Industrial Relations Section
Princeton University
Working Paper #115
September, 1978

Household and Market Production of Families in a Late
Nineteenth Century American City

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ABSTRACT

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Urban families in the late nineteenth century depended upon their children as their most important source of labor income apart from the male head of household. This paper explores the determinants of the labor force participation of children over ten years old within the context of the economic theory of household and market production, using micro-level data from 1880 Philadelphia. The father's income and unemployment, the presence of the mother or father, boarders, servants, older and younger siblings, parents' literacy, ethnicity, among other variables are used in a probit analysis of the labor force participation of children. The results validate the economic theory of household and market production demonstrating, in particular, substitution between mothers and their daughters and the role of comparative advantage in family decisions concerning the allocation of their members' time. Ethnic differences were only important for daughters.

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Introduction: The Family in Economics and History

Both economists and historians have recently focused their research on the family, although for rather different reasons. Economists, recognizing that many decisions are made within the context of the household, have made the family their unit of analysis.¹ Historians, as well, have quantitatively studied the family in a quest to understand common people, who have left none of the documents traditionally used to analyze the uncommon. Two of the most prominent topics for both disciplines have been the allocation of family members' time, and the size and composition of households.

Economists have generally analyzed the first topic within a household production framework stressing the allocation of the husband's and wife's time (e.g., see Gronau [1973, 1976], and Ashenfelter and Heckman [1974]). They have approached the second in terms of the economics of fertility and the quantity-quality tradeoffs in child production (e.g., see Becker and Tomes [1976]; Becker and Lewis [1973]). But by studying the family only in its contemporary setting and thereby placing it in an historical vacuum, they have ignored a host of household decisions important to families in past era and have slighted, as well, the evolution of the family economy over time.² Although little work has been done to integrate studies on the

contemporary American family with those on its nineteenth century ancestors, there has been some movement in that direction (e.g., see Chiswick's [1977] work on the social mobility of recent immigrant groups). The present paper seeks to bridge that gap in terms of the labor force decisions of household members.

Family decisions in most nineteenth century American cities were, in many ways, qualitatively different from those today. They involved the allocation of all family members' time, not merely that of the husband and wife, and children, not wives, were the most common source of labor income apart from the male head of the household. In further contrast to contemporary families, fertility was not the only determinant of the size and composition of the nineteenth century household. The presence of non-nuclear relatives, boarders, and servants, and the age at which children became independent of their parents' households were equally important family decisions affecting household size. Needless to say, many of these options were interrelated decisions for these families. For example, the presence of boarders and non-nuclear relatives, by altering the economic well-being of the family, led to different labor force experiences of family members, and a parent's choice of education, leisure, home or market work for a child was not unrelated to the eventual age at which the child exited from that household.

This paper has two purposes--first, to show what economists studying the family today can learn from historical data and second, to show how economic methods can be used to understand social history. The paper will explore why children worked, using micro-level data from a late nineteenth century American city.³

The Data

The data for this study originated in the 1880 U.S. Federal Population Census manuscripts for Philadelphia. These data yield detailed information on both individual and household characteristics. The census in 1880 and since its inception in 1790, was a tabulation of American households, including information on every household member, including boarders and servants. The census of 1880 was the first to list the relationship of these various household members to the "head" of the household. The information recorded for 1880 includes: geographical (street address) location, full name, race, sex, age, relationship to the head of the household, marital status, occupation, number of months unemployed during the census year, infirmities, school attendance, literacy in any language, place of birth, and place of parents' birth.⁴ A large sample of these data has been collected by the Philadelphia Social History Project and has been linked to other nineteenth century records, such as the Federal Manufacturing Census, business directories, and transportation routes.⁵

Philadelphia in 1880 contained about 860,000 people and was as ethnically and economically diverse a city as could be imagined. It was the second largest city in the United States both in terms of population and manufacturing activity. About 16 percent of its citizens lived in households headed by a German born individual and about 25 percent resided in Irish headed households. Philadelphia, in addition, contained over 30,000 blacks, the most extensive group of Afro-Americans in any northern city.⁶ Philadelphia's manufacturing sector was a combination of light and heavy industry, containing cotton, woolen, and silk mills as well as locomotive works and iron foundries.

Male heads of households in nineteenth century Philadelphia had varied employment opportunities in the city, although occupations were somewhat segmented among the many ethnic groups. Germans were mainly the proprietors and skilled craftsmen; the Irish were laborers and manufacturing employees; and native born whites, although scattered among practically all classes of employment, had the bulk of the prestigious commercial and clerical positions.

Philadelphia's residents lived primarily in nuclear units but, as is shown in Table 1, a large percentage lived with family members other than their spouses and children in expanded and extended households. Over 23% of the dual parent families in which the head was a native white American had at least one family member outside the nuclear unit, and this figure increases to over 28% for the 50 to 59 year old age group. German and Irish families had a lower percentage of expanded households, 13.5% and 16.1% respectively, probably more the result of the availability of relatives than a lack of fondness. About one in six households across all ethnic groups boarded unrelated individuals, and these were disproportionately female headed and older families. Native white American families were most likely to have servants while Irish families were about one-third as likely.

Nineteenth century Philadelphia was primarily a "walking city." Horse drawn streetcars, though a convenient method of transportation over some distances, were far too expensive to be used on a daily commuting basis, and the actual average journey to work was probably not over one mile and rarely as much as two (Hershberg 1979). Therefore once located, the family's residence imposed formidable constraints. In the short run, family decisions

took this labor shed as a constraint, but minimized its impact over longer periods of time through geographical mobility.

