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WOMEN'S CHANGING PARTICIPATION IN THE LABOR FORCE: A WORLD PERSPECTIVE

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Abstract

Women's Changing Participation in the Labor Force:

A World Perspective

This paper describes the contemporary composition of the labor force during economic development, for men and women, by firm or family, employment, and by industry. The increasing fraction of all men and all women employed by firms is decomposed into that related to the changing sectoral mix of employment across national economies, and that related to changes in the proportion of employment by firms within sectors. Regressions are reported to describe how each of these sources of employment change are associated with income per adult across countries at different levels of development, and within countries over time. Women have increased their share in the labor force in all regions except for South and West Asia and Africa. They have made slower progress from family to firm employment in Latin America than observed in other regions. Women's differential progress in assuming a more equal role with men in the labor force, and particularly their employment outside of the family warrants more detailed analysis by economists.

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Women's Changing Participation in the Labor Force: A World Perspective*

Women's economic activities are hard to compare precisely across countries and sometimes difficult even to compare within countries over time. Cultural variation in interpreting what is productive work compounded by differences in the statistical definition of who is in the labor force are responsible for much ambiguity in measurements of women's productive roles that straddle home and market economic activities. It is widely recognized that women's activities are changing rapidly in high income, technologically advanced, countries.[1] The diversity is even greater across low income countries in what women do, but there is little consensus on how these roles are changing today. This paper assesses patterns in women's labor force participation and the composition of this participation among wage earners, self-employed, and unpaid family workers.

The shift of the locus of employment in contemporary societies from family to firm is attributed to technological economies of scale in production and finance, and the capacity of firms to minimize transaction costs, particularly in such major sectors as manufacturing, construction, commerce and services.[2] For women, it is also hypothesized that obtaining a job for wages outside of the family contributes to women's control over the returns to their labor and hence augments their relative power in the allocation of household economic resources.[3] This economic status of women relative to men may in turn be associated with specific consumption patterns, investments in the health and education of children, and declines in fertility.

Despite the limitations of international census and survey data, about sixty countries report labor force data by sex, for at least two points in time, disaggregated by wage/self-employed/unpaid family workers, and by sector of economic activity. These data are the focus of this paper, though they clearly are <u>not</u> a representative sample of the world's population. The sectoral composition of employment, as well as the mix of firm and family based jobs, changes systematically with development.[4/] This paper considers whether recent trends in women's labor force participation and the type of jobs held are explained by the intersectoral shifts in the distribution of employment or by trends within these sectors.

The association between the distribution of employment by industry and job type and the rate of participation in the market labor force by women probably embodies relationships operating in both directions. Changes in the final demands for goods and services, due to increases in per capita income for example, may alter the mix of employment by industry with consequences on the fraction of jobs that women are likely to hold. Conversely, an increase in the rate of participation by women will depress wages in those industries that are peculiarly intensive users of female labor, lowering unit costs and encouraging expansion of output and of female employment in these sectors. No attempt is made here to identify statistically and separate the consequences of a shift in the demand or the supply schedule by specifying the variables that operate only on the supply of women wanting work, or only on the demand for goods produced predominantly by women. The decompositions of labor force outcomes by industrial sector can be strictly interpreted, only if it is assumed that changes in demand occurring with economic growth are responsible for part of the variation in women's labor force participation patterns but that the causal effect in the opposite direction is relatively minor.

I. Basic Data and Methods

Labor Force Concepts and Job Type

Population censuses and household surveys frequently tabulate persons in the labor force by sex and by industry, as well as by "type of employment." This classification of job type refers to (1) wage and salary workers, (2) employers, self-employed or own account workers, (3) unpaid family workers, and (4) others. The category "others" often includes unemployed and "not specified elsewhere" as well as a heterogeneous mixture of groups that differ from country to country, such as in some cases the armed forces. This "other" category is rarely more than ten percent of the labor force, and because it cannot generally be allocated by industry, it is excluded here.

The fraction of a specific job type in "total" employment is thus defined as one job type over the sum of the first three job types, for example, the fraction of wage earners ($W_1 = (1)/(1 + 2 + 3)$) approximates the importance of firm as opposed to family based employment. Persons holding more than one type of job are allocated to their primary job, but in the case of agriculture those who cultivate their own, rented, or share-cropped land are categorized as self-employed, though they may also work for wages, possibly outside of the agricultural sector. Because individuals cannot allocate their time proportionally across types of jobs or across sectors, these traditional tabulations of labor force by primary attachment are potentially misleading.

There does not appear to be a commonly accepted definition of a worker. Consequently, from country to country the definition of "participating in gainful activity" varies, and has an effect on "measured" participation rates, particularly for women. Even within a country over time, definitions may be modified with serious consequences for the number of persons enumerated in

unpaid family work.[5] The need to adjust labor force statistics across countries and over time to reflect a common concept of gainful activity is widely recognized. This difficult task is not attempted here. Because of this measurement problem, separate analyses of the data for men and women are reported, and since the definition of male and female wage earners is subject to less ambiguity than other job types, comparisons of male and female wage earners across populations are also undertaken. Because more than 95 percent of men age 25 to 55 tend to be counted as being in the labor force in censuses and surveys, variation in the concept of labor force activity is relatively minor for measuring male participation in these ages. But even for men when participation is averaged for all persons over age 15, the extent of schooling and differences in age composition can affect substantially aggregate participation, in a manner that has not yet been sufficiently studied by economists.

The distinction is also drawn between the "informal" and "formal" sector, but this means many things to different analysts and no satisfactory scheme of measurement has been proposed.[6] Some workers in small unregulated firms using traditional production technologies, and not benefiting from a formal contract, are said to belong to the "informal" sector, but they are classified here simply as wage earners, for lack of information on firm size, production technology, or type of labor contract. Most family and self-employed workers are plausibly assigned to the "informal" sector. The firm-family job type distinction analyzed here may therefore approximate the formal-informal sector dichotomy. The match, however, is anything but exact.

