with fully employed husbands as base, column 3 in Table 3), and dividing it by the percentage difference in income, that is, by $(1/52 \times 100)$ we obtain the estimate of the difference $(\beta_t - \beta_p)$ in elasticity terms.[20] This estimate is shown in column 5 of Table 5.

The slope $b_{mx.e}$ which serves as an approximation of the response to permanent income (β_p) is next converted into an elasticity at the mean by the usual procedure[21] using the averages in Table 4. The estimate is shown in column 4 of Table 5. The sum of column 4 and column 5 in Table 5 provides an estimate of the response elasticity to transitory income (β_t), which is shown in column 6. These estimates of transitory income elasticity in column 6 resemble the alternative estimates in columns 7 and 8, though they are somewhat smaller.

Looking at the sizes of parameter estimates in Table 5, we find perhaps most meaningful for purposes of comparisons with aggregates those in the modal population group (age 35-55, high school education). The estimate of the elasticity with respect to permanent income (β_p) in it is not very different from the corresponding estimate in the area regression (Table 1). The estimate of the transitory elasticity (β_t) is more than twice as large.

The estimates vary among population subgroups in a roughly systematic way: Response to permanent income is weaker the higher the educational level of heads 35 years of age and older. Responses to transitory income differ in a similar way. An opposite pattern is discernible in the young groups with small children. In the young but childless groups the magnitudes are either small or statistically unreliable.

It is difficult to say how much substance could be assigned to these differentials, given all the necessary qualifications—about the rata and the estimating procedure. As previously mentioned, small income elasticities in the childless groups are theoretically plausible. But they may also be produced by the arithmetic of elasticities, since levels of partici-

[20] $\frac{e}{m} . b_{me \cdot x}$, where e is number of weeks worked by the heads, measures the percentage change in labor force rate per 1 per cent increase in weeks employed, keeping husbands' income constant. But a 1 per cent rise in e, as stated in the text implies a 1 per cent rise in transitory income x_t, *and* a 1 per cent decline in permanent income x_p. Hence: $\frac{e}{m} . b_{me \cdot x}$, in elasticity terms.

[21] Elasticity at the mean of y with respect to x is equal to the slope of the regression of y on x, multiplied by the ratio of the mean of x to the mean of y.

pation are high in these groups. The weakening response to transitory income with rising education level in the groups with family heads over 35 years old is consistent with the hypothesis that the availability of assets obviates the need for offsetting temporary income change by means of labor input.

The differential extent to which transitory components in heads' incomes are offset by family labor input in the various population groups is shown in Table 6. In each stratum the regression slope of

TABLE 6

ESTIMATES OF FRACTION OF NEGATIVE TRANSITORY INCOMES OF HEADS, WHICH IS OFFSET BY FAMILY LABOR INPUT

Age	Education	b_{ye}[a]	b_{xe}[b]	$1-\frac{b_{ye}}{b_{xe}}$
Less than 35, children under 16	Elementary	18.7	39.1	0.52
	High school	27.4	51.2	0.47
	College	33.2	60.5	0.45
Less than 35, no small children	Elementary	13.4	43.8	0.69
	High school	23.1	47.1	0.51
	College	32.4	60.1	0.46
35-55	Elementary	42.1	56.8	0.26
	High school	32.4	60.8	0.47
	College	46.7	75.1	0.38
Over 55	Elementary	40.6	54.6	0.25
	High school	45.1	54.1	0.17
	College	54.9	62.3	0.12

SOURCE: 1950 BLS data.

[a] b_{ye} = slope of regression of family income (dollars) on weeks worked by head.

[b] b_{xe} = slope of regression of heads' income (dollars) on weeks worked by head.

family income (before tax) on weeks worked by heads was divided by the regression slope of heads' earnings on weeks worked by them. This ratio measures the loss in family income relative to the loss in husbands' earnings due to one week's loss of employment. The per cent by which the numerator is smaller than the denominator measures the extent to which a change in head's income was offset by an opposite change in income of other family members.[22]

The results in Table 6 show that the absorption of negative transitory components of heads' income declines with increasing education after

[22] "Loss" and "change" are only figures of speech in a cross-section analysis.

age 35, and with advancing age in each education group. This absorption is, of course, a net effect of all earners, not just the wife, and is consistent with the hypothesis on alternatives to dissaving.

Census Surveys

Decennial censuses and current population reports of the Census Bureau are the major sources of empirical knowledge about labor force behavior of various population groups. The cross-sectional information on labor force rates of married women is usually contained in one-way or, less frequently, two-way classifications of these rates by variables such as: current or preceding year's income of husbands or of family, education, occupation, age, presence and age of children, color, location, and so forth. These gross relations between labor force rates and the classifying variables are manifold and bewildering. A literal reading of such relations as separate effects of the particular classifying variables is confronted with puzzling differences among various sets of cross-sectional data and leads to apparent contradictions with time series. The purpose of the empirical analysis in this section is to explore the extent to which the economic model presented in this paper (equation 3) is capable of rationalizing some of the observed patterns. Alternatively, this exploration can be viewed as a set of additional tests of the model and of hypotheses concerning sizes of its parameters.

