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Women: productivity *and labour in the* United States

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An attempt is made in this article to gauge the effect on productivity of women's move out of the home and into gainful employment in the United States during the period 1960-1980. It questions the validity of the frequently-made assertion that women's growing participation in the labour force has lowered productivity. The authors contend that, compared with a broader method of measuring economic production, the traditional gross domestic product underestimates the growth of productivity during periods when increasing numbers of women are joining the labour force. They demonstrate that the shift made by women from housework to gainful employment during the period in question constituted an efficient reallocation of labour hours. Quantitative estimates of changes in productivity occurring in an economy that includes both a household sector and a market sector show that women's shift out of the household sector has had significantly positive effects in terms of productivity, and although the increase in productivity resulting from women's shift out of the household sector did not completely offset the decrease in private sector productivity which occurred during that period, it nevertheless mitigated the decline considerably.

I

Introduction

Women's participation in the Latin American labour force has increased in recent decades. Between 1950 and 1980, the female labour force in the region trebled, expanding from 10 to 32 million. Despite this increase and the steep rise in women's participation during the 1980s, however, even now only one-third of working-age women enter the labour market in Latin America. Since this percentage is still quite low, it would therefore be premature to attempt to determine this phenomenon's impact on the productivity of labour in the countries of the region.

In the United States, however, the slowdown in the growth of labour productivity seen since the mid-1960s, and especially since 1973, has been attributed to the increase in the number of women working outside the home, as well as to such other factors as slower growth of the economy, demographic changes, more regulations and higher energy prices. Thus, the experience of the United States, together with the methodology developed in this study, may be useful in evaluating and predicting the effect on

Latin American labour productivity of the sustained incorporation of a significant number of women into the labour force.

The purpose of this article is to analyse the impact of increasing female participation in the labour force on the evolution of productivity in the United States.¹ It will, first of all, demonstrate that the shift made by women from the household sector to gainful employment during the period in question constituted an efficient reallocation of labour hours even though it led to what appeared to be a drop in productivity due to the fact that the gross national product (GNP) does not include hours spent on housework or the household sector's output. A quantitative estimate will then be given of the changes in productivity occurring in a "broad" economy – i.e., an economy that includes both the household sector and the market sector – and it will be shown that the use of the conventional GNP instead of a broader measurement of economic output results in the underestimation of the growth of labour productivity in the United States.

II

Theoretical considerations

GNP is really only a partial measure of economic activity.² For example, since the factors of production used in the household sector receive no remuneration whatsoever and since its output is not marketed, this sector is entirely omitted from national accounts. If the significant shift of resources that has taken place between the household sector and the market had not occurred, changes in GNP would accurately reflect

changes in the efficiency of resource use, since a change in real GNP per worker would then correspond to a change in productivity.

The absence, until the 1960s, of a significant flow of women between the household and market sectors served to justify the position taken by those who regarded the measurement of housework as nothing more than a methodological curiosity. Up to that time, the percentage of women working in the home had remained relatively constant; in other words, the participation rate of the household sector had held fairly steady.

Since the mid-1960s, however, the percentage of women working in the home has changed. For example, the female labour force in the United States expanded by 20 million between 1960 and 1980 (it

¹ This article analyses the period 1960–1980 because these were the years (particularly between 1970 and 1980) when the decrease was most marked. Thereafter, labour productivity began to rise, albeit slowly.

² In 1991, the Bureau of Economic Analysis of the United States Department of Commerce stopped using GNP as its basic yardstick for economic activity and instead started to use the gross domestic product (GDP), because the latter is a more appropriate short-term means of measurement.

grew by 12 million during the 1970s alone). Altogether, women's participation in the workforce climbed from 32% in 1947 to 39% in 1965 and to 51% in 1980. In 1947, only one out of every five women worked outside the home; around 1980, one out of every two women did so.

Although this phenomenon has had a variety of complex causes, there can be little doubt that many women began to participate in the labour force because they saw that opportunities in the wage-earning sector exceeded the value of the time they devoted to housework. The study of time allocation carried out by Gary Becker, 1992 Nobel Prize winner, suggests that women in the household sector will shift over to wage labour if the latter's opportunity cost exceeds the value of the housework produced for the family unit (Becker, 1965; Becker and Michel, 1973). Clearly, such a shift would lead to greater efficiency.