Descriptive Statistics of Labor Force by Sector

Tabulations of the labor force by job type, sex, and eight industrial sectors at two points in time were obtained for 75 countries, but only 61 are analyzed here that also have constant local price series on GNP.[7] These are listed in Appendix Table A-1. Table 1 reports for males the sample labor force weighted means and standard deviation of the sector's share of total employment (left panel) and the fraction of wage earners in a sector's employment (right panel). The weighted averages are also disaggregated by five regions of the world. It should be noted that subSaharan Africa is represented by only one country, Cameroon, and therefore the African region is labeled "North Africa" as a reminder that the sample does not represent the entire continent. The initial and final year available for each country differ (Table A-1), but tend to span ten to thirty years from 1950 to 1982. Most of the male labor force is employed in four sectors, as seen from the left side of Table 1, namely, agriculture, manufacturing, commerce and services. As the fraction of male employment in agriculture drops from 62 to 14 percent between low and high income countries (Cols. 2 and 3), the fraction in manufacturing increases from 11 to 29, commerce from 7 to 16, and services from 12 to 20 percent. Table 2 provides the same data for women. A similar decline in agriculture, but a smaller rise in manufacturing and a larger gain in commerce and services across development groups is noted for women than for men. Fifty-four percent of employed men and 58 percent of the employed women are classified as wage or salary earners (right side of Tables 1 and 2). Contrasting the low and high income countries, agriculture has consistently the lowest fraction of wage earners, 25 to 29 percent for males and 30 to 14 percent for females, while the small sectors of mining and utilities contain primarily male wage earners, 88 to 97 and 94 to 99 percent, respectively, in low and high income countries.

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Table 1

Distribution of Male Workers and Male Wage Earners by Sector and Region[a]

Sector of Employment:	Fraction of Male Workers Employed in Sector							Fraction of Male Workers Who Are Wage Earners						
	World	High[b] Income	Low[b] Income	Latin America	North Africa	East Asia	South & West Asia	World	High[b] Income	Low[b] Income	Latin America	North Africa	East Asia	South & West Asia
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Agriculture	.445	.138	.623	.477	.547	.627	.668	.255	.289	.250	.367	.377	.161	.242
	(.265)	(.112)	(.133)	(.127)	(.107)	(.147)	(.095)	(.117)	(.144)	(.111)	(.124)	(.172)	(.080)	(.081)
Mining	.011	.019	.006	.016	.008	.004	.006	.941	.972	.882	.941	.969	.835	.857
	(.011)	(.013)	(.006)	(.013)	(.010)	(.003)	(.002)	(.075)	(.036)	(.092)	(.063)	(.050)	(.170)	(.058)
Manufacturing	.174	.286	.109	.164	.105	.082	.101	.808	.928	.623	.825	.785	.702	.501
	(.098)	(.058)	(.042)	(.036)	(.029)	(.059)	(.019)	(.193)	(.059)	(.180)	(.082)	(.116)	(.135)	(.109)
Utilities	.008	.016	.004	.007	.006	.002	.004	.974	.991	.935	.943	.984	.962	.922
	(.007)	(.005)	(.003)	(.007)	(.004)	(.003)	(.002)	(.043)	(.012)	(.058)	(.049)	(.033)	(.055)	(.058)
Construction	.061	.110	.033	.068	.053	.031	.023	.805	.837	.742	.774	.839	.826	.666
	(.047)	(.023)	(.032)	(.028)	(.047)	(.021)	(.026)	(.116)	(.062)	(.160)	(.093)	(.097)	(.123)	(.189)
Commerce	.103	.155	.073	.091	.082	.092	.061	.543	.735	.305	.483	.343	.234	.256
	(.051)	(.041)	(.027)	(.026)	(.014)	(.035)	(.017)	(.254)	(.139)	(.135)	(.089)	(.071)	(.134)	(.077)
Transportation	.051	.078	.035	.050	.044	.038	.029	.831	.925	.708	.718	.818	.704	.692
	(.026)	(.012)	(.016)	(.015)	(.015)	(.020)	(.011)	(.131)	(.048)	(.100)	(.091)	(.052)	(.119)	(.091)
Services	.149	.201	.118	.137	.155	.123	.109	.816	.872	.759	.758	.902	.855	.714
	(.063)	(.061)	(.040)	(.058)	(.026)	(.031)	(.032)	(.107)	(.031)	(.123)	(.115)	(.046)	(.053)	(.119)
NonAgriculture	.555	.862	.377	.523	.453	.373	.332	.767	.870	.630	.734	.760	.651	.564
	(.265)	(.112)	(.133)	(.127)	(.107)	(.147)	(.095)	(.146)	(.054)	(.114)	(.044)	(.056)	(.083)	(.099)
Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.539	.790	.393	.559	.551	.344	.349
								(.228)	(.113)	(.130)	(.101)	(.150)	(.118)	(.084)
Participation rate[c]	.823	.754	.877	.834	.786	.831	.919							
	(.105)	(.080)	(.090)	(.091)	(.148)	(.067)	(.062)							
Number of Countries	61	22	39	17	6	6	10	61	22	39	17	6	6	10
Employment Weight (in percent)	100	37	36	11	3	11	39	100	37	36	11	3	11	39

[a] Country means are weighted by male employment in sector or economy, and weighted standard deviation is reported in parentheses beneath mean.
[b] High income countries are synonymous with the "West" category in Table A-1 and includes Japan, Western Europe, Canada, USA, Australia and New Zealand, and low income countries include the remainder. See Table A-1 for a list including the regional breakdown of the "low income" countries.
[c] Male labor force participants to males age 15 or more.

