NBER WORKING PAPER SERIES
ON
HISTORICAL FACTORS IN LONG RUN GROWTH

# BUYING THE AMERICAN DREAM: HOUSING DEMAND IN THE UNITED STATES IN THE LATE NINETEENTH CENTURY

Michael R. Haines

Allen C. Goodman

Working Paper No. 5

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
August 1989

Paper prepared for the Summer Workshop of the development of the American Economy Project at the National Bureau of Economic Research, Cambridge, MA July 17-21, 1989. An earlier version of this paper was presented at the annual meetings of the Social Science History Association, November 3-6, 1988, Chicago, IL. This paper is part of NBER's research program in Development of the American Economy. Any opinions expressed are those of the authors not those of the National Bureau of Economic Research.

NBER Working Paper #5
August 1989

# BUYING THE AMERICAN DREAM: HOUSING DEMAND IN THE UNITED STATES IN THE LATE NINETEENTH CENTURY

ABSTRACT

This paper examines homeownership and housing demand for a sample of approximately 6,800 urban, industrial workers in the United States for the period 1889/90. Using data from the Sixth and Seventh Annual Reports of the U.S. Commissioner of Labor, housing demand is viewed as a two part process: first, the "tenure choice" decision whether to own or rent; and, second, how much of either type of housing to purchase. Tenure choice and renter demand equations are estimated, using the concept of expected, rather than current income. Data limitations did not permit estimation of owner demand. The results indicate lower homeownership rates among American workers circa 1890 than later and significant effects on ownership of income, age of household head, region, industry, occupation, ethnicity, and family size and composition. Rental prices and value/rent ratios had effects in the expected directions. Partial and full elasticities calculated for renter demand reveal downward biases if only current income is used to estimate housing demand. The results indicate that modern housing demand theory performs well with historical data.

Michael R. Haines
Department of Economics
Wayne State University
Detroit, MI 48202
(313)577-3236
and
NBER
1050 Massachusetts Ave
Cambridge, MA 02138

Allen C. Goodman
Department of Economics
Wayne State University
Detroit, MI 48202
(313)577-3236

Homeownership has long played a role in shaping the aspirations of American families. When the nation was largely populated by farmers, homeownership often went along with ownership of the farm. So, by 1890, when the U.S. census first asked direct questions about housing, approximately two thirds (65.9 percent) of all farm housing units were owner-occupied. The farm homeownership rate has remained high, having been 80.5 percent in 1970. For non-farm housing, homeownership has been less prevalent, but increasing. The 1890 census revealed that 36.9 percent of all non-farm housing units were owner-occupied. This had risen to 62.0 percent by 1970. [U.S. Bureau of the Census, 1975, series N-243.] By 1983, almost two thirds of all housing units (now mostly urban and non-farm) were occupied by their owners. [U.S. Bureau of the Census, 1987, Table 1223.]

Among urban workers, homeownership rates have been historically lower. Only 17.6 percent of the 6809 worker families surveyed by the U.S. Commissioner of Labor in the United States in 1889 and 1890 were homeowners. [U.S. Commissioner of Labor, 1890, 1891.] This compares with the 36.9 percent rate for all non-farm units given by the census in 1890. This had risen to 19.0 percent for a 1901 survey of 25,440 urban families in 32 states and the District of Columbia [U.S. Commissioner of Labor, 1904] and has continued to converge toward the national average as the society has become more urban and as worker incomes have increased.

Homeownership thus has represented a large and growing portion of consumer spending in the United States since the turn of the century. It is indeed inextricably bound up in what is often called the "American Dream." There exists a substantial sociological literature documenting the central role of homeownership in the expectations and aspirations of Americans. [Rossi, 1980. Morris and Winter, 1978. Perrin, 1977.] Rossi and Shlay, for example, have

noted:

> "American preferences for homeownership and for the spatial segregation of homeowners from renters appears to be so general that they can be regarded as norms deeply embedded in American values....Owning one's home is viewed widely as a measure of achievement, as part of the American dream." [Rossi and Shlay, 1982, p. 30.]

Historically, homeownership has been "one of the basic elements of satisfactory middle class life" in the United States. [Warner, 1962, p. 157.] It was of importance to both native-born and immigrant workers. [Kirk and Kirk, 1981.] To the native born, possession of property, especially homes, seemed desirable as a stabilizing and conservative influence, reinforcing thrift, industriousness, occupational and geographic stability, good citizenship, and other virtues, as well as providing a sense of status and economic security. [Tygiel, 1979, pp. 92-93. Kirk and Kirk, 1981, pp. 473-475.] In the borough of Homestead, a steel mill town adjacent to Pittsburgh, Margaret Byington found a strong penchant for homeownership among workers during the first decade of this century.

> "More substantial proof of the instinct of homemaking is shown in the often heroic efforts to buy a house. In view of the number of families who could not pay sufficient rent to secure either rooms enough for comfortable living or sanitary conveniences, it is a striking fact that according to the census figures of 1900, 586 families in Homestead borough, 25.7 per cent of the total number, held title to their homes; and 47.4 per cent of these were free from encumbrance. Personal interviews have corroborated this evidence that mill-town workingmen wish to own their dwellings." [Byington, 1910, pp. 56-57.]

It was often advantageous to employers to have homeowning employees:

> "[I]t is an advantage to a mill-town employer to have property-owning employees. The labor force is more stable and there is less likelihood of a strike, the employees not wishing to jeopardize their positions after a house has been acquire, lest they have to move." [Fitch, 1910, p. 193.]

Savings plans and low interest mortgage loans to workers were sometimes made available by firms to their workers.

Among immigrants, Bodnar has noted that

> "[w]hile urban life was transient and social mobility an unrealistic expectation for most newcomers, long-term residence in cities and towns frequently led to a degree of stability through the process of homeownership. While it is not at all clear that homeownership was a surrogate for social mobility since perceptions about success and immediate objectives could vary, it was a fact of life that it contributed to some degree to stability and longevity in various neighborhoods." [Bodnar, 1985, p. 180.]

Homeownership was not exclusively a middle-class suburban phenomenon. Some have hypothesized that homeownership was an extension of the desire of the immigrant peasant for land as a sign of social mobility. [Bodnar, 1985, pp. 180-183.] The well known study of Polish immigrants to America by Thomas and Znaniecki [1918-20, p. 162] noted that property ownership established "the main condition of social standing of the family." Slavic immigrants often perceived homeownership as a means to reduce the risks in their economic environment. [Bodnar, 1976, pp. 49-50.] Edith Abbott [1936, pp. 379-382] commented that immigrants believed that property conveyed a superior social status. Thernstrom [1964, pp. 154-157] has proposed that acquisition of homes was accomplished at the expense of children's education (especially among the Irish) through the use of children's earnings to acquire property. The evidence on this is, however, contradictory. [Bodnar, 1985, p. 182.] More likely, higher male incomes made both homeownership and more extended children's education easier to attain.

It is important to note that there were considerable restrictions to access to capital and asset markets for workers. Aside from saving accounts and insurance policies, real property in the form of houses and building lots was one of the few investment opportunities for these small-scale urban savers. In short, they were faced with many constraints. Further, it was not

always possible to find rental accommodations equivalent in space and amenities to owner-occupied properties, which could also be more readily modified. In consequence, homeownership can be an indicator of adherence to a life-cycle savings strategy. [Ransom and Sutch, 1989.] The strong positive association of homeownership and age (see below) is consistent with this.

There have been efforts to examine some quantitative aspects of homeownership in the United States in the late nineteenth and early twentieth centuries, but many have been of a descriptive nature. [See, for example, Tygiel, 1979. Kirk and Kirk, 1981.] Many of the results have had uncertain theoretical foundations leading to inconclusive findings.

The present paper, in contrast, utilizes some recent theoretical and empirical work in the area of urban housing demand. [Goodman and Kawai, 1986. Goodman, 1988. Mayo, 1981.] The analysis will consider "tenure choice" -- owning versus renting -- and renter housing demand. It will be confined to one data set, the families in the American portion of the 1889/90 U.S. Commissioner of Labor Survey. [U.S. Commissioner of Labor, 1890, 1891.] Since these data contain no information on housing expenditures for homeowners, estimation of owner demand is not possible.

The Model

Following Goodman [1988] and Goodman and Kawai [1986], one can conceptualize the demand for housing as a process divisible into stages. First, the consumer confronts a set of prices for rental and owner housing, which have "hedonic" components (e.g., number of rooms, sanitary and bathing facilities, water supply, sewerage disposal, type of lighting and heating, location, accessibility to work, type of construction, convenience of access to the street). There are thus prices for housing services (both owner and

renter) as well as investment components (i.e., capital gains in real property).

Second, the consumer must evaluate choices not only in light of prices, but also in terms of income. In this case, it seems logical that housing, the quintessential consumer durable, should be related to permanent rather than current income. [Friedman, 1957]. Permanent income should be a function of a number of socioeconomic and demographic characteristics related to life cycle stage, age of household head and spouse, ages and sexes of children, education and occupation of household head and spouse, etc.

Third, given prices and permanent income, the consumer must decide whether to own or rent (tenure choice). This should be related to relative prices of owning renting, potential capital gains from ownership, permanent and transitory incomes, and some socioeconomic and demographic variables.

Finally, the consumer must decide "how much" rental or owner-occupied housing to purchase, also based on the relative prices of owning and renting, potential capital gains (if owning), permanent and transitory incomes, and some socioeconomic and demographic characteristics. These last two decisions are often made simultaneously, although it is easy to think of them as sequential. The present paper will focus on the estimation of permanent income, then on the tenure choice and renter demand.

It is useful to address the tenure choice in more detail. (The following material draws on Goodman [1988].) In the decision to rent or own, it is important to consider potential capital gains. Since asset value (of the home) is related both to the stream of housing services that it produces and to the expected capital gains to its owner, an increased cost of the stream of owner services, relative to renter services, should increase the likelihood

that renting would be chosen over owning. On the other hand, a high value of homes relative to rent payments (as measured by a value-rent ratio) should indicate an attractiveness of owning relative to renting from an investment standpoint.

