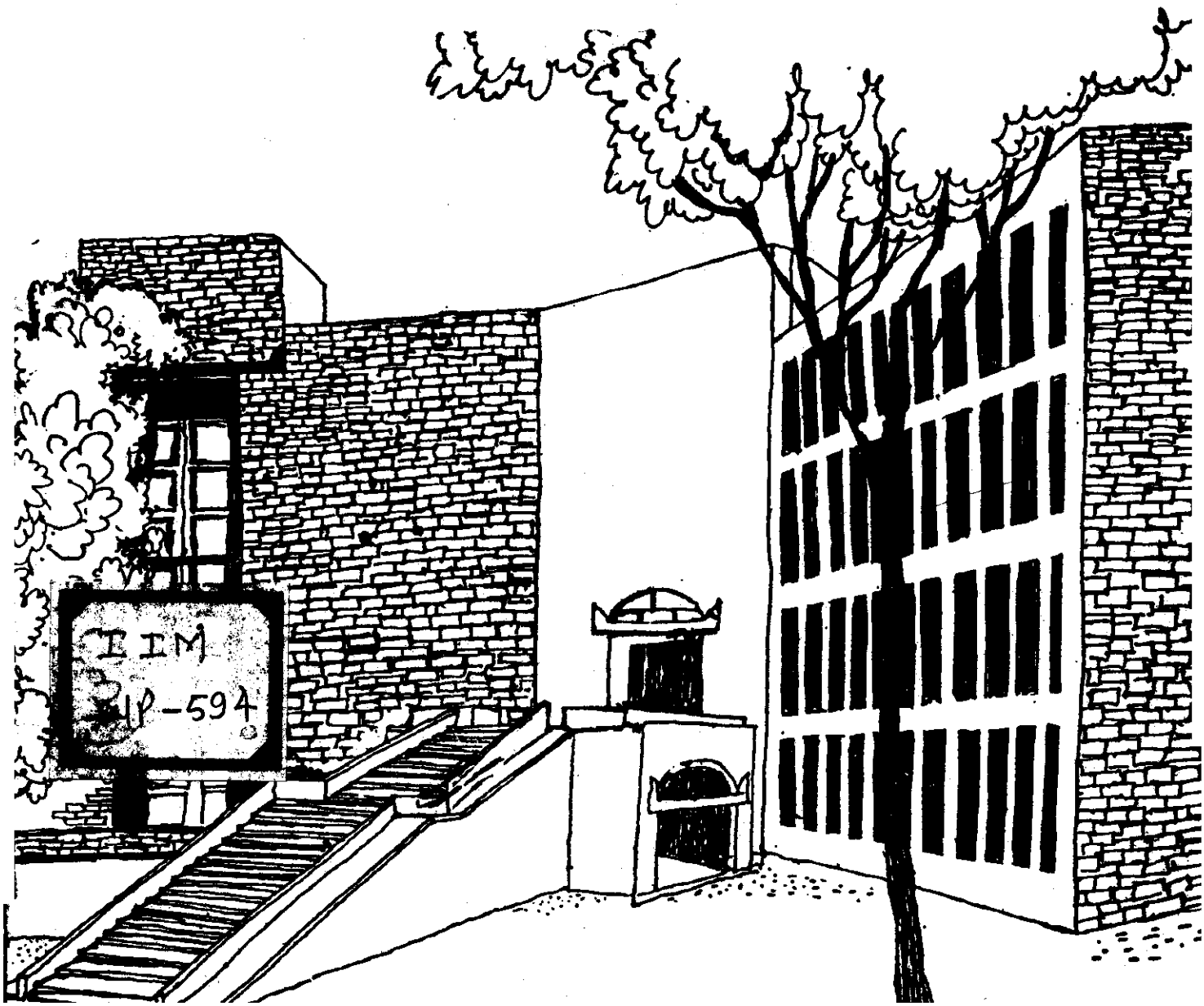
विद्याविनियोगाद्विकास:
IIM
AHMEDABAD

W. P. 594

Working Paper



ON ESTIMATING WOMEN'S CONTRIBUTION TO NATIONAL PRODUCT

By

Ravindra H. Dholakia

W P No. 594

December 1985

INDIAN INSTITUTE OF MANAGEMENT
AHMEDABAD-380015
INDIA

ON ESTIMATING WOMEN'S CONTRIBUTION TO NATIONAL PRODUCT

Ravindra H. Dholakia, IIM Ahmedabad, 1985.