Table 2

Distribution of Female Workers and Female Wage Earners by Sector and Region[a]

Sector of Employment:	Fraction of Female Workers Employed in Sector							Fraction of Female Workers Who Are Wage Earners						
	World	High[b] Income	Low[b] Income	Latin America	North Africa	East Asia	South & West Asia	World	High[b] Income	Low[b] Income	Latin America	North Africa	East Asia	South & West Asia
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Agriculture	.404	.121	.663	.205	.673	.609	.821	.275	.138	.297	.297	.075	.195	.344
	(.345)	(.149)	(.258)	(.158)	(.313)	(.166)	(.113)	(.211)	(.174)	(.207)	(.237)	(.167)	(.149)	(.207)
Mining	.003	.003	.002	.004	.001	.001	.003	.875	.966	.758	.831	.925	.535	.773
	(.003)	(.004)	(.002)	(.003)	(.003)	(.000)	(.001)	(.139)	(.023)	(.137)	(.164)	(.145)	(.222)	(.047)
Manufacturing	.158	.219	.103	.177	.076	.109	.080	.771	.925	.471	.723	.486	.532	.268
	(.088)	(.056)	(.075)	(.065)	(.112)	(.076)	(.059)	(.276)	(.077)	(.276)	(.200)	(.285)	(.240)	(.170)
Utilities	.003	.004	.001	.003	.002	.000	.002	.914	.995	.696	.946	.971	.918	.587
	(.002)	(.002)	(.002)	(.003)	(.003)	(.001)	(.001)	(.171)	(.005)	(.207)	(.062)	(.133)	(.159)	(.134)
Construction	.008	.013	.004	.005	.003	.003	.004	.808	.838	.716	.900	.883	.877	.595
	(.007)	(.008)	(.003)	(.003)	(.005)	(.003)	(.003)	(.133)	(.095)	(.179)	(.092)	(.162)	(.078)	(.117)
Commerce	.143	.218	.074	.128	.038	.158	.016	.627	.775	.231	.501	.342	.129	.155
	(.095)	(.043)	(.077)	(.062)	(.021)	(.054)	(.013)	(.307)	(.175)	(.223)	(.206)	(.243)	(.116)	(.183)
Transportation	.016	.029	.004	.011	.007	.003	.003	.952	.968	.850	.943	.963	.881)	(.715)
	(.014)	(.008)	(.006)	(.004)	(.010)	(.006)	(.003)	(.074)	(.026)	(.153)	(.074)	(.037)	(.136)	(.136)
Services	.265	.393	.148	.469	.200	.116	.072	.883	.927	.773	.824	.965	.811	.624
	(.190)	(.123)	(.162)	(.142)	(.222)	(.069)	(.059)	(.127)	(.056)	(.174)	(.084)	(.040)	(.098)	(.249)
NonAgriculture	.596	.879	.337	.795	.327	.391	.179	.793	.889	.561	.752	.780	.458	.427
	(.345)	(.149)	(.258)	(.158)	(.313)	(.166)	(.113)	(.207)	(.088)	(.223)	(.109)	(.198)	(.169)	(.208)
Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.583	.799	.385	.658	.306	.298	.359
								(.288)	(.186)	(.213)	(.167)	(.342)	(.142)	(.188)
Participation rate[c]	.349	.377	.326	.247	.124	.452	.328							
	(.135)	(.089)	(.158)	(.083)	(.143)	(.146)	(.145)							
Number of Countries	61	22	39	17	6	6	10	61	22	39	17	6	6	10
Employment Weight (in percent)	100	48	52	08	01	15	28	100	48	52	08	01	15	28

[a] Country means are weighted by female employment in sector or economy, and weighted standard deviation is reported in parentheses beneath mean.
[b] High income countries are synonymous with the "West" category in Table A-1 and includes Japan, Western Europe, Canada, USA, Australia and New Zealand, and low income countries include the remainder. See Table A-1 for a list including the regional breakdown of the "low income" countries.
[c] Female labor force participants for female age 15 or more.

The sectors that evidence the largest changes in the fraction of wage earners with development are commerce, that more than doubles from 23 or 31 percent for women and men in low income countries to 74 or 78 percent in high income countries, and manufacturing where the analogous increase is from 47 or 62, to 93 percent for both sexes. Intermediate increases are seen for construction, transportation, and services, from about 70 to 90 percent wage earners.

With the exception of agriculture, the shift from family to firm employment is evident for both men and women. To determine whether men or women are disproportionately entering (or exiting) the labor force and then making this transition from family to firm employment, Table 3 summarizes by region the figures for this same sample of countries. First the population weighted averages are reported and then the annual rates of change. Several patterns are notable. In the full labor force, women constitute about a third of the workers, but the fraction is declining by .67 percent per year in the low income countries, while increasing by .22 percent per year in the high income countries. Given the preponderance of populations in the South and West Asian countries in particular, the share of female workers in my entire sample (i.e. the world) is declining. It may be observed, however, that this fraction is nonetheless increasing in Latin America and East Asia at a substantial rate. Regional differences in the direction of change in women's labor force roles are evidently pronounced. It is not surprising, therefore, that there is no consensus on trends associated with development in women's labor force participation.

This decline can be traced in Table 3 more specifically to the decline in self-employed women in South and West Asia (-1.86 percent per year) and a much more gradual decline in North Africa, plus a smaller reduction in women as a fraction of family unpaid workers in North Africa. Although this decline in

Table 3
The Proportion of the Labor Force and Type of Employment that is Female and Annual Rates of Change, by Region

	Women as a Fraction of Job Category							
	Labor Force		Wage Earners		Unpaid Family Workers		Self Employed	
	Mean	Rate of Change	Mean	Rate of Change	Mean	Rate of Change	Mean	Rate of Change
World	.31	-.31	.32	.13	.57	.09	.21	-1.02
High Income	.36	.22	.36	.35	.68	.03	.19	.18
Low Income	.27	-.67	.26	-.20	.53	.13	.22	-1.28
Latin America	.24	.30	.27	.29	.31	.26	.16	.26
North Africa	.14	-.13	.09	.09	.31	-.22	.17	-.34
East Asia	.37	.29	.34	.21	.60	.22	.24	.42
South and West Asia	.25	-1.21	.26	-.52	.51	-.02	.22	-1.86

Sources: See sample composition Table A-1 and special adjustments and data sources in Data Appendix.

the fraction of women in family employment is large in the population weighted sample, it may be partly a result of spurious changes in the definition of the labor force between the Indian censuses of 1961 and 1971. However, similar declines are evident in Pakistan from 1961 to 1971, and in Bangladesh from 1961 to 1974, except in wage employment. It has also been argued that the 1961 Indian and Pakistan Censuses modified traditional labor force definitions with a resulting upward shift in the reported level of economic activity for both women and men, compared with either 1951 or 1971.[8/] This pattern of decreasing labor force activity rates by women in South and West Asia, that is apparent at least through the early 1970s, has not been extensively analyzed. It may be due to the sluggish overall growth of the region except for oil, or to the lower levels of school enrollment among women than men that placed women in the region at a disadvantage relative to men in market employment.