However, because the output of the household sector is not included in GNP, this increased efficiency is not reflected in a higher level of productivity. In contrast, the increase in women's participation in the paid workforce *is* included, so that a shift of labour from the household sector to gainful employment will necessarily result in an increase in output, but the level of output per hour will expand or shrink, depending on whether the new wage-earners produce more or less than workers who joined the labour force earlier.

In conventional national accounts, which exclude the household sector, total productivity is a weighted average of men's and women's productivity in paid jobs, with the weightings corresponding to the relative distribution of the two sexes in the labour force. Since in 1960-1980 women who entered the workforce earned less, on average, than men, the increase in the percentage of women entering the labour force caused productivity to seem to be lower than it would have been if the proportion of men and women in the workforce had not changed. Baily (1981), Denison (1974) and Perry (1971) use this approach to explain why the productivity slowdown can be attributed partly to the existence of a larger percentage of women in the labour force.

If the household sector is counted as part of the economy, however, it then becomes possible to measure the increase in efficiency generated by this shift out of the household sector. In this more broadly defined economy, women's changeover from unremunerated to remunerated labour does not constitute

a change in the distribution of the labour force by sex (as would occur if a large number of women immigrated from another country) but instead a change in the sectoral distribution of output. If the output per hour is lower in the household sector than in the wage-earning economy, then the shift away from the home and towards gainful employment will raise total productivity. If we use a model that includes two sectors of this sort, the level of productivity will be determined by the weighted average productivity of the household sector and that of the rest of the economy, with the weightings being based on the percentage of hours worked in each of these sectors. As workers move out of the less productive sector, productivity will rise.

In order to illustrate this point, let us consider an economy in which there are two wage-earners whose average output is equal to three units (see table 1). Let us further suppose that a housewife's marginal product is two units in her paid job and one unit in the home. According to a conventional analysis of GNP, if the housewife changes over to paid work, total output will increase by two units while average output will fall from 3.0 to eight-thirds ($8/3$), as shown below. However, if household output were included in GNP, then total output would still rise (although by only one unit), but average output would also increase (from seven-thirds ($7/3$) to eight-thirds ($8/3$)). Thus, we see that the traditional approach overestimates the net increase in production resulting from the movement of resources out of the household sector and underestimates the effect of this resource shift on productivity.

The shift by women out of the household sector and into gainful employment is analogous to the movement of workers out of the agricultural sector in the United States during the 1950s and early 1960s. Like agriculture, housework is a traditional mode of production. As job opportunities in the modern sector of the economy increase, workers forsake the traditional sector for more productive and economically profitable employment in the modern sector. Like housewives, many of the workers who left the farms were not earning wages. Both the agricultural and the household sectors have been transformed by the combination of productivity differentials (improvements in productivity made possible by technological progress and a fairly constant level of demand for traditional-sector output) and a weakening of barriers to inter-sectoral mobility.

TABLE I

Effect on GNP of women's shift from the household sector to wage labour
(Units)

	GNP	GNP plus household output
Total initial output	6	7
Total output after the shift	8	8
Average initial output	3	$\frac{7}{3}$
Average output after the shift	$\frac{8}{3}$	$\frac{8}{3}$

Studies conducted by Kutscher, Mark and Norsworthy (1977), McCarthy (1978), Nordhaus (1972) and Norsworthy and Fulco (1974) show how the shift away from agriculture was an important source of productivity growth in the post-war period.

III

Methodological considerations relating to the estimation of the household sector's output

In order to estimate the growth rate of productivity accurately, a broad measurement of GNP that includes the household sector must be used. Using such a measurement, the hours worked by women for pay can then be compared with the hours they used to work in the home.