Although there were numerous constraints governing the economic lives of these nineteenth century families, they did not face legal restraints in sending their children into the labor market. A few states had enforceable child labor laws by the 1880's, but Pennsylvania did not, and it was not until 1901 that this state passed a compulsory education act, a necessary prerequisite for effective child labor legislation.⁷ Philadelphia's manufacturing sector provided an abundance of tasks which could be performed by children, and, furthermore, skilled craftsmen could employ their children as apprentices. Children were a major economic resource in the family, providing income in normal times beyond that of the primary bread-winner, and supporting the family in extraordinary situations, such as during the father's unemployment or illness.

Children's participation in the labor force varied with age, sex, and ethnicity as shown in Table 2.⁸ Ethnic children, in this case, the Irish and the Germans, labored in the market to greater degree than native white children. The higher labor force participation rates of these Irish and German children reduced the disparities in the incomes of these families, as is shown by Table 3, and children in ethnic families contributed a larger percentage of family income than did native white youngsters.⁹ Boys worked in the market more than girls, and older children more than younger. What can explain why these children worked? What factors served to increase or decrease their participation? Which particular children in a family worked and which did not? Data on individual children and their families and households provide answers to these questions.

The Determinants of Children's Labor

The economic model of the allocation of household member's time developed, for example, by Gronau (1976, 1973) and Bloch (1973), can be easily extended from the husband and wife case to incorporate children. One can simplify such a model by assuming that nineteenth century fathers spent all their time in the market and that their wives spent all their time producing the household good, because, in fact, almost all (97%) male heads of households in 1880 Philadelphia worked in the labor market and practically no currently married women worked for pay (4%). The family is assumed to maximize a family utility function:

$$(1) \quad U = U(Z, L_{s_1} \dots L_{s_n}, L_{d_1} \dots L_{d_\ell}) ,$$

where the arguments are the household produced good Z , and the leisures of the sons (L_{s_i}) and of the daughters (L_{d_i}).¹⁰ The household good is produced using X , the purchased good, $\bar{H}_m = T$, the mother's time which is entirely devoted to the home, and H_{s_i} and H_{d_i} , the son's and daughter's time spent working at home:

$$(2) \quad Z = f(X, \bar{H}_m, H_{s_1} \dots H_{s_n}, H_{d_1} \dots H_{d_\ell}) .$$

The family maximizes (1) given (2) and subject both to the budget constraint:

$$(3) \quad X = \sum_{i=1}^n N_{s_i} w_{s_i} + \sum_{i=1}^{\ell} N_{d_i} w_{d_i} + \bar{N}_f w_f + V ,$$

where $\bar{N}_f = T$ is the father's time, spent entirely working in the labor market, V is non-labor income, the N 's are labor market times of the children, and the w 's are their opportunity costs, and to time constraints for each family member:

$$(4) \quad T = N_i + L_i + H_i \quad (i=s_1 \dots s_n; d_1 \dots d_\ell, m, f) .$$

The maximization solution is no different from that in the husband-wife case, for which the determination of the L's, the H's and X depends on the individuals' relative productivities in the home and the market and the exogenously determined income. For each pair of individuals, say a son (s) and a daughter (d):

$$(5) \quad \frac{f_{H_d}}{w_d} = \frac{f_{H_s}}{w_s} = f_x$$

$$\frac{u_{L_d}}{w_d} = \frac{u_{L_s}}{w_s} = \frac{u_Z}{\pi}$$

where f_H is the child's marginal product in home production, u_L is the marginal utility of the child's leisure, u_Z is the marginal utility of the home produced good, and π is the marginal cost of the home produced good. The intuitive explanations for these familiar conditions are again not very different from the husband-wife case, and therefore I will only dwell at length on their different aspects.

Wage data for 1880 Philadelphia and Pennsylvania indicate that girls less than fifteen years old earned about 86% of boys of the same age. The ratio of their market wages increases with their age, and becomes about 70% by maturity in most occupations.¹¹ Sons, therefore, would most likely specialize in market work in families in which there were also daughters. However, because the age-wage profile rises more sharply for males than for females, birth ordering should influence time allocation decisions. One would expect, for example, that older brothers would have a strong comparative advantage over younger brothers but that older sisters would have little advantage over younger sisters in market production.

Since most daughters and sons eventually became wives and husbands, the decisions regarding the allocation of their time in their parent's home can be viewed as training for their own future households. For example, if in (2) the daughter's productivity were expressed as the present discounted value of her productivity in any household, she might work more in her parent's home than her alternative wage and current comparative advantage might indicate. That is, by working with her mother, a daughter is training for her future full-time occupation. The difference between the daughter's shadow wage at home, if it could be measured, and her alternative wage in the market partially reflects the value of this on-the-job training. Daughters whose marriageability is dubious, those who are unattractive perhaps, would have less to gain by such training.

The death of the mother will, if daughters and their mothers are substitutes in the production of Z , cause f_{H_d} to rise and lead to more of the daughter's time being used in the home. Depending on the role of X and f_{H_s} , less of the son's time will be used. The loss of the father reduces the demand for leisure, and should shift all children into the labor force and home production, depending upon the form of (2) and the role of X .