Consider a housing market with buyers able to purchase either rental or owner-occupied housing within a metropolitan area. Consumers would be influenced in their tenure choice and housing demand not only by the relative price of owner-occupied versus rental housing services (which include not only the direct services themselves but also the local public goods of the location of the housing), but also by the value-rent ratio. The ratio of home prices to rental payments would rise with increases in the housing services and value of the local public goods provided for owner-occupied houses and decrease for increases in the same for rental housing. It would, however, increase with expected capital gains for owner-occupied housing, and there would be no symmetric change for renters. (Increases in property taxes would tend to decrease the value-rent ratio to the extent they fully fell on owners and could not be fully passed on to renters.) Thus both relative prices and a value-rent ratio should be in the demand analysis in order to capture separately the effects of expected capital gains. Unfortunately, in the analysis below, only a value-rent ratio and estimated rental prices could be obtained. Therefore, the effect here must be viewed as a reduced form, providing only the net effect of relative prices and expected capital gains.

The second consideration is the appropriate measure of income to predict tenure choice and housing demand. As mentioned above, permanent income would appear best, but there is a question as to how to estimate it. Macroeconomic work most often employs a distributed lag function of previous values of

current income. This is clearly not feasible with the cross-sectional data used here. Alternatively, a human capital approach which relates labor income to human capital assets (based on age, education, training, experience, etc.) and non-labor income. The difference between current income (which consists of both labor and non-labor income) and this estimated expected income would be a residual income containing both unsystematic components of income and unmeasured systematic components. In a very real sense, estimated expected income, which embodies measurable systematic components of labor income, is analogous to permanent income, and the residual is analogous to transitory income. We will call our measures expected and residual income, respectively.

Defining observed income Y as the sum of expected income ($Y_e$) and residual income ($Y_r$), one can formulate $Y_e$ as the systematic return to both human (H) and nonhuman (N) capital:

$$Y_e = \alpha H(E, A, S) + \tau N, \tag{1}$$

where human capital H is related to education E, age A, and other sociodemographic and occupational characteristics S. Substituting this into the income identity yields:

$$Y = \alpha H(E, A, S) + \tau N + Y_r. \tag{2}$$

If returns to nonhuman capital are available in flow terms (i.e., dollars per year), $\tau N$ can be netted out of the right hand side. To construct the expected and residual components of measured income Y, estimate:

$$Y^* = Y - \tau N = \alpha_0 + \alpha_1 A + \alpha_2 A^2 + \alpha_3 E + \alpha_4 E^2 + \alpha_5 S + u, \tag{3}$$

where the quadratic terms capture the nonlinear effects of these variable on expected income predicted by theory. $Y^*$, the predicted value of $Y^*$, and u, the predicted value of u, are interpreted as estimates of the systematic components of labor income and residual income, respectively. The value of $\tau N$

is then added to $Y^*$ to yield expected income.

The decision to acquire a financial burden as substantial as a home may depend, at least in part, on the outlook of the individual or family for a number of years in the future. These expectations would, in turn, likely be a function of the life cycle stage, occupation, age, family composition, ethnic background, and even region and industry of employment.

Goodman [1988] has shown that demand elasticities for housing may be biased toward zero if current rather than expected income is used.[1] Thus assume that current income (Y) is equal to expected income ($Y_e$) plus residual income ($Y_r$) and, further, that it is a function of education (E) and age (A) plus a random factor (u). Also, assume that quantity of housing services demanded (Q) is a function of expected and residual income plus another random element (e). Thus

$$Y = Y_e + Y_r = vE + \phi A + u \qquad (4)$$

and $$Q = \alpha Y_e + \beta Y_r + e \qquad (5)$$

Substituting $(vE + \phi A)$ for $Y_e$ and $(Y - vE - \phi A)$ for $Y_r$, we obtain

$$Q = (\alpha - \beta)vE + (\alpha - \beta)\phi A + \beta Y + e$$

or $$Q = \theta_1 E + \theta_2 A + \theta_3 Y + e \qquad (6)$$

where the $\theta$'s indicate reduced form parameters. Small or statistically insignificant estimates of $\theta_3$ are hence not uncommon, since they are estimates of the effects of residual income components ($\beta$) instead of expected income components ($\alpha$). Low demand elasticities are one consequence.

A third theoretical issue is how to enter socioeconomic and demographic variables into demand models. Unfortunately, economic theory does not provide a great deal of guidance. Some efforts in this direction have focused on including demographic variables directly in the utility function, resulting in

demand functions that are very difficult to estimate. Deaton and Muellbauer [1986], Deaton, Ruiz-Castillo, and Thomas [1985], and Goodman [1988] have proposed the including other socioeconomic and demographic variables in a more straightforward manner, producing plausible results, including an application of the Almost Ideal Demand System [Deaton and Muellbauer, 1980] estimated on the U.S. Commissioner of Labor data used in this paper. [Haines, 1987.] In the present instance, these socioeconomic and demographic variables appear at the level of the determination of expected income, at the point of tenure choice, and, again, for rental demand.

The Data

Carroll Wright, first U.S. Commissioner of Labor and pioneer empirical statistician [Williamson, 1967], collected demographic, income, and family expenditure data in 1889 and 1890 for 8,544 families in 24 states of the United States and five European countries (Great Britain, Germany, France, Belgium, and Switzerland). The family heads were employed in nine different industries (pig iron, bar iron, steel, bituminous coal, coke, iron ore, cotton textiles, woolen textiles, and glass). Appendix Table A-1 displays the distribution of families by industry and geographic location. The information on family composition, income, and expenditures was extensive, and a listing of the variables is given in Appendix Table A-2.

The budget and income data were originally collected for a study of the effects of tariffs on the costs of production in selected industries. The micro data were quite literally published. The sample has been discussed at length elsewhere [Williamson, 1967; Modell, 1978; Lees, 1980; Haines, 1979a, ch. 6; 1979b], and it seems reasonable and internally consistent. The method of sampling was not clarified, and the report stated only that

> the Department has aimed to secure accounts from a representative number of employees of the establishments covered....and also from those families whose surroundings and conditions made them representative of the whole body of employees in any particular establishment. This representative character, however, has been impaired in some measure by two features: First, some families have not been willing to give the information desired, while second, other families, perfectly willing, have not been able to give reasonably exact accounts of their living expenses. [U.S. Commissioner of Labor, 1890, pp. 610-611.]

Although the survey was probably not random, the American data on age of family head seem to conform to age distributions by occupations of married males in the census of 1890. [Haines, 1979a, ch. 6.] The micro data have been used by a number of researchers [Kelley, 1976; Fishlow, 1973; Modell, 1978; Haines, 1979a, 1979b, 1985; Lees, 1980], and the published data have furnished information for studies of savings and expenditures [e.g., U.S. Bureau of the Census, 1975, Series G564-573; Brady, 1956]. In short, although the 1889/90 survey may have been selective of industries and of families within those industries, it nevertheless constitutes a valuable source of household level data on the economic and demographic aspects of working class family life during rapid industrialization.

There is still another reason to be interested in data from the late nineteenth century to estimate housing demand. Since 1914, and particularly since World War II, high marginal income tax rates, along with the deductibility of interest and the lack of taxation of imputed income from owner-occupied housing, have made it difficult to separate the marginal tax effects from the income effects. There was no income tax in 1890. As a result, the income elasticities may be more "pure" parameters than are those estimated with more recent data.

Homeownership among American Workers in 1890

Table 1 provides information on homeownership within the 1889/90

Commissioner of Labor Survey. Only about 17.6 percent of the total American sample and 6.7 percent of the European sample were homeowners. This represents, for the United States, a rate considerably below that for all non-farm housing units from the U.S. census of 1890 -- 37 percent. [U.S. Bureau of the Census, 1896.] Within the survey of the American workers, homeownership rates were highest in the Midwest and the Middle Atlantic region and lowest in New England and the South. Among the states with more than 100 cases each, homeownership was greater in Illinois, Indiana, Ohio, Pennsylvania, Virginia, Maine, New York, and New Jersey. Workers employed in the production of pig iron, coal, and iron ore, and heavy industry in general, were more likely to own. The very low rates in cotton textiles may have resulted from a larger amount of company provided rental housing in this industry, although incomes were also lower in textiles than in mining and metallurgy. By occupation, semiskilled and skilled workers had higher homeownership rates relative to the unskilled. Among different ethnic groups (as measured by the nativity of the head of household), a greater proportion of the foreign born were homeowners relative to the native born, with especially high ownership rates among the Irish and Germans and very low rates among Canadian immigrants.

As the final group of panels in Table 1 shows, homeownership was, not unexpectedly, an increasing function of family income and age of family head. This is a persistent pattern in the twentieth century -- older persons have had more time to acquire wealth and higher income permits higher rates of wealth accumulation. This is also reflected in the larger proportion of homeowners in later life cycle stages, with older children or in late middle or old age with no children. Larger families, especially those with four to seven children, were more likely to own, although families with the largest

numbers of children were not as likely own. Perhaps it was difficult to find suitably large homes for sale in urban areas for families with eight or more children. Or perhaps it was that such large families found it difficult to muster the resources for a down payment. Finally, if the head of household was a female, ownership was much less likely. Relatively few of the households (two percent) were, however, female-headed.