1. Introduction

In the male-dominating world, the condition of women crucially depends on the extent of economic independence of females. Such is the expressed opinion of the most of the distinguished women participants in the international conference 'on the conditions of women in the third world countries,' recently concluded in Nairobi (July 1985). The policy implication of this opinion was well-recognised by the Indian government long ago. There was a spurt in the programmes encouraging women's participation in the economic activities particularly after the sixties. As a result, we find a number of women branches of post offices, banks, etc. coming up all over the country. There have also been special programmes for identifying, training and assisting women entrepreneurs. Moreover, in the various block level and microlevel planning exercises designed specially for the rural areas, the focus has been primarily on creating self-sustaining productive employment in general and for females in particular. In order to measure the impact of such programmes and policies on the desired goal of achieving greater economic independence of females, some specific indicators are required.

Female Workforce Participation Rate (FWPR), it may be argued, is an obvious choice for the stated purpose. There are, however, two types of difficulties in using the indicator of FWPR. One is conceptual and the other is practical. The conceptual difficulties are: i) The

FWPR is not independent of the business and seasonal fluctuations in the extent of economic activities in the economy. As a result, if the two years are not falling on the same trend line, change in the FWPR cannot be exclusively ascribed to the change in the female participation in the workforce.

(ii) The FWPR is known to decline with time in the initial stage of economic development when the structural transformation of the economy is taking place. This happens because with increasing productivity in agriculture and allied activities, the females and children who constitute the marginal working force, tend to withdraw from the working force due to priorities for other household duties and children's education. Moreover, as a shift in the employment pattern takes places in favour of more organized manufacturing and service sectors, the exacting nature of the new jobs drives the marginal categories of the workers out of the working force. (see Sinha, 1965; and K. Nath, 1970). The FWPR is thus a function of several factors and the changes in it over time do not necessarily reflect changes in the condition of women in the society.

iii) Increased work-force participation by itself cannot be taken as a measure of the economic well-being because productivity of the work is also an important determinant of the state of economic independence. Productivity may or may not be reflected in the wages in cash and/or kind. For instance, in a family enterprise, the active involvement of females usually does not get rewarded in terms of amoluments, though their productivity is acknowledged. Depending on their skill and productivity, they derive their status and a sense of economic independence in such circumstances. Conceptually, therefore, FWPR alone cannot satisfactorily measure the condition of women in terms of economic independence. It should be accompanied by the concept of female productivity.

The practical difficulties with the indicator of FWPR are: (i) In a country like India, reliable and comprehensive estimates of FWPR are available only once in a while, i.e., once in a decade on a census basis and once in five years on a sample basis. The dimension and the nature of the economy is a prohibitive factor in generating such estimates more frequently. It, therefore, becomes a practical constraint on efforts to overcome problems of fluctuations in extent of economic activities. (ii) The other practical difficulty is the one of temporal non-comparability of the date on working force from census to census in India. Females, constituting the marginal and many a times non-formal group in the working force, get relatively more affected by the changes in the definition of a worker employed by different censuses. Naturally, the changes in FWPR as obtained from the censuses in India hide more than what they reveal. There have been efforts even at the official level to restore comparability of data on working force between censuses. Paper No.1 of 1974 presented the results of the (sample) Resurvey of economic questions based on 1961 and 1971 census concepts with a view to finding adjustment factors to make the two sets of data comparable. The 1981 census adopted the concepts of Main and Marginal workers to get two sets of estimates of workers in 1981 comparable to 1971 and 1961 census data. The success of these efforts in satisfactorily resolving the problem of comparability is a matter of opinion based on analysis and some concept of plausibility. (see for instance, R.H. Dholakia, 1977 and J. Krishnamurthy, 1984).

On the other side, it is argued that the changes in the definition of a 'worker' introduced by different censuses in India after the Independence were almost dictated by the need to measure the working force according to the current conditions. (see the Census of India, 1981). O.D. Duncan (1958) justified changes in Census definitions as sometimes inevitable "because the 'things' being measured are changing qualitatively and structurally, as well as quantitatively .... It is clear, therefore, that non-comparability is not merely a technical problem, and that in spite of any technical virtuosity in reconciling discrepant definitions, strictly comparable data are also data which carry a bias of temporal perspective".

