Common Pots and Household Demand: Testing the Unitary Household Model in Early Twentieth Century America

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Traditionally, economists have assumed that households make decisions in the same way as an individual, by maximizing a well-defined collective utility function. Either families reach a consensus on common goals (Samuelson, 1956), or an altruistic parent is able to give the “rotten kids” incentives to maximize his own objective function (Becker, 1981). This unitary model has come under increasing attack on both theoretical and empirical fronts. As I discuss in Section I below, there is by now a convincing case that contemporary households violate the unitary model’s predictions. However, to my knowledge there has been no direct attempt to address the model’s relevance for historical periods. After all, one might expect it to perform better in an era before women’s liberation, when men might still have been able to rule the household as local dictators. This paper aims to assess the validity of the unitary household model in one of the earliest settings for which we still have rich data: the United States at the close of the First World War.

Social histories of the early twentieth century United States support the unitary model in arguing that family income was generally allocated to a common pot. Husbands turned over their earnings to their wives, reserving only a small quantity of “pocket money” for expenses like tobacco and liquor (Byington, 1969; Tentler, 1979). While men might have retained ultimate control over household income, they left micromanagement of daily expenditures to women. When Margaret Byington conducted a small household expenditure survey in Homestead (a steel town near Pittsburgh), most men were unable to give her the requested information and simply referred her to their wives. The common pot model was the rule even in the few households with working wives: a study by the Women’s Bureau over the 1920’s and 30’s found that up to 95% of working wives
contributed *all* of their earnings to the family (Chafe, 1972). This figure is hardly surprising when one considers contemporary attitudes toward married women’s work; a working wife was said to neglect her duties to home and family, driving her husband to drink and luring him into idleness (Braybon, 1981). Most families sent their children to work before the wife, and the only excuse for married women’s work was that the family otherwise faced destitution. In this environment, it would have been exceedingly difficult for a wife to retain any part of her earnings for her own use.

A complete test of the unitary model in the early twentieth century cannot stop at working wives, however. Unlike the contemporary United States, even minor children worked more often than their mothers, and social history is not as supportive of the common pot story when working children were involved. This is especially clear in the case of sons. Boys typically surrendered only a portion of their pay, sometimes paying board and retaining control over all their remaining earnings. There was clearly a strategic element in parent-son interactions; many mothers confessed to fearing that pushing their sons too hard would drive them from home, depriving the family of the son’s earnings completely (Tentler, 1979). Therefore, unless sons had the same preferences as their parents, there is little reason to expect that their economic decisions could be aggregated into those of the household.

The situation is more ambiguous for daughters. The Women’s Bureau study mentioned above found that fully two thirds of single women living at home gave all their earnings to the family (Chafe, 1972). Louise Montgomery, commenting on Chicago’s Polish families, claimed that even when daughters earned more than their father or their brothers, they accepted “a position in the household that [forced] them to
coax, cry, or quarrel with the mother whenever they [wished] independent spending money” (Montgomery, 1913, quoted in Tentler, 1979, p. 90). More often, wages too low to support themselves meant that daughters lacked a credible threat to leave and therefore deprived them of bargaining power (Tentler, 1979). On the other hand, some young women stated economic independence as their primary reason for working. Bessie Van Vorst of a New York mill town, speaking on behalf of many of her fellow factory operatives, told an interviewer, “I don’t have to work; my father gives me all the money I need, but not all the money I want. I like to be independent and spend money as I please” (Weiner, 1985, p. 25). Leslie Tentler (1979) believes that a daughter’s earnings brought a reluctant willingness by her parents to bargain over spending money and even the home’s décor. Thus while a daughter’s earnings initially entered the common pot, she may have retained some decision-making power as an individual distinct from the household unit.

This paper looks at the internal dynamics of early twentieth century families through the lens of consumer demand. The unitary model of the household imposes testable restrictions on observable behavior: the substitution matrix should be negative semidefinite and symmetric, and income effects should be invariant with respect to the source of income. Since detailed price data are unavailable for the desired period, the focus will be on income pooling. Insofar as the unitary model is accurate, individual incomes should have no effect on demand once I control for total household expenditure. Unfortunately, data limitations mean that I must use earnings as the measure of individual incomes. This introduces some bias into the estimates, since theory posits that labor supply, and hence earnings, is jointly determined with commodity demand. However, even most unearned income is endogenous in intertemporal models, and endogeneity bias
is intuitively much more credible for some commodity demands than for others. I discuss
the likelihood of endogeneity bias further in the results section.

