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in Economic Inequality

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CHANGES IN HOME PRODUCTION
AND TRENDS IN ECONOMIC INEQUALITY*

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Abstract

Previous studies of trends in inequality have ignored changes in the distribution of home production. This paper asks whether including the value of home production affects the trend in inequality of families. During the 1980s household money income grew at a slow rate but inequality increased. At the same time home production declined somewhat overall, but it declined more for high income households than for low income household. Using Panel Study of Income Dynamics data we develop three methods to adjust household money income for the value of home production. We then compare trends in the level and distribution of these measures of adjusted income to the trends in the level and distribution of money income. Income adjusted for the value of home production is more equally distributed than unadjusted income, but inequality of adjusted income grew during the 1980s. These conclusions are the same regardless of the method for adjusting income.

CHANGES IN HOME PRODUCTION AND TRENDS IN ECONOMIC INEQUALITY

INTRODUCTION

It is widely recognized that ignoring home production understates aggregate output. However, little attention has been paid to the impact of ignoring home production in assessing trends in economic inequality, even though many studies have shown that home production is important to economic well-being and that the amount of home production has decreased as labor force participation of women has increased. For instance, Gronau (1980) estimated that in 1973 among white married-couple households the value of home production was equal to 70 percent of households' money income after taxes. Among households with young children, the value of home production was nearly equal to households' money income after taxes. Furthermore, Juster and Stafford (1991) show that women reduced time devoted to home production by more than 10 percent between 1965 and 1981, a period of rapid increase in women's labor force participation.

If the reduction in home production was disproportionately in families at the top of the distribution of money income, the reduction in goods produced in the home may partially offset the increase in money income. Furthermore, standard economic theory is consistent with a greater reduction in home production at the top of the money income distribution. People whose potential earnings are high increase their labor supply more than people whose potential earnings are low. As returns to education and experience increased during the 1980s, one expects high earners to have increased their labor supply with off-setting reductions in either home production or leisure. Measures of money income that place no value on the alternative uses of time may therefore overstate the gains of families at the top of the income distribution.

Furthermore, changes in family composition are also likely to affect the distribution of home production as well as money income.¹ We know that much of the increase in income inequality is accounted for by the increase in single-parent households.² Since single-parent households have less time to devote to both the market and home production, the growth in single parent households could contribute to a decline in both income and home production at the bottom of the income distribution.

1 Cancian, Danziger, and Gottschalk (1991, Table 6.4) show that between 1978 and 1988 wives earnings accounted for 64 percent of the growth in household income among white couples and 70 percent among black couples.

2 For a review of this literature see Danziger and Gottschalk (1995).

In this paper we estimate trends in economic well-being using household money income and income adjusted for the value of home production and, in some cases, the value of leisure. The paper is divided into four sections. The first describes the data that we use. The second and third review trends in money income and hours of home production respectively. The third section discusses the methods we use to adjust income for the value of home production and leisure. Section four provides our results.

DATA.

We use data from the Panel Study of Income Dynamics (PSID) for interview years between 1976 and 1988. Our sample includes households headed by someone 25 to 64

years old. The samples are between 2,363 and 3,852 households depending on the year. Sample weights are used throughout. (See Hill 1992 for a description of the PSID.)

Starting in 1976 the PSID has asked heads of households how many hours they, their spouse (if present), and other household members spend in an average week on housework and in labor market work.³ The PSID also contains the necessary income and earnings data to calculate the adjusted income measures we describe below.

³ Hours of home production is measured as the respondent's response to a question that asks, "About how much time do you spend on housework in the average week? (I mean time spent cooking, cleaning, and doing other work around the house.)" The respondent is also asked to report the average weekly hours of housework of the spouse and other household members. We omit hours of home production of household members other than the head and partner. The hours of housework contributed by other household members has hardly changed over time for any household type.

An alternative source of data used in many home production studies is time-use diaries in which individuals keep detailed records of their activities for a short time period. These data presumably produce more accurate estimates of time use than the survey data collected in the PSID, but they cannot be used to assess trends in the distribution of home production across income groups, since there is no consistent time series data that include both diary entries and income for a sufficiently large sample of households.