It is clear from the discussion so far that FWPR is an inadequate indicator of the contribution of females in the quantum of economic activities in the economy ultimately to guage the extent of economic independence of women. The concept of female productivity has to be explicitly taken into account. In that case, it is better to measure the contribution of women in the national product directly. The present paper makes an humble attempt to suggest a method to estimate the contribution of women in the national product on the basis of readily avilable data. The next section examines the theoretical basis for the prevalent method of measuring the quality of labour with the help of wage-differentials. It is rejected on the ground that its assumptions are not consistent with the purpose at hand. The third section, then, presents two different models to deal with the problem. The data requirement of one of them is more than the availability, whereas the other one passes the test of data availability. The fourth section presents the results of an illustrative exercise carried out with the data on 15 major state economies in India for the years 1961, 1971 and 1981. In the fifth and the final section of the paper, major conclusions are summarized.

II. Method of Wage-Differentials

In the classical and neo-classical framework, a well-established convention of measuring the quality of labour is adopted by most of the empirical researchers. (see, for instance, Denison and Chung, 1976; Denison, 1962; Auer, 1979; B.H. Dholakia, 1974, 1980; Denison, 1985, etc.). The method was basically suggested by David Ricardo in context of examining the impact of differences in the skill-composition of labour in the production

of the two commodities on his labour theory of value. He suggested that the labour content should be measured in homogeneous units by converting the skilled workers into unskilled ones by some appropriate multipliers. He further suggested to estimate the multipliers by the wage rate differentials between the categories because he felt that the occupational wage differentials are very stable over-time.

In order to apply his method to our problem of estimating the female's contribution to the national product and the growth therein, we can proceed in the following way by assuming a neo-classical aggragate production function showing constant returns to scale as follows:

Let $X = A.K^{\alpha} L^{1-\alpha}$ .. .. (1)

where X, K and L are output, capital stock (or non-labour) and working force respectively; and α and A are parameters.

Now Ricardo's method requires conversion of female workers into male workers or vice-versa with the help of appropriate multiplier.

$\therefore$ Let $L = M + aF$ .. .. (2)

where M and F denote male and female workers respectively; and 'a' is the appropriate multiplier [*1] which represents the male equivalent workers for one female worker. 'a' could be greater or less than unity, but generally it is taken as less than or equal to unity.

Now, $X = A.K^{\alpha}. (M+aF)^{1-\alpha}$ .. .. (3)

$\therefore \partial X/\partial M = (1-\alpha) AK^{\alpha} (M+aF)^{-\alpha}$

$= (1-\alpha) X/(M+aF)$ .. .. (4)

and $\partial X/\partial F = (1-\alpha) AK^{\alpha} (M+aF)^{-\alpha}.a$

$= a(1-\alpha) X/(M+aF)$ .. .. (5)

Here $\partial X/\partial M$ and $\partial X/\partial F$ represent the marginal productivities of male workers and female workers respectively which are assumed to be equal to their respective wage-rates in equillibrium under perfect competition.

Now taking the ratio of (5) to (4), we have

$$\frac{\partial X/\partial F}{\partial X/\partial M} \qquad \frac{a(1-\alpha)}{(1-\alpha)} \quad \frac{X/(M+aF)}{X/(M+aF)} = a \qquad \ldots\ldots \quad (6)$$

Thus, 'a' which was taken as the appropriate multiplier to convert female workers into the male workers turns out to be the wage-differential between female and male workers on the assumptionsof homogeneous production function,*2 equillibrium and unit elasticity of substitution between capital and labour but infinite elasticity of substitution between male workers and female workers. In other words, this method assumes that 'a' is invariant. Following this method further, it is possible to derive the estimates of relative shares of male and female workers as the respective elasticities of outputs

$$EX/EM = (\partial X/\partial M).\ M/X \qquad \text{and } EX/EF = (\partial X/\partial F).\ F/X$$
$$= (1-\alpha)\ M/(M+aF) \qquad \ldots\ldots \quad (7)$$

and
$$EX/EF = (F/X)\ a(1-\alpha)\ X/(M+aF)$$
$$= (1-\alpha)\ aF/(M+aF) \qquad \ldots\ldots \quad (8)$$