Expected Income

Obviously a number of the factors above vary together. Older households were more likely to have been larger and have higher household income. Industries were not spread evenly by region. The first step in a multivariate analysis of this process is to estimate expected income. The results of this are presented in Table 2. These are ordinary least squares regressions of a number of socioeconomic and demographic variables on three transformations of labor income (i.e., the income of the husband, wife, and children in the family). The three different dependent variables are based on the Box-Cox transformation to allow for the non-linearities which seem to appear in the pattern of labor income. [Amemiya, 1985, pp. 249-252. Goodman and Kawai, 1986.] The transformation is $(Y^{\lambda} - 1)/\lambda$. The linear case would have $\lambda = 1$, and the natural log transform ($\ln(Y)$) would be $\lambda = 0$. One intermediate case, the square root transform ($\lambda = .5$) was also estimated. It should be noted that the income variables were adjusted for differences in price indices across states.[2]

The results at the bottom of Table 2 indicate that the natural log transformation was superior, though not by a great deal, to the square root transform. That is, the adjusted R-squared value, the F-ratio, and the value of the likelihood function all point to a better fit (lower absolute value of

the likelihood function).[3] The maximum value of the likelihood function lies between $\lambda = .5$ and $\lambda = 0$, but probably close to $\lambda = 0$ (the log transform). The log transform estimated by ordinary least squares is thus taken as an approximation to the maximum likelihood estimate of the Box-Cox transform. As may be seen, labor income was strongly related to region, industry of employment and occupation of the head of household, family composition, and especially age of the household head. The age variable is taken as a quadratic to account for known non-linearity. [Haines, 1979a, ch. 6.] Both age coefficients were significant and gave the correct orientation to the implied parabola (concave from below). Ethnicity was not so strongly related, once other factors had been taken into account. Whether the wife and particularly whether the children were working were both significant determinants in a positive direction, as was the fact of a household being headed by a male.

The third equation of Table 3 (the natural log transform) was then used to create a predicted value of labor income (transformed back to the original form in dollars) for each observation in the data set. Non-labor income (i.e., income from other sources, including boarders) was then added back in to obtain an estimate of family expected income ($Y_e$). Family residual income ($Y_r$) was then calculated as ($Y - Y_e$). These values were then used in the regressions for the tenure choice, given in Table 3.

Tenure Choice

The estimation of the tenure choice in Table 3 is done with maximum likelihood probit [Maddala, 1983, ch 2], because the dependent variable is discrete and dichotomous (0 = renter, 1 = owner). The probit model avoids the problems of the linear probability model (e.g., heteroskedasticity,

predictions out of range, poor fit at the extremes) which obtain if the equations in Table 3 were estimated by ordinary least squares (which is, in fact, used to get the first approximation for the iterative estimate).

The first two equations of Table 3 use only the measures of income and the value/rent ratio mentioned earlier. The value/rent ratio is, as noted, the ratio of average house values to average rents per room. The average house values were taken as state level average values of non-farm mortgaged homes from the census of 1890. [U.S. Bureau of the Census, 1896, Tables 14 and 38.] The rents were state averages of rents per room for the renter in the U.S. Commissioner of Labor Survey itself.[4] Thus each family in a state (e.g., Pennsylvania) has a value/rent ratio for that state.

This is an effort to approximate an exogenous price structure. Unfortunately, no price ratio of housing services to rental services could be obtained, since the survey gives no information on whether homeowners in the sample had mortgages and, if so, how much they paid in principal and/or interest. Thus the value/rent ratio here embodies both price and capital gains effects. It is a reduced form coefficient and its predicted sign is unclear. If the price effects would dominate (i.e., high house prices relative to rents leading to a high relative cost of owner-occupied housing services), the sign on the value/rent coefficient would be negative. If capital gains effects would dominate (i.e., higher relative house prices leading to expectations of larger capital gains), the sign on the value/rent coefficient would be positive.[5]

The price effects dominate for the value/rent variable. The coefficients are negative and statistically significant (as measured by the asymptotic t-ratios). The coefficients on the income variables are in the expected

direction (positive) and all highly statistically significant. The magnitude of the estimate for total current family income (.00074) is smaller than that for predicted expected income (.00091). This confirms that estimating tenure choice and demand with current rather than expected income will lead to a downward bias of demand elasticities for ownership and housing services. It is interesting that not only expected, but also residual income components could have influenced the choice to own rather than rent in a positive direction. It is possible that a good year might make it easier to cover the down payment and other costs associated with purchase of a home. (It is also possible that not all expected components have been captured in the estimates from equation (3) in Table 2.) The likelihood function using expected and residual income rather than current income increases by 3.5, which is statistically significant at a five percent level.[6] It therefore matters whether one uses current or expected income.

Equations (3) and (4) of Table 3 add the socio-economic and demographic variables from Table (2) back into the probit equations estimating tenure choice. Since many of these variables were used to estimate expected income, one might expect them to be unimportant in the equation using expected income (equation (4)), though they would likely be significant in equation (3) which uses only current income. Surprisingly, a number of these variables remained statistically significant in equation (4), the specification with estimated expected and residual income. This confirms that they exhibited independent impacts beyond those solely through expected income. The quadratic formulation of the age of head of household remained significant, as did many of the industry coefficients, family size, the number of children working, and several of the ethnic and occupational dummy variables. Also, when these

socioeconomic and demographic variables were added, the magnitudes of the expected and residual income coefficients, as well as the coefficient of the value/rent ratio, rose while that for current income fell slightly.

It should be noted that the coefficient on residual income in equation (4) in Table 3 is statistically insignificantly different from the coefficient on current income in equation (3), supporting the conjecture from equation (6) on p. 7 above that the improperly specified relationship using current income actually is making estimates of these residual components. Finally, the additional socioeconomic variables resulted in a significant increase in the likelihood value generated by the equation (i.e., a smaller absolute value of the likelihood function).

Comparing the results in equation (4) of Table 3 to those in Table 1, it can be noted that the age of the household head remains positively related to homeownership, though in a curvilinear fashion. Regional differences were in the same direction as predicted by the marginals in Table 1. The Midwest exhibited the highest rates and the South the lowest. Relative to the glass industry (the omitted dummy variable), workers in pig iron and in coal and iron mining had higher rates of homeownership, while workers in bar iron, steel, coke, and textiles had lower rates. These results correspond roughly to the simple tabulations in Table 1 and indicate that there were effects specific to employment, likely relating to the nature of the towns themselves and local land availability. Mining communities were often rural, and it should have been possible to acquire land for dwellings cheaper there than in more densely settled urban areas more characteristic of the other industries.

Family size remained positively related to homeownership, as did wife's working status. The latter, however, was now statistically insignificant.

Interestingly enough, having children working was likely to deter ownership of a home, when controlling for other factors. Higher income thus encouraged both homeownership and less labor force participation (and more schooling) for children, although we have not explicitly modeled the latter relationship. The zero order correlation between the income of the male head of household and the number of children working was -.293. Also, having a male head of household was now negatively related to homeownership, but the effect was statistically insignificant and the coefficient unstable (comparing equations (3) and (4) in Table 3).

The pattern among the native and foreign born also appeared mixed. The Irish, German, and Slavic immigrants still had higher rates of ownership relative to the native born, but, once income, age, family structure, location, occupation, and industry were taken into account, the higher rates for the Irish now became statistically insignificant. Canadian migrants still had significantly lower homeownership rates relative to those born in the United States, but British immigrants also now had significantly lower ownership rates. It seems highly probable that homeownership, with its attendant restrictions on mobility, was lower among those groups more likely to return to their country of origin (especially Canadians, but also British migrants) and higher among groups more likely to remain lifetime migrants to the United States (Irish, Germans, Slavic). Hence differences by migrant origins did not disappear when various socioeconomic and demographic factors were controlled.

Finally, skilled workers (and craftsmen) continued to have statistically significantly higher rates of ownership relative to the unskilled, even after income, industry, age, and family effects were placed in the equation. This

may reflect the greater stability and lower mobility of segment of the labor force made up of skilled workers and craftsmen because of firm- or industry-specific human capital as well as company policies to encourage homeownership among these workers precisely to reduce labor mobility. [For the steel industry, see Fitch, 1910, ch XV, and Brody, 1960, ch. IV.]

Housing Demand

The next step in the analysis is to estimate housing demand. As explained above, lack of data on housing expenditures for owners means that it is possible to estimate demand only for renters. The results are presented in Table 4, which gives ordinary least squares estimates of housing expenditures by renters regressed on income (current or expected and residual), the estimated state rental price per room, and a series of socio-economic variables. In this case, age (and age squared) of household head, region, nativity of household head, and several family composition variables (numbers of parents, children, and boarders and other residents) were used. Information on industry and skill level of household head was omitted because it was felt that these variables really operated only through income. Region and nativity might well embody differences in preferences for housing by geographic area and ethnic group. A simple linear form is used here, although a semi-logarithmic specification was tried. The fit was consistently better for the linear specification.[7]

Included in the equations in Table 4 is a variable $\Psi$. This is the inverse Mill's ratio and is introduced to provide a correction for censoring, which may arise because some individuals choose to own while others choose to rent.[8] If the demand equations are estimated separately for renting and owning without taking into account this endogenous choice element, bias can

result. [Goodman, 1988. Lee and Trost, 1978. Rosen, 1979.] Interestingly enough, the coefficient of $\Psi$ (psi) was statistically significant only in equation (1), which included only income and the rental price. Its significance disappeared when the additional socio-economic variables were introduced. Its omission from the full equation (compare equations (2) and (4) in Table 4) made little difference for the estimated parameter values, indicating that censoring did not create appreciable bias in this instance.

In terms of the other estimates in Table 4, income had a significant positive effect on housing expenditure, with expected income having a larger effect than total current income. Age of head had a statistically significant quadratic relationship with housing expenditures with an orientation like that for tenure choice (i.e., concave from below). That is, household heads in mid-life course (as opposed to young or old householders) were more likely to own or, if renters, to spend more on housing, holding family composition constant. The housing price coefficient was significant and positive, suggesting that renter demand was price inelastic.