In order to apply equation 3 to the observable gross relations let us deduce the implications of the model for such relations. Starting with the observed gross relation between husbands' income and wives' participation rates (b_{mx}), it can be shown that:[23]

$$b_{mx} = [\beta_p \cdot P + \beta_t \cdot (1\text{-}P)] + a \cdot b_{wx} \quad (4)$$

Specifically, the observed elasticity is a sum of two terms. The first term (in brackets) is an average of permanent (β_p) and transitory (β_t) income elasticities weighted by the ratio (P) of permanent income variance to current income variance. Since both elasticities are negative, this term is negative. The second term is a product of the

[23] From $m = \beta_p \cdot x_p + \beta_t x_t + aw + u$, where the variables are measured as deviations from their means,

$$\Sigma mx = \beta_p \cdot \Sigma x_p \cdot x + \beta_t \cdot \Sigma x_t \cdot x + a\Sigma wx + \Sigma ux$$

Assuming that x_t is independent of x_p and of u, and dividing by Σx^2:

$b_{mx} = \beta_p \cdot P + \beta_t \cdot (1\text{-}P) + ab_{wx}$, where b_{mx} is the least squares regression of m on x, b_{wx} the least squares regression of w on x and P the ratio of variance of X_p to the variance of X. Elasticities replace slopes and relative variances replace variances when the original model is specified in logarithms.

female wage rate elasticity (α) and the elasticity of wives' earning power with respect to current income of husband (b_{wx}), that is, of the rate at which a difference in wage rates of wives is associated with a difference in income of husbands. The second term is expected to be positive. It must, therefore, be smaller in absolute size than the first, in order to yield the usually observed negative relation between labor force rates of wives and incomes of husbands, by husbands' current income brackets. This is true for two reasons: b_{wx} is small, thereby weakening the positive effect of the wage rate; and β_t is substantially stronger than β_p, thereby augmenting the negative effect of (permanent) income. That the regression of earning power of wife on income of husband is rather weak is indicated by several sets of data. According to Table 3, the elasticity coefficient is 0.4 to 0.5, by income averages of education groups within age groups. A similar figure was computed from a Census cross-classification of median occupational full-time wages of husbands and wives in 1956.[24] Another computation, which applies full-time average incomes of education classes of males and females[25] to a cross-classification of husbands and wives, by educational background,[26] produced an elasticity coefficient of about 0.5. The inverse regression of the same variables produced an elasticity coefficient of 0.7. Strictly speaking, these are estimates of b_{wx_p} and b_{x_pw} respectively, the regressions with permanent incomes. The term in equation 4 is the regression of *current* income on wives' wage rate (b_{wx}) which is likely to be weaker than b_{wx_p}.[27]

When the wage rate of wife is kept fixed, the second term in equation 4 vanishes, and

$$b_{mx.w} = \beta_p \cdot P + \beta_t \cdot (1\text{-}P) \quad (4a)$$

If the absolute size of β_t is, in fact, greater than that of β_p, the observed regression $b_{mx.w}$ is steeper than the "long-run" coefficient β_p, so long as the variance of current income exceeds the variance of permanent income ($P < 1$). Also, the negative size of $b_{mx.w}$ increases the smaller P, that is the greater the contribution of transitory components to the current income variance.

[24] Published as Table 2 by Richard N. Rosett in "Working Wives: An Econometric Study," *Studies in Household Economic Behavior*, Yale University Press, 1958, p. 85.

[25] *Current Population Reports*, P-60, No. 27, April 1958, Table 20, p. 37.

[26] *Current Population Reports*, P-20, No. 83, Aug. 1958, Table C, p. 2.

[27] Indeed, a reasonable assumption that X_t is independent of w, yields

$$b_{wx} = b_{wx_p} \cdot P, \text{ since } \frac{\Sigma wx}{\Sigma x^2} = \frac{\Sigma wx_p}{\Sigma x_p^2} \cdot \frac{1}{P}$$

Looking next at the regression on w, and assuming the X_t is independent of w, we find the expression for the gross relation between wives' earning power and labor force rate is:[28]

$$b_{mw} = \beta_p \cdot b_{x_p w} + a \quad (5)$$

It is clear from equation 5 that the observed gross wage rate elasticity of labor force participation (b_{mw}) underestimates the true elasticity (a), because of the negative first term on the right-hand side. It must be positive, however, if $/a/ > /\beta_p/$, and closer to a than to zero, if our previous estimates are roughly correct.

Implications 4 and 5 can be simultaneously put to a test, if labor force rates of wives are cross classified by husbands' income and by a measure of wives' earning power. One such cross-classification in census data provides the opportunity. Table 7 is a two-way tabulation of labor force rates of wives in survey week of March 1957, by income of husbands in 1956 and education level of wife. We use the latter as an index of wives' earning power, assigning to it average full-time incomes of females in these education classes. Empirical results are consistent with the theory.

(1) A comparison of equations 4 and 4a indicates that $/b_{mx.w}/ > /b_{mx}/$. That is to say, the decline in participation associated with increasing income should be stronger when w is held constant than when it is not. Rates of decline are, in fact, more pronounced in the inside columns of Table 7 than in the left-hand marginal column.

(2) The gross relation of participation rates and earning power (measured by education) of wives is positive and strong. This has been repeatedly observed in census data.[29]

(3) When income of husbands is held fixed, the increase in participation with increasing wage rate of wives is stronger than when it is not. Rates of increase are more pronounced in the inside rows of Table 7 than in the left-hand marginal row.