Thus, the relative share of female workers is obtained from this method as the relative share of labour (measured in terms of male units) weighted by the proportion of male equivalent female workers to male equivalent total working force. It is interesting to note that aF/(M+aF) is less than F/(M+F) if 'a' is less than unity. This is because 1/M is a proper fraction and if we add a given number to its numberator and denominator, higher is the number we are adding, higher is the resulting proportion. The implication of this observation is that the ratio of relative share of female to the share of total labour is less than the proportion of female workers to total reported workers, if 'a' is less than unity. If, however, the value of 'a' is unity, the marginal productivities of the male and the female workers are the same and hance the relative share of female workers in the national product is the proportion of females in total working force times the relative share of labour. In the framework of econometric model, the null-hypothesis for 'a' is that a = 1. The hypothesis, however, does not get tested within the same framework generally. The prevalent practice is to estimate the

value of 'a' independently and feed it into the model. Thus, the crucial null-hypothesis of no differential between male-female productivity does not get statistically tested within the model. This, by itself, defeats the very purpose of estimating [illegible] women's contribution to national product in the context discussed earlier.

Moreover, the assumption on invariant 'a' implying infinite elasticity of substitution is also questionable. It assumes that all male workers will go out of job and will be replaced by females if there is even a slight increase in the wages of males given the wages of females and vice-versa. This is too unrealistic an assumption to base over analysis*3

Similarly, the assumption of MP_L = Wages so crucial for the use of wage-differential to be used as multipliers, is also not a very comfortable assumption in our context. Such an assumption for instance is totally inconsistant with theories and hypotheses about sex-discrimination and socio-cultural factors influencing the wage-differentials between males and females. Ignoring the latter for tackling the problem at hand would only imply overlooking the problem itself!

III. Suggested Models:

We may now formulate two different models to overcome the shortfalls of the one based on wage-differentials. These two models may be regarded as substitutes and choice should be based on the standard considerations like the availability of the required data, degree of overall goodness of the fit, plausibility of the estimates, etc. The two models have somewhat different approaches to the problem.

III (a) Model-I:

The first one of the two is a direct application of the

Cobb-Douglas production function treating male and female workers as separate factors of production. Thus, we are assuming unit elasticity of substitution between male and female workers unlike infinite elasticity of substitution assumed in the wage-differential method. Using the same notations as in section II above,

$$X = A.K^{\alpha}.F^{\beta}.M^{1-\alpha-\beta} \qquad \ldots\ldots (9)$$

It is clear that we are assuming homogeneity of degree one or the constant returns to scale. β represents the factor elasticity of output with respect to female workers. With equillibrium under perfect competition and constant returns to scale, it would represent the relative share of female workers in the national product. However, what is important is that we can test the hypothesis of the equality or otherwise of the marginal product of male and female workers directly without explicitly assuming equillibrium or perfect competition.

Differentiating (9) w.r.t. M and F,

$$\partial X/\partial M = (1-\alpha-\beta).A.K^{\alpha}F^{\beta}.M^{-\alpha-\beta}$$

$$= (1-\alpha-\beta)\,X/M \qquad \ldots\ldots (10)$$

and $$\partial X/\partial F = \beta.A.K^{\alpha}.F.\beta-1_{M}{}^{1-\alpha-\beta}$$

$$= \beta X/F \qquad \ldots\ldots (11)$$

If the two marginal products are equal, the ratio of (10) to (11) should be equal to unity, i.e.

$$\frac{\partial X/\partial M}{\partial X/\partial F} = \frac{(1-\alpha-\beta)}{\beta}\,\frac{X/M}{X/F} = 1 \quad \text{by hypothesis}$$

$$\therefore \quad \beta = (1-\alpha-\beta)\,F/M$$

$$\text{i.e. } \beta - (1-\alpha-\beta)\,F/M = 0 \qquad \ldots\ldots (12)$$

Thus, (12) gives us the null-hypothesis for the estimates of α and β to be tested for equivalence of the marginal product of male and female workers. It should be noted that (12) contains the term F/M which implies/and female worker is a function of the ratio of female to male workers. Since, these are exogenous variables in our model, we can treat them as given and get the variance of the estimate of (12).

/ that the difference in the marginal products of male

It should be noted that here this model requires data on K, F and M besides X. In India, we do not have any official set of estimates for the stock of capital including land and other natural resources even at a point of time. Moreover, comparable and consistant estimates of male and female workers on a time series basis are also not available in India. If we turn to the cross-sectional data by taking states as the units, there could be problems regarding estimates of the stock of capital and natural resources including land on the empirical side and regarding the assumption of uniform production function on conceptual side. These problams can be overcome in the course of time, but in the mean time we may try to estimate the contribution of women in the national product through another route.