Disaggregating by sector the female fraction of the labor force and the female fraction of wage earners in Table 4 provides further evidence of the contrary trends in women's participation by region. Even among wage earners, the fraction of women in manufacturing is low in North Africa and both portions of Asia, for in these regions women in manufacturing are mostly self-employed or family unpaid workers, presumably in home-based craft production. In commerce (i.e. wholesale and retail trade) women are a smaller fraction of wage earners in Asia than they are of the total labor force, because (particularly in East Asia) women are frequently traders and shopkeepers. Women constitute two-thirds of the family workers and a half of the self-employed working in commerce in Asia. The roles of women in agriculture are heterogeneous across regions of the world and agriculture is the dominant sector in the largest and poorest nations.[9/] Women represent a third of the total agricultural labor force in high income countries and a somewhat smaller fraction in low income

Table 4

The Fraction of Women in the Labor Force and Among Wage Earners, by Sector and Region[a]

Sector of Employment:	Fraction of Females in Labor Force							Fraction of Females Among Wage Earners						
	World	High[b] Income	Low[b] Income	Latin America	North Africa	East Asia	South & West Asia	World	High[b] Income	Low[b] Income	Latin America	North Africa	East Asia	South & West Asia
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Agriculture	.290	.327	.284	.118	.171	.362	.295	.301	.189	.315	.098	.040	.406	.365
	(.132)	(.162)	(.126)	(.091)	(.187)	(.094)	(.103)	(.138)	(.112)	(.134)	(.056)	(.031)	(.088)	(.069)
Mining	.088	.076	.111	.076	.024	.102	.136	.082	.075	.097	.068	.023	.068	.124
	(.061)	(.053)	(.068)	(.072)	(.013)	(.060)	(.056)	(.057)	(.053)	(.060)	(.051)	(.014)	(.047)	(.054)
Manufacturing	.283	.298	.258	.251	.109	.439	.208	.273	.297	.207	.227	.071	.372	.124
	(.081)	(.041)	(.117)	(.057)	(.124)	(.070)	(.079)	(.076)	(.037)	(.109)	(.051)	(.057)	(.055)	(.051)
Utilities	.126	.131	.115	.116	.047	.085	.129	.119	.131	.088	.116	.046	.081	.086
	(.062)	(.038)	(.096)	(.058)	(.027)	(.027)	(.111)	(.052)	(.038)	(.067)	(.061)	(.027)	(.027)	(.074)
Construction	.056	.062	.042	.023	.010	.051	.063	.056	.062	.040	.026	.011	.054	.055
	(.039)	(.036)	(.041)	(.017)	(.006)	(.039)	(.048)	(.039)	(.035)	(.041)	(.017)	(.007)	(.045)	(.051)
Commerce	.379	.438	.279	.304	.072	.0500	.082	.408	.451	.221	.311	.072	.355	.049
	(.154)	(.068)	(.201)	(.124)	(.060)	(.082)	(.057)	(.128)	(.072)	(.152)	((.072)	(.021)	(.083)	(.063)
Transportation	.123	.172	.043	.064	.026	.048	.031	.137	.179	.051	.084	.030	.059	.032
	(.081)	(.061)	(.031)	(.021)	(.012)	(.046)	(.019)	(.082)	(.061)	(.041)	(.032)	(.013)	(.057)	(.025)
Services	.439	.520	.318	.515	.178	.355	.182	.456	.535	.318	.536	.187	.343	.159
	(.149)	(.061)	(.159)	(.049)	(.044)	(.098)	(.058)	(.159)	(.067)	(.178)	(.062)	(.048)	(.108)	(.065)
Nonagriculture	.319	.361	.249	.320	.108	.380	.154	.324	.366	.225	.326	.111	.301	.118
	(.098)	(.056)	(.113)	(.046)	(.035)	(.055)	(.050)	(.101)	(.059)	(.109)	(.043)	(.021)	(.060)	(.042)
Total	.306	.356	.271	.237	.144	.368	.254	.319	.359	.264	.268	.085	.336	.255
	(.093)	(.061)	(.095)	(.061)	(.131)	(.062)	(.0809)	(.081)	(.062)	(.071)	(.049)	(.024)	(.037)	(.056)
Number of Countries	61	22	39	17	6	6	10	61	22	39	17	6	6	10
Employment Weight (in percent)	100	48	52	08	01	15	28	100	48	52	08	01	15	28

[a] Country means are weighted by female employment in sector or economy, and weighted standard deviation is reported in parentheses beneath mean.
[b] High income countries are synonymous with the "West" category in Table A-1 and includes Japan, Western Europe, Canada, USA, Australia and New Zealand, and low income countries include the remainder. See Table A-1 for a list including the regional breakdown of the "low income" countries.

regions. But among wage earners in agriculture, women are a larger share in the less developed countries than in the high income countries. In the delivery of services, women are a majority of the work force in developed countries but only a third in the low income countries. In Latin America women are also a majority of service workers, whereas that proportion is much lower in North Africa and South and West Asia. The shift in the composition of production and employment out of agriculture and into manufacturing and services is thus associated with opportunities for women's employment to expand relative to men's, particularly as wage earners.

Decomposition of Changes in Labor Force Status

Two indicators of women's position in the labor force emerge from these tabulations: (1) the fraction of a certain type (i) of job occupied by women, T_i, which is a measure of women's employment status relative to men, and (2) the fraction of women workers who have a specific type of job, W_i, or the relative composition of women's jobs. To relate changes in these aggregate indicators of the labor market to changes in the sectoral composition of employment that parallel the development process a simple decomposition is exploited. For example, the national fraction of women workers who are in the first category of jobs, i.e. wage earners, $W_{1.}$, is defined as the sum of worker-weighted sector-specific (j) proportion of women workers who are wage earners:

$$W_{1.} = \sum_j W_{1j} n_j ,$$

and change in this national employment indicator can be decomposed into three parts, according to the sectoral disaggregation:

$$\Delta W_{1.} = \sum_j n_j \Delta W_{1j} + \sum_j W_{1j} \Delta n_j + \sum_j \Delta n_j \Delta W_{1j} \qquad (1)$$

where W_{1j} is the fraction of women in sector j who are wage earners, n_j is the proportion of women workers in sector j, and Δ denotes change over a specified period. The first component of (1) is the intrasectoral change in the share of wage earners, assuming the initial relative employment distribution of women among sectors, n_j, does not change. The second component is the intersectoral change due to shifts in the relative distribution of women's employment among sectors, assuming no change in within sector fractions of wage earners. The third or residual interaction term captures the covariation in the relative size of sectors and change in their fractions of wage earners.