The rest of this paper is organized as follows. Section I briefly reviews some of the
relevant literature, almost all of which pertains to more recent times. Section II presents
my empirical approach to testing the unitary household hypothesis. Section III
summarizes the data, which come from the 1917-1919 Cost of Living in the United States
survey (CLUSS), while Section IV presents the results. Section V concludes.

**Section I**

The literature is almost unanimous in rejecting the unitary household model. Several
test the model using the Canadian Family Expenditure Survey (FAMEX); all of
these, like this paper, include earnings in their measure of individual income. Browning
*et al* (1994) pool the 1978, 1982, 1984 and 1986 FAMEX to look at the effects of
individual incomes on the ratio women’s to men’s clothing expenditures. They find that
this ratio is increasing in wife’s income, holding total income constant. Estimation of a
structural model indicates that going from supplying 25% to 75% of household income
raises the wife’s share of total expenditure by 2.3%, a statistically significant but
economically modest effect. Browning and Chiappori (1998) follow a similar approach in
pooling the 1974-1992 FAMEX. They find that singles satisfy the symmetry restriction;
conversely, couples’ price responses are not symmetric, and their individual incomes
differentially affect demand. In particular, an increase in the wife’s share of income has a
statistically significant effect on demand for women’s clothing (positive), demand for
men’s clothing (negative), and demand for food prepared at home (negative). Phipps and
Burton (1998) use only the 1992 FAMEX, consequently ignoring the effects of price
variation. In a sample of families with two parents working full-time, full-year and no working children, they find that the wife’s income is associated with greater expenditures on restaurant food, women’s clothing, and childcare, while it is associated with lower expenditures on transportation and men’s clothing. However, they do not reject income pooling for certain other goods, like housing, which suggests that households may make some decisions as a collective unit.

Consumer surveys from other countries are in rough agreement with the FAMEX in rejecting the unitary household model. Lancaster and Ray (2002) use the 1993/94 Australian Household Expenditure Survey to estimate a comprehensive structural model by three-stage least squares. They allow the earnings, unearned income, and pension income of each individual to have a separate effect and test the hypotheses that various types of income are pooled. Income pooling is rejected for many items; in contrast to Phipps and Burton (1998), however, they find that income is not pooled for housing expenditures, while it is for clothing expenditures. Thomas (1990) tests the unitary model for a sample of urban families in Brazil (using the Estudo Nacional da Despesa Familiar). He restricts his attention to individuals’ unearned income, and tests for separate effects on mother’s fertility, children’s protein and calorie intake, child survival, and child health. In most cases, income pooling can be rejected; women’s unearned income seems to have far larger effects on measures of child welfare.

Other studies take a different approach to testing the unitary model. Fortin and Lacroix (1997) look at labor supply decisions in the 1986 Canadian census. Restricting their attention to two-earner families with at most one child, they reject pooling of unearned income for all groups except young couples with no pre-school children. If
pooling is imposed, then the symmetry restrictions are rejected for all groups. Lundberg, Pollak and Wales (1997) exploit a natural experiment in the United Kingdom. In the late 1970’s, a substantial child allowance that had been added to fathers’ paychecks was given directly to mothers instead. The authors look at two ratios, children’s to men’s clothing expenditures and women’s to men’s clothing expenditures, in the pre-reform and post-reform periods. Both ratios are higher in 1980-90 than in 1973-76, suggesting that the transfer of unearned income affected household demand. Finally, Pezzin and Schone (1997) perform what is, to my knowledge, the only test of income pooling across generations. Using the U.S. Survey of Assets and Health Dynamics, they select a sample of currently unmarried elderly individuals who reside with an adult child. Controlling for total household nonlabor income, a child’s unearned income has a significant negative effect on own labor supply and on the likelihood and intensity of care provided to the parent. Conversely, the effect on prescription drug expenditures is positive, suggesting that children use increased bargaining power to substitute market for personal care.