(4) The systematic differences between rows and columns in Table 7 are indicative of the influence of income transitories. From left to right, successive columns correspond to income distributions of groups

[28] Multiply equation 3 by w, sum over all values, and divide by Σw^2:

$$\Sigma\, mw = \beta_p \cdot \Sigma x_p w + \beta_t \cdot \Sigma x_t w + a \cdot \Sigma w^2$$

and

$b_{mw} = \beta_p \cdot b_{x_p w} + \beta_t \cdot b_{x_t w} + a$, and if X_t is independent of w:

$b_{mw} = \beta_p \cdot b_{x_p w} + a$

[29] See Long, *The Labor Force*, pp. 94-96, and Bancroft, *The American Labor Force*, pp. 65-69.

with higher education and occupation levels. Research in income distribution and consumption[30] indicates that (1-P), the relative importance of transitory components in the income variance, increases with education and occupation level. Equation 4a, therefore, predicts steeper

TABLE 7

LABOR FORCE RATE OF WIVES, BY OWN EDUCATION, BY INCOME OF HUSBANDS, URBAN AND RURAL NONFARM, MARCH 1957
(per cent)

INCOME OF HUSBANDS IN 1956	Total	EDUCATION OF WIVES				
			High School		*College*	
		Elementary School	1-3 Years	4 Years	1-3 Years	4 Years and Over
Total	30.4	26.3	29.9	31.6	35.5	39.4
Under $1,000	33.5	25.6	38.4	48.7	n.a.	n.a.
$1,000-1,999	29.8	24.7	27.1	42.8	n.a.	n.a.
2,000-2,999	36.7	30.3	34.6	47.0	n.a.	n.a.
3,000-3,999	36.3	31.0	34.4	38.8	54.1	n.a.
4,000-4,999	32.3	24.7	33.5	33.4	43.5	n.a.
5,000-5,999	29.1	24.4	26.1	28.6	41.9	50.0
6,000-6,999	27.1	19.3	20.8	28.1	35.1	40.8
7,000-9,999	20.7	16.0	16.2	21.4	22.1	24.7
10,000 and over	11.5	n.a.	n.a.	8.5	9.5	18.3
Median full-year incomes of females, by education		$2,408	$2,583	$3,021	$3,440	$3,809

SOURCE: Labor force rate, *Current Population Reports*, P-50, No. 81, p. 2, Table 2. Median full-year incomes of females, *Current Population Reports*, P-60, No. 27, p. 37, Table 20.
n.a. = not available.

slopes at higher education levels, *provided* $/\beta_t/ > /\beta_p/$. The increase in slopes by columns is clearly visible in Table 7. The systematic differences by rows are, of course, a reflection of the same phenomenon.

(5) A numerical check on the previously estimated parameters showed them to be rather surprisingly good: Using estimates of β_p from Table 1, β_t from the modal class in Table 5, a value of 0.8 for P,[31] and of 0.4 for b_{wx}, equation 4 predicts an average 3 per cent (negative) difference in participation rates of wives for a 10 per cent (positive)

[30] See the marginal propensities and income elasticities in H. S. Houthakker, "The Permanent Income Hypothesis," *American Economic Review*, June 1958, p. 401. Also my "Study of Personal Income Distribution," unpublished Ph.D. dissertation, Columbia University, 1957.

[31] Friedman's estimate of 0.85 relates to family incomes. The value for husbands' incomes is probably somewhat smaller. The calculations are not sensitive to modest differences in assumptions.

difference in current incomes of husbands. This is a good approximation to the actual slope in the marginal column of Table 7.

At the same time, equation 5 predicts an average increase of about 2 per cent in labor force rates of wives for a 10 per cent increase in wives' earning power. This is, again, a remarkably good approximation to the actual value in the marginal row of Table 7.

Equation 4 provides an insight into the nature of bias involved in interpreting the observed gross relation between labor force rates of wives and income of husbands as the "true" income effect. It does not provide a unique answer as to whether such gross regressions underestimate or overestimate the true income effect. Given the notion that the response to transitory income is stronger than that to permanent income, the expression indicates that the negative elasticity is overestimated on account of the variability of transitory components in current income ($P < 1$), but a contrary bias is produced by the positive intercorrelation between husbands' income and wives' wage rate.

Since $b_{wx} = b_{wx_p} P$ on the assumption that x_t is independent of w, it follows from equation 4 that the closer the independent variable approximates a permanent income concept, the flatter the gross relation between it and the labor force rate. This is true for two reasons: the negative term in equation 4 decreases, and the positive term increases. It is for these reasons, roughly speaking, that the slope of the relation between labor force rates of wives and education level of husbands,[32] or family rent,[33] is close to zero.[34]

Several other behavior patterns observed in census data can be analyzed in terms of the model presented here.

Labor force rates of wives reported in a survey week, by occupation of husbands, are roughly inversely related to average incomes of husbands in these occupations. However, at the same low income brackets of husbands, participation rates reverse their ranks: they are higher at higher occupational levels[35] (as measured by income). These are effects of transitory components of income of the same kind as shown

[32] See, for example, *Current Population Reports*, P-60, No. 27, April 1958, Table F.

[33] Tabulations of the 1940 Census indicate a weak negative slope. The 1950 BLS data used here show a zero or even slightly positive slope.

[34] When $P = 1$ is put into equation 4, it becomes $b_{mx_p} = \beta_p + a \cdot b_{wx_p}$. With the orders of magnitudes of our estimates, b_{mx_p} is close to zero.

[35] See Table F in *Current Population Reports*, P-60, No. 12, also exhibited and discussed by H. P. Miller, *Income of the American People*, pp. 88-89, and by Bancroft, *The American Labor Force*, p. 124.

in column 4 of Table 3, where the classification is by education of husband.