One problem with using this conventional framework of household production to analyze the labor force behavior of children, is that children are not only capable, at some time, of leaving the household, but they do in fact eventually exit.¹² With a more complicated model, the age of independence can be determined within the household maximization process, and Donald Parsons (1976) has suggested one way to treat this problem. Parents maximize their utility which is in turn a function of the utility of the children. The family's utility function has as its arguments the consumption and leisure of

the various family members, and therefore family members each receive a share of the family's product. Each family member implicitly transfers some income to the others or consumes at their expense. It will be optimal, at some point, for parents to demand positive transfers from their children, that is, the maximization process yields a consumption to the child which falls short of the child's own income. Children, however, may opt to leave the household, depending upon the price of alternative lodgings, affective ties, ambient conditions in the parent's household, among other factors. Parsons models a competitive equilibrium to this problem, but suggests that more complex bargaining schemes might be used.

Other complications could be added as well. For example, families might value more highly the leisure of one child over that of another. Such affective differences might influence productivity in the home and would obviously affect the age of independence as suggested.

The variables explaining the labor force participation of the children must therefore account for various household characteristics as well as those relating to the individual child. The variables relating to the children should proxy the child's comparative advantage in the market. Demands in the home and exogenously determined income and wealth should also be included. One is, of course, limited by the questions asked on the 1880 Federal Population Census, but data on wages from additional sources have been used to supplement information on the family's labor income.

The variables included to account for the individual characteristics of the child and its siblings are:

the age of the child (AGECHILD);

the number of older brothers and sisters (#OLDBROS; #OLDSIS) and the number of younger brothers/sisters over ten years old (#YNGBROS; #YNGSIS), to account for the comparative advantage of the child in the labor market. One would expect that older children would be relatively more productive outside the home but, as suggested in the theoretical section, that the extent of the comparative advantage would depend on the sex of the child.

the presence of younger siblings (CHILD6), that is those six years old and under, to account for increased household demands on older children.

The variables included to account for the economic characteristics of the child's family are:

the (full-time) weekly wage of the father (WAGEPOP). This variable has been inferred from the father's occupation by matching it with nineteenth century wage data for occupations in Philadelphia and Pennsylvania.¹³ Since the father's occupation is assumed to be exogenously determined, so is his wage.¹⁴ Because actual wages generally vary with age for a particular occupation, these constructed wages will not always account for changing productivity within an occupation. To make an explicit correction for this problem would involve adjusting the wage by the individual's age. This adjustment would depend upon the age-wage profile for the particular occupation and because such information would be impossible to obtain, the age of the household head (AGEFAM) has been added to the regression;¹⁵

the months during the census year the father was unemployed (UNPOP), assumed to be exogenously determined;

the (full-time) weekly wage of the mother, if she were working in the paid labor market (WAGEMOM);

the presence of servants (SERVANT), to account for the wealth of the family;¹⁶

the illiteracy of the mother (ILLITMOM) and the illiteracy of the father (ILLITPOP). These variables, which indicate whether the individuals could read or write in any language, are included to modify the wage variables and account for the home environment;

the (full-time) weekly wages of non-nuclear related individuals (WAGEOFM). Note that all weekly wage variables were constructed in the same manner as WAGEPOP.

Two father's occupation dummies were included. The first, (UNSKILL), is for very low skilled occupations to account for parent's inability in locating jobs for their children. Parents with very low skilled jobs might have little access and few contacts to obtain jobs for their children.¹⁷ The second, (SKILL), is for skilled craftsmen, who might be hiring their own children to pass trades over to them. Families with high-wage fathers might have high labor force participation rates for their children, if their children were apprentices. Since the Germans were disproportionately skilled craftsmen, this variable was entered to adjust for the different occupational structures of the three ethnic groups;

the presence of the mother (MOM) and the presence of the father (POP). One would expect that a girl without a mother would be more likely to remain at home but that the absence of a father would increase the probability of all children's being in the labor force.¹⁸

The ethnic background of the child's parents was added as well:

the birthplace of the parents determined whether the child was (GERMAN), (IRISH), native born, with native born grandparents (omitted dummy), or native born with at least one foreign born grandparent (NWA.FOR).

The observations for this study are children over ten years old in families with either mother or father present. Children in subfamilies, that is families living within other households, were not directly included. The entire sample consisted of 8282 never married children, 4113 females and 4169 males.

Since the child is either in the labor force, as indicated by the listing of an occupation, or is engaged in another activity, at school or at home, the dependent variable is dichotomous. Probit analysis was used to circumvent the problems of heteroscedasticity and specification error inherent in an ordinary least squares regression analysis of a dichotomous dependent variable.

Results

The regression results in Table 4 are presented separately for male and female children, because a likelihood ratio test indicated that one could reject the hypothesis that the two samples were from the same population.¹⁹ The probit coefficients estimated in this manner must be interpreted by constructing an index, $\hat{I}$, which is a linear function of the X's. This index is then evaluated by the value of the cumulative normal distribution at $\hat{I}$, to obtain the probability of a child's being in the labor force, conditional on the X's--a vector of individual and family characteristics. Therefore, one must compute the index,

$$(6) \quad \hat{I} = \hat{B}_0 + \hat{B}_1 X'_1 + \dots + \hat{B}_n X'_n, \text{ and then obtain}$$

$$(7) \quad \hat{y} = F(\hat{I}), \text{ where } F(\cdot) \text{ is the cumulative normal distribution, and } \hat{y}$$

is the conditional probability of a child's working. The econometric results presented in Table 4 are exceptionally good especially considering the quality of the

wage data and the absence of information on many of the market-related characteristics of the individual children.