In terms of regional effects, renters in New England, the Middle Atlantic states, and the South all spent less on housing than families in the Midwest (the omitted dummy variable). Families in the South spent the least, while those in the Middle Atlantic states were relatively close to families in the Midwest. Families with only one parent spent less on housing (although the coefficient was consistently insignificant), as did families with more children and other household members (including boarders). In general, larger families were more likely to own, but, if they did not, they spent less on rent and more on other items, especially food. [Haines, 1987.] Finally, the nativity variables show that foreign born households, with the exception of

German immigrants, spent less on their rental housing than households with a native-born head. The effects were almost all statistically significant and rather large, considering that average rental expenditure for the sample was about $80. This may indicate an imperfect measurement of prices here, since housing in neighborhoods inhabited by foreign migrants may have been cheaper. But it may also have indicated a willingness to spend less on housing in order to spend more on food and other goods and services. The foreign-born did tend to spend greater shares of their budgets on food. [Haines, 1987.]

These effects are summarized in a set of elasticities, presented in the upper panel of Table 5. The second column of the top panel presents the partial elasticities (conditional on tenure choice) of tenure choice with respect to income, the value/rent ratio, and the age of the household head. The tenure choice elasticities are calculated at the mean values of the variables. Since they are derived from probit coefficients, they must be evaluated at some point on the standard normal density function. Again, they were computed at the density point given by the mean values of the independent variables from equations (3) and (4) of Table 3.[9] Notably, the elasticity of the probability of homeownership was greater with respect to expected income than it was for current income. In neither case, however, was the elasticity greater than one. In this sense, homeownership would not be considered a "luxury". The elasticity with respect to residual income was, as one might expect, negligible, since mean reference values for residual income were close to zero. The value/rent elasticity was negative and moderate in size. In contrast, homeownership was very responsive to age at the mean age of this sample (about 39.5 years). An increase in age by one year (about 2.5 percent) would have increased homeownership by about 3.7 percent. This, of

course, would decline with age and the elasticity would eventually become negative (at about 44 years of age).

The third and fourth columns in the top panel of Table 5 are the partial elasticities of rental expenditure with respect to income, the value/rent ratio, and age of the household head. The third column evaluates the income elasticities at the mean income of the renter sample ($655 for total current family income), and the fourth column evaluates these elasticities at the mean income of the total sample ($684 for total current income). In the case of income, if there is little correlation of rental price with income (correlation between the rental price and current income for the renter sample was -.0001, and -.1228 with expected income), then these expenditure elasticities become actual income elasticities of demand.[10] For rental expenditure, housing may be seen to have been income inelastic, with demand elasticities considerably less than one. Housing was, not surprisingly, a "necessity". In this case, however, the elasticities for expected and current incomes were not much different. The decision to own or rent was a long term decision, but actual expenditures by renters were roughly as responsive to current as to longer run expected income. The elasticity of rental expenditure relative to the age of household head was much lower than that for homeownership, but it was still positive at the mean age of the sample. The fifth column of the upper panel of Table 5 contains the partial price elasticity of renter demand.[11] Renter demand was somewhat price inelastic, although the value of -.650 is not especially low.

Finally, it is useful to introduce a framework that integrates the tenure-specific analysis into a full system. Let Q equal total housing demand, the sum of the probability of owning (or, alternatively, the proportion of owners)

f, multiplied by the amount of housing demanded by owners, plus the comparable probabilities (proportions) for renters, or:

$$Q = f\,Q_o + (1-f)\,Q_r. \tag{7}$$

$Q_o$, $Q_r$, and f are all determined by incomes Y, the price vector P, and a set of sociodemographic variables D. Differentiating Q totally (following Goodman, 1988) provides the following full elasticities E for income and sociodemographic variables. (Price variables are treated similarly but are ignored here due to the reduced-form nature of our price term.)

$$E^*_y = (1-f)\eta_{Qry}(Q_r/Q) + f\eta_{Qoy}(Q_o/Q) + [1 - (Q_r/Q)]\eta_{fy} \tag{8}$$

$$E^*_D = (1-f)(\eta_{Qry}\eta_{yD} + \eta_{QrD})(Q_r/Q) + f(\eta_{Qoy}\eta_{yD} + \eta_{QoD})(Q_o/Q) + [1 - (Q_r/Q)](\eta_{fy}\eta_{yD} + \eta_{fD}) \tag{9}$$

Equation (8) shows the full income elasticity as a function of the renter income elasticity, weighted by the size of renter housing relative to all housing, owner income elasticity, similarly weighted, and a transition elasticity, implying that $[1 - (Q_r/Q)] > 0$. The transition elasticity is important if (as is generally the case) a move from renter to owner tenure is accompanied by an increase in housing consumption. Full demographic elasticity (equation (9)) is similar, except that the demographic terms can center in two ways: first, as determinants of expected income (and then through the income term); and, second, as determinants of expected income.

Since owner housing demand cannot be directly estimated with the data set at hand, further assumptions are necessary to estimate full elasticities. To estimate Q, it is necessary to have an estimate of $Q_o$. Goodman [1988] has estimated that $Q_o = 1.469Q_r$ and that $\eta_{Qoy} = 1.462\eta_{QrY}$. The resulting full elasticities are given in the lower panel of Table 5. Notably, the full

income elasticities are higher than the partial income elasticities, suggesting a further downward bias to such elasticity calculations if the simultaneous effect of tenure choice is not taken into account. The present results do not suggest, however, that housing demand was income elastic. On the other hand, the full elasticities of renter demand with respect to expected income are now considerably higher than those with respect to current income, indicating the importance of taking the systematic components of labor income into account. Finally, the full elasticity calculations point to a high response of renter demand with respect to age of household head. This must be qualified, however, by noting the nonlinearities involved and the fact that these elasticities were evaluated at both the means of income and age.

## Conclusions

In general, several points may be concluded from the analysis. First, there were significant differentials in homeownership rates among American workers around the turn of the century, albeit at much lower levels than later in the twentieth century. Second, using the 1889/90 U.S. Commissioner of Labor survey of 6809 worker families in the United States in nine industries in twenty four states, it has been possible to estimate probit equations to predict homeownership from income, the ratio of house values to rental prices, and various other socioeconomic and demographic factors. It has also been possible to estimate renter demand functions, although the survey provided insufficient information to allow estimation of owner demand functions.

Third, many of the differentials observed in the marginal distributions of homeownership did hold up under multivariate analysis. There remained effects for industry, occupation (essentially skilled versus unskilled), and age of head of household. Skilled workers and those employed in mining and

pig iron production tended to have higher ownership rates relative to unskilled workers and those employed in other ferrous metallurgy, in textiles, and in glass manufacture. The extent of urbanization for these industrial locations seems a likely explanation here. Older household heads and those living in larger families also had greater rates of ownership. Some regional effects remained, with greater ownership rates in the Midwest relative to all other regions, though only the South had a statistically significantly smaller extent of homeownership among these workers. The peculiar nature of the sample in terms of the distribution by industry, ethnicity, and region very likely contributed to this pattern, however.

Fourth, higher relative housing prices, as measured by the value/rent ratios, had a significant negative impact on the decision to own. Rental prices (as measured by state level average rents per room) also had a significant effect on demand for renter housing and in the expected (negative) direction. Fifth, the level of household income had a significant and positive effect on both the probability of homeownership and on renter demand. Expected income estimated by the human capital approach appears to be a preferable theoretical and empirical income measure.

Finally, some ethnic differentials in ownership remained in the full probit regressions for homeownership. Relative to the native born, Irish, German, and Slavic immigrants had higher probabilities of ownership, controlling for other variables. The coefficient for the Irish was not, however, statistically significant. British, Canadian, and other migrants had lower homeownership rates. The chance of returning to area of origin was higher for Canadian and British migrants and likely contributed to lower homeownership rates. Within the group of renters, the estimated demand

equations show that all the foreign born, with the exception of German immigrants, spent less on housing relative to the native born. This suggests a need to explore the underlying factors determining ethnic variations in home acquisition and housing demand.

Housing demand estimates from the 1889/90 U.S. Commissioner of Labor Survey show that modern housing demand theory performs well with historical data. The equations for renter demand performed well, explaining about a third of total variation in rental expenditure. Both tenure choice and renter demand elasticities were slightly higher than those found in recent cross-sectional housing demand work, but they are very plausible and are evidence of some longer run stability along this dimension of behavior. The availability of sociodemographic variables in the data base also suggests that differences in tastes may well have been important. Hopefully, these results will assist us in tracing the evolution of homeownership in America, that quintessential part of the "American Dream."

## FOOTNOTES

1. Goodman [1988] uses the terminology of permanent and transitory income instead of the terms expected and residual income employed here.

2. The calculation of these state level price indices for 1890 is explained in Haines [1989].

3. The likelihood function Box-Cox transformation is, in this case:

$$L = -(N/2)(\ln(\sigma^2)) + (\lambda - 1)(\Sigma \ln(Y_i))$$

where N is the number of observations, $\sigma_2$ is the error variance, $\lambda$ is the Box-Cox transformation parameter (= 1 for the linear case and = 0 for the logarithmic transformation), and Y is the dependent variable in the model. The likelihood function is distributed $\chi^2$ with 1 degree of freedom.

4. Rents per room for Missouri and Louisiana were assigned average values for the East North Central and East South Central regions, respectively, within the Commissioner of Labor Survey. This was done because of the very small sample sizes for these two states.

5. During the period 1873 to 1896, the United States experienced price deflation. This might have created expectations of housing price declines. What is relevant, however, is real capital gains in relationship to real rental prices. The sign on the value/rent ratio would still be positive under conditions of general price deflation if the real capital gains phenomenon would dominate.

6. The expression $-2(L - L^*)$ is distributed $\chi^2$ with the critical value at a five percent level of significance equal to 3.84.

7. The R-squared values, F-ratios, and values of the likelihood function all indicated a better fit for the simple linear specification than for the specification using the logarithm of rental expenditure (i.e., the semi-logarithmic specification).