It is only fair to point out that no universally accepted methodology has been found for setting a value on household production, and existing estimates therefore vary widely. There are two basic problems. One is to develop a definition of household production that will distinguish it from recreational activities. Some authors feel that the latter are economic activities, since the time spent on them does have an opportunity cost; others limit household activities to those not involving consumption. The inclusion or exclusion of recreational activities is the main reason for the discrepancies between different

The transfer of workers from low-productivity tasks on the farms to more productive work in other sectors contributed nearly four-tenths of a percentage point to the annual rate of increase in productivity in the private sector of the economy between 1948 and 1965.

The effects on aggregate productivity of women's departure from purely domestic work should be the same as the movement of workers out of the farming sector. However, since agricultural output is included in GNP while the output of housework is not, conventional studies only pick up the positive effects of the move out of agriculture. Women who change over from housework to gainful employment are treated as if they were low-productivity immigrants rather than previously-employed labour. Since the shift away from the household sector has been on a much larger scale than the flow out of the agricultural sector, however—during the period in question only 3.3 million workers left the farms, whereas 20 million housewives transferred into the market sector—the latter's potential contribution to productivity is much greater.

estimates of household activity. In the final analysis, the decision whether or not to include these activities will be determined by the specific purposes of the research being conducted. Thus, such activities should be included in studies having to do with well-being, but they would not be relevant to estimates of household labour that focus on productivity.

The other methodological problem lies in placing a value on household output, since it does not carry a price. Trying to measure it on the basis of the goods produced in the home is very complicated, because this involves assigning values to a wide variety of items. Researchers usually prefer to look at factor costs and thus measure the value of household production based on the inputs used. The most difficult aspect of this approach is the assignment of a value to household labour, since household capital goods can be purchased in the market.

Because housewives are not paid wages and many of them have not participated in the labour market in the recent past, ambiguities arise when an attempt is made to assign a value to their labour. One of the two existing methods for estimating factor costs is based on *market prices* and sets the cost of labour by referring to the cost of acquiring equivalent household services – babysitters, cleaning women, drivers, cooks, etc. – in the market. There are two types of market prices: replacement value, i.e., the cost of hiring someone to do all the work a housewife performs; and the service value, i.e., the cost of obtaining substitutes for each household function.

The other method of estimating factor costs is based on *opportunity cost* and assigns a value to the labour employed in household production by referring to the wage that is forgone in the market. This method assumes that the household is a rational unit which allocates its time in a manner equal to the marginal utility of all uses. Time is thus seen as a basic constraint for the family unit. On balance, the net return on an hour of marginal labour will represent the marginal value of that time.

In this approach, however, housewives' lack of remuneration and of work experience poses a problem. One way of dealing with it is to assume that the value of household labour is equal to the wage that could be earned in the market and, on that basis, to determine an appropriate wage for each housewife. The assumption of rationality implies that the housewife will work in the home without pay so long as the value of this labour for the family unit equals or exceeds her potential market wage. If the value of the work performed in the home is less than the potential market wage, then housewives will turn to paid occupations, whose marginal product is greater.

This line of reasoning, however, overlooks the relationship between factor (and more specifically, labour) mobility and the assignment of value to household labour. In fact, it assumes that there is perfect mobility of household-sector labour. All other things being equal, in the absence of barriers to labour mobility the marginal productivity of household labour will be equal to the housewife's potential market wage. Although a housewife earns no pay for the services she provides, the value of the labour involved in performing housework is equal to her potential wage, since otherwise the housewife would switch over to a sector with higher marginal productivity. The housewife's decision to refrain from

engaging in gainful employment would seem to indicate that she places a marginal value on the time she spends in the home that is at least equal to the wage she forgoes.

If there are barriers to mobility, however, then it is not valid to assume that the wage will be equal to the marginal product of labour. The housewife's decision to remain outside the market will not necessarily mean that she places a marginal value on her time in the home that is at least equal to the wage she forgoes, and it would be reasonable to assume that she may stay in the home even if the value of household labour is lower than this wage. For example, she may remain in the home owing to family or social constraints or because her form of socialization says she should not work outside the home. Under these circumstances the forgone wage may well be greater than the marginal product of her labour. Hence, if the opportunity-cost approach is used, the forgone wage would be an overestimation of the value of household labour.