There is therefore a good case against the unitary model for modern households. While none of the literature directly addresses this topic in a historical context, Khan (1996) does present some suggestive evidence for nineteenth century couples. Over this century, property law was reformed to allow married women to create separate estates, to control their own property, to sign contracts and engage in business transactions, and to keep the earnings from their own labor.¹ Since these laws were passed at different times in different states, Khan is able to use patent records to assess their impact on married women’s commercial activity. She finds that the reforms did have a positive effect on

¹ Such laws had been passed in virtually all states by the time of the CLUSS.
women’s patenting. One possible explanation is that nineteenth century families were non-unitary. Without legal rights to property distinct from their husbands’, women had less incentive to engage in inventive activity; after the reforms, invention raised household income and women’s bargaining power. While provocative, Khan’s evidence is indirect, and this paper aims to test the unitary model using more conventional methods.

**Section II**

Ideally, one would like to estimate a complete, theory-based demand model that allowed for bargaining among a variable number of household members. Aside from the sheer difficulty of this exercise, the CLUSS poses at least two challenges that make the task impossible: the survey contains a high proportion of individuals (particularly wives) with zero earnings, and it omits data on price variation necessary to identify price effects. Since we can at best approximate the intrahousehold bargaining process, and approximation around individual incomes of zero is not especially important, including the zero earners would unduly influence the results. However, keeping only households where both the wife and a child have positive earnings creates a sample size problem. I resolve the dilemma by separately testing the income pooling hypothesis for wives, sons and daughters. That is, I take three samples, each of which contains precisely two major wage earners, defined as those earning at least $100 over one year; any wages of minor earners (under $100) and any non-wage income are assumed to be pooled with the husband’s earnings. As for the lack of price data, it would not be a problem if one could assume that all families faced the same prices. This is indeed the approach that several authors take with modern cross-sectional data. However, if price uniformity is questionable in the modern world, it is all the more implausible for the past, when
transportation costs were higher. Thus I make two alternative assumptions: i) price
effects are additively separable from income and demographic effects, and ii) prices are
constant within geographic regions. I define geographic regions as cities (neighborhoods
for some of the larger metropolitan regions) or states, depending on the analysis. These
two assumptions conveniently allow geographic dummy variables to account for price
effects nonparametrically.

Given that the conditions of estimation are less than ideal, I use two distinct methods
to test the unitary model. The first approach is to estimate a complete (if highly
aggregated) demand system. Let there be \( n \) goods. Assuming additive separability of
price effects, a non-unitary household’s demand for the \( i^{th} \) good can be written

\[
x_i = f_i(y_1, y_2, D) + g_i(p)
\]

(1)

where \( x_i \) is total expenditure on the good, \( y_1 \) and \( y_2 \) are the incomes of the two major wage
earners, \( D \) is a vector of demographic factors, and \( p \) is a vector of prices. Letting \( y = y_1 + y_2 \)
denote total household income, we can reparameterize a second-order approximation
to the arbitrary function \( f_i \) as

\[
f_i(y_1, y_2, D) = \beta_1(y - \bar{y}) + \beta_2(y_2 - \bar{y}_2) + \beta_3(y - \bar{y})^2
\]

\[
+ \beta_4(y_2 - \bar{y}_2)^2 + \beta_5(y - \bar{y})(y_2 - \bar{y}_2) + \beta_6(D - \bar{D})
\]

\[
+ \beta_7(D - \bar{D})(D - \bar{D}) + \beta_8(y - \bar{y})(D - \bar{D}) + \beta_9(y_2 - \bar{y}_2)(D - \bar{D})
\]

(2)

where bars indicate means values. Preliminary investigations that included family
members’ ages, a dummy for home ownership, family size, and number of young
children suggested that family size is the only significant demographic variable.\(^2\) Thus I drop all other elements from \(D\). In order to further improve precision, I also drop the interaction term between family size and the income variables. The final form of the demand equations is therefore

\[
x_i \approx \beta_1(y - \bar{y}) + \beta_2(y_i - \bar{y}_i) + \beta_3(y - \bar{y})^2 + \beta_4(y_i - \bar{y}_i)^2 + \beta_6(D - \bar{D})^2 + \beta_8(D - \bar{D})^2 + g_i(p) - \delta_i
\]  

(3)

with \(g_i(p)\) approximated by city dummies in this analysis. I have replaced \(D\) by \(D\) because it is now scalar valued. The unitary model claims that

\[
f_i(y_1, y_2, D) \approx \tilde{f}_i(y, D)
\]  

(4)

which imposes the parameter restrictions \(\beta_2 = \beta_4 = \beta_6 = \beta_8 = 0\). These restrictions can be tested for the model as a whole or for individual demand equations.