Another set of data which suggests a response to temporary income change are classifications of labor force rates of wives by labor force status of husband and by his age. Not being in the labor force is more likely to be a short-run phenomenon for younger husbands (education, temporary disability, etc.) than for older ones. Table 8 shows a strong labor force response in the younger groups and none in the group over

TABLE 8

LABOR FORCE RATES OF WIVES, BY AGE AND LABOR FORCE STATUS OF HUSBANDS

	Employment Status of Husbands					
	1954			*1955*		
Age of Husbands	Employed	Unemployed	Not in Labor Force	Employed	Unemployed	Not in Labor Force
14-24	26.3	26.6	55.3	29.2	32.0	60.0
25-44	27.3	30.7	54.9	27.4	42.3	44.5
45-64	29.5	34.0	27.3	31.3	35.2	28.0

SOURCE: *Current Population Reports.*

45. The fact that the response to labor force status of husband is stronger than the response to his employment status is also reasonable in view of the short observation period (survey week).

The relation between "transitory" income variability and observed labor force behavior can also be detected by varying the length of the observation period. Extending the period of observation means reducing the importance of transitory income components, hence reducing the negative slope of the income-labor force relation.

In Table 9 a comparison is made between work experience of wives by income level of husbands and by periods of observation. Columns 1 and 2 present the long-run (since marriage) work experience of married women, with husbands and children present, classified by income of husbands as reported at the time of the survey (1955). Over the long run for which the work experience is reported income differences were undoubtedly smaller, but in the same direction.[36] The income-labor

[36] It can be shown that, in general, the correlation between current and permanent income is:

$$r(x,x_p) = \sqrt{P} + r(x_t,x_p) \cdot \sqrt{1-P}$$

This is always positive, with the exception of the case when a negative $r(x_t, x_p)$ exceeds in absolute value the ratio $\sqrt{\frac{P}{1-P}} = \frac{\sigma(x_p)}{\sigma(x_t)}$

force relation which is strongly negative for the short observation period (column 3) vanishes in the long period[37] (columns 1 and 2). To repeat the previous argument, this does not mean that the response to permanent income is zero. The permanent elasticity (β_p) which is negative is just about offset by the positive wage rate elasticity (a),

TABLE 9

WORK EXPERIENCE OF WIVES, BY INCOME OF HUSBAND, OBSERVATION PERIOD, AGE, AND PRESENCE OF CHILDREN

INCOME OF HUSBAND IN 1955 (dollars)	WORK EXPERIENCE SINCE MARRIAGE[a] *Age, 25-35 With Children* Average Number of Years at Work (1)	*Age, 18-40 With Children* Average Number of Years at Work (2)	LABOR FORCE RATE IN SURVEY WEEK, 1956[b] All (3)	*Age 20-44 With Children of Age:* Less Than 6 (4)	6-18 (5)	No Children (6)
Less than 3,000	2.67	2.24	38.1	22.4	54.6	59.0
3,000-4,000	2.61	2.49	30.4	16.7	39.0	61.0
4,000-5,000	2.71	2.63	29.6	15.8	38.5	62.6
More than 5,000	2.68	2.64	24.0	11.1	35.9	56.5

[a] From article based on "Growth of American Families Study," *Milbank Memorial Fund Quarterly*, July 1959, Table 5, p. 291.
[b] Based on *Current Population Reports*, P-50, No. 73, Table 9.

even though the effect of the latter is attenuated by the fact that wives' earning power usually rises less than half as fast as that of husbands' when moving up the permanent income brackets of husbands.

Since columns 1 and 2 report for women with children, and column 3 pertains to all women of a similar age group, the latter were further subdivided by presence and age of children for clearer comparison. The contrast between the long-period and the short-period relation is, indeed, stronger for the more appropriate comparison of columns 1 and 2 with columns 4 and 5, rather than with column 3. Moreover, the breakdown by presence of children reveals a phenomenon, previously suggested, and repeatedly observed in census data:[38] When small

[37] The age span in cols. 1 and 2 obscures somewhat the interpretation of results in Table 9. A comparison of cols. 1 and 2 indicates, however, that the quantitative effect is not strong enough to affect the conclusions.

[38] See *Current Population Reports*, P-50, No. 39, Table 6. Also Durand, *The Labor Force in the U.S.*, pp. 91-92.

children are present the observed negative relation of labor force rates with income is stronger than when they are absent (column 6). Considerations of substitutability between care of children and wage goods and services are consistent with such findings. According to the theoretical argument, the positive wage rate effect (α) is weaker and the negative income effect (β_p) is stronger the lesser the substitutability between wife's labor at home and goods and services obtainable in the market. This is likely to be the case when small children are present.

Implications

CROSS SECTIONS AND TIME SERIES

If the orders of magnitude of the parameter estimates of equation 3 are roughly correct, there is no real contradiction between findings on labor force behavior of married women in cross-sections and in time series. The impression of a contradiction is due to the way cross-sections have been looked at, in terms of gross relations between income of husband and labor force participation of wife. Such gross comparisons yield results (slopes or elasticities) which are sensitive both to the existence of transitory components in income and to the covariation of wives' earning power with husbands' income. The transitory components accentuate the negative effect of income. In their absence, the cross-sectional negative relation would hardly be noticeable. If, in addition, the positive relation between husbands' and wives' incomes were stronger than is usually observed in cross-sections, a positive rather than negative relation would be found between labor force rates of wives and incomes of husbands, even at a point of time.

Thus, if equation 3 is projected onto time series, two facts intervene which convert the negative income relation in cross-sections into a positive secular relation: (1) short-run transitory components of income are not relevant to long-run developments, and (2) the female wage rate has risen over time at least as fast as the male rate.

It is of some interest, at this point, to inquire how much of the quantitative change over time can be "explained" by the use of the supply function estimated from the recent cross sections.