8. $\Psi$ equals, for the renter case, $-g(I)/(1 - G(I))$, where I is the index value of the probit estimates of tenure choice (from Table 3), g(I) is the normal density function evaluated at I, and G(I) is the cumulative normal density function evaluated at I. The ratio for owners would be g(I)/G(I) for the present case where renting =0 and owning =1.

9. The elasticity requires the partial derivative of the probit function. This must be evaluated at some point on the standard normal density function. So, for example, the elasticity of tenure choice (f) with respect to expected income ($Y_e$) would be

$$[(\delta f/\delta Y_e)(Y_e/f)][\phi(X'\beta)] = (\beta_y)(Y_e/f)[\phi(X'\beta)]$$

where $\phi(.)$ is the standard normal density function and the $\beta$'s are the coefficients. The elasticities were calculated at the mean value of $X'\beta$.

10. Expenditure equals pq. Taking logarithms, ln(expenditure) = ln(p) +

ln(q). Dividing through by ln(Y), we have [ln(expenditure)/ln(Y)] = [ln(p)/ln(Y)] + [ln(q)/ln(Y)]. The latter term is the true income elasticity of demand. If p and Y are virtually uncorrelated, then the expenditure elasticity (i.e., [ln(expenditure)/ln(Y)]) is roughly equal to the income elasticity of demand, since [ln(p)/ln(Y)] would be approximately zero.

11. Following the reasoning in footnote 8, ln(expenditure) = ln(p) + ln(q). Dividing through by ln(p), we get [ln(expenditure)/ln(p)] = [ln(p)/ln(p)] + [ln(q)/ln(p)]. Thus the price elasticity of demand [ln(q)/ln(p)] = [ln(expenditure)/ln(p)] - 1. The last term is computed directly from Table 4.

## REFERENCES


Abbott, Edith. 1936. The Tenements of Chicago, 1908-1935. Chicago.

Amemiya, Takeshi. 1985. Advanced Econometrics. Cambridge, MA: Harvard University Press.

Bodnar, John. 1976. "Immigration and Modernization: The Case of Slavic Peasants in Industrial America." Journal of Social History. Vol. 10.

Bodnar, John. 1985. The Transplanted: A History of Immigrants in Urban America. Bloomington, IN: Indiana University Press.

Brady, Dorothy S. 1956. "Family Saving, 1888 to 1950." In Raymond Wl Goldsmith, Dorothy S. Brady, and Horst Mendershausen. A Study of Saving in the United States. Vol. III. "Special Studies." Princeton, NJ: Princeton University Press. pp. 137-273.

Brody, David. 1960. Steelworkers in America: The Nonunion Era. Cambridge, MA: Harvard University Press.

Byington, Margaret F. 1910. Homestead: The Households of a Mill Town. New York: The Russell Sage Foundation.

Deaton, Angus, and John Muellbauer. 1980. "An Almost Ideal Demand System." American Economic Review. Vol. 70, No. 3 (June). pp. 312-326.

Deaton, Angus S., and John Muellbauer. 1986. "On Measuring Child Costs: With Applications to Poor Countries." Journal of Political Economy. Vol. 94, No. 4 (August). pp. 720-744.

Deaton, Angus S., Javier Ruiz-Castillo, and Duncan Thomas. 1985. "The Influence of Household Composition on Household Expenditure Patterns: Theory and Spanish Evidence." Unpublished paper. (September).

Fishlow, Albert. 1973. "Comparative Consumption Patterns, the Extent of the Market, and Alternative Development Strategies." In Eliezar B. Ayal, ed. Micro Aspects of Development. New York: Praeger Publishers. pp. 41-80.

Fitch, John A. 1910. The Steel Workers. New York: The Russell Sage Foundation.

Friedman, Milton. 1957. A Theory of the Consumption Function. Princeton, NJ: Princeton University Press.

Goodman, Allen C. 1988. "An Econometric Model of Housing Price, Permanent Income, Tenure Choice, and Housing Demand." Journal of Urban Economics. Vol. 23. pp. 327-353.

Goodman, Allen C., and Masahiro Kawai. 1986. "Functional Form, Sample Selection, and Housing Demand." Journal of Urban Economics. Vol. 20. pp. 155-167.

Haines, Michael R. 1979a. Fertility and Occupation: Population Patterns

in Industrialization. New York: Academic Press.

Haines, Michael R. 1979b. "Industrial Work and the Family Life Cycle, 1889-1890." Research in Economic History. Vol. 4. pp. 289-356.

Haines, Michael R. 1985. "The Life Cycle, Savings, and Demographic Adaptation: Some Historical Evidence for the United States and Europe." In Alice S. Rossi, ed. Gender and the Life Course. New York: Aldine. pp. 43-63.

Haines, Michael R. 1987. "Consumer Behavior and Immigrant Assimilation: A Comparison of the United States, Britain, and Germany, 1889/90." Paper presented at the annual meetings of the Allied Social Sciences Association. Chicago (December).

Haines, Michael R. 1989. "A State and Local Consumer Price Index for the United States in 1890." Historical Methods. Vol. 22, No. 3 (Summer). pp.

Kelley, Allen C. 1976. "Savings, Demographic Change and Economic Development." Economic Development and Cultural Change. Vol. 24, No. 4. pp. 683-693.

Kirk, Carolyn T., and Gordon W. Kirk, Jr. 1981. "The Impact of the City on Home Ownership: A Comparison of Immigrants and Native Whites at the Turn of the Century." Journal of Urban History. Vol. 7, No. 4 (August). pp. 471-498.

Lee, L. F., and R.P. Trost. 1978. "Estimation of Some Limited Dependent Variable Models with Applications to Housing Demand." Journal of Econometrics. Vol. 8. pp. 357-382.

Lees, Lynn H. 1980. "Getting and Spending: The Family Budgets of English Industrial Workers in 1890." In John M. Merriman, ed. Consciousness and Class Experience in Nineteenth Century Europe. New York: Holmes and Meier. pp. 169-186.

Maddala, G.S. 1983. Limited-Dependent and Qualitative Variables in Econometrics. Cambridge, Eng.: Cambridge University Press.

Mayo, S.K. 1981. "Theory and Estimation in the Economics of Housing Demand." Journal of Urban Economics. Vol. 11. pp. 95-116.

Modell, John. 1978. "Patterns of Consumption, Acculturation, and Family Income Strategies in Late Nineteenth Century America." In Tamara K. Hareven and Maris A. Vinovskis, eds. Family and Population in Nineteenth-Century America. Princeton NJ: Princeton University Press. pp. 206-240.

Morris, E.W., and M. Winter. 1978. Housing, Family, and Society. New York: John Wiley & Sons.

Perrin, C. 1977. Everything in its Place: Social Order and Land Use in America. Princeton, NJ: Princeton University Press.

Pollak, Robert A., and Terence J. Wales. 1981. "Demographic Variables

in Demand Analysis." Econometrica. Vol. 49, No. 6 (November). pp. 1533-1551.

Ransom, Roger L., and Richard Sutch. 1989. "Two Strategies for a More Secure Old Age: Life-Cycle Saving by Late-Nineteenth-Century American Workers." Paper presented at the Summer Workshop of the Development of the American Economy Project, National Bureau of Economic Research, Cambridge, MA, July 17-21.

Rosen, H.S. 1979. "Housing Decisions and the U.S. Income Tax: An Econometric Analysis." Journal of Public Economics. Vol. 11. pp. 1-23.

Rossi, Peter H. 1980. Why Families Move. 2nd ed. Beverly Hills, CA: Sage Publications.

Rossi, Peter H., and Anne B. Shlay. 1982. "Residential Mobility and Public Policy Issues: 'Why Families Move' Revisited." Journal of Social Issues. Vol. 38, No. 3. pp. 21-34.

Thernstrom, Stephen. 1964. Poverty and Progress: Social Mobility in a Nineteenth Century City. Cambridge, MA: Harvard University Press.

Thomas, William I., and Florian Znaniecki. 1918-20. The Polish Peasant in Europe and America. 4 vols. New York.

Tygiel, Jules. 1979. "Housing in Late Nineteenth-Century American Cities: Suggestions for Research." Historical Methods. Vol. 12, No. 2 (Spring). pp. 84-97.

U.S. Bureau of the Census. 1896. U.S. Census of Population: 1890. "Report on Farms and Homes: Proprietorship and Indebtedness." Washington, DC: G.P.O.

U.S. Bureau of the Census. 1975. Historical Statistics of the United States: Colonial Times to 1970. 2 vols. Washington, DC: G.P.O.

U.S. Bureau of the Census. 1987. Statistical Abstract of the United States: 1988. (108th edition). Washington, DC: G.P.O.

U.S. Commissioner of Labor. 1890. Sixth Annual Report of the Commissioner of Labor, 1890. Part III. "Cost of Living." U.S. Congress, House of Representatives, House Executive Document 265, 51st Congress, 2nd Session. Washington, DC: G.P.O.

U.S. Commissioner of Labor. 1891. Seventh Annual Report of the Commissioner of Labor, 1891. Part III. "Cost of Living." U.S. Congress, House of Representatives, House Executive Document 232, 52nd Congress, 1st Session. Washington, DC: G.P.O.

U.S. Commissioner of Labor. 1904. Eighteenth Annual Report of the Commissioner of Labor. "Cost of Living and Retail Prices of Food." Washington, DC: G.P.O.

Warner, Sam Bass, Jr. 1962. Streetcar Suburbs: The Process of Grwoth in

Boston, 1870-1900. Cambridge, MA: Harvard University Press.

Williamson, Jeffrey G. 1967. "Consumer Behavior in the Nineteenth Century: Carroll D. Wright's Massachusetts Workers in 1875." Explorations in Entrepreneurial History. Second Series. Vol 4, No. 2 (Winter). pp. 98-135.