I measure \(y\) by total household expenditure, on the grounds that it is a better measure of permanent income than current income. Several authors argue that total expenditure is endogenous if some goods are purchased infrequently; I ignore this problem, since instrumenting total expenditure would place too heavy a burden on my small sample sizes. I partition consumption into seven categories: food, clothing for the secondary wage earner (wife, son, or daughter), clothing for all other family members, furniture, fuel, health expenditures (doctor visits and medication), and a catchall category for other expenses. The equation for other expenses is omitted in order to satisfy adding-up restrictions. It would have been desirable to estimate a separate equation for housing, but

\(^2\) It is perhaps unsurprising that age turned out to be statistically insignificant, since it likely contains substantial measurement error. The interviewers were instructed to “use tact in asking the age. Estimate rather than ask the age of a person if the question seems inexpedient” (ICPSR, 1986).
I sidestep the complexities of calculating housing costs in a sample that includes a mix of homeowners and renters.

Although the above method is straightforward and constitutes my preferred method of testing the unitary model, it suffers from at least two disadvantages. First, it imposes a certain inflexibility of functional form. For example, equation (4) would be ruled out of hand if one used a translog approximation of \( f_i \) (since the marginal effects of \( y_1 \) and \( y_2 \) cannot be everywhere equal if demand depends on \( \ln y_1 \) and \( \ln y_2 \)). Secondly, the above method makes no use of available theory that should, in principle, allow us to obtain additional information on the intrahousehold allocation process. My second method makes use of the theory developed by Browning et al (1994) and is a simplified version of their approach. Browning et al prove a useful result that holds for non-unitary households under reasonable assumptions. If i) the household consumes at least one nonpublic good, ii) preferences are caring in the Becker (1981) sense, iii) public and nonpublic consumption are separable for each individual, and iv) intrahousehold allocation is Pareto efficient, then we can describe household behavior by a sharing rule. The sharing rule allocates income for nonpublic consumption to each individual in accordance with his or her bargaining power; individuals then maximize private utility subject to the constraint that expenditures not exceed their allocated income. I assume that clothing is a private good, so that each major wage earner’s clothing expenditure is the result of an individual maximization problem. Specifically, let demand take the form

\[
\ln x \sim \gamma_0 + \gamma_1 \ln \left[ \gamma_2 + \gamma_3 \ln \left( y_1 + y_2 \right) \right] \sim \gamma_4 \ln \left[ \gamma_5 + \gamma_6 \ln \left( y_1 + y_2 \right) \right]^2 \sim g(p)
\] (5)
where \( ? \) is the sharing rule and \( m \) household income for assigned to nonpublic consumption. Assume \( m \) to be a constant fraction \( q \) of total income, and let \( ? \) take the form

\[
e^{-\frac{\theta}{e^2}}, \quad ? = 2(\theta + z ? ? \ln m)
\]

where \( z \) is a variable that measures the relative bargaining power of the two major wage earners. Using the approximations \( \frac{?}{0.5} \frac{(1 ? / 2)}{?} \) and \( \ln(1 ? / 2) \approx / 2 \) for \( ? \approx 0 \) (i.e., \( ? \approx .5 \)), one can obtain the demand equation

\[
\ln x ? \theta_0 ? (1 ? ? 1 \ln y ? \theta_1 z ? ?_2 (1 ? ? )^2 (\ln y)^2
\]

\[
? ? \frac{?^2 z^2}{2} (1 ? ? ) (\ln y) \theta_0 \theta_1 p
\]

where \( \theta_0 \) and \( \theta_1 \) are reparameterizations. I define \( z \) as the proportion of total expenditure earned by the secondary wage earner, \( z = y_2/y \); experimentation with \( z = \ln (y_2/y) \) generated imprecise estimates. Equation (7) can be estimated by Non-Linear Least Squares. In order to maintain a reasonable level of precision, I use dummy variables for states rather than cities to capture the \( g(p) \) term. The unitary household hypothesis is just \( ? = 0 \), so that the sharing rule is unaffected by bargaining power.