Although the PSID includes much less detailed information on time use than diary surveys, it can be used to generate a consistent set of cross-sectional estimates of the total amount of time devoted to home and market production. Juster and Stafford (1991) note that survey questions like those asked in the PSID tend to over-state the use of time for specific tasks, but this bias will affect estimated trends in time use or the relative use of time for different household types only if the magnitude of the reporting error varies over time or by household type.

CHANGES IN THE LEVEL AND DISTRIBUTION OF MONEY INCOME

As many studies document, the 1980's was a decade of slow growth in money income for non-elderly households (Danziger and Gottschalk 1995, Karoly 1993). Table 1 uses data from the PSID to show that median household income for households headed by someone 25 to 64 years old hardly changed between 1976 and 1988.

As many analysts have pointed out, trends in money income may understate growth in economic well-being for two reasons. First, average household size declined by 12.2 percent between 1969 and 1979 (from 3.5 to 3.08) and by 5.2 percent (to 2.92) over the next decade. With fewer mouths to feed, households required fewer resources, so households' need for income declined while income increased. Using money income unadjusted for household size implicitly assumes that economies of scale are so large that additional household members imposed no cost on the household or, conversely, that reductions in household size do not reduce the household's needs. At the other extreme, per capita income assumes that there are no economies of scale and, therefore, that each additional household member adds the same amount to the needs of the household. The "true" equivalence scale is presumably between these extremes. Table 1 shows that per capita household income grew by a substantial 19.2 percent between 1976 and 1988. This is considerably greater than increase in unadjusted income over the same period.

A second factor that has affected growth in median income as well as growth in inequality is the shift from married-couple to single-parent households and other units

with only one potential earner. Since overall growth in income is a weighted average of income growth for each type of household, it will be affected by changes in the weights as well as changes in the group specific means. As the weight shifts to single-adult households, who as Table 1 shows have lower average incomes, overall growth in household income declines.

Table 1 shows that between 1976 and 1988, income unadjusted for household size grew by 10.2 percent among married-couple households and by 7.6 percent among households headed by a single adult. But over the same period per capita income grew by 16.7 percent for married-couple households and 21.3 percent among households headed by a single adult. Whether one should focus on overall growth in income or on group-specific growth depends on whether one wants to include the effects of these demographic shifts in an assessment of changes in economic well-being. We will leave it up to the reader by presenting our analysis by household type.

While median income did increase during the 1980s, at least moderately, the increase was not uniform throughout the income distribution. Table 2 shows that between 1976 and 1988 the income of the household at the twentieth percentile declined by 11.3 percent, while the income of the household at the eightieth percentile grew by 9.5 percent. The increase in inequality was less for per capita income. This increase in inequality was largely due to increased inequality in the labor market. But it was also partly due to an increase in single-adult households combined with the increase in married-couple households with two workers. If changes in home production also have not been uniform throughout the income distribution, trends in a measure of income adjusted for the value of home production might not parallel trends in money income.

CHANGES IN THE LEVEL AND DISTRIBUTION OF TIME USE.

In order to see if trends in time-use in the PSID are the same as trends using time-use surveys, we begin by showing overall trends in home production in the PSID. We then show changes in the distribution of home production and the impact of these changes on the distribution of economic well-being.

Trends in Hours of Home Production and Labor Market Work. Evidence on time use in the US, reviewed in Juster and Stafford (1991), shows that women have reduced their home production as they increased their market production. They show that between 1965 and 1981 women reduced their hours of home production by an average of 11.3 hours per week (from 41.8 to 30.5). However the number of hours spent in the labor market increased by an average of only 5.0 hours (from 18.9 to 23.9 hours per week). The result was a net decline of 6.3 hours per week devoted to combined home and market production (or a 6.3 hour increase in leisure). These same studies also show that the number of hours men devote to home production is roughly a third of the number of hours women devote and that men increased their hours of home production by an average of 2.3 hours per week (from 11.5 hours to 13.8 hours) between 1965 and 1981. On average they decreased market work by 7.6 hours per week, resulting in a net increase of 5.3 hours per week devoted to leisure. We do not know from these studies if the decline in home production continued throughout the 1980s. We also do not know how it is distributed over income groups.