The economic characteristics of the family had a strong impact on child labor. These effects are summarized in this paragraph and more extensively analyzed below. The father's full-time wage was negatively related to the child's probability of working. Although the mother's wage did not have a significant impact, it was negatively related to the daughter's labor force participation, showing some substitution between girls and their mothers. This substitution is also evident in the impact of boarders and in the differential effect the absence of a mother had on sons and daughters. The father's unemployment sent both boys and girls into the labor force, with a stronger impact on the former. Families with girls, it seems, were more likely to have non-nuclear relatives living in the household and working, thus providing a double incentive to keep the girls at home.

The higher the father's wage, the lower the probability of the child's participating in the labor force. The elasticity around the mean labor income, given a 25 percent probability of working, was about $1/2$ for female children. The impact of changes in the father's wage was smaller for boys, slightly less than $1/4$ around the same values.

These responses to changes in full-time labor income, however, are only with respect to changes in occupational titles, in that the wages were assigned by occupations. Within an occupation, labor income can vary both because of productivity differences and because of unemployment. Productivity has been partially proxied in the regressions by the age of the father.²⁰ Because the sample consists of children over ten years old, the fathers are primarily over forty years old. They are, therefore, most likely in the declining range of the age-labor income profile for their occupation. (See Haines

[forthcoming] on age-income profiles for nineteenth century men.) The age of the father, as expected, has a positive sign, implying that the older the father the more probable is the labor force participation of the children. The older the father, the more the assigned wage overstates the actual wage and therefore the more probable, given the occupation, the children will be in the labor force. The impact of the major economic variable, WAGEPOP, can therefore be strengthened by explicitly including the impact of the father's age as well. Such a construction would require knowledge concerning the mean age of persons in various occupations. Therefore, the computed elasticities for WAGEPOP should be considered lower bounds on the actual values.

The unemployment of the family's prime breadwinner was an additional economic factor in the labor force experiences of the children. Unemployment has been added as a separate variable to allow for different responses to it and to the full-time wage.²¹ If most unemployment were unanticipated, one would expect a different effect from a month's unemployment than from an equivalent decline in full-time wages. The responses to transitory changes in income are usually expected to be less than those to permanent changes. However, many of these nineteenth century families could not smooth out transitory changes in their income streams by selling physical assets. Many were severely constrained in their liquidity positions with little to sell except their own time and their children's. Therefore, the impact of unemployment would be to increase the probability of the children's participating in the labor force.

The response to father's unemployment for the girls was very close to that as measured by the wage variable. That is, a decline in the father's

wage equivalent to a one month loss in wages, was about equal in its impact to a one month's spell of unemployment. The male children, however, were far more affected by the father's unemployment. Although changes in the father's occupational title altered the boy's labor force participation less than that of the girls, the father's unemployment provided a strong incentive to send sons into the labor market. A one month spell of unemployment was equivalent in its impact on a son to several months decline in the full time wage. When families suffered an unexpected decline in labor income, they responded by sending their sons to work.²²

The illiteracy of the parents can indicate lower productivity for a given occupational title, in a manner similar to that for age. If the father was illiterate, his assigned wage might be too high for his particular occupation. Illiteracy can, as well, measure the relative gains from the child's remaining in the household versus being employed outside the family. Children with more educated mothers might learn from them, and become more productive individuals by remaining in the household.²³ This effect would probably be greater for girls than for boys. Furthermore, educated parents might value more highly both education and leisure for their children. Illiteracy was entered in the equations separately for the mother and the father. The mother's illiteracy had a much stronger impact than the father's for all children, and the effect of the mother's illiteracy was strongest for the daughters. Girls with illiterate mothers were far more likely to be sent to work, and the illiteracy of their fathers made little difference. Boys were similarly affected by their mother's illiteracy although the impact was a bit weaker. More importantly, they were somewhat more affected than were their sisters by their father's illiteracy.

The variables UNSKILL and SKILL were entered to account for occupational differences not captured in the wage variables. The coefficients on these variables have the predicted signs but they are not highly significant. Fathers in very unskilled positions seem to have had more difficulty finding jobs for both their sons and daughters. Fathers who were skilled craftsmen were somewhat more likely to have an employed child, but the magnitude of this impact is small and the standard error very large. The wage proxies and the other economic variables in these regressions were more important than the characteristics of the occupations in determining the likelihood of work for children.

The boarding of unrelated individuals was a common nineteenth century urban phenomenon. Families generally housed boarders in rooms emptied by their grown children. For many families, boarding was a major way of supplementing labor income, and providing support in parents' later years. Married and widowed women who did not desire to work outside the home, could partially support a family through the institution of boarding. The probit analysis indicates that the impact of boarding was primarily on the daughters, for whom it was a strong deterrent to their labor force participation. The income provided the family by boarders may have contributed to this effect, and, most likely, this impact was reinforced by boarding's increased demands on home duties. The presence of servants is a good wealth proxy for nineteenth century families, and both the male and female children whose families had servants stood a substantially reduced probability of working in the labor market.

In addition to boarding unrelated individuals, families lived with non-nuclear but related individuals. Literary and impressionistic evidence

from the period have been insufficient in resolving whether these persons were an integral part of the family economy. The regression results yield some evidence on this matter, and indicate that these other family members were indeed part of the family's decision making unit. Daughters, but not sons, were affected very strongly by the presence of working relatives.

A dollar from an uncle or grandparent, for example, had about the same impact as an additional dollar in wages from a father, in reducing the probability of a daughter's working in the market. It is possible that families with daughters who were comparatively more productive in the home, were more likely to invite working relatives to live with them. The impact of these individuals on the daughter's labor force participation seems to be similar to that of boarders both in terms of the increased income and the greater demand for home production. The household, not the family, is therefore the relevant unit of analysis, at least for families in which there are daughters.