**Section III**

The CLUSSS data were originally collected by the Bureau of Labor Statistics (BLS) in order to facilitate wage setting during wartime. They contain the incomes and expenditures of 12,817 intact families with at least one child, all of which resided in one
of 99 relatively large industrial areas. "Slum and charity" families were excluded. Respondents were asked to recall incomes and expenditures over the entire past year rather than over (say) the past week; thus very few zeroes are recorded for the expenditure variables, and I ignore the censoring problem. The CLUSS interviewers were instructed to exclude all families with boarders, although families with no more than three lodgers were included. Fortunately, this minimizes the difficult problem of dealing with board and lodging income. Although I pool it with husband’s earnings, one is tempted to attribute board and lodging income to women, since they no doubt performed the additional labor required. Indeed, taking in boarders was an attractive alternative to joining the labor force for many early twentieth century wives, and household income from boarders could be substantial: an average of $250.77 in one 1901 survey (Fraundorf, 1979). However, equating all board and lodging income with women’s earnings would ignore non-labor inputs (space) paid for by the family as a whole and would assume that women obtained equivalent bargaining power by working in the home—in which case we might think that the value of women’s time performing household chores should be included in their “earnings” as well. At any rate, the fact that families with boarders were excluded from the CLUSS means that board and lodging income amounts to only about 0.5% of total income in my sample of working wives, hardly enough to drive the results.

One immediate objection to my use of the CLUSS to estimate demand functions is that it pertains to a time when the United States was at war. Fortunately for our purposes, American consumers faced very little rationing during the First World War. While there were some restrictions on purchases, they did not generally affect the total consumption

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3 Note that my use of geographic dummy variables to account for price effects further increases the
of a good (Moehling, 2001). A related objection is that the U.S. economy underwent substantial inflation from 1917 to 1919; the CPI averaged nearly 17% in those three years (data from the Federal Reserve Bank of Minneapolis, 2003). Since the CLUSS data pertain to different one-year periods for different households, it would seem that my omission of any price level variable is serious. However, families within the same city were interviewed at approximately the same date, so that price level effects, like relative price effects, should be captured by my geographic dummies. This limits the severity of the inflation problem.4

As mentioned in Section II, I further restrict my samples so that all husbands and precisely one other family member earned over $100. I also limit the samples to whites. Black women had considerably greater labor force attachment than white women, possibly due to a lingering effect of slavery on the social stigma against married women’s work (Goldin, 1990, p. 27). This leaves sample sizes of 403 – 574, and sample characteristics are summarized in Table 1. The average family in the samples lived a frugal but not quite poverty-stricken lifestyle. The working children supplied about a quarter of household income, the working wives somewhat less. The secondary wage earners clearly had lesser labor force attachment than their husbands and fathers; mean weeks employed are around 47 for the primary earner but only 30 - 37 for the secondary workers. The average working child is on the verge of adulthood, but that obscures a

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4 It does not eliminate the problem entirely for either of my approaches. Without using price level data to deflate \( y \) and \( y_2 \), the form of the demand system equations rules out homogeneity of degree 0 in nominal incomes and prices. The nonlinear own clothing demand equations use dummies for states rather than cities, and cities within the same state were not necessarily interviewed at the same time.
range of ages from 11 to 47. Unfortunately, small sample sizes prohibit separate analyses for younger and older children.