This form of decomposition is useful if the three identified sources of change have meaning in terms of the origin of the change or its economic and social consequences. In the case at hand, the standard definition of industrial sectors relates to different kinds of outputs, and development entails a shift in output and employment from agriculture to industry (manufacturing/mining/utilities/construction/transportation) and to services (commerce, business, governmental and personal services).[10/] A major source of structural change caused by economic development arises from this form of intersectoral shift of production activity and employment, and is linked to the second component in the above decomposition. Sectoral shifts in output can be driven by sectoral differences in either factor productivities (technology), which affect the relative price of sectoral output (Gershenkron effects), or income elasticities of consumer demand (tastes) for the output of various sectors, which change the mix of final goods domestically demanded (Engel effects). Income effects on the composition of demand are moderated and factor

productivity effects on the composition of output are augmented if the domestic economy is open to international trade and a sector's output (and input) is tradeable and specialization thereby encouraged. This is a reflection of the assumption that a small country is a price taker in the open world economy, because world demands are more price elastic than protected national demands. In an open economy, therefore, development influences the composition of national output primarily through its effect on factor productivity across sectors.

Intrasectoral change in the mix of wage and family employment, or the first component in the decomposition, depends on change in organization and technology that makes it more or less efficient for firms to produce a given output than for families or self-employed individuals. At the high level of aggregation considered here (2 digit industries), firms and families in the same sector may well produce quite different commodities. Shifts in the composition of output within a sector that are not observed in my data could thus explain an increase in W_{1j}, just as intersectoral shifts in proportions of employment at the national level can explain the increase in $W_{1.}$. Technical change may contribute to an increase in the optimal (unit-cost minimizing) scale of production. Available data, however, distinguish only the threshold between a family-sized enterprise and a small-firm, not employment by various size classes of firms. The exception to such scale economies appears to be agriculture, where modernization in high income countries leads to a consolidation of land and increasing capital intensity, without requiring the replacement of the nuclear family as the labor/management unit. In most other sectors it is anticipated that development leads to increasing reliance on units of production that are of larger scale than the family. How much larger is not a question that these data can address.

Estimating Determinants of Component Changes

The above outlined decomposition of changes in indicators of labor force status provides information on whether intersectoral shifts in jobs or intrasectoral changes in job types are responsible for current movements in the labor market position of women. A second phase of the analysis is to account for these inter (Δn_j) and intra (ΔW_{1j}) sectoral changes in the labor market. Initially only income per adult, an approximation of economic development, is treated as the determinant of these sector and job composition changes. The data are again national and represent a panel of cross sections. The same relationship can be estimated from between country variation (i.e. the cross section) or from the within country variation (i.e., time series).[11]

$$W_{1kt} = \alpha_o + \alpha_1 \ell n\ Y_{kt} + \mu_k + e_{kt} \qquad (2)$$

where $\ell n\ Y_{kt}$ is the natural logarithm of real GNP in the kth country at time t per potential worker age 15 to 64[12], μ_k is a country specific fixed-effect embodying omitted time invariant explanatory factors, and e_{kt} an error that is serially uncorrelated.

Changes over time within countries are analyzed in the same framework by first differencing within countries:

$$\Delta W_{1kt} = (W_{1kt} - W_{1kt-n})/n = \alpha_1(\ell n\ Y_{kt} - \ell n Y_{kt-n})/n + (e_{kt}-e_{kt-n})/n \qquad (3)$$

where n is the longest postwar interval for which the required data is available for each country.[13] The same methods are used to analyze cross sectional and time series variation in n_j to account for intersectoral changes

in the relative distribution of employment that is associated with growth in income. More suitable nonlinear models for these dependent variables, W_{1j} and n_j, that are limited to the unit interval, such as the logistic and the fixed effect logit specification for within country estimates, did not change qualitatively any of the conclusions reported later, and they do not conform to the linear decomposition of changes outlined earlier.[14]/

Kuznets, among others, compared differences in economic structure <u>across</u> countries at different stages of economic development with the analogous differences that occur <u>within</u> countries as they develop.[15]/ The analysis outlined here is therefore undertaken for the same reason. Within country comparisons are for many purposes better designed, because they implicitly hold constant for any time-invariant country-specific omitted variables (μ_k). On the other hand, they tend to be less precise, because only short intervals in the development process are observed and short run fluctuations, disequilibria, and errors in measurement are thus more likely to mask long run equilibrium tendencies.

II. Evidence of Changes in Labor Force Status

Wage earners as a proportion of all male employed workers increased in this population weighted sample by .69 percent per year. The fraction of wage earners among female workers increased twice as rapidly, by 1.51 percent per year. Although the fraction of wage earners increased on average, it fell in a number of countries, many of which are in Latin America. Countries that experienced no growth in the fraction of wage earners tended to grow slowly (Cf. Table A-1). The exceptions are frequently countries with effective minimum wage legislation. The redeployment of workers from families to firms thus appears to be associated with the success of the economy to grow and the

lack of minimum wage legislation that increases differentially the cost of labor to firms.

Sectoral decompositions of the change in the share of wage earners for men and women are reported in Tables 5 and 6, first on the basis of a two-way partition of the labor force into agricultural and nonagricultural workers, and then according to an eight-way partition that subdivides nonagriculture into mining, manufacturing, utilities, construction, commerce (wholesale and retail trade), transportation, and services. Because the fraction of wage earners is generally lower in agriculture than elsewhere in the economy, and the nonagricultural share of employment increases with development, this intersectoral shift of employment helps to explain about a third of the entire sample's growth in the male fraction of wage earners in the labor force as reported in the first row of Table 5. Among female workers the intersectoral shift of employment out of agriculture accounts in Table 6 for only a sixth of the more rapid advance of females into wage employment. The residual interaction is relatively unimportant in the world total decompositions, accounting for two percent.