Demographic variables in addition to the economic factors affected the child's participation. The absence of either the mother or father, generally through death, influenced the children's activities. A family without a father was more likely to have both its sons and daughters in the labor force, although the impact was stronger on the sons. The absence of the mother, though, had a differential effect on the male and female children, revealing again the strong substitutability between daughters and their mothers in the family economy. Girls were far less likely to work in the market if they had no mother at home, even though their brothers were equally influenced to work by the absence of either parent.

The presence of older siblings living at home was an important factor in the labor force experience of children, consistent with the optimal allocation of family resources. A boy was almost equally deterred from working by the presence of either an older brother or sister. But a young girl stood

a much lower probability of working had she an older brother than had she an older sister. These results are fully consistent with the statement of a fashionable woman's magazine of the day, that a girl was expected to work "to relieve her hard-working father of the burden of her support, to supply [her] home with comforts and refinements, [and] to educate a younger brother."²⁴ The presence of younger, working-aged siblings increased the likelihood of a child's working, but as suggested by the wage data, this impact was stronger for the boys. Birth order, then, was an important factor in determining who worked.²⁵ The presence of very young children in the family decreased the probability of all children's working, probably reflecting the increased demands youngsters created in the home.

As a final point, do the economic and demographic variables included in the analysis fully account for differences among the various ethnic groups? For sons, the answer is yes, but for daughters, the answer is no. Furthermore, neither the male nor female regressions was affected by the inclusion of a variable accounting for second-born generation native American children. Therefore, the higher labor force participation of the immigrant's male children is fully accounted for by differences in other independent variables. However, that for the female children is not, although the impact of "foreignness" was worn away after only one generation in America. This result can indicate that one part of the assimilation process was "learning" not to send your daughters into the labor force and that this socialization process occurred quite rapidly. The impact of ethnicity on child labor is fully consistent with studies on social mobility that have demonstrated that ethnics, as opposed to native born Americans, were less likely to have their children climb the

social status ladder but that these immigrants were more likely to advance themselves through the acquisition of property. Irish immigrants, in particular, seemed to have placed a great emphasis on acquiring their own home, and they involved their daughters in pursuit of this goal. Whether this was a vestige of their peasant background and culture, or part of a longer run strategy to secure economically their later years is not at present known.

Implications

Economic, demographic, and cultural factors influenced decisions concerning whether parents sent their children out of the home to work, and simple demographics generally determined which of the children in the family was to work. There are two sets of implications from this study, one for economists and the other for historians. Economists studying the allocation of time in the family should be interested in the determinants of children's labor because such an analysis involves many of the same issues found in analyses of working wives. Furthermore, the problems addressed in this paper raise a number of complications not necessarily inherent in the contemporary setting. Families deciding whether to have a child work, also have to decide which child and how many children. There are obvious interrelationships within each family, that is the error terms for the children within a particular family are probably correlated. This issue is present in the husband-wife case, but presents fewer difficulties there. Furthermore, because children have the ability to leave their parent's households, issues of power and bargaining in family decisions become obviously important here. Children who worked in the market at young ages may leave the family earlier than those who did not.²⁶ Families appear to have had long-run strategies in life,

involving fertility, child labor, child education and training, savings behavior, the age of independence of the child, inheritance, and the provision of support by children in the parents' old age. Although this paper has addressed one small part of these decisions, it is part of a larger project whose goal is to analyze all these decisions using nineteenth century data.

A second set of implications in this paper is for those interested in understanding nineteenth century American social history. Its most important finding, in that regard, is that ethnicity was important only in determining whether daughters worked in the market. Furthermore, it appears from other data that immigrants' children left home at younger ages than did native born children. It is possible that as part of their "cultural baggage," immigrants expected their children to provide a substantial fraction of the family's income. These customs may have been at variance with those of the "host" culture and the children may have settled these differences by leaving home.²⁷ It is also possible, at least for the Irish, that their poor initial economic position led them to adopt a very particular long run strategy. This strategy may have involved a high labor force participation rate for their children, a high savings rate, and a large eventual accumulation of physical property which was used, in conjunction with inheritance, to entice one child to remain in the household into the latter years of the parents.²⁸

Although it is dangerous to generalize from cross sections to time series, this work also indicates the impact on child labor of rising real incomes and smaller families. There are many reasons to believe that child labor laws were passed only after children were less important in the market place, and some research has stressed the impact of technological change, especially in textiles.²⁹ This study has looked more to the supply of labor and has found

that rising real income would have been a strong disincentive to market work by children, strengthening the assertion that child labor laws were ineffective legislation.

Concluding Remarks

This paper has tried to disentangle the many determinants of child labor in the late nineteenth century in the context of the family economy. I have sought the answers to why parents sent children into the labor market and why particular children within a family worked. Economic and demographic variables accounted for many of the differences in child labor across families. The most interesting findings in this regard are: the substitutability of daughters for their mothers, the importance of non-nuclear family members in the household economy, the differential impact of a father's wages and his unemployment on his son, and the role of birth order in determining which children worked outside the home. Ethnicity--a cultural 'catch-all' variable--was important only for daughters and not for second born generation children. This work supports the notion that immigrants were culturally different than natives, but that assimilation into the host culture occurred quite rapidly. This study has raised many related questions: Did ethnic children leave their households at different ages from native American children? Did work in the market have a future impact on daughters in terms of their nuptiality and work experiences later in life? The answers to these questions are suggested in this study but need to be researched further.