The appropriate equation for this purpose is equation 1,

$$m = \beta_p y + \gamma w + u \text{ where } \gamma = \alpha - \beta_p$$

and y is family income computed as a sum of earning powers of husbands and wives. The estimated equation is (from Table 1):

$$m = -0.53y + 2.05w \quad (6)$$

In Table 10 actual secular changes in labor force rates of married women are compared with changes predicted by equation 6. The data used for the comparison are not exactly appropriate. They cover the

TABLE 10

ACTUAL AND "PREDICTED" SECULAR CHANGES IN LABOR FORCE RATES OF MARRIED WOMEN, 1890-1959

	1889-1919	1919-29	1929-39	1939-49	1949-59
Changes in full-time[a] earnings of males (dollars)	685	878	328	561	562
Changes in full-time[b] earnings of females (dollars)	386	504	252	585	576
Changes in family[c] earning power (dollars)	1,071	1,382	580	1,146	1,138
Expected changes in labor force rates	+2.2	+3.2	+2.1	+6.0	+5.7
Actual changes[d] in labor force rates	+4.4	+2.7	+2.1	+7.8	+8.4
Expected as per cent of actual changes	50%	119%	100%	77%	68%

[a] In 1949 prices. SOURCE: Long, *The Labor Force*, Table 17, p. 118; and *Survey of Current Business*.
[b] In 1949 prices. SOURCE: Long, *The Labor Force*, Table C-8, p. 356.
[c] Sum of first and second lines.
[d] SOURCE: Long, *The Labor Force*, Table A-6, p. 297.

whole United States population, rather than white urban families for which equation 6 was estimated. The historical trend for the latter is steeper than for the aggregate. On the other hand, secular improvements in the census reporting system, urbanization, and decline in homework for pay which was easily overlooked by interviewers and respondents, lend an opposite bias to the census data. The latter bias is probably strongest in the earliest period, for which the relative

discrepancy between actual and estimated is largest (1889-1919 in Table 10). The "fit" since 1919, which is on the whole surprisingly good, shows an interesting trend: the early decade is "overexplained" by equation 6, and the per cent of actual changes "accounted for" by equation 6 declines over time. Implicit in this finding is a suggestion that the negative income elasticity has been decreasing over time,[39] or that the positive wage rate elasticity has been growing over time. Both developments are consistent with the theory underlying the analysis in this paper: they are to be expected, if the degree of substitutability between home production and wage goods has been historically increasing.[40]

This historical change can also be viewed as an omission in equation 6 of a set of relative prices, which are fixed in cross sections. These are relative prices of commercial performance of household tasks. A secular decline in such prices relative to other consumer prices means that the secular increase in opportunity costs of work at home is *underestimated* by equation 6.

On the other hand, it cannot be assumed that productivity in the home remained constant while productivity in the market increased over time. To the extent that productivity in the home increased with the growth of productivity in the market, the female wage rate *overestimates* the increase in the relative price of female labor among its alternative uses. However, in the face of a small family income elasticity of demand for home production and with secularly rising incomes, the growing productivity at home meant a decline of hours of work at home. This, in turn, was likely to mean a shift toward market activities.[41] Thus, to the extent that the increase in w over time overestimates the change in relative prices, a positive effect toward market work is exerted (in a residual fashion) via income effects on home production and leisure.

[39] This is consistent with an observed secular flattening of gross income-labor force slopes in cross sections.

[40] See discussion under Work Choices.

[41] To take an extreme illustrative example, if growth of productivity was as rapid in the home as in the market, and the income elasticity of demand for home production close to zero, w would measure nothing else but the decline of hours of work at home. In other words, the income elasticity of hours of work at home would be -1. Since the negative income elasticity of total hours of work is surely less than unity, a shift toward market work is clearly implied.

The evaluation of the relative importance of these factors in bringing about the results shown in Table 10 is not undertaken here.[42] It requires a fuller theoretical development and empirical specification of the model presented in this paper.

SECULAR AND CYCLICAL EFFECTS OF TRANSITORY COMPONENTS

The consideration of labor force responses to actual or expected "transitory" changes may have some relevance to historical changes. Educational and occupational trends may put more young married women into the labor market while their husbands acquire formal training or experience on the job and family income is temporarily low. The trends toward early marriages and greater longevity generate prospects of long-lasting reduction in homework after the children are grown. Such expectations may motivate women toward more education and training and induce higher labor force rates throughout the life cycle. The spread of contractual commitments (insurance, installment buying, etc.) to lower income groups may make the adjustment of money income to expenditures more compelling than the adjustment of expenditures to money income.

Analysis of cyclical changes in labor force participation of married women requires an assessment of the effect of transitory changes in income as well as of cyclical change in the female wage rate. The first effect is negative: a decline in employment of head, hence in family income, induces (or temporarily prolongs) labor force activities of wives. On the other hand, cyclical changes in female wage rates or of employment opportunities favor the shifting of market activities to periods of prosperity. The income factor is stressed by the proponents of the "added worker" hypothesis. The employment opportunity is stressed by its opponents. Empirical data do not show any definite cyclical patterns in labor force behavior.

If, for the analysis of work choices of wives, we define the wage rate somewhat more broadly to include employment opportunities, it can be shown that the estimated parameters in equation 3 indeed predict an almost complete cancellation of the two opposing tendencies, hence the absence of pronounced cyclical patterns. Define the wage

[42] But see the very interesting data and hypotheses presented by Long, *The Labor Force*, Ch. 7.

rate as an expected magnitude, that is, a product of the actual wage rate and the probability of being employed. If employment in the community drops by p per cent and actual wage rates remain unchanged, the expected wage rate drops by p per cent. Since the loss of family income is due to the loss of employment, its decline is also p per cent on the average. But with the same per cent decline in w and x (ex ante family income), the net outcome depends, according to equation 3, on the comparative strengths of the negative transitory income elasticity (β_t) and the positive wage rate elasticity (α). According to our empirical estimate ($\alpha = +1.5$ in Table 1, $\beta_t = -1.4$ in the modal group, Table 5) the net effect is negligible. Even if a slight margin in favor of the wage rate is likely, the difference is not clear enough to yield discernible patterns.