Some studies in psychology and sociology, as well as some in economics, emphasize the decrease in home production, especially the decrease in time spent with children, that occurs when mothers go to work outside the home (Kammerman and Hayes 1982, Hewlett 1991). But none of these studies estimates the impact of lost home production on the distribution of economic well-being.

Figure 1 shows overall trends in annual hours of home production among all households and four sub-groups defined by whether the head was married and whether there was a child in the household. For each group the number of hours of home production declined after 1977.

The decline in hours devoted to home production for all households is a result of the decline in hours for each group and the changing relative size of the groups. Between 1977 and 1988 two parent households declined from 46 percent of all households to 35 percent. The relative size of the other three groups all increased, with the largest increase coming from childless singles, who grew from 21 percent to 29 percent of all households. Since the shrinking group (two-parent families) had above average hours of home production and the fastest growing group (childless singles) had the fewest hours of home production, the compositional effect reduced aggregate hours of home production. The result was a decline of 349 hours per year in aggregate hours of home production between 1977 and 1988.

Figure 1 shows that between 1976 and 1988 single parents always devoted fewer hours to home production than married parents. But the decrease in average hours of home production between 1977, when home production began to decline, and 1988 was 319 hours per year (a decrease of 15.6 percent) for two-parent households, but only 140 hours (13.5 percent) for single-parent households. Thus, the gap in home production between single-parent and two-parent household decreased from 1010 hours in 1977 to 831 hours in 1988. All else equal this raises income adjusted for the value of home production for single-parent families relative to two-parent families, thus reducing inequality between the two family types.

Households with no children headed by a single adult devote many fewer hours to home production than married couples with no children. But the decline in the absolute number of hours devoted to home production was similar for both household types.

Figure 2 shows trends in hours devoted to the labor market. Over this period the overall annual number of hours devoted to market work hardly changed, rising from 2,502 in 1976 to 2,643 in 1988, an increase of only 141 hours. But this obscures the differences in the trends for different types of households. The increase in annual hours of market work among two-parent households with children was 394 hours. For single-parent households it was only 157 hours. For married couples with no children the increase was 218 hours and for single-adult households with no children it was 261. The shift in household composition toward household types that worked relatively few hours in the market limited the increase in aggregate market hours.

The net result of the modest increase in market work and the decrease in housework between 1977 and 1987 is shown in Figure 3. The average household devoted 248 fewer hours per year (a 6.1 percent decrease) to total production in 1988 than in 1977. Consistent with findings from time-use studies, these results show a slight net increase in leisure over this decade.

Trends in the Distribution of Home Production and Labor Market Work. Karoly and Burtless (1993) show that the increase in labor force participation among wives has been concentrated in the upper end of the income distribution, contributing to the rise in inequality. If the decline in home production is also concentrated there, the increase in income among those at the upper end of the income distribution overstates their increase in income adjusted for the value of home production. This implies that there might have been less growth in economic inequality than standard income measures suggest. Figure 4 shows hours of home production for all households by money income quintiles. In all years households in the poorest income quintile allocate the fewest hours to home

production. Those in the third and fourth quintile allocate the most. This suggests that adding the value of home production could increase inequality in each year.

Figure 4 shows that hours of home production decreased for all households, but decreased less for the poorest 20 percent of households than for more affluent households. Thus, the gap in hours of home production between the rich and poor narrowed between 1977 and 1988. This suggests that home production may have had a greater effect on inequality in the past than in the present and that increases in inequality over this period may be smaller when using income adjusted for the value of home production than when using money income.

METHODS FOR ADJUSTING INCOME FOR HOME PRODUCTION

Our first measure of income is the traditional money income measure, unadjusted for home production or leisure:

$$I_1 = M_h W_h + M_s W_s + O_f$$

where M_h and M_s are the hours of market work of the head and spouse (if present); W_h and W_s are their wages; and O_f is other income received by the household. Other income includes all non-labor sources such as interest, dividends, rents, public assistance, and private pensions.