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Footnotes

*Research on this paper was supported by a grant in Applied Micro-economics from the Sloan Foundation, and, through the Philadelphia Social History Project, by NEH grant #RC 25568-76-1156 and NIMH grant MHL6621. I would like to thank the Philadelphia Social History Project for making their data available to me and for providing a stimulating research environment. I have benefitted from comments on previous versions of this paper by participants at seminars at Princeton, Berkeley, Cal Tech, Michigan, Stanford, and the University of Connecticut. Mark Gersovitz and Roger Gordon provided me with particularly helpful comments during the various stages of this paper.

¹The new theory of consumer behavior pioneered by Becker and Lancaster is generally credited with having first emphasized the household as the primary decision making unit in the economy.

²Many development economists and others who have viewed children as economic assets have been more interested in the antecedents of the contemporary family. See, for example, Lindert (1976).

³The word "children" is used throughout this paper to refer to "own children" of any age living in their parents' household.

⁴These data have been microfilmed by the National Archives of the United States. Those for 1870 include personal and real estate but exclude the relationship to the head of the household and marital status. Those for 1890 have been destroyed, and the manuscripts for 1900 have only recently been open to the public. I have chosen to work with the 1880 data because these are the only nineteenth century manuscripts which list the relationship to the household head.

⁵See T. Hershberg, guest editor, Historical Methods Newsletter, vol. 9, (March-June 1976), for a complete description of the Philadelphia Social History Project's data, goals, and history. The data base of the Philadelphia Social History Project is exceedingly rich, enabling the location of individuals both in time and in space and the linking of records in both dimensions. Even longitudinal files for individuals and families can be created with these data. The present paper is but the beginning of a more extensive study on the family and the household economy in a late nineteenth century American city and is part of the Philadelphia Social History Project's even larger study on the nineteenth century city.

⁶The present paper will analyze only children in white households.

⁷See Forest Chester Ensign, Compulsory School Attendance and Child Labor, (New York: Arno Press, 1969; reprinted from 1921 original), Miriam E. Loughran, The Historical Development of Child-Labor Legislation in the United States, (Washington, D.C.: 1921), and J. Lynn Barnard, Factory Legislation in Pennsylvania: Its History and Administration (Philadelphia: 1907), for the histories of both child labor and compulsory schooling laws in Pennsylvania and elsewhere.

⁸Less than 1% of the children over ten years old in the sample were listed as both attending school during the census year and having an occupation. These children have been assigned only to the labor force category for the regression analysis. It is highly probable that many children also worked part-time during the year but that the respondent to the census marshal did not list an occupation for them because they were not considered to be earning a living.

⁹Although there is little evidence on the percentage of a child's income given over to its parents, the information that does exist indicates that children who lived at home generally gave most of their earnings to their parents. For example, Carroll Wright's survey of working women, Fourth Annual Report of the Commissioner of Labor, 1888, Working Women in Large Cities, (Washington: GPO, 1889), indicated that about one-half of those living at home gave their entire earnings to their parents. Almost all the others claimed to have paid board to their parents. The women interviewed in the Wright census were generally in their twenties, the average age was 24.25 years, the mode was 20, and the median about 21.5. Most likely, younger children regularly handed over their full wages to their parents.

Wright's data on residence and the sharing of incomes for Philadelphia are:

Give Earnings	At Home				In Boarding House	In Lodging House	In Private Family	Total
	Pay Board	Receive Board	Other Conditions	Total				
650	564	29	97	1340	131	13	216	1700

Wright, ...Working Women in Large Cities, p. 344.

Of the 1340 women living at home, 731 stated that they assisted in housework and 609 said they did not.

¹⁰This notation closely follows Gronau (1976).

¹¹The wage data are from Annual Report of the Secretary of Internal Affairs of the Commonwealth of Pennsylvania. Part III Industrial Statistics. Vol. VII 1879-80 (Harrisburg: Lane S. Hart, 1881) and Department of Labor, Eleventh Annual Report of the Commissioner of Labor, 1895-96: Work and Wages of Men, Women, and Children (Washington: GPO, 1897). The ratios of the value of the marginal product for boys and girls are consistent with data on hire rates for slaves. Young female slaves were somewhat more productive than were young male slaves but mature men were far more productive than were women (Fogel and Engerman 1974). Young girls were capable

of greater dexterity and work discipline than were young boys but, for many reasons, they lost this advantage in their late teens.

Although female wages were about 70% of male wages for occupations in the same industries, females were not hired in particular industries, such as iron and steel. Therefore, the overall average of female to male wages would be lower.

¹²See G. Becker, E. Landes and R. Michael (1977), on divorce as exit from marriage.

¹³An appendix describing these wage data and their sources can be obtained from the author upon request.

¹⁴The census marshals in 1880 asked individuals for the occupations in which they worked and supported themselves. Therefore the assumption that the occupation is exogenously determined implies as well that the labor force participation and the wage are exogenously determined. Since about 97% of all fathers in the sample listed an occupation, the assumption about the labor force participation rate is not crucial.

¹⁵One can, alternatively, assume that age-wage profiles were identical for all occupations, differing only by a constant, but then one would need the average age of individuals in each occupation to make the precise adjustment.

¹⁶The presence of servants would also decrease the time spent by both children and mothers in working at home. Since the census did not give time allocations to work and home and leisure, this cannot be tested.