**TABLE 1: Selected Summary Statistics**

<table>
<thead>
<tr>
<th></th>
<th>Sample of working wives</th>
<th>Sample of working sons</th>
<th>Sample of working daughters</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>447</td>
<td>574</td>
<td>403</td>
</tr>
<tr>
<td>( \bar{y} ) (Mean household expenditure)</td>
<td>$1,431.46</td>
<td>$1,662.42</td>
<td>$1,635.85</td>
</tr>
<tr>
<td>( \bar{y}_2 ) (Mean secondary income)</td>
<td>$268.26</td>
<td>$423.75</td>
<td>$398.21</td>
</tr>
<tr>
<td>( \bar{D} ) (Mean family size)</td>
<td>4.74</td>
<td>5.65</td>
<td>5.55</td>
</tr>
<tr>
<td>Mean age of husband or father</td>
<td>38.07</td>
<td>45.74</td>
<td>46.58</td>
</tr>
<tr>
<td>Mean age of wife, son, or daughter</td>
<td>34.08</td>
<td>17.05</td>
<td>18.60</td>
</tr>
<tr>
<td>Mean weeks employed for husband</td>
<td>47.71</td>
<td>48.29</td>
<td>47.82</td>
</tr>
<tr>
<td>Mean weeks employed for wife, son or daughter</td>
<td>29.66</td>
<td>34.62</td>
<td>37.14</td>
</tr>
<tr>
<td>Food expenditure share</td>
<td>40.33%</td>
<td>39.73%</td>
<td>39.70%</td>
</tr>
<tr>
<td>Own clothing expenditure share</td>
<td>4.70%</td>
<td>6.44%</td>
<td>7.30%</td>
</tr>
<tr>
<td>Others’ clothing expenditure share</td>
<td>11.70%</td>
<td>11.09%</td>
<td>11.63%</td>
</tr>
<tr>
<td>Furniture expenditure share</td>
<td>4.94%</td>
<td>3.87%</td>
<td>4.22%</td>
</tr>
<tr>
<td>Fuel expenditure share</td>
<td>5.39%</td>
<td>4.83%</td>
<td>5.22%</td>
</tr>
<tr>
<td>Health expenditure share</td>
<td>2.59%</td>
<td>2.75%</td>
<td>2.36%</td>
</tr>
</tbody>
</table>

Together, the six consumption categories account for about 70% of total expenditure. Housing costs comprise a significant part of the remainder, but the bulk of it consists of the CLUSS category for miscellaneous expenses. Overall, there is a reassuring degree of similarity across the three samples. The principal difference is that husbands are younger in the sample of working wives, but this is to be expected, since older men would be more likely to have children of working age. The fact that working wives had lower earnings than working children is not surprising: they worked fewer weeks, and their wages were lower as well. On the whole, then, there are no glaring deficiencies in the
data that would invalidate their use for testing the unitary household model. I therefore proceed to the presentation of estimation results below.

Section IV

A. Demand system

Tables 2 – 4 give partial derivatives of expenditure on each good evaluated at sample means. The parameter estimates are not as precise as one might like. While omitting the geographic dummy variables might tighten the estimates considerably, they are strongly significant \( p < .0001 \) in all samples and so I avoid this course. Overall, the estimates are reasonable even if precision is somewhat lacking. All goods are estimated to be normal—even the omitted other expenses category, since the sum of total expenditure derivatives is always less than unity. In all three samples, households obey Engel’s Law, with marginal effects of total income on food expenditure less than the average expenditure share of food (see Table 1). Total income effects are roughly consistent across samples. There is an unwelcome disparity in the estimated effects of family size, but most of the disparity is between the sample of working wives and the other two samples. We saw in Section III that average family size is substantially lower in the sample of working wives, so that the figures are not strictly comparable.

The basic message of Tables 2 – 4 is delivered in the cross-equation tests: income pooling is not rejected for working wives, is rejected for working sons, and is strongly rejected for working daughters. The only equation that rejects income pooling for working wives is the equation for furniture expenditures, but the negative sign on wife’s income in this equation is hard to rationalize. One would expect women, who almost certainly spent more time at home than their husbands even when they did some market
work, to have a stronger preference for furniture expenditure than their spouses. One would therefore expect furniture expenditures to *increase* with the wife’s earnings and

**TABLE 2: Demand System Estimates for Sample of Working Wives**

<table>
<thead>
<tr>
<th></th>
<th>Food</th>
<th>Own Clothing</th>
<th>Others’ Clothing</th>
<th>Furniture</th>
<th>Fuel</th>
<th>Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x_i / y$</td>
<td>.2456</td>
<td>.0941</td>
<td>.1479</td>
<td>.1090</td>
<td>.0222</td>
<td>.0203</td>
</tr>
<tr>
<td>$x_i / y_2$</td>
<td>.0107</td>
<td>-.0021</td>
<td>.0182</td>
<td>-.0543</td>
<td>.0112</td>
<td>.0048</td>
</tr>
<tr>
<td>$x_i / D$</td>
<td>27.85</td>
<td>-12.77</td>
<td>9.646</td>
<td>-9.833</td>
<td>2.283</td>
<td>2.561</td>
</tr>
</tbody>
</table>

Income pooling rejected (p-value)?
No (.0641) No (.7130) No (.0663) Yes (.0491) No (.7965) No (.8173)

Derivatives are calculated at sample means.
All single-equation tests of income pooling use a 5% significance level.
Cross-equation test of income pooling failed to reject (p = .1456).