Thus, unless the presence and magnitude of barriers to mobility are taken into account, opportunity costs will skew estimates of labour and of the value of household production. At the same time, the existence of barriers to mobility will increase the potential contribution to productivity of the shift from one sector to another. In the absence of perfect mobility, it may be assumed that the value of household labour will move closer and closer to the potential wage as barriers to mobility diminish. In other words, in the presence of such barriers, the potential wage will overestimate the value of household labour, and the extent to which it does so will depend on the magnitude of the barriers. If these barriers decrease over time, then the magnitude of the overestimation and the bias distorting the value of household labour will diminish as well. In turn, since the bias introduced in this valuation of labour diminishes as barriers to mobility weaken, the growth rate of household production, as measured across time, will be underestimated.

In point of fact, events seem to indicate that barriers to mobility are indeed diminishing as the years go by. According to a number of studies on prevailing attitudes about female and male roles in the United States, opinions about men's and women's roles in society have changed considerably, especially since 1960. In 1964, for example, only about 50% of the women surveyed believed that a woman who worked outside the home could have a close

relationship with her children. Just six years later, however, the figure had risen to 75%. Even more significantly, more women felt that working outside the home did not interfere with other activities (Smith (ed.), 1979).³

For the purposes of this article, the opportunity-cost approach has been used to determine the value of housework.⁴ However, since basing the calculations on the wages paid in the marketplace overestimates the value of the household sector's output and

skews estimates of productivity growth in situations where labour cannot move freely from one sector to another, this wage will be adjusted.

Once a value has been assigned to labour as a factor of production, the household sector's output can be estimated with the help of a production function. A broad measurement of the economy which includes the household sector can then be obtained. The methodology used to calculate household output is outlined in the annex.

IV

The productivity model

The effect on productivity of the shift of housewives into work outside the home can be measured with the help of the sectoral breakdown of productivity growth devised by Norsworthy and Fulco (1974) to study the effect on productivity of workers' departure from agriculture. Their methodology breaks down the change in output per worker/hour into three separate effects.

The "productivity effect" is the portion of total productivity growth generated by the growth of each sector. The "shift effect" is the portion that derives from the shifting of workers between sectors having different levels of productivity or, in other words, from changes in sector weightings. Finally, there is the "interaction effect", which is usually quite small.

Since the focal point of this article is women's shift out of the home, what is of interest to us here is the magnitude of the "shift effect", i.e., the contribution made by women's shift out of the home to productivity growth in a broadly-defined economy which includes household production.

³ For a description of how barriers to mobility have grown weaker during this period, see Oppenheim, Czajka and Arber (1976).

⁴ This model has been used because its bias is simpler to correct than that due to the market-price method. At all events, given the duality of production and distribution, and assuming that household units base their decisions regarding participation in the labour force on an optimization pattern of the type described by Becker, these two different approaches ought to be essentially consistent. Actually, the largest discrepancies found in the literature regarding the value of domestic production arise out of the use of different assumptions in respect of the inclusion or exclusion of recreational activities, which are not relevant to the present study.

In an economy composed of a household sector and a non-household sector, changes in the economy's average productivity will stem from changes in the weightings of the household and non-household sectors and from changes in productivity within each sector.

In other words, if $P(t)$ is the average productivity of the economy in year t , then:

$$P(t) = P(t)^{nh} W(t)^{nh} + P(t)^h W(t)^h$$

where:

$P(t)^{nh}$ = output per worker/hour in the private sector in year t ;

$P(t)^h$ = output per worker/hour in the household sector in year t ;

$W(t)^{nh}$ = percentage of total hours worked in the private sector in year t ; and

$W(t)^h$ = percentage of total hours worked in the household sector in year t .

A change in productivity can be broken down into three effects:

$$\Delta P(t) = \Delta P(t)^{nh} \cdot W(t-I)^{nh} + \Delta P(t)^h \cdot W(t-I)^h \text{ (productivity effect)}$$

$$+ \Delta W(t)^{nh} \cdot P(t-I)^{nh} + \Delta W(t)^h \cdot P(t-I)^h \text{ (shift effect)}$$

$$+ \Delta W(t)^{nh} \cdot P(t)^{nh} + \Delta W(t)^h \cdot P(t)^h \text{ (interaction effect)}$$

where:

$t-I$ is the value of a variable in the preceding period;

Δ is an operator of first differences, $X = X(t) - X(t-I)$.