Money income assigns a value of zero to hours spent not working in the market. An alternative approach is to value all hours the same, whether they are spent in market work, home production, or leisure. This approach has led to the concept of "full income" in which all hours are valued at an individual's wage under the assumption that leisure and home production are worth their opportunity cost, which is the income the individual could have earned had that time been spent in the market. Thus our second measure of income, and our first measure of adjusted income, is:

$$I_2 = (M_h + H_h + L_h)W_h + (M_s + H_s + L_s)W_s + O_f$$

where H_h and L_h are the hours of home production and leisure of the head and H_s and L_s are the hours in the same activities for the spouse, if present.⁴ Since the total hours devoted to market work, plus home production, plus leisure is the same for everyone, this measure reflects only differences in wage rates and non-labor income.

⁴ Leisure is a residual category that includes all waking hours not devoted to market or home production. We assume that the total non-sleeping time is 16 hours per day (or 5840 per year.)

An intermediate approach, and one taken in the literature cited above, is to adjust income by the value of home production, but ignore the value of leisure. The drawback of this approach is, of course, that if additional market hours come at the cost of foregone leisure rather than home production, there will appear to be no off-setting cost. This measures the distribution of goods consumed (both market goods and home production), not the distribution of well-being.⁵

⁵ For persons with zero earnings, we impute wages using standard techniques to correct for selection into the labor market. The wage equation included a quadratic in age, education, an interaction of age and education, as well as three dummy variables for geographic region. In addition to these variables, the selection equation included the following identifying variables: number of children, two dummy variables for child under age 3 and child aged 3 to 6, income of spouse, total transfer income, city size,

county unemployment rate, and dummy variables for being married, disabled and owning a home.

Adjusting income to reflect the value of home production requires two pieces of information: the number of hours each person devoted to home production and the value of an hour devoted to home production. Nearly all previous research has valued home production either as the amount of money that it would take to replace the goods and services produced in the home (the replacement cost) or as the amount of money that one could have earned had that hour been spent in market production (the opportunity cost).

Replacement cost values home production at the price households would have to pay to purchase in the market the goods and services they produce in the home:

$$I_3 = (M_h W_h + M_s W_s) + R(H_h + H_s) + O_f$$

where R is the replacement cost of hours devoted to market production. In practice the measures of replacement cost that are usually used are quite crude. We follow the standard practice of using the median hourly earnings of private household service workers as a measure of replacement cost.

If the opportunity cost of working in the home is the foregone income that would have been earned in the market, then both market work and home production should be valued at the market wage.⁶ This leads to our final measure of adjusted income:

$$I_4 = (M_h + H_h)W_h + (M_s + H_s)W_s + O_f$$

⁶ A crucial assumption of this approach is that individuals are free to adjust the number of hours they work in the market.

Using the opportunity cost to value home production implies that the time allocation across household members affects the value of home production for the unit. Husbands and wives typically have different market wages so their home production hours will be valued at different rates. This reflects the assumption that higher wage spouses will undertake fewer low-return home production tasks than the lower-wage spouse because of the higher opportunity cost.

TRENDS IN ADJUSTED INCOME INEQUALITY

We now put all of these pieces together by looking at the trends in inequality using these different concepts of income. As a measure of inequality we use the ratio of income at the twentieth percentile to median income (the 20/50 ratio) and the ratio of income at the eightieth percentile to median income (the 80/50 ratio).⁷ Figure 5 shows the first ratio and Figure 6 shows the second. Table 3 shows these ratios for 1976, 1977, 1987 and 1988.

⁷ Percentiles are determined separately for each income concept. Thus the 20/50 ratio for full income is the ratio of full income at the twentieth percentile to the median full income.

Three conclusions can be reached from these two figures. First, income at the twentieth percentile decreased relative to median income and income at the eightieth percentile increased relative to the median, regardless of the income measure. Therefore, including the value of home production (and the value of leisure as in full

income) does not overturn the main conclusion of the inequality literature: households at the bottom of the distribution lost ground, while those at the top gained.

Second, inequality is lower in any year when income is adjusted for the value of home production than when it is not. As Table 3 shows, in 1988 adding the value of both home production and leisure (full income) raises the 20th percentile from 49.1 percent of the median (for money income alone) to 54.1 percent. The ratio of the twentieth percentile to the median is only slightly greater for income adjusted for the value of only home production than for money income alone. In 1988 the twentieth percentile is 52.0 percent of the median when we value home production at the opportunity cost and 51.2 percent of the median when we value it at the replacement cost.