**TABLE 3: Demand System Estimates for Sample of Working Sons**

<table>
<thead>
<tr>
<th></th>
<th>Food</th>
<th>Own Clothing</th>
<th>Others’ Clothing</th>
<th>Furniture</th>
<th>Fuel</th>
<th>Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x_i / y$</td>
<td>.2297</td>
<td>.0403</td>
<td>.1482</td>
<td>.0683</td>
<td>.0298</td>
<td>.0253</td>
</tr>
<tr>
<td>$x_i / y_2$</td>
<td>.0558</td>
<td>-.0342</td>
<td>.0790</td>
<td>-.0027</td>
<td>-.0036</td>
<td>-.0042</td>
</tr>
<tr>
<td>$x_i / D$</td>
<td>30.59</td>
<td>-10.75</td>
<td>13.89</td>
<td>-1.464</td>
<td>-1.264</td>
<td>-.6971</td>
</tr>
</tbody>
</table>

Income pooling rejected (p-value)?
No (.0621) No (.7453) No (.6170) No (.2805) No (.4605) No (.1447)

Derivatives are calculated at sample means.
All single-equation tests of income pooling use a 5% significance level.
Cross-equation test of income pooling rejects (p = .0173).

**TABLE 4: Demand System Estimates for Sample of Working Daughters**

<table>
<thead>
<tr>
<th></th>
<th>Food</th>
<th>Own Clothing</th>
<th>Others’ Clothing</th>
<th>Furniture</th>
<th>Fuel</th>
<th>Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x_i / y$</td>
<td>.2045</td>
<td>.1041</td>
<td>.1572</td>
<td>.0868</td>
<td>.0338</td>
<td>.0197</td>
</tr>
<tr>
<td>$x_i / y_2$</td>
<td>.0041</td>
<td>.0718</td>
<td>-.0407</td>
<td>-.0396</td>
<td>-.0026</td>
<td>-.0368</td>
</tr>
<tr>
<td>$x_i / D$</td>
<td>37.15</td>
<td>-12.47</td>
<td>11.67</td>
<td>-3.883</td>
<td>-.2171</td>
<td>1.310</td>
</tr>
</tbody>
</table>

Income pooling rejected (p-value)?
No (.8468) Yes (.0008) No (.0837) Yes (.0031) No (.1837) Yes (.0256)
Derivatives are calculated at sample means.
All single-equation tests of income pooling use a 5% significance level.
Cross-equation test of income pooling rejects ($p = .0001$).
bargaining power. I conclude that the estimated demand system provides no compelling
evidence against income pooling between spouses. While one can never prove that the
unitary model’s restrictions hold exactly, the CLUSS data at least suggest that it gives a
better approximation of marital relations than parental ones.

The sample of working sons yields little specific information. None of the individual
equations reject income pooling at the 5% significance level. The food equation comes
close, but this could be due to the endogeneity of earnings; work efficiency or potential
labor supply may be dependent upon nutrition, and unitary households that purchased
additional food for their sons might increase his earnings. In fact, including a measure of
labor supply (weeks worked) in the food equation reduces the estimated effect of son’s
income to a seventh order decimal. Thus while there is some evidence that sons did not
pool their earnings with general household income, we can say little about exactly how
their preferences differed.

The sample of working daughters gives the most interesting results. Income pooling
is strongly rejected in the cross-equation test and is rejected in the own clothing,
furniture, and health equation tests as well. The daughter’s earnings variables are also
marginally significant in the others’ clothing equation. Moreover, the signs of $\frac{\partial x_i}{\partial y_2}$
(positive for own clothing, negative for others’ clothing, furniture, and health
expenditures) have an intuitive interpretation in the equations where income pooling is
rejected. We might expect daughters to use increased bargaining power to augment their
own level of clothing expenditures at the expense of others’. Working daughters would
also be less interested in furniture than their parents, since furniture is a long-term investment in a home that the daughters might soon be leaving. And health expenditures were probably directed primarily toward the parents and any younger children. Of course, endogeneity bias might explain the positive effect of daughter’s earnings on own clothing expenditures, since daughters who worked heavily outside the home might need more and fancier clothes. However, including weeks worked in the own clothing equation actually makes the daughter’s earnings variables more significant. I conclude that the demand system estimates make a good case against income pooling between working daughters and their parents.