When nonagricultural employment is divided into seven subsectors (lower panel), the sources of the change in the male or female fraction of wage earners do not change appreciably. The agricultural-nonagricultural distinction is apparently of paramount importance for intersectoral shifts. Intrasectoral increases in the wage earner fractions (within sectors) is the dominant explanation for the change in the employment mix between family and firm, particularly for women.

Tables 5 and 6 also report these decompositions within regions (see again Appendix Table A-1 for regional groupings). East Asia evidences the most rapid growth in the fraction of male

Table 5

Decomposition of Change Over Time in the Fraction of Wage Workers Among Male Employed Workers, Within and Between Sectors, by Region

Class of Countries	Sectors Analyzed	Average Fraction of Wage Earners (in percent)	Total Change Per Year	Sample Size (Number of Countries)	Percent of Change Due To:[c] Intrasector Change	Intersector Change	Residual Interaction
	Agriculture Nonagriculture[a]						
World (Entire Sample)		53.9	.69	61	64	35	2
High Income		79.1	.54	22	40	61	-1
Latin America		55.9	.41	17	32	75	-7
Africa		55.1	.68	6	53	36	11
East Asia		34.4	.88	6	56	40	3
South & West Asia		35.0	.85	10	84	13	3
	All 8 sectors[b]						
World (Entire Sample)		53.9	.69	61	65	33	2
High Income		79.1	.54	22	42	56	1
Latin America		55.9	.41	17	36	71	-7
Africa		34.9	.88	6	59	35	6
East Asia		55.1	.68	6	49	43	8
South & West Asia		35.0	.85	10	84	14	2

[a]Agriculture includes forestry and fishing.

[b]Nonagriculture divided into the following ISIC categories: Mining; manufacturing; electricity, gas, and utilities; construction; wholesale and retail trade; transportation; business and personal services.

[c]Percent of changes due to the three components may not precisely sum to one because of rounding. The change in workers in wage employments is summed across countries before total changes in the share of wage earners are calculated and decomposed for the sample and for the regional aggregations of countries.

See Appendix Table A-1 for composition of sample.

Table 6

Decomposition of Change Over Time in the Fraction of Wage Workers Among Female Employed Workers, Within and Between Sectors, by Region

Class of Countries	Sectors Analyzed	Average Fraction of Wage Earners (in percent)	Total Change Per Year	Sample Size (Number of Countries)	Percent of Change Due To: [c] Intrasector Change	Intersector Change	Residual Interaction
	Agriculture Nonagriculture[a]						
World (Entire Sample)		62.7	1.51	61	82	17	2
High Income		79.9	.79	22	39	58	3
Latin America		65.9	.23	17	-28	107	20
North Africa		30.6	.87	6	57	66	-22
East Asia		29.8	.61	6	77	17	5
South & West Asia		36.0	2.75	10	97	2	1
	All 8 sectors[b]						
World (Entire Sample)		62.7	1.51	61	81	17	2
High Income		79.9	.79	22	39	59	2
Latin America		65.9	.23	17	-2	87	14
North Africa		30.6	.87	6	55	57	-12
East Asia		29.8	.61	6	82	14	4
South & West Asia		36.0	2.75	10	96	3	1

[a]/Agriculture includes forestry and fishing.

[b]/Nonagriculture divided into the following ISIC categories: Mining; manufacturing; electricity, gas, and utilities; construction; wholesale and retail trade; transportation; business and personal services.

[c]/Percent of changes due to the three components may not precisely sum to one because of rounding. The change in workers in wage employments is summed across countries before total changes in the share of wage earners are calculated and decomposed for the sample and for the regional aggregations of countries. See Appendix Table A-1 for composition of sample.

wage earners, .88 percent per year, almost twice that recorded in the high income economies. South and West Asia report the most rapid increases in the fraction of female wage earners, of 2.75 percent per year, but this is largely due to the abrupt decline in self-employed women and not due to an absolute gain in female wage employment (Table 3). Latin America exhibits the slowest increase for the fraction of women in wage employment of .23 percent per year. Yet women are increasing their labor force participation rapidly in this continent where they have nearly gained parity with males in terms of education (Table 3), but appear to be deflected from firm employment, possibly by pervasive minimum wage legislation. The growth in the fraction of female wage earners is moderately rapid in the high income market economies, .79 percent per year. The disparities among regions in the rate of absorption of women into wage employments are larger than for men.[16] Interpretations of employment patterns among women might be facilitated if it were possible to analyze simultaneously female overall labor force participation rates and disentangle changes in the definition of economic activity that often lie behind changes in women's family and self-employment activities.[17] Because of these limitations in the measurement of changes in the fraction of female workers who hold wage employment, our focus shifts to the share of women (relative to men) in the total labor force, and, more specifically, the women's share of all wage earners or firm employees. Decompositions based on these latter indicators of women's status relative to men are shown in Tables 7 and 8.

Half of the widely noted increase in women's share of the labor force (Table 7) in high income countries is accounted for by the redistribution of employment across the eight distinguished sectors (i.e. 47%), though the shift out of agriculture is no longer quantitatively important (top panel). In Latin America the intersectoral change in jobs accounts for an even larger part of

Table 7

Decomposition of Change Over Time in Women's Fraction of the Labor Force, Within and Between Sectors, by Region

Sectors and Region of Countries	Women as a Fraction of Labor Force	Average Annual Rate of Change in Fraction (%)	Percent of Change Due to[c]		
			Intrasector Change	Intersector Change	Residual Interaction
Agricultural/Nonagricultural Sectors[a]					
World Sample	.31	-.31	102	4	-6
High Income	.36	.22	95	-7	12
Latin America	.24	.30	34	51	14
North Africa	.14	-.13	147	7	-54
East Asia	.37	.29	97	5	-2
South and West Asia	.25	-1.21	96	5	-1
Agriculture and Seven Other Sectors[b]					
World Sample	.31	-.31	117	-12	-5
High Income	.36	.22	46	47	7
Latin America	.24	.30	8	87	5
North Africa	.14	-.13	123	29	-52
East Asia	.37	.29	96	2	2
South and West Asia	.25	-1.21	95	6	-2

[a]Agriculture includes forestry and fishing.