The fact that high-income households report more hours of home production might seem to imply that adding the value of home production would increase inequality. However, while the absolute increase in income from adding the value of home production is largest for high-income households, it is small relative to the base. As a result, adding the value of home production has a smaller proportionate impact on high-income than on low-income households.

Similarly, adding the value of both home production and leisure lowers the ratio of income at the eightieth percentile to the median in each year. In 1988 it lowers it only slightly, from 1.714 to 1.704. Adding only the value of home production reduces this ratio more than adding both home production and leisure. However, the increase in the ratio of the eightieth percentile to the median is slightly greater using adjusted income than using money income.

Figures 7 and 8 show analogous results for per capita income. Table 3 shows median per capita income and per capita income at the 20th and 80th percentile of the income distribution by year. Conclusions for per capita income are similar to those for unadjusted income, namely that measures of income adjusted for home production yield less inequality than money income in any one year, but inequality grew regardless of the income measure used.

Finally, Table 4 shows trends in household income and in adjusted income for single-parent and two-parent families. It shows that two-parent families had more than double the income of single parent families in 1976 and 1988 regardless of whether we use unadjusted income or income adjusted for the value of home production. (Table 4 shows only money income adjusted with replacement cost because the conclusions are the same regardless of how we value home production.) But the gap between these two family types grew somewhat more if we take into account the value of home production. The same is true if we substitute per capita income.

CONCLUSIONS

Taken together these results show that: 1) home production reduces the observed inequality among households,⁸ 2) inequality increased between 1976 and 1988 regardless of the income measure used. Including the value of home production or leisure has little effect on the increase in inequality, and 3) these conclusions hold regardless of what method we use to value home production and regardless of the adjustment for household size.

⁸ This may be one reason why there is less inequality in consumption than in measured income (Mayer and Jencks 1993).

The objective of this descriptive paper has been to set out the facts. The next step in this line of research would be to identify the causal links between changes in the labor

market and home production and the relationship between home production and the well-being of parents and their children.

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Table 1

INCOME OF HOUSEHOLDS (1992 DOLLARS) HEADED BY PERSONS 25 TO 64 YEARS OLD BY HOUSEHOLD TYPE AND YEAR

	All	Married Couple	Single Adult			
Median Household Income 1976	40,642	47,357	24,801	1977		
	42,179	49,394	25,085	1987	40,571	51,871
	1988	41,509	52,165	26,684	% Change 1976-88	2.1
	7.6					10.2

Median Per Capita Household Income 1976				13,740	13,547	14,172
1977	14,290	14,060	15,250	1987	16,180	15,846
17,118	1988	16,320	15,813	17,155	% Change 1976-88	18.8
16.7	21.3					

SOURCE: Authors' calculations from the PSID. Notes: All income amounts are in 1992 dollars.

TABLE 2

INCOME BY INCOME GROUPS FOR HOUSEHOLDS HEADED
SOMEONE 25 TO 64 YEARS OLD BY YEAR

	20TH PERCENTILE	80TH Median	20TH/ PERCENTILE	80TH/ MEDIAN	MEDIAN MONEY INCOME	1976
22,670	40,642	64,964	.558	1.599	1977	22,980 42,179
67,264	.545	1.595	1987	19,760	40,571	69,090 .487 1.703
1988	20,370	41,508	71,158	.491	1.714	
MONEY INCOME PER CAPITA 1976				7,794	13,740	24,620 .567
1.792	1977	8,140	14,290	25,720	.570	1.800 1987
7,739	16,180	31,020	.478	1.917	1988	8,094 16,320
32,760	.496	2.007				

SOURCE: Authors' calculations from the PSID. Notes: All income amounts are in 1992 dollars.