TABLE 1. HOMEOWNERSHIP RATES. U.S. COMMISSIONER OF LABOR SURVEY, 1889/90.

| VARIABLE | OWNERSHIP RATE | N of CASES |
|---|---|---|
| TOTAL SAMPLE | 0.1539 | 8544 |
| United States | 0.1761 | 6809 |
| Europe | 0.0669 | 1735 |
| Belgium | 0.1613 | 124 |
| France | 0.0478 | 335 |
| Germany | 0.2900 | 200 |
| Great Britain | 0.0215 | 1024 |
| Switzerland | 0.0000 | 52 |
| UNITED STATES ONLY | 0.1761 | 6809 |
| REGION | | |
| New England | 0.0993 | 1239 |
| Middle Atlantic | 0.1911 | 3249 |
| South | 0.0857 | 1167 |
| Midwest | 0.3076 | 1154 |
| STATE OF RESIDENCE | | |
| Alabama | 0.0631 | 317 |
| Connecticut | 0.0574 | 296 |
| Delaware | 0.0000 | 48 |
| Georgia | 0.0446 | 224 |
| Illinois | 0.2817 | 252 |
| Indiana | 0.2383 | 214 |
| Kentucky | 0.1000 | 20 |
| Louisiana | 0.2000 | 10 |
| Maine | 0.1964 | 275 |
| Maryland | 0.1374 | 211 |
| Massachusetts | 0.0694 | 418 |
| Mississippi | 0.0000 | 34 |
| Missouri | 0.3889 | 18 |
| New Hampshire | 0.1161 | 155 |
| New Jersey | 0.1873 | 363 |
| New York | 0.1893 | 750 |
| North Carolina | 0.0338 | 148 |
| Ohio | 0.3644 | 623 |
| Pennsylvania | 0.2035 | 1877 |
| Rhode Island | 0.0526 | 95 |
| South Carolina | 0.0909 | 33 |
| Tennessee | 0.0497 | 161 |
| Virginia | 0.2129 | 202 |
| West Virginia | 0.0923 | 65 |
| INDUSTRY | | |
| HEAVY INDUSTRY | 0.2165 | 2490 |
| Pig Iron | 0.2480 | 762 |
| Bar Iron | 0.1814 | 623 |
| Steel | 0.1530 | 183 |
| Coal | 0.2598 | 508 |
| Coke | 0.1325 | 249 |

TABLE 1. HOMEOWNERSHIP RATES. U.S. COMMISSIONER OF LABOR SURVEY, 1889/90.

| VARIABLE | OWNERSHIP RATE | N of CASES |
|---|---|---|
| Iron Ore | 0.2667 | 165 |
| TEXTILES | 0.1055 | 3043 |
| Cottons | 0.0783 | 2132 |
| Woolens | 0.1690 | 911 |
| GLASS | 0.2657 | 1276 |
| OCCUPATION | | |
| Unskilled | 0.1297 | 2081 |
| Semi-skilled | 0.2097 | 1936 |
| Skilled | 0.1891 | 1327 |
| Craftman | 0.2367 | 714 |
| White Collar | 0.1538 | 208 |
| Helper, Apprentice | 0.1256 | 207 |
| Other & Unknown | 0.1339 | 336 |
| NATIVITY | | |
| NATIVE | 0.1589 | 3693 |
| FOREIGN BORN | 0.1964 | 3116 |
| Engl.,Scots,Welsh | 0.1658 | 935 |
| Irish | 0.2066 | 944 |
| Canadian | 0.0372 | 349 |
| German | 0.3069 | 668 |
| French,Belg.,Swiss | 0.1869 | 107 |
| Slavic | 0.2698 | 63 |
| Other | 0.1400 | 50 |
| SEX OF HOUSEHOLD HEAD | | |
| Male | 0.1783 | 6636 |
| Female | 0.0930 | 172 |
| AGE OF HOUSEHOLD HEAD | | |
| Below 20 | 0.0000 | 5 |
| 20-29 | 0.0879 | 1297 |
| 30-39 | 0.1599 | 2347 |
| 40-49 | 0.2065 | 1860 |
| 50-59 | 0.2473 | 938 |
| 60 & over | 0.2768 | 336 |
| HOUSEHOLD INCOME | | |
| $200 & below | 0.1591 | 44 |
| $201-$500 | 0.1187 | 2283 |
| $501-$800 | 0.1589 | 2625 |
| $801-$1200 | 0.2372 | 1332 |
| $1201-$1500 | 0.3281 | 320 |
| $1501 & over | 0.4049 | 205 |
| BOARDERS PRESENT | | |
| Yes | 0.1676 | 1671 |
| No | 0.1789 | 5138 |

TABLE 1. HOMEOWNERSHIP RATES. U.S. COMMISSIONER OF LABOR SURVEY, 1889/90.

| VARIABLE | OWNERSHIP RATE | N of CASES |
|---|---|---|
| LIFE CYCLE STAGE | | |
| Wife < 45, no children | 0.1104 | 634 |
| Youngest child 0--4 | 0.1581 | 3339 |
| Youngest child 5--14 | 0.1973 | 1804 |
| Youngest child 15+ | 0.3104 | 451 |
| Wife > 44, no children | 0.2566 | 265 |
| Female-headed HH | 0.0930 | 172 |
| Male head, no spouse | 0.0714 | 84 |
| FAMILY SIZE | | |
| 1 | 0.1667 | 6 |
| 2 | 0.1483 | 951 |
| 3 | 0.1636 | 1204 |
| 4 | 0.1769 | 1272 |
| 5 | 0.1584 | 1187 |
| 6 | 0.2017 | 828 |
| 7 | 0.2007 | 593 |
| 8 | 0.2237 | 371 |
| 9 | 0.2256 | 195 |
| 10 & over | 0.1683 | 202 |
| # OF CHILDREN | | |
| 0 | 0.1529 | 909 |
| 1 | 0.1621 | 1197 |
| 2 | 0.1755 | 1271 |
| 3 | 0.1618 | 1211 |
| 4 | 0.1988 | 835 |
| 5 | 0.1990 | 598 |
| 6 | 0.2173 | 382 |
| 7 | 0.2239 | 201 |
| 9 | 0.1875 | 128 |
| 9 | 0.1373 | 51 |
| 10 & over | 0.1154 | 26 |

SOURCE: U.S. Commissioner of Labor [1890, 1891].

TABLE 2. Ordinary Least Squares Estimates of Expected Income.
Working Class Families in Nine Industries. United States. 1889/90.

| | (1) | | | (2) | | | (3) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | Signi. | t-ratio | Coeff. | Signi. | t-ratio | Coeff. | Signi. | t-ratio |
| Dependent Variable | Real Labor Income | | | Square Root Transform of Real Labor Income | | | Natural Log Transform of Real Labor Income | | |
| Independent Variables | | | | | | | | | |
| Constant | 165.69 | *** | 3.087 | 26.9210 | *** | 14.279 | 5.4261 | *** | 73.451 |
| Age of HH Head | 18.22 | *** | 9.040 | 0.7410 | *** | 10.468 | 0.0315 | *** | 11.347 |
| Age of HH Head Sqrd. | -0.2067 | *** | -8.923 | -0.0086 | *** | -10.550 | -0.0004 | *** | -11.678 |
| Region | | | | | | | | | |
| New England | -47.01 | *** | -3.271 | -1.2348 | ** | -2.446 | -0.0324 | --- | -1.639 |
| Mid Atlantic | -74.78 | *** | -7.908 | -2.1843 | *** | -6.576 | -0.0643 | *** | -4.941 |
| South | -159.93 | *** | -12.477 | -6.1409 | *** | -13.639 | -0.2523 | *** | -14.302 |
| Midwest | NI | NI | NI | NI | NI | NI | NI | NI | NI |
| Industry | | | | | | | | | |
| Pig Iron | -200.60 | *** | -15.982 | -6.8954 | *** | -15.640 | -0.2415 | *** | -13.982 |
| Bar Iron | -34.23 | *** | -2.600 | -1.4378 | *** | -3.109 | -0.0548 | *** | -3.024 |
| Steel | -164.34 | *** | -7.974 | -6.2142 | *** | -8.584 | -0.2444 | *** | -8.617 |
| Coal | -330.40 | *** | -21.436 | -12.4622 | *** | -23.018 | -0.4891 | *** | -23.058 |
| Coke | -280.37 | *** | -15.170 | -9.9928 | *** | -15.392 | -0.3700 | *** | -14.547 |
| Iron Ore | -431.89 | *** | -19.769 | -17.8483 | *** | -23.258 | -0.7823 | *** | -26.021 |
| Cottons | -264.07 | *** | -21.217 | -9.6172 | *** | -21.998 | -0.3631 | *** | -21.197 |
| Woolens | -211.46 | *** | -15.707 | -7.6145 | *** | -16.102 | -0.2797 | *** | -15.096 |
| Glass | NI | NI | NI | NI | NI | NI | NI | NI | NI |
| Family Composition | | | | | | | | | |
| # Children Working | 113.93 | *** | 32.980 | 4.3475 | *** | 35.827 | 0.1734 | *** | 36.474 |
| Wife Working | 56.60 | *** | 4.310 | 5.5067 | *** | 5.435 | 0.1114 | *** | 6.164 |
| Male-Headed HH | 178.36 | *** | 6.243 | 7.7568 | *** | 7.729 | 0.3766 | *** | 9.566 |
| HH Head's Nativity | | | | | | | | | |
| Native born | NI | NI | NI | NI | NI | NI | NI | NI | NI |
| British | 44.54 | *** | 4.403 | 1.6310 | *** | 4.590 | 0.0633 | *** | 4.545 |
| Irish | 19.35 | * | 1.911 | 0.5575 | --- | 1.567 | 0.0184 | --- | 1.323 |
| Canadian | 38.21 | ** | 2.306 | 1.1439 | ** | 1.965 | 0.0329 | --- | 1.444 |
| German | -20.02 | * | -1.787 | -0.5711 | --- | -1.452 | -0.0161 | --- | -1.045 |
| French, Belg, Swiss | 83.95 | *** | 3.303 | 2.7091 | *** | 3.035 | 0.0934 | ** | 2.670 |
| Slavic | -77.08 | --- | -2.328 | -2.8940 | ** | -2.488 | -0.1114 | ** | -2.445 |
| Other | 4.28 | --- | 0.117 | -0.1100 | --- | -0.086 | -0.0095 | --- | -0.189 |
| HH Head's Occupation | | | | | | | | | |
| Unskilled | NI | NI | NI | NI | NI | NI | NI | NI | NI |
| Semiskilled | 182.22 | *** | 20.987 | 6.6836 | *** | 21.914 | 0.2577 | *** | 21.565 |
| Skilled | 101.88 | *** | 10.106 | 3.9026 | *** | 11.022 | 0.1535 | *** | 11.066 |
| Craftsman | 231.69 | *** | 20.449 | 9.2627 | *** | 23.274 | 0.3829 | *** | 24.554 |
| Wh. Collar, Superv. | 74.63 | *** | 3.916 | 3.0795 | *** | 4.600 | 0.1297 | *** | 4.946 |
| Helper, Apprentice | -53.49 | *** | -2.759 | -1.5591 | ** | -2.289 | -0.0433 | --- | -1.622 |
| Other | 4.38 | --- | 0.199 | 0.2217 | --- | 0.287 | 0.0240 | --- | 0.790 |