While the parameter estimates predict no clear-cut cyclical patterns of labor force participation of married women in the aggregate, they point to differential patterns of subgroups depending on employment experience of husbands. In families whose heads have become unemployed, the relative decline in family income is much stronger than the relative decline in the "expected" wage rate of the wife. In such families, therefore, labor force rates of wives are likely to increase in recessions. In all other families, incomes are relatively stable but wage-rate expectations decline somewhat. The likely result in these families is a slight decrease in labor force rates of wives.

These conclusions are confirmed by a recent study[43] of the 1958 recession experience, based on a subsample of the Census Current Population Survey. According to this study, 21.6 per cent of the wives of unemployed husbands increased their labor force participation during the recession period, 16.8 per cent decreased it, and 61.6 per cent did not change. At the same time, 11.1 per cent of the wives of employed husbands increased their labor force participation, 16.6 per cent decreased it, and 72.3 per cent did not change.

[43] Arnold Katz, "Cyclical Unemployment and the Secondary Family Worker," Board of Governors, Federal Reserve System. The paper was presented at the meeting of the Econometric Society, December 1960, in St. Louis, Missouri.

In his paper, Katz presents additional evidence in favor of our hypothesis that families may maintain consumption levels through labor force adjustments to transitory income changes, and that for married women the response to such income changes is quite pronounced. He shows, for example, that a wife's labor force adjustment to her husband's unemployment is more extensive when this idleness is less anticipated.

FAMILY INCOME DISTRIBUTION AND CONSUMPTION[44]

Analysis of economic factors influencing labor force behavior of married women carries a direct implication that family income composition and distribution, consumption behavior, and labor supply are intimately related problems. Decisions of family members about work are related to family income in an ex ante sense and are reflected in the ex post total money income of the family. The labor supply function here presented is an analytical bridge between the distribution of personal income (of family heads, for example) and the distribution of total money income of the family. The income effect on market labor supply, both in its long-run and transitory senses, implies a reduction in income inequality when moving from personal incomes (of heads) to family incomes. The wage-rate effect implies an increase in inequality, since incomes of husbands and market earning powers of wives are positively related. For particular population groups observed, the more prevalent the transitory components in heads' incomes, and the weaker the association between the wage rates of the family members, the greater the equalizing effect of labor supply on family income distribution—and conversely.

With respect to consumption behavior, it is clear that the analysis of economic adjustments to changes in family income must include adjustments in the composition of consumption, particularly between the "visible" items (money expenditures) and the "invisible" ones such as leisure and home production. This is an apparent adjustment, on the money income side, of the money income–money expenditures equation, and is an alternative to adjustment on the expenditure side or in asset position, or both. The three alternatives have distinct implications for a money economy.

Finally, in studying factors affecting family consumption, it is not sufficient to look at sociodemographic characteristics of the family head in order to add explanatory variables to income or to gauge the permanent income of the family. For short-period observations the knowledge of employment status and labor force behavior of family members is of primary importance.[45]

[44] For a more detailed discussion and empirical evidence, see my paper "Labor Supply, Family Income, and Consumption," *American Economic Review*, May 1960, pp. 574-583.

[45] A time-series consumption function based on such data is presented by the author in "Employment and Consumption," *Review of Economics and Statistics*, February 1960, pp. 20-26.

COMMENT

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During the last half-century, there has been an enormous increase in the labor force participation of married women. Even now, however, at any given time two of three wives are at home, in school, in institutions, or playing bingo with other wives, and are therefore unwilling or unable to work. Whether various economic and social forces will bring more of these wives into the labor force is an absorbing economic question, especially since wives are the majority of adult women and form the largest source of additional gainful labor. The economic forces that have aroused most attention have been those centering around income or wages. Real incomes have been rising in most western nations. Do these rising incomes have the effect of bringing more wives into the labor force or of driving out some of those now working?

On this question there has been a confusion of evidence, especially as between moment-of-time and over-time relationships. Moment-of-time studies have been of two sorts: One sort, among different localities such as cities or metropolitan areas, have usually shown that the higher a locality's per capita income, adjusted to adult-male equivalents, the lower the labor force participation rates of its females, including those in ages in which most women are married. The other sort, among different income groups in the same locality, have shown even more uniform tendency for husbands in higher income groups to have smaller proportions of wives in the labor force.

On the basis of these moment-of-time relationships, one might expect that a great rise of real incomes over time would have resulted in a notable decline in the tendency of wives to work. On the contrary, the labor force participation of wives has not only failed to decline, it has risen enormously—perhaps sixfold from 1890 to 1960.

What has been the cause of this apparent contradiction between the inverse behavior at a moment of time, and the positive behavior over time? Various studies, including my own,[1] have attributed it to the difference between static factors at a moment of time and dynamic factors over time, the latter including (1) declining burden of house-

[1] Clarence D. Long, *The Labor Force under Changing Income and Employment*, Princeton University Press for National Bureau of Economic Research, 1958, pp. 97-140.

work due to fewer children, better appliances, more outside services for the home; (2) declining hours of work in office and factory jobs, so that more women could perform a dual function of wage earner and wife or mother; and (3) the opening up of new job opportunities for women. Other dynamic forces were also explored: rising wages and improved education of females, relative to males; and the push and pull of young and older males who were, on net balance, leaving the labor force.