[b]Nonagriculture divided into the following ISIC categories: Mining; manufacturing; electricity, gas, and utilities; construction; wholesale and retail trade; transportation; business and personal services.

[c]Percent of changes due to the three components may not precisely sum to one because of rounding. The change in workers in wage employments is summed across countries before total changes in the share of wage earners are calculated and decomposed for the sample and for the regional aggregations of countries.

See Appendix Table A-1 for composition of sample.

Table 8

Decomposition of Change Over Time in Women's Fraction of Wage Employment, Within and Between Sectors, by Region

Sectors and Region of Countries	Women as a Fraction of Wage Earners	Average Annual Rate of Change in Fraction (%)	Percent of Change Due to[c] Intrasector Change	Intersector Change	Residual Interaction
Agricultural/Nonagricultural Sectors[a]					
World Sample	.32	.13	71	31	-2
High Income	.36	.35	94	6	-0
Latin America	.27	.29	45	42	13
North Africa	.09	.09	17	81	2
East Asia	.34	.21	107	-5	-1
South and West Asia	.26	-.52	109	-13	4
Agriculture and Seven Other Sectors[b]					
World Sample	.31	.13	-11	119	-8
High Income	.36	.35	48	54	-2
Latin America	.27	.29	-9	111	-2
North Africa	.09	.09	97	23	-21
East Asia	.34	.21	114	-5	-9
South and West Asia	.26	-.52	109	-12	3

[a]/Agriculture includes forestry and fishing.

[b]/Nonagriculture divided into the following ISIC categories: Mining; manufacturing; electricity, gas, and utilities; construction; wholesale and retail trade; transportation; business and personal services.

[c]/Percent of changes due to the three components may not precisely sum to one because of rounding. The change in workers in wage employments is summed across countries before total changes in the share of wage earners are calculated and decomposed for the sample and for the regional aggregations of countries.

See Appendix Table A-1 for composition of sample.

the growth in women's proportion of the labor force, but in this case most is due to the relative movement of production and employment out of agriculture (51 out of 87%). At the other extreme in East Asia, where the women's proportion of the labor force has grown somewhat more rapidly than in Latin America, this advance is fully explained by within sector gains in the fraction of women in the labor force. In North Africa and South and West Asia, where women are a decreasing fraction of the labor force, intersectoral shifts in employment are relatively unimportant. The declines in women's participation are widely distributed across sectors, either because there has been a widespread displacement of women from the work force, or the redrawing more narrowly of the definition of the labor force in censuses after 1961 has reduced the enumeration of women in informal and family production activities.

Table 8 therefore repeats the decomposition analysis based only on the fraction of wage earners who are women. This indicator of women's participation should be less affected by changes in the definition of gainful economic activity within the family. The wage earner data suggest, nonetheless, that the entire gain in women's status in firm employment can still be traced to the changing sectoral composition of wage employment in Latin America. In East Asia and Africa, the increase in the fraction of wage earners who are women is attributable to advances in this fraction within sectors, and is not linked to changes in the sectoral composition of employment. Thus, even when family employments are excluded, women in South and West Asia are still losing ground in terms of their fraction of wage employment, and this is not attributable to changes occurring in the composition of employment in this region, or more accurately the lack of it.

Decomposing observed changes in women's participation in the labor force implies that the changing sectoral distribution of employment that is broadly

consistent with development has tended to increase women's fraction of wage employment in Latin America and also in the group of High Income Countries. Similar advances made by women in the labor force in East Asia are not attributable to such changes in the sectoral composition of employment. Nor has the slow progress of women in North Africa, from a very small fraction of the wage labor force, been assisted by changes in the changing composition of African employment. Development-related changes in the sectoral composition of jobs is not a major factor in the loss of women's portion of wage employment in South and West Asia. Decompositions of changes in the fraction of women in self-employed jobs or unpaid family work (not reported) confirm that where women are moving ahead relative to men in wage employment, they are also increasing their relative position in family jobs, such as in Latin America and East Asia. Conversely, the female fractions of self-employed and family unpaid workers are declining broadly within most sectors in South and West Asia. The patterns observed by region in women's labor force participation do not appear localized to a few sectors or concentrated in certain types of jobs (Tables 3 and 4).

III. Evidence of Within Sector Variation in the Share of Wage Earners and the Distribution of Employment with Development

Because increases in the fraction of all women in wage employment within the various sectors account for virtually all the progress women have made in this direction in Africa and Asia, analysis within specific sectors may clarify the origins of and limitations on women's entry into firm employment. Analysis thus examines first between-country and then within-country variation in W_{1j}, the fraction of women in wage employment in sector j, and only then analyzes the parallel variation in sectoral distribution of employment, n_j. Discussion

is focused on women in the four largest sectors--agriculture, manufacturing, commerce and services--though comparisons are required with males to place in perspective how technologies and trade may have influenced the changing balance of firm and family employment for both sexes within and between sectors.

The Fraction of Wage Earners by Sector

Table 9 reports weighted ordinary least squares estimates for each sector based on (1) the pooled initial and final year cross sections of 61 countries, and (2) the annual rates of change over the observed interval within countries. In the cross section the fraction of male wage earners in agriculture increases with income, but decreases for women. Within countries, the rate of increase in income over time in percent is associated with an increase in the male and female fractions of wage earners in agriculture of .14 and .28 percentage points, respectively. The growth in the male and female fraction of wage earners in services also increases more rapidly with income within countries than it does across countries; a one percent income gain is associated within countries with a .12 percentage point increase in services for both men and women, whereas the cross section suggests only a .04 and .08 percentage point gain. Manufacturing and commerce exhibit the opposite tendency for the cross sectional income associations to exceed that for time series, .13 and .17 for men and .19 and .22 for women, versus .11 and .12 for men over time, and much slower for women, .04 and .13 percentage points. Thus, cross sectional patterns underestimate the rate at which the fraction of wage earners has increased over time with development in agriculture and services, but overestimate this change in the composition of employment in manufacturing and commerce. This difference by sector could be related to regulations and public policy that have increased wages and labor costs for firms in manufacturing and

Table 9

Regressions of the Fraction of Wage Earners on Income:
(1) Combination of Initial and Final Year Cross Section of Countries, and
(2) Annual Rates of Change Within Countries, by Sector of Employment and Sex of Worker