TABLE 2. Ordinary Least Squares Estimates of Expected Income.
Working Class Families in Nine Industries. United States. 1889/90.

| | (1) | | | (2) | | | (3) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Coeff. | Signi. | t-ratio | Coeff. | Signi. | t-ratio | Coeff. | Signi. | t-ratio |
| Dependent Variable | Real Labor Income | | | Square Root Transform of Real Labor Income | | | Natural Log Transform of Real Labor Income | | |
| Adjusted R-squared | 0.370 | | | 0.406 | | | 0.417 | | |
| F-ratio | 138.500 | *** | | 160.710 | *** | | 168.110 | *** | |
| N | 6782 | | | 6782 | | | 6782 | | |
| Likelihood Function | -37596.0 | | | -36408.3 | | | -35961.1 | | |

*** = significant at least at a 1% level; ** = significant at least at a 5% level;
* = significant at least at a 10% level; --- = not significant at least at a 10% level;
NI = not included

SOURCE: Calculated by ordinary least squares regressions from the American families in U.S. Commissioner of Labor [1890, 1891].

TABLE 3. Probit Estimates of Homeownership. Working Class Families in Nine Industries. United States, 1889/90.

| Dependent Variable: | (1) | | | (2) | | | (3) | | | (4) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Homeownership | Coeff. | Signi. | t-ratio | Coeff. | Signi. | t-ratio | Coeff. | Signi. | t-ratio | Coeff. | Signi. | t-ratio |
| Independent Variables | | | | | | | | | | | | |
| Constant | -1.13833 | *** | -18.209 | -1.23309 | *** | -17.114 | -2.77347 | *** | -7.804 | -2.80057 | *** | -7.881 |
| Current Income | 0.00074 | *** | 14.687 | | | | 0.00072 | *** | 11.056 | | | |
| Expected Income | | | | 0.00091 | *** | 11.203 | | | | 0.00103 | *** | 6.869 |
| Residual Income | | | | 0.00063 | *** | 9.419 | | | | 0.00066 | *** | 9.288 |
| Value/Rent Ratio | -0.00187 | *** | -6.546 | -0.00194 | *** | -6.750 | -0.00226 | *** | -5.046 | -0.00228 | *** | -5.073 |
| Age of HH Head | | | | | | | 0.06128 | *** | 4.534 | 0.05575 | *** | 4.058 |
| Age of HH Head Sqrd. | | | | | | | -0.00037 | ** | -2.516 | -0.00033 | ** | -2.114 |
| Region | | | | | | | | | | | | |
| New England | | | | | | | -0.08129 | --- | -0.835 | -0.07408 | --- | -0.759 |
| Mid Atlantic | | | | | | | -0.10679 | * | -1.656 | -0.09301 | --- | -1.435 |
| South | | | | | | | -0.44917 | *** | -5.665 | -0.39998 | *** | -4.874 |
| Midwest | | | | | | | NI | NI | NI | NI | NI | NI |
| Industry | | | | | | | | | | | | |
| Pig Iron | | | | | | | 0.21579 | *** | 2.983 | 0.25766 | *** | 3.455 |
| Bar Iron | | | | | | | -0.31321 | *** | -4.022 | -0.29673 | *** | -3.797 |
| Steel | | | | | | | -0.25503 | ** | -2.003 | -0.20259 | --- | -1.568 |
| Coal | | | | | | | 0.18869 | ** | 2.034 | 0.27941 | *** | 2.773 |
| Coke | | | | | | | -0.31072 | *** | -2.630 | -0.23419 | * | -1.909 |
| Iron Ore | | | | | | | 0.50484 | *** | 4.112 | 0.62077 | *** | 4.682 |
| Cottons | | | | | | | -0.40439 | *** | -5.042 | -0.34802 | *** | -4.153 |
| Woolens | | | | | | | -0.10076 | --- | -1.024 | -0.05141 | --- | -0.595 |
| Glass | | | | | | | NI | NI | NI | NI | NI | NI |
| Family Composition | | | | | | | | | | | | |
| Family Size | | | | | | | 0.01924 | * | 1.665 | 0.02086 | * | 1.801 |
| # Children Working | | | | | | | -0.16514 | *** | -6.074 | -0.20092 | *** | -6.411 |
| Wife Working | | | | | | | 0.04848 | --- | 0.517 | 0.03951 | --- | 0.421 |
| Male-Headed HH | | | | | | | 0.02403 | --- | 0.126 | -0.03907 | --- | -0.203 |
| HH Head's Nativity | | | | | | | | | | | | |
| Native born | | | | | | | NI | NI | NI | NI | NI | NI |
| British | | | | | | | -0.12301 | ** | -1.965 | -0.13502 | ** | -2.147 |
| Irish | | | | | | | 0.09277 | --- | 1.528 | 0.08537 | --- | 1.403 |
| Canadian | | | | | | | -0.55643 | *** | -3.800 | -0.57946 | *** | -3.932 |
| German | | | | | | | 0.32820 | *** | 5.248 | 0.33414 | *** | 5.338 |
| French, Belg, Swiss | | | | | | | -0.10261 | --- | -0.684 | -0.12366 | --- | -0.822 |
| Slavic | | | | | | | 0.41097 | ** | 2.255 | 0.41062 | ** | 2.253 |
| Other | | | | | | | -0.17573 | --- | -0.736 | -0.17559 | --- | -0.735 |
| HH Head's Occupation | | | | | | | | | | | | |
| Unskilled | | | | | | | NI | NI | NI | NI | NI | NI |
| Semiskilled | | | | | | | 0.05872 | --- | 1.047 | 0.01368 | --- | 0.230 |
| Skilled | | | | | | | 0.16686 | ** | 2.542 | 0.14190 | ** | 2.132 |
| Craftsman | | | | | | | 0.21848 | *** | 3.138 | 0.14467 | * | 1.887 |

TABLE 3. Probit Estimates of Homeownership. Working Class Families in Nine Industries. United States, 1889/90.

| Dependant Variable: Homeownership | (1) Coeff. | Signi. | t-ratio | (2) Coeff. | Signi. | t-ratio | (3) Coeff. | Signi. | t-ratio | (4) Coeff. | Signi. | t-ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wh. Collar, Superv. | | | | | | | 0.12199 | --- | 0.999 | 0.09849 | --- | 0.804 |
| Helper, Apprentice | | | | | | | -0.03764 | --- | -0.295 | -0.03527 | --- | -0.277 |
| Other | | | | | | | 0.20917 | --- | 1.547 | 0.20263 | --- | 1.497 |
| Log Likelihood | -3034.28 | | | -3030.78 | | | -2722.59 | | | -2719.97 | | |
| Chi Square | 255.87 | *** | | 262.84 | *** | | 879.26 | *** | | 884.50 | *** | |
| N | 6782 | | | 6782 | | | 6782 | | | 6782 | | |

*** = significant at least at a 1% level; ** = significant at least at a 5% level; * = significant at least at a 10% level; --- = not significant at least at a 10% level; NI = not included

SOURCE: Calculated by maximum likelihood probit regressions from the American families in U.S. Commissioner of Labor [1890, 1891].