III (b) Model II:

To begin with, we may conceptualize a seperable additive production function as

$$X = X_m + X_f \qquad \ldots\ldots (13)$$

Where X_m and X_f are the outputs due to the male and female workers respectively. Further,

$$X_m = A.K^{\alpha}.M^{r} \qquad \ldots\ldots (14)$$

$$X_f = A.K^{\alpha}.F^{\beta} \qquad \ldots\ldots (15)$$

and, $$X = A.K^{\alpha}.W^{1-\alpha} \qquad \ldots\ldots (16)$$

$$\text{where } W = M+F \qquad \ldots\ldots (17)$$

It should be noted that we are assuming constant returns to scale by (16). The two components of (16) in (14) and (15) are merely hypothetical to estimate share of male and female workers. It is worth noting that only one of the exponents r or β can be taken as a parameter. The other one would be a variable determined by values of other parameters and the exogenous variables in the system. It is also clear that the elasticity of substitution between male and female workers is less than infinity in the model.

Now let us assume that male productivity is proportional to the average productivity per worker, and that r in (14) is a parameter while β in (17) is a variable. Then,

$$X_m/M = b\ X/W \qquad \ldots\ \ldots\ (18)$$

$$\therefore \quad X_m/X = b.M/W \qquad \ldots\ \ldots\ (19)$$

$$\text{i.e.} \quad AK^{\alpha} M^{r} / AK^{\alpha} W^{1-\alpha} = b.M/W$$

$$\therefore \quad M^{r} / W^{1-\alpha} = b.M/W$$

$$\text{i.e.} \quad bM^{1-r} = W^{\alpha}$$

$$\therefore \quad M^{1-r} = W^{\alpha}/b$$

$$\therefore \quad (1-r) \ln M = \alpha \ln W - \ln b$$

$$\therefore \quad \ln M = (\alpha/1-r) \ln W - (\ln b/1-r) \qquad \ldots\ \ldots\ (20)$$

This is a significant result, obtained from our model, which can be used as a regression equation to obtain the estimates of the parameters b and r for a given value of α [*4]. Once we obtain the estimates of b and r, from (19), we can obtain the contribution of male workers and hence of the female workers to the total output in the economy. The value of b indicates the male-female average productivity differential and $b = 1$ represents the case of no differential in average product of male and female workers. However, if we are interested in the share of male and female workers in the national product, we can obtain it as under:

$$R_m = EX/EM = (\partial X/\partial M)\ (M/X)$$

$$= (r.X_m/M)\ (M/X)$$

$$= r.X_m/X$$

$$= r.b.M/W \text{ using (19)} \qquad \ldots\ \ldots\ (21)$$

$$\text{and} \quad R_f = R_w - R_m \qquad \ldots\ \ldots\ (22)$$

where R_w is the relative share of labour which is also given by $1-\alpha$ in (16).

IV Results

In order to illustrate the use of the models described in the preceeding section, we may conduct the exercise for the Indian economy. Since strictly comparable estimates of workers are not available on a time series basis, we have to confine to the cross-sectional analysis only. The data requirement for the model I (equation 9) includes estimates of output, employment by sex and capital stock including land and natural resources. If we take state economies as unite for observations, the official set of estimates for comparable SDP(i.e. output) [*5] and employment by sex exist at least for the year 1970-71 The problem, however, is for the estimates of capital stock and land and natural resources. Here no official set of data exist for state economies. We may, therefore, use the estimates of real stock of capital for the 15 major states in India prepared by R.H. Dholakia (1985). These estimates, it should be noted at the outset, do not include the estimates of land and natural resources. This is a major limitation of our exercise in the case of model I. Our results for the equations (9) and (12) are as follows:

$$\ln (X/M) = -1.501 + \underset{(0.190)}{1.073^{*}} \ln(K/M) + \underset{(0.052)}{0.044} \ln (F/M)$$

$r^2 = 0.7761$ *; $\hat{\beta} = (1-\hat{\alpha}-\hat{\beta})$ F/M $= \underset{(0.0922)}{0.0686}$

$F(2,12) = 20.798$

Correlation Matrix:

	ln(X/M)	ln(F/M)
ln(K/M)	0.8733*	- 0.5917**
ln(F/M)	-0.4235	1.000

* significant at 1% level of significance

** significant at 5% level of significance.

Figures in paranthoses are standard errors of the estimates. (It should be noted that (9) can be estimated by first dividing through M and then by converting it into the double-log form as presented here. The value of F/M for calculating variance of (12) is taken from the national estimates of F and M in 1971 census).