Table 2 shows productivity growth rates and their breakdowns. The first row corresponds to the conventional measurement of private-sector productivity growth taken by the Bureau of Labor Statistics of the United States Department of Labor for the periods preceding and following 1973, when the slowdown occurred. These figures indicate the presence of a productivity slowdown from 1960 on, with a decrease in the average growth rate from nearly 3% in 1960-1972 to slightly over 0.7% in 1973-1980.

TABLE 2

United States: Overall productivity growth and the contributions made by the "productivity effect", the "shift effect" and the "interaction effect"
(Average annual rates)

	1960-1980	1960-1972	1973-1980
Productivity growth, excluding household sector (conventional GNP)	2.036	2.917	0.716
Productivity growth, including household sector	2.246	2.865	1.319
Productivity effect	2.059	2.774	0.986
Shift effect	0.186	0.089	0.330
Interaction effect	0.002	0.002	0.002

The second row gives the growth rates of productivity when the household sector is counted as part of the economy. These rates also indicate the presence of a slowdown, but the decline is less pronounced. For example, in the period 1973-1980,

average productivity growth was equivalent to 46% of what it had been during the preceding period if the household sector is included but was equal to only 24% if that sector is not included. Considered from another angle, the productivity slowdown in the private sector amounted to 2.2% according to the conventional measurements but only 1.5% when the household sector is taken into account.

The third and fourth rows give the breakdown for productivity growth. The "productivity effect" may be interpreted as the growth of total productivity that would have occurred if there had been no movement of women from the household sector to the market. The reader will note that this hypothetical productivity growth rate is slightly lower than the rate obtained using the conventional measurement for the period 1960-1972, indicating that the private sector's productivity growth rate decreased at a slower rate than the domestic sector's.

Contrary to the conventional belief that women's entry into the formal labour force has lowered productivity, the "shift effect" is both positive and strong. During the period 1960-1980, the shift effect's contribution to the growth rate of productivity was around one-fifth of a percentage point per year. Even more significantly, it began to increase as from 1972. Moreover, the annual data show that as the percentage of hours devoted to household production decreased, the shift effect's contribution to productivity increased. At the same time, the growth rate for private-sector productivity fell sharply. Thus, we see that when we use a broad measurement of productivity, the slowdown in its growth is reduced by nearly one half.

V

Conclusion

If women's changeover from unpaid household labour to gainful employment is interpreted as a shift in the sectoral composition of the product rather than as a change in the composition of the workforce, then women's growing participation in the labour force can be said to have increased the efficiency of the economy. The magnitude of this effect has grown since 1972 as the relative size of the household sector has diminished.

It has been demonstrated here that a productivity model which excludes the household economy does not pick up the real effect on output per hour of the shift from the household sector to the market. When the household sector is included, although a decrease in the productivity growth rate is still seen between 1960-1972 and 1973-1980, the annual decline averages only 1.5%, as compared to 2.2% when the conventional GNP is used.

ANNEX

Methodology used to calculate household production⁵

In measuring total production, only the household and non-household sectors need be considered –the non-household sector corresponds to the private sector of the economy, for which conventional estimates are available– since most studies on productivity omit the government sector. The production and hours worked in a broadly-defined economy that includes the household sector are simply the sum of the production and hours worked in the non-household and household sectors.

In order to estimate household production, a Cobb-Douglas production function was used in which:

$$Q = (wL)^{\alpha} \cdot (rK)^{1-\alpha}$$

where:

Q = household production

w = wage

L = hours worked

r = the price of capital

K = the stock of capital

α = the share of labour in the economy

$1-\alpha$ = the share of capital in the economy.