TABLE 4. OLS Estimates of Renter Demand. Working Class Families in Nine Industries. United States. 1889/90.

| Dependent Variable: | (1) | | | (2) | | | (3) | | | (4) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rent Expenditure | Coeff. | Signi. | t-ratio | Coeff. | Signi. | t-ratio | Coeff. | Signi. | t-ratio | Coeff. | Signi. | t-ratio |
| Independent Variables | | | | | | | | | | | | |
| Constant | -0.08201 | --- | -0.028 | -9.21999 | --- | -1.157 | -11.44939 | --- | -1.433 | -10.71712 | --- | -1.370 |
| Current Income | | | | | | | 0.06725 | *** | 36.942 | | | |
| Expected Income | 0.06827 | *** | 28.902 | 0.07943 | *** | 29.834 | | | | 0.07990 | *** | 30.503 |
| Residual Income | 0.05004 | *** | 23.041 | 0.05913 | *** | 26.496 | | | | 0.06015 | *** | 30.457 |
| Rental Price | 29.09905 | *** | 11.75 | 29.24671 | *** | 9.684 | 28.36802 | *** | 9.371 | 29.89103 | *** | 10.138 |
| Age of HH Head | | | | 1.46805 | *** | 4.672 | 1.82292 | *** | 5.879 | 1.53909 | *** | 5.033 |
| Age of HH Head Sqrd. | | | | -0.01707 | *** | -4.775 | -0.02021 | *** | -5.692 | -0.01756 | *** | -4.964 |
| Region | | | | | | | | | | | | |
| New England | | | | -9.13873 | *** | -4.279 | -11.29743 | *** | -5.342 | -10.28035 | *** | -5.733 |
| Mid Atlantic | | | | -2.79156 | --- | -1.467 | -4.41660 | ** | -2.334 | -3.69480 | ** | -2.216 |
| South | | | | -20.12079 | *** | -8.773 | -23.56025 | *** | -10.546 | -21.38705 | *** | -11.264 |
| Midwest | | | | NI | NI | NI | NI | NI | NI | NI | NI | NI |
| Family Composition | | | | | | | | | | | | |
| # of Parents | | | | -1.83388 | --- | -0.782 | 0.12174 | --- | 0.052 | -1.52504 | --- | -0.657 |
| # of Children | | | | -2.60879 | *** | -10.547 | -2.32956 | *** | -9.543 | -2.62634 | *** | -10.646 |
| # Boarders/Others | | | | -0.78456 | ** | -2.155 | -0.27680 | --- | -0.777 | -0.74783 | ** | -2.065 |
| HH Head's Nativity | | | | | | | | | | | | |
| Native born | | | | NI | NI | NI | NI | NI | NI | NI | NI | NI |
| British | | | | -4.58337 | *** | -3.263 | -4.57795 | *** | -3.248 | -4.76221 | *** | -3.419 |
| Irish | | | | -5.46957 | *** | -3.799 | -5.22941 | *** | -3.621 | -5.46485 | *** | -3.795 |
| Canadian | | | | -14.23144 | *** | -6.239 | -14.49960 | *** | -6.336 | -14.81641 | *** | -6.727 |
| German | | | | 3.69620 | ** | 2.086 | 4.28862 | ** | 2.416 | 4.20853 | ** | 2.485 |
| French, Belg, Swiss | | | | -13.00626 | *** | -3.570 | -12.74258 | *** | -3.486 | -13.00078 | *** | -3.568 |
| Slavic | | | | -15.70175 | *** | -3.167 | -16.50376 | *** | -3.318 | -15.30763 | *** | -3.097 |
| Other | | | | -4.02109 | --- | -0.787 | -4.55818 | --- | -0.889 | -4.40020 | --- | -0.864 |
| Psi | -30.64130 | *** | -11.269 | -3.92576 | --- | -0.984 | 0.39039 | --- | 0.099 | | | |
| Adjusted R-Squared | 0.292 | | | 0.340 | | | 0.335 | | | 0.340 | | |
| F-ratio | 575.95 | *** | | 152.32 | *** | | [illegible] | *** | | 160.73 | *** | |
| N | 5584 | | | 5584 | | | 5584 | | | 5584 | | |
| Likelihood Function | -19724.95 | | | -19528.31 | | | -19547.34 | | | -19528.30 | | |

*** = significant at least at a 1% level; ** = significant at least at a 5% level; * = significant at least at a 10% level; --- = not significant at least at a 10% level; NI = not included

SOURCE: Calculated by ordinary least squares regression from the American renter families in U.S. Commissioner of Labor [1890, 1891].

TABLE 5. Partial and Full Elasticities. Tenure Choice and Renter Demand. Worker Families in Nine Industries. United States. 1889/90.

| Partial Elasticity of: | Tenure Choice | Rental Expenditure (a) | Rental Expenditure (b) | Rental Demand |
|---|---|---|---|---|
| with Respect to: | | | | |
| Expected Income | 0.839 | 0.623 | 0.636 | |
| Residual Income | 0.032 | 0.017 | 0.029 | |
| Current Income | 0.634 | 0.546 | 0.571 | |
| Value Rent/Ratio | -0.516 | | | |
| Age of Household Head | 1.493 | 0.690 | | |
| Rental Price | | | | -0.650 |

| Full Elasticity of: | Rental Demand (a) | Rental Demand (b) |
|---|---|---|
| with respect to: | | |
| Expected Income | 0.802 | 0.809 |
| Current Income | 0.644 | 0.655 |
| Age of Household Head | 1.290 | 1.290 |

(a) Income elasticities evaluated at the mean income of the renter sample.
(b) Income elasticities evaluated at the mean income of the total sample.

SOURCE: See text.

TABLE A-1. Families Classified by Industry and Place of Residence.
U.S. Commissioner of Labor Survey, 1889/90. (All Families.)

| | Industry | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Residence | Pig Iron | Bar Iron | Steel | Coal | Coke | Iron Ore | Cottons | Woolens | Glass | Total |
| 1 Alabama | 143 | 39 | 2 | 60 | 30 | — | 43 | — | — | 317 |
| 2 Georgia | 25 | — | — | — | — | — | 199 | — | — | 224 |
| 3 Illinois | 40 | 68 | 38 | — | — | — | — | — | 106 | 252 |
| 4 Indiana | — | — | — | 36 | — | — | — | — | 178 | 214 |
| 5 New York | 56 | 41 | 62 | — | — | 38 | 187 | 214 | 152 | 750 |
| 6 Ohio | 98 | 140 | 8 | 103 | — | 29 | — | — | 245 | 623 |
| 7 Pennsylvania | 313 | 277 | 48 | 301 | 187 | 73 | 213 | 213 | 252 | 1877 |
| 8 Tennessee | 51 | 17 | — | — | 15 | 9 | 69 | — | — | 161 |
| 9 Virginia | 27 | 35 | — | — | — | 16 | 124 | — | — | 202 |
| 10 West Virginia | 9 | 5 | 25 | 8 | 17 | — | — | — | — | 65 |
| 11 Connecticut | — | — | — | — | — | — | 150 | 146 | — | 296 |
| 12 Kentucky | — | — | — | — | — | — | 20 | — | — | 20 |
| 13 Louisiana | — | — | — | — | — | — | 10 | — | — | 10 |
| 14 Maine | — | — | — | — | — | — | 164 | 111 | — | 275 |
| 15 Maryland | — | — | — | — | — | — | 164 | — | 47 | 211 |
| 16 Massachusetts | — | — | — | — | — | — | 400 | 18 | — | 418 |
| 17 Mississippi | — | — | — | — | — | — | 34 | — | — | 34 |
| 18 New Hampshire | — | — | — | — | — | — | 119 | 36 | — | 155 |
| 19 North Carolina | — | — | — | — | — | — | 148 | — | — | 148 |
| 20 Rhode Island | — | — | — | — | — | — | 55 | 40 | — | 95 |
| 21 South Carolina | — | — | — | — | — | — | 33 | — | — | 33 |
| 22 Missouri | — | — | — | — | — | — | — | — | 18 | 18 |
| 23 New Jersey | — | — | — | — | — | — | — | 85 | 278 | 363 |
| 24 Delaware | — | — | — | — | — | — | — | 48 | — | 48 |
| U.S. TOTAL | 762 | 623 | 183 | 508 | 249 | 155 | 2132 | 911 | 1276 | 6809 |
| 25 Belgium | 11 | 75 | — | 10 | 4 | — | — | — | 24 | 124 |
| 26 France | — | 40 | — | — | — | — | 116 | 179 | — | 335 |
| 27 Germany | — | 22 | 35 | 18 | 10 | 19 | 72 | 24 | — | 200 |
| 28 Great Britain | 66 | 114 | 166 | 166 | 14 | — | 341 | 131 | 26 | 1024 |
| 29 Switzerland | — | — | — | — | — | — | 52 | — | — | 52 |
| EUROPE TOTAL | 77 | 251 | 201 | 194 | 28 | 19 | 581 | 334 | 50 | 1735 |
| OVERALL TOTAL | 839 | 874 | 384 | 702 | 277 | 184 | 2713 | 1245 | 1326 | 8544 |

Source: U.S. Commissioner of Labor [1890, 1891].

Table A-2

Information Coded from the 1889/90 U.S. Commissioner of Labor Survey of Worker Families in Nine Industries in the United States and Five European Countries

1. State or country of residence
2. Industry
3. Nationality of family head
4. Number of children at school
5. Number of children at home
6. Number of children at work
7. Presence of boarders
8. Number of boarders and others in the household
9. Occupation of husband
10. Age of husband
11. Age of wife
12. Total number of children
13. Age of each child
14. Sex of each child above age 10
15. Does the family own its home or rent?
16. Husband's income
17. Wife's income
18. Children's income
19. Income from boarders
20. Other income
21. Total income
22. Number of rooms in the house or apartment (if rented)
23. Total expenditures

24. Food expenditures
    of which expenditures for:
    (a) Beef
    (b) Hog products
    (c) Meat (not specified)
    (d) Eggs
    (e) Lard
    (f) Butter
    (g) Tea
    (h) Coffee
    (i) Sugar
    (j) Molasses
    (k) Potatoes
    (l) Poultry
    (m) Fish
    (n) Milk
    (o) Flour and meal
    (p) Bread
    (q) Rice
    (r) Cheese
    (s) Fruit
    (t) Vinegar, Pickles, and condiments
    (u) Vegetables (not specified)

Table A-2 (cont.)

(v) Food (not specified)

25. Fuel
    (a) Type
    (b) Quantity
    (c) Expenditure

26. Lighting
    (a) Type
    (b) Expenditure

27. Clothing expenditure
    (a) Husband's
    (b) Wife's
    (c) Children's

28. Other expenditures
    of which expenditures for:
    (a) Furniture and utensils
    (b) Taxes
    (c) Property insurance
    (d) Life insurance
    (e) Labor organization contributions
    (f) Other organizational contributions
    (g) Religion
    (h) Charity
    (i) Books and newspapers
    (j) Amusements and vacation
    (k) Intoxicating liquor
    (l) Tobacco
    (m) Sickness and death
    (n) Unspecified other expenditures