B. Nonlinear Model of Own Clothing Demand

The nonlinear model of own clothing demand generally corroborates the above findings. Table 5 summarizes the results. The parameter $\beta_1$, measuring the effect of total household income on allocation, is very imprecisely estimated. Fortunately, the main parameter of interest, $\beta_2$, yields more information. Income pooling is rejected for working sons and daughters but not for working wives; one cannot make too much of this last result, however, as it stems primarily from a large standard error. If one takes the model seriously as a structural description of intrahousehold allocation, one can even quantify the importance of relative bargaining power. Using the approximation $\beta_2 = 5(1 - \beta_1^2 / 2)$ and holding $y$ constant, we find that a son who went from providing 25% to providing 50% of household income would see his share of nonpublic household expenditure rise by 3.15 percentage points; a daughter’s share would rise even more, by 3.90 points. These are large effects. As mentioned in Section II, Browning et al (1994) found that a Canadian wife in 1978-86 who went from earning 25% to 75% of household income
would raise her share of household expenditure by a mere 2.3%. Combined with the
demand system estimates, I believe these results constitute reasonably convincing

**TABLE 5: Estimates from the Nonlinear Model of Own Clothing Demand**

<table>
<thead>
<tr>
<th></th>
<th>Theta</th>
<th>Gamma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wives</td>
<td>-.0079</td>
<td>.2291</td>
</tr>
<tr>
<td></td>
<td>(not estimated)</td>
<td>(.2867)</td>
</tr>
<tr>
<td>Sons</td>
<td>.0877</td>
<td>.2523</td>
</tr>
<tr>
<td></td>
<td>(.5260)</td>
<td>(.0776)</td>
</tr>
<tr>
<td>Daughters</td>
<td>.3011</td>
<td>.3117</td>
</tr>
<tr>
<td></td>
<td>(.9060)</td>
<td>(.0960)</td>
</tr>
</tbody>
</table>

Theta \[ ? \frac{2y}{?y} \] \[ ? \frac{2}{?y} \]
Gamma \[ \frac{2}{(y_2 / y)} \]

Standard errors in parentheses.

evidence that early twentieth century children and their parents did not truly pool family
incomes, even if they often appeared to do so on the surface.

**Section V**

The unitary model of the household claims that families make economic decisions as
if they were individuals. That is, household members contribute their incomes to a
common pot and use some kind of collective method to determine expenditures. The
social history of the early twentieth century is supportive of the unitary model for married
couples. The literature on working daughters generally suggests that they contributed to a
common pot as well, while the literature on sons claims the contrary. This paper uses
quantitative data on household demands to test these more qualitative accounts. Both the
multiple-equation demand models and the nonlinear own clothing demand models give
mixed support to the social histories. I find no evidence against income pooling between
husbands and wives. This conflicts with Khan’s (1996) finding that changes in property
law affected married women’s patenting activity; stronger evidence is necessary before we can be convinced that early twentieth century couples truly differed from their modern counterparts in acting as an economic unit. While my tests do reject income pooling between parents and working sons, the most interesting result is that income pooling is rejected even more strongly for working daughters. Contrary to expectations, there is no evidence that young women were under their parents’ thumb any more than their brothers.

This finding seems paradoxical, given that daughters (unlike sons) lacked a credible threat to leave the household before marriage. How then did working daughters manage to extract concessions from their parents? I suspect they were led to “coax, cry, and quarrel,” precisely as Louise Montgomery said they were forced to do. The literature on non-unitary households recognizes that uncooperative marriage rather than outright separation may be the more typical threat point in the intrahousehold allocation process. Similarly, young women in the early twentieth century may have been able to use the threat of uncooperative parental relations to their advantage. If nothing else, they could use social norms of fairness to shame their parents into granting them financial latitude. The evidence presented in this paper indicates that the working daughter’s threat to fight was no less effective than the working son’s threat to leave.

References