Sector	Sample		Men			Women		
Size		Intercept	LogGNP/A	R^2	Intercept	LogGNP/A	R^2	
Agriculture	1	122	.088	.0286	.060	.740	-.0810	.146
			(1.45)	(2.77)		(7.09)	(4.53)	
	2	61	-	.136	.213	-	.278	.150
				(4.10)			(3.26)	
Mining	1	122	.649	.0395	.464	.394	.0678	.584
			(21.7)	(9.94)		(9.92)	(12.4)	
	2	61	-	.025	.021	-	.062	.073
				(1.10)			(2.07)	
Manufacturing	1	122	-.153	.131	.868	-.619	.185	.787
			(4.40)	(28.1)		(9.14)	(20.8)	
	2	61	-	.105	.335	-	.035	.100
				(5.50)			(2.54)	
Utilities	1	122	.821	.0199	.406	.121	.102	.751
			(47.1)	(8.91)		(2.81)	(18.7)	
	2	61	-	.072	.110	-	.192	.075
				(2.67)			(2.16)	
Construction	1	122	.457	.0457	.206	.387	.0542	.280
			(7.27)	(5.58)		(6.18)	(6.82)	
	2	61	-	-.033	.033	-	-.045	.060
				(1.43)			(1.96)	
Commerce	1	122	-.653	.165	.878	-1.067	.219	.862
			(15.7)	(29.4)		(17.0)	(27.4)	
	2	61		.120	.422	-	.127	.310
				(6.62)			(5.19)	
Transportation	1	122	.335	.0681	.497	.535	.0508	.425
			(7.22)	(10.9)		(12.0)	(9.42)	
	2	61	-	.016	.014	-	.003	.001
				(.91)			(.23)	
Services	1	122	.503	.0404	.373	.284	.0757	.515
			(13.3)	(8.45)		(5.31)	(11.3)	
	2	61	-	.122	.194	-	.117	.143
				(3.80)			(3.16)	
Nonagriculture	1	122	.0599	.0968	.859	-.348	.147	.817
			(2.25)	(27.1)		(6.96)	(23.1)	
	2	61	-	.076	.282	-	.105	.174
				(4.85)			(3.55)	
Total	1	122	-.439	.147	.873	-.487	.154	.670
			(12.6)	(28.7)		(6.93)	(15.6)	
	2	61	-	.188	.511	-	.272	.276

commerce, but are more difficult to enforce on firms in agriculture and services.

For the economy as a whole, a one percent annual rate of growth in real income per adult is associated with about the same increase in the share of wage earners for men and for women, .15 and .16, respectively. The observed changes within countries were only slightly larger for men, .19 percentage points, but substantially larger for women, .27 percentage points. Women have thus entered wage employments more rapidly than would have been anticipated on the basis of the cross country association by income level. Other recent developments may have contributed to the more rapid entry of women into the wage labor force in more rapidly developing countries, such as the leading role of manufactures in expanding international trade and the forces that led to the sharp decline in fertility in Latin America and East Asia.[18]/

The Distribution of Employment by Sector

Table 10 reports regressions where the fraction of the labor force employed in each sector, n_j, is the dependent variable. The intersectoral shift of workers out of agriculture (or the converse entrance into nonagriculture) is virtually identical in the cross section or within countries over time. A one percent increase in income is associated with a decline in .18 percentage points in the male agricultural share of the labor force and about a .20 percentage point decline in female. The cross sectional pattern in employment shares is a less adequate predictor of within country changes in manufacturing, which relatively gained workers more slowly within countries than one would have expected on the basis of the cross country pattern by income, increasing over time one-third as rapidly with income as implied in the cross-section. For women there was virtually no growth in employment share in manufacturing

Table 10

Regressions of Sector Fraction of Employment on Income:
(1) Combination of Initial and Final Year Cross Section of Countries, and
(2) Annual Rates of Change Within Countries, by Sex of Worker

Sector		Sample Size	Men			Women		
			Intercept	LogGNP/A	R^2	Intercept	LogGNP/A	R^2
Agriculture	1	122	1.620	-.177	.931	1.846	-.207	.847
			(54.2)	(40.3)		(32.2)	(25.7)	
	2	61	-	-.183	.673	-	-.199	.637
				(11.1)			(10.3)	
Mining	1	122	-.0160	.00413	.297	.00157	.00014	.005
			(3.96)	(6.94)		(1.16)	(.71)	
	2	61	-	-.00516	.055	-	.00115	.029
				(1.81)			(1.26)	
Manufacturing	1	122	-.224	.0599	.777	.109	.0384	.444
			(11.2)	(20.4)		(3.89)	(9.78)	
	2	61	-	.0191	.092	-	.00861	.006
				(2.46)			(.59)	
Utilities	1	122	-.0181	.00397	.738	-.0041	.0010	.491
			(12.3)	(18.1)		(6.22)	(10.6)	
	2	61	-	.00104	.017	-	.0001	.000
				(1.01)			(.12)	
Construction	1	122	-.126	.0282	.760	-.0120	.00293	.368
			(12.8)	(19.5)		(4.82)	(8.36)	
	2	61	-	.9347	.363	-	.00946	.578
				(5.85)			(9.07)	
Commerce	1	122	-.0977	.0302	.721	-.195	.0486	.608
			(8.39)	(17.6)		(7.69)	(13.6)	
	2	61	-	.0319	.470	-	.0622	.412
				(7.29)			(6.48)	
Transportation	1	122	-.0534	.0157	.793	-.0448	.00879	.871
			(10.7)	(21.4)		(20.3)	(28.4)	
	2	61	-	(.0187	.536	-	.00735	.386
				(8.33)			(6.14)	
Services	1	122	-.0881	.0356	.665	-.483	.108	.751
			(5.61)	(15.4)		(12.0)	(19.0)	
	2	61	-	.0827	.495	-	.120	.539
				(7.66)			(8.38)	
Nonagriculture	1	122	-.620	.177	.931	-.846	.207	.847
			(20.7)	(40.3)		(14.7)	(25.7)	
	2	61	-	.183	.673	-	.199	.637
				(11.1)			(10.3)	