My study even attempted some simple statistical illustrations of how these various dynamic factors may have contributed to the inflow of wives into the labor force. But it did not attempt to set up a rigorous analytical model, because the factors seemed too numerous, the relationships among them too complex and changing, and their statistical measurement too inadequate to permit us to fit them into any mathematical framework. Thus, the contradiction between the over-time positive relation and moment-of-time inverse relation was not fully or precisely reconciled.

This gap Jacob Mincer now undertakes to fill by demonstrating that the same model can explain both moment-of-time and over-time relationships.

Most recent investigations into the relation of labor force participation to wages recognize that wages exert both income and price effects on willingness to work. Under the income effect, higher wages should, other things equal, cause the worker to take some of the higher income in the form of more leisure and therefore less labor force participation. Under the price effect, the same wage rise also raises the price or cost of leisure to the worker; his enjoyment of leisure is marred by the thought of how much earnings he is foregoing, so that he is tempted to work more rather than less.

Which effect triumphs? Ever since Lionel Robbins wrote his article on the elasticity of demand for income in terms of effort,[2] economists have recognized that the outcome cannot be predicted on theoretical or a priori grounds, but depends on the relative preferences of individuals as between real income and leisure and thus can only be determined by empirical investigation. Most empirical investigations of moment-of-time relationships do, however, indicate that the income effect has triumphed over the price or substitution effect, and that

[2] "On the Elasticity of Demand for Income in Terms of Effort," *Economica*, June 1930, pp. 123-129.

higher earnings have been associated with lower labor force participation.

Mincer's model adds two novel features to the analysis of the relationship between income and labor force participation.

First, he points out that the choice is not a mere two-way choice between leisure and paid work, but a three-way choice between leisure, paid work, and unpaid housework or family chores. The outcome of this three-way choice will be a family decision. And this family decision will depend on husband's income, wife's earnings, relative desires for market goods, home goods, and leisure; substitutability of market goods for home goods (as whether a wife can buy a washing machine or pay a commercial laundry to take over that part of housework). Mincer simplifies this problem by setting up a model, in which the labor force participation of wives depends on incomes of husbands, earnings of wives, and other factors or tastes.

Second, he makes use of Milton Friedman's consumption theory, namely, that people adjust their consumption expenditures, not to their current incomes (the absolute-income hypothesis) but to their permanent incomes. A family whose head normally earns $10,000 a year tends to spend on consumption, say, $8,000 a year. If the regular income of the family head should drop temporarily to $5,000, the family will continue to spend $8,000 because it has geared its spending and living habits to what it regards as its long-run income and is unwilling to adjust its scale of living to temporary fluctuations in income. But where does it get the wherewithal to pay for the $3,000 excess of consumer spending? It may make up this excess in two broad ways: either by drawing on past savings or future credit—assets of various kinds; or by having some member of the family enter the labor force. Young and poorly educated families may not have much savings or credit; for these, the only alternative may be increased labor force participation of son, daughter, or wife. Mincer's hypothesis is that the labor force participation of the wife may be greater, the smaller the permanent income of the husband, and the smaller the current income in relation to the permanent income.

Having set up his hypothesis, Mincer tests it against a variety of moment-of-time data.

1. Cross-section data, from a number of standard metropolitan areas.

2. Newly available data of the Bureau of Labor Statistics' Survey of Consumer Expenditures in 1950, in which the labor force participation

of wives was classified by age, education, and income of family head, and by wife's earnings, with separate labor force participation rates given for wives whose husbands earned currently much less than when fully employed.

3. Census sample data for March 1957, in which the labor force rates of wives were classified by education of wives (as broadly reflecting their earning power), stratified by husbands' income groups in 1956.

4. Census sample data on long-run work experience for wives (since marriage), by income group of husband in 1955, and short-run labor force rates by the same income groups.

The results of these moment-of-time studies are as follows:

First, he finds, as others have, that wives' labor force participation rates respond negatively to husband's incomes: the more husbands earn, the less wives work. But he finds, in addition, that wives' labor force participation rates respond positively to wives' earning power: the more the wife is capable of earning, the more likely she is to work. Moreover, the wives' positive elasticity with respect to wives' earnings is about double their negative elasticity with respect to husbands' income.

Second, his findings support his hypothesis that wives are more apt to work if husbands' current earnings were below permanent earnings; and that the response of wives' labor force to so-called transitory income is stronger than to permanent income—in fact more than double. Given a period long enough for transitory elements to disappear, the inverse relationship seemed to disappear also, because the strong positive elasticity with respect to wives' earnings more than offset the remaining weak negative elasticity with respect to permanent income of husbands.

Third, the response of labor force to income, both permanent and transitory, is weaker the higher the educational level of family heads over 35—presumably because better educated family heads have other assets which make it unnecessary for wives to work if income is low. Higher-income husbands tend to have higher-earning wives, but the relationship is a weak one.

Mincer, having tested his econometric model against moment-of-time data, is now ready to use it to explain why the labor force participation of wives has grown enormously with income since 1890. For this purpose he uses changes from one census year to the next in full-time

earnings of males, in full-time earnings of females, and in family earnings (the sum of the male and female earnings). Full-time and not current earnings are used, because over long periods the problem of transitory incomes is supposed to be not relevant. Inserting these earnings changes into his equation derived from moment-of-time data, he estimates what the change in labor force rates of wives will be from one decade to the next and then compares this predicted change with the actual change recorded from the census data.