The number of hours worked in the household sector were calculated annually for the period 1960-1980. Since this article focuses on changes in the output per hour by housewives who made the switch to gainful employment, the analysis is confined to activities involving a 40-hour work week, which is the standard work week in a market economy and constitutes the "economic activity" used in the conventional GNP and in productivity statistics. This approach deliberately underestimates the level of household production, but it enables us to examine changes in output per hour resulting from increased participation by housewives in gainful employment.⁶

It is assumed that full-time housewives (adult women who do not participate in the labour force) and "unemployed" adult women work 40 hours per week in the household sector. It is further assumed that adult women who work part-time in the market devote 20 hours per week to housework. Adolescents, men and single (never-married) women were excluded from the analysis because they did not constitute a significant factor in terms of the shift in question.⁷ Thus, the total number of hours worked in the household sector in one year is equal to 2 000 hours multiplied by the number of full-time housewives (in accordance with the above definition) plus 1000 hours multiplied by the number of part-time housewives.

Using the opportunity-cost approach, it would have been a very laborious task to attempt to estimate the potential market wage of each housewife. Instead, the housewife population was divided into 12 categories according to the main determinants of women's participation in the workforce: race, marital status and presence and age of children. The number of hours worked in the household sector was then calculated for each of these categories.

The ages and educational levels of women wage-earners were analysed, since these features largely determine their wage levels, and 30 different age/education combinations were defined. The average hourly wages for each of these 30 combinations were obtained from the *Current Population Survey* prepared by the United States Department of Commerce.

The percentage distribution of each of these 30 age/education combinations was then calculated for the 12 categories based on race, marital status and presence and age of children; this permitted the demographic characteristics to be collated with the wage determinants so that the opportunity cost could then be computed. This operation yielded a set of wage levels and weights that could be used to

⁵ See Bustillo (1985) for a complete description of the methodology and data used.

⁶ One justification for standardizing the work week at 40 hours is that official employment statistics are based on the assumption that agricultural labourers who work their own farms do so for 40 hours per week (unless they indicate that they work less than full time). This same is true of wage-earners who work more than 40 hours.

⁷ Consideration was given to the possibility of including single (never-married) women with children in the category of housewives, but the data on this group are either unreliable or non-existent. Apparently, many of these women also report their marital status as that of separated or divorced; in any event, the number of women in this category was fairly small during the period under study.

estimate potential wages. These wages were then multiplied by the number of hours worked in the home for each of the 12 categories. The resulting series of weighted wages represent a measurement of the value of the labour employed in the household sector.

In dealing with barriers to mobility, the researchers experimented with a series of assumptions which yielded four different estimates of the value of labour. The ratio of female to male participants in the labour force was used as a substitute for barriers to mobility, with annual adjustments of the wage level assigned to each category being made using an adjustment factor calculated on the basis of this ratio. This had the effect of reducing the value of the labour employed in the home in all the years covered by the study, but the reduction was proportionally greater in the earlier years. As women's participation in the labour force increased during the 1960s, the adjustment factor decreased to almost nothing. (It was assumed that the female labour-market participation rate would never equal the male participation rate even under an assumption of perfect mobility). Hence, the adjustment for barriers to mobility underestimates the shift in the value of the labour factor as compared to unadjusted series. In all cases the real minimum wage was used as a floor for assigned wage levels.

A sensitivity analysis of the four different series obtained using the different assumptions concerning barriers to mobility demonstrated the soundness of the results, regardless of which measurement was used. This was because the average remuneration of women wage-earners was not much higher than the minimum wage, which was used as the floor level in all cases. Only one of these results is presented here.

The flow of household capital services is a combination of the cost of the capital stock and the imputed depreciation value. The stock of household capital was assumed to be composed of the net stock of household appliances and equipment plus a portion of the net stock of motor vehicles. Annual data on this stock and estimates of depreciation were obtained from the United States Department of Commerce.

To calculate the coefficients of the Cobb-Douglas production function, the corresponding shares of labour and capital in the income of the economy were used. The share of labour amounted to 0.73, while that of capital was 0.27.

Finally, data on annual production and hours worked in the private sector between 1960 and 1980 were obtained from the Bureau of Labor Statistics of the United States Department of Labor.

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