¹⁷Teenage unemployment among contemporary youths has been partially blamed, by some, on a failure of the labor market to clear because of informational problems. This logic suggests that the children of parents who have no access to jobs for their sons and daughters stand a much higher probability of being unemployed.

¹⁸Note that all other characteristics of a nonexistent mother or father, e.g. wage, literacy, unemployment, are equal to zero and that this procedure is identical to running dual parent and single parent families separately.

¹⁹The hypothesis that all the coefficients of the regression with both males and females were equal to those of the unconstrained separate regressions was rejected at the 0.5 percent level.

²⁰If father was either dead or not present for another reason, the age of the mother was used.

²¹Note that the measured response of children to their father's unemployment will be reduced, somewhat, by the way in which these variables are measured. Unemployment for the father is given in months per census year, but the child's labor force participation is inferred only from the listing of an occupation. An occupation might not be listed if the child were working only during the months of the father's unemployment and not full time or when the census marshal visited the family.

²²This result might be a function of the costs of finding jobs in the "walking city." If this cost were fixed, that is not a function of the sex of the child, it would pay to have boys work since the transactions cost would be a smaller percentage of the wage. Parents, in addition, might not want their daughters to travel far to work every day and might prefer to have a son work.

²³See Leibowitz (1974) on the impact of parents' education on home investments in children for contemporary families.

²⁴Arthur's Home Magazine, V. XLIX (June 1881), p. 325-7.

²⁵One reason that the impacts of older and younger siblings are not symmetric is that there appear to be factors influencing work which could not be included in the regressions. That is, the error terms for children in a particular family are probably correlated.

²⁶I owe this point to Carmel Chiswick.

²⁷Note that the results presented in this paper are conditional on a child's residing at home. The coefficients in Table 4 can be biased if there are omitted factors which influence both the age of independence and the labor force decisions of children in the home. For example, if certain parents are very mean and force their children to work in the market, then it is possible that they will have few older children living at home and that most of the younger children left at home will be working in the market.

²⁸Theoretical models, such as in Parsons (1976), predict that in societies lacking alternative means of providing for old age security and in the absence of coercion, there may be a suboptimal level of human capital investment and too high a level of physical capital investment.

See Thernstrom (1975) on social mobility versus property mobility attained by immigrants in nineteenth century Newburyport, Massachusetts. Thernstrom's findings are in agreement with my hypothesis and tentative results using the 1870 Federal Population Census for Philadelphia show that Irish families accumulated more property given their occupation than did other families.

²⁹See Sanderson (1972) on this point.

TABLE 1

PHILADELPHIA'S FAMILIES AND HOUSEHOLDS, 1880 BY ETHNICITY

	Households Headed By:		
	<u>Irish</u>	<u>German</u>	<u>Native White American</u>
<u>Average Size,</u> of primary families, excluding servants and boarders ^a	4.743	4.687	4.237
<u>Average Number of Children,</u> ^b in primary families with both parents present, age of father:			
40 to 49 yrs.	2.699	2.627	2.037
50 to 59 yrs.	2.674	2.428	2.090
60 to 69 yrs.	2.325	1.819	1.822
<u>Percent With One or More Non-Nuclear, Related Individuals,</u> in primary families with both parents present	16.1%	13.5%	23.6%
age of father: 50 to 59 yrs.	16.1%	13.5%	28.2%
<u>Percent With Related Sub-Families,</u> in primary families	3.55%	4.11%	6.47%
<u>Percent With Boarders,</u> in primary families with both parents present	15.53%	16.06%	16.11%
<u>Percent With Servants,</u> in primary families	4.99%	9.32%	16.29%

Source: Federal Population Census Manuscripts, Philadelphia, 1880.

^aThe "primary family" is the nuclear or extended family of the "head" of the household, as listed by the census marshal.

^bChildren living at home.

TABLE 2

THE SCHOOLING AND LABOR FORCE EXPERIENCES OF CHILDREN
IN PHILADELPHIA, 1880

(Percentage of single children living at home, at work and at school by age, sex, and ethnicity for children in primary families.)

	NWA				IRISH			GERMAN		
	Age	Work	School	N	Work	School	N	Work	School	N
Males	11	3.0%	91.1%	84	6.0%	90.8%	92	3.9%	92.9%	127
	12	9.4	83.0	106	11.7	82.7	124	9.0	85.1	117
	13	15.5	76.1	71	30.4	62.8	117	29.3	58.2	97
	14	32.0	55.6	89	36.3	51.9	109	60.8	25.8	123
	15	45.6	45.6	68	59.9	30.7	96	68.8	19.4	93
	16	71.7	21.0	69	72.2	16.7	108	81.0	9.6	105
	17	72.6	16.1	62	87.7	8.1	93	85.5	4.5	110
	18	80.3	12.1	66	86.2	4.3	105	88.3	7.0	107
	19	85.1	7.9	57	95.3	2.8	106	92.2	1.0	103
	≥20	91.8	2.2	451	95.9	0.7	604	94.5	1.8	509
Females	11	1.1%	88.9%	90	3.0%	87.9%	99	3.5%	92.7%	130
	12	5.2	85.6	97	15.0	74.4	133	9.4	80.0	143
	13	10.1	78.5	79	15.8	71.6	95	15.5	56.0	116
	14	11.9	72.6	84	37.3	45.7	107	28.3	31.9	113
	15	20.0	53.8	65	38.8	28.2	103	41.5	7.5	100
	16	38.9	34.5	68	57.7	15.8	105	49.2	9.0	122
	17	20.4	25.9	54	56.8	6.8	88	55.3	2.6	114
	18	40.8	2.8	71	58.0	6.7	119	51.9	3.3	109
	19	34.3	0.0	70	68.2	0.0	88	56.7	1.9	104
	>20	36.5	0.7	411	66.5	0.7	576	45.6	1.7	458

Source: Federal Population Census Manuscripts, Philadelphia, 1880, sample collected by the Philadelphia Social History Project.