TABLE 3

MONEY INCOME AND MEASURES OF INCOME
AT THE 20TH, 50TH, and 80TH PERCENTILES AND THE
RATIO OF 20TH TO 50TH AND 80TH TO 50TH

	20TH PERCENTILE	80TH Median	20TH/ PERCENTILE	80TH/ MEDIAN	MEDIAN
FULL INCOME 1976		81,940	147,700	225,700	.555 1.528 1977
79,860	146,900	223,300	.544	1.520	1987
218,700	.512	1.636	1988	71,390	132,000 224,900 .541
1.704					
ADJUSTED INCOME: OPPORTUNITY COST 1976				27,370	46,601 70,268
.587	1.508	1977	26,760	47,633	72,566 .562 1.523 1987

23,760 45,875 74,450 .517 1.623 1988 24,520 47,143
 77,073 .520 1.635

ADJUSTED INCOME: REPLACEMENT COST 1976 34,340 59,619 92,232
 .576 1.547 1977 33,320 61,626 96,729 .541 1.570 1987
 28,370 56,619 92,160 .501 1.628 1988 28,880 56,452
 94,551 .512 1.675

FULL INCOME PER CAPITA 1976 28,700 49,820 86,520 .576
 1.737 1977 29,410 50,630 84,250 .581 1.664 1987
 27,890 53,520 97,220 .521 1.817 1988 28,630 55,720
 100,900 .514 1.811

ADJUSTED PER CAPITA INCOME: OPPORTUNITY COST 1976 9,457
 15,660 26,680 .604 1.704 1977 9,777 16,100 27,240
 .607 1.692 1987 9,699 18,230 32,900 .532 1.805 1988
 9,732 18,380 34,300 .530 1.866

ADJUSTED PER CAPITA INCOME: REPLACEMENT COST 1976 11,900
 20,340 33,870 .585 1.665 1977 12,810 21,470 35,220
 .597 1.640 1987 11,930 22,280 40,030 .535 1.797 1988
 11,640 22,550 41,150 .516 1.825

SOURCE: Authors' calculations from the PSID. Notes: All income amounts are in 1992 dollars.

TABLE 4

CHANGES IN THE MEDIAN INCOME OF TWO-PARENT FAMILIES
 RELATIVE TO THE MEDIAN INCOME OF SINGLE-PARENT FAMILIES

	Two-Parent Families	Single-Parent Families	Ratio of Two-parent to Single-parent 1976	Money
Income with replacement cost	47,204	22,202	2.13	Income Adjusted
	56,997	28,495	2.00	
1977 Money Income with replacement cost	48,079	25,130	1.91	Income Adjusted
	59,564	29,396	2.02	
1987 Money Income with replacement cost	49,401	21,416	2.30	Income Adjusted
	56,929	24,687	2.30	
1988 Money Income with replacement cost	48,980	23,162	2.11	Income Adjusted
	56,340	25,545	2.20	

ENDNOTES

1 Cancian, Danziger, and Gottschalk (1991, Table 6.4) show that between 1978 and 1988 wives earnings accounted for 64 percent of the growth in household income among white couples and 70 percent among black couples.

2 For a review of this literature see Danziger and Gottschalk (1995).

3 Hours of home production is measured as the respondent's response to a question that asks, "About how much time do you spend on housework in the average week? (I mean time spent cooking, cleaning, and doing other work around the house.)" The respondent is also asked to report the average weekly hours of housework of the spouse and other household members. We omit hours of home production of household members other than the head and partner. The hours of housework contributed by other household members has hardly changed over time for any household type.

4 Leisure is a residual category that includes all waking hours not devoted to market or home production. We assume that the total non-sleeping time is 16 hours per day (or 5840 per year.)

5 For persons with zero earnings, we impute wages using standard techniques to correct for selection into the labor market. The wage equation included a quadratic in age, education, an interaction of age and education, as well as three dummy variables for geographic region. In addition to these variables, the selection equation included the following identifying variables: number of children, two dummy variables for child under age 3 and child aged 3 to 6, income of spouse, total transfer income, city size, county unemployment rate, and dummy variables for being married, disabled and owning a home.

6 A crucial assumption of this approach is that individuals are free to adjust the number of hours they work in the market.

7 Percentiles are determined separately for each income concept. Thus the 20/50 ratio for full income is the ratio of full income at the twentieth percentile to the median full income.

8 This may be one reason why there is less inequality in consumption than in measured income (Mayer and Jencks 1993).

9 Gronau (1980) estimates that among households with young children, the loss of home production when the wife joined the labor force almost equals her increased money earnings.