The results are noteworthy. For each interdecennial comparison, his model predicts increases in wives' labor force participation. Thus, Mincer observes, there is no apparent contradiction between the findings of the labor force behavior of married women in cross-section and time series. The impression of a contradiction derives from the way the cross-section has been looked at, in terms of gross relations between income of husbands and labor force participation of wives. The gross inverse relation at a moment of time is due largely to two factors: (1) the existence of transitory components in income—without them the cross-sectional negative relationship will hardly be noticeable; and (2) the weak covariation of wives' earning power with husbands' income, a weakness which nullifies the strong tendency of wives' labor force rates to be positively associated with their own earnings. Over long periods of time, the transitory component is largely absent and the female earnings rise as much as male earnings (if not more). This combination, of a big rise in female earnings, and a strong positive relationship between wives' labor force participation and their own earnings, more than offsets the weak income relation with husbands' permanent income.

So much for the description of what Mincer has undertaken to do. Now for an appraisal of his success.

As to moment-of-time relationships, Mincer has proved his case fairly well. I find reasonably convincing his evidence that: (1) transitory-income influences are stronger than permanent-income influences in explaining labor force participation; (2) wives' labor force participation is positively related to wives' own potential earnings, and is stronger than the negative income elasticity; and (3) the wives' earnings, while varying with husbands' earnings, do not vary nearly as much, so that in moment-of-time data the positive wage-rate elasticity of wives is largely cancelled out, leaving the negative income effect triumphant. The evidence that he has amassed rests on data

that are independent enough in source and rich enough in classification to establish his hypothesis rather convincingly.

As to his studies over time, he has made something of a case: that the rise of labor force participation of wives has been due to the greater upward pull of their own rising earnings over the downward pull of their families' rising incomes, especially since full-time wages of females have gone up faster than those of males.

A number of features of the study suggest, however, that more is needed than two variables—earnings of husbands and of wives—to explain the labor force behavior of wives in the long-run periods.

For one thing, the equation does not predict the over-all changes fully but only four-fifths of the rise. This underprediction need not be very disturbing; on the contrary, it would be suspicious if Mincer could fully explain the entire rise in labor force of wives for 70 years by only two variables. In view of the many other factors which could help explain this rise, it is perhaps a virtue of his equation that it leaves some room for their impact.

For another thing, the equation does not predict decade movements very accurately. For the three-decade changes between 1890 and 1920, it is far off indeed. (However, since the census labor force data were slightly undercounted in 1890 and 1920 and greatly overcounted in 1910, Mincer was doubtless justified in bypassing the decade-to-decade movements in the first 30 years and merely studying the whole change from 1890 to 1920. But even that change is twice as great as his equation predicts.) For the next decade, 1919-29, the equation overpredicts the actual change by a fifth. For 1939-40 and 1949-59, it underpredicts the actual changes by wide margins. Only in 1929-39, a decade of depression—when, incidentally, transitory income, ignored in this equation, might have been expected to operate—was the prediction exactly right.

Next, the study does not take account of one of the most interesting developments of those decades—the behavior of the labor force of Negro women. Yet, Negro wives show the same inverse labor force income relationship as white wives at a moment of time, and the wages of Negro women have probably risen not only more rapidly than those of Negro men, but also more rapidly than those of white women. I have the impression that employment opportunities for Negro women have also improved relatively. Yet the labor force participation rate

of Negro females has declined since 1900 and especially since 1930. The case of Negro women provides a severe challenge to an econometric model which attempts to unify the explanation of moment-of-time and over-time behavior. A model which purports to explain dynamic increases also carries the obligation of explaining dynamic decreases. I think the data are available for such a study, at least since 1940. In any event, the case of Negro wives calls for discussion.

In addition, although Mincer indicates that the possession of young children makes the labor force–income relationship at a moment of time more steeply inverse, his model over time makes no allowance for the decline of young children relative to the number of wives. This would presumably help explain why his model does not predict the full rise in labor force participation of wives.

Finally, the study does not take advantage of the existence of recent annual data to test the year-to-year changes in labor force participation of wives against the year-to-year changes in husbands' incomes and wives' earnings, and using, of course, both permanent and temporary incomes. If Mincer does not feel that the annual statistics of labor force and earnings are adequate for such a test, his discussions should at least point out the statistical and analytical difficulties.

On the whole, this paper impresses me as first-rate. The ideas are fertile, the analysis stimulating, the empirical applications resourceful, especially with regard to the cross-sectional data. I do not regard the case as proven. Before Mincer can be said to have fully demonstrated the usefulness of his model in resolving the apparent contradiction between inverse cross-sectional behavior and positive dynamic behavior, he will have to carry out further empirical investigation: First, separate investigation of the labor force behavior of Negro wives both at a moment of time and over time. Second, further cross-sectional analysis of wives' behavior before 1950. Third, an analysis of wives' labor force behavior in detailed localities, for example rural and urban areas or individual cities of the United States and of other countries. Fourth, an analysis of wives' labor force behavior over time, by age, education, and number of children, or presence and absence of children. Fifth, an analysis of labor force behavior from one year to the next, to test the flexibility of the model, especially the functional relationship of the labor force to transitory income.

Until these further studies are made, however, this study must remain as I find it now: not really an empirical explanation of the dynamic

behavior of the labor force participation of wives, but an idea for such future investigation. On the basis of this idea, a scholar with an appetite for hard work would be justified in launching an extensive inquiry into the dynamic behavior of labor force of wives. I hope it will be Mincer who does it. In any event, we should be grateful to him for a careful and imaginative piece of work.