Note: NWA = native white American parents; work (school) = percentage of children in age group at work (school), N = number of observations in each age group. The percentage at work and the percentage at school do not sum to 100%. The residual were listed in the census as "at home." The small number of those listed as both having an occupation and being at school were divided between these two categories.

TABLE 3

THE FAMILY ECONOMY: IRISH AND GERMAN LABOR INCOME AS A PERCENT OF NATIVE WHITE INCOME, AND THE PERCENT OF FAMILY INCOME EARNED BY CHILDREN

(for dual parent primary families, 1880 Philadelphia)

Age of Father in Years	IRISH			GERMAN			NATIVE WHITE AMERICAN
	<u>PopInc</u> ^a	<u>FamInc</u> ^b	<u>Child</u> ^c	<u>PopInc</u>	<u>FamInc</u>	<u>Child</u>	<u>Child</u>
20-24	92.6%	92.6%	0.00	101.5%	101.5%	0.00	0.00
25-29	81.2	81.2	0.00	99.1	99.1	0.00	0.00
30-34	72.6	74.1	0.01	88.0	89.3	0.01	0.01
35-39	82.1	86.5	0.06	91.5	90.9	0.03	0.03
40-44	70.8	81.9	0.17	83.2	92.9	0.17	0.11
45-49	76.7	84.3	0.29	92.7	97.3	0.27	0.26
50-54	76.4	93.3	0.38	93.7	104.8	0.35	0.28
55-59	66.2	90.1	0.41	91.2	98.2	0.33	0.32
60-64	82.3	98.4	0.43	101.5	101.0	0.34	0.30
65-70	76.9	100.3	0.46	97.9	101.8	0.33	0.29

Source: Federal Population Manuscripts, Philadelphia, 1880 and Appendix, "Wages for Nineteenth Century Occupations," on request from the author.

^aThe percent of the native white figure for the father's age group, of the father's full-time labor income as given by his occupation.

^bThe percent of the native white figure, for the father's age group, of the family's full-time labor income: father's, mother's, and children's, as given by their occupations.

^cThe percent of family income earned by the children.

Note: Because the labor income was inferred from the occupation, these numbers are estimates and should not be viewed or used as precise figures. Furthermore, the labor income figures are not adjusted for unemployment, that is, they are full-time labor income figures.

TABLE 4

THE DETERMINANTS OF CHILD LABOR

(for never married children in primary families with at least one parent present and one child over 10 years old)

Variable	Maximum Likelihood Estimate		MLE/Standard Error ^a		Sample Mean		MLE/Standard Error ^a		Sample Mean		Units of Variable	
	Estimate	Female: Mean of dependent variable=0.678	Estimate	Female: Mean of dependent variable=0.384	Estimate	Female: Mean of dependent variable=0.384	Estimate	Female: Mean of dependent variable=0.384	Estimate	Female: Mean of dependent variable=0.384	Variable	Variable
Constant	-1.837		-1.837		18.52		-5.941		18.43		years	
AGECHILD	0.053		11.420		0.57		2.996		0.56		0 to highest	
#OLDBROS	-0.133		-4.495		0.55		-7.529		0.56		0 to highest	
#OLDSIS	-0.188		-6.450		0.56		1.013		0.53		0 to highest	
#YNGBROS	0.410		10.750		0.55		6.639		0.54		0 to highest	
#YNGSIS	0.346		9.272		0.48		10.224		0.47		0; 1 = presence of	
CHILD6	-0.141		-4.924		0.71		-2.313		0.69		yearly/1000	
WAGEPOP	-0.167		-3.270		50.26		-6.060		51.03		years	
AGEFAM	0.038		11.532		0.32		2.096		0.35		0 to 12 (months)	
UNPOP	0.043		2.361		0.01		1.276		0.02		yearly/1000	
WAGEMOM	0.414		1.247		0.14		-0.401		0.15		0; 1 = presence of	
BOARD	0.077		1.148		0.11		-2.794		0.09		0; 1 = presence of	
SERVANT	-0.610		-7.774		0.05		-8.981		0.05		0; 1 = illiterate	
ILLITMOM	0.383		3.115		0.04		4.375		0.04		0; 1 = illiterate	
ILLITPOP	0.154		1.091		0.05		0.393		0.06		yearly/1000	
WAGEOFM	0.001		0.063		0.08		-2.417		0.08		0; 1 = unskilled	
UNSKILL	-0.095		-1.079		0.27		-1.670		0.28		0; 1 = skilled	
SKILL	0.031		0.539		0.93		0.896		0.93		0; 1 = presence of	
MOM	-0.264		-2.427		0.86		4.610		0.87		0; 1 = presence of	
POP	-0.256		-2.699		0.37		-2.341		0.37		0; 1 = Irish	
IRISH	0.001		0.009		0.36		5.802		0.37		0; 1 = German	
GERMAN	0.119		1.429		0.17		3.498		0.16		0; 1 = foreign NWA	
NWA.FOR	-0.079		-0.858				-0.874					
-2 times log likelihood ratio	1543											
number of observations	4169											

^aAsymptotically 't'