Although the results indicate statistically insignificant difference between male and female marginal products, the results, on the whole, are implausible. Statistically, the equation yields a very significant fit, yet the estimates of the factor elastiaties of output defy common sense. The probable reasons for such implausible results are : (1) Although the problem of multicollinearity does not appear to be very serious one at the first sight from the Correlation Matrix presented above, it does exist in certain degree. It might have affected adversely the estimates of the parameters and their standard errors. (2) The presence of measurement error could have adversely affected the results because our estimates of capital stock do not include land and natural resources as pointed out earlier. These are very crucial estimates to tackle the assumption of constant returns to scale empirically. (3) As argued by R.H. Dholakia (1985), the Indian states are not likely to have a uniform production function with constant returns to scale. The argument is strengthened because the data on Indian states are found to support the twin hypotheses that the marginal product of capital is uniform and that the marginal product of labour is in constant proportion to the average product of labour across states in India. The

implication of these hypotheses is that the relative share of labour of capital and the relative share of land vary from State to State. In order to apply model I to India, therefore, we may have to wait till reliable and comparable time series estimates are available for the aggregates involved.

The second model, however, requires only the estimates of working force by sex and the relative share of labour. If, therefore, we confine our exercise only to the censal years taking cross-sectional data on states, we can apply the model-II and estimate (20), (21) and (22). Before we present our results, it is worth-noting that the estimate of the intercept term in (20) has important implications because 'b' represents productivity differential between male and total workers. If the estimate of the intercept term turns out to be statistically insignificant, it implies that our null-hypothesis of absence of male-female productivity differential cannot be rejected, i.e. b=1. If, however, the estimate turns out to be negative and statistically significant, we can reject the null-hypothesis in favour of positive difference between male and female productivity. If, on the contrary, the estimate turns out to be positive and statistically significant, we may reject the null-hypothesis in favour of a negative difference between male and female productivity.

We may now examine the results of (20) for the years 1961, 1971 and 1981.

1) 1961: $\ln \hat{R} = 0.3347 + 0.9287^{*} \ln w$

$r^2 = 0.9687^{*}$ (0.4250) (0.0463)

2) 1971: $\ln M = 1.1646 + 0.9170^{*} \ln W$

$r^2 = 0.9824^{*}$ (0.5479) (0.0340)

3) 1981: $\ln M = 1.1884 + 0.9145^{*} \ln W$

$r^2 = 0.9714^{*}$ (0.7424) (0.0453)

* Significant at 1% level of significance.

(Figures in parentheses represent standard errors of the estimates)

From these results, it is very clear that intercept term in all the years turns out to be statistically insignificant. It is insignificant even at 40% level of significance in 1961, at 10% level of significance in 1981 and at 5% level of significance in 1971. For estimating the contribution and relative shares of male and female workers in the national product, therefore, we can take b=1 in all the three years. We, still, require the value of relative share of labour at the national level to estimate (21) and (22). Unfortunately, official estimates of the relative share of labour even at the national level is not available so far in India.. What we have is the estimate of income-shares which cannot be used as an estimate of the employment elasticity of the output for welknown reasons. In any case, we can take certain plausible values of the relative share of labour and present the corresponding estimates for (21) and (22).

Table 1 : Alternative Estimates of Relative Shares of Male and Female Workers

R_w	1961			1971			1981		
	r	R_m	R_f	r	R_m	R_f	r	R_m	R_f
0.55	0.5155	0.3724	0.1776	0.5093	0.4209	0.1291	0.5079	0.4053	0.1447
0.56	0.5262	0.3801	0.1799	0.5202	0.4299	0.1301	0.5189	0.4140	0.1460
0.57	0.5370	0.3879	0.1821	0.5311	0.4389	0.1311	0.5298	0.4227	0.1473
0.58	0.5478	0.3957	0.1843	0.5420	0.4479	0.1321	0.5407	0.4314	0.1486
0.59	0.5585	0.4035	0.1865	0.5529	0.4569	0.1331	0.5517	0.4402	0.1498
0.60	0.5693	0.4113	0.1887	0.5638	0.4659	0.1341	0.5626	0.4489	0.1511
0.61	0.5801	0.4191	0.1909	0.5747	0.4749	0.1351	0.5735	0.4576	0.1524
0.62	0.5908	0.4268	0.1932	0.5856	0.4839	0.1361	0.5845	0.4664	0.1536
0.63	0.6016	0.4346	0.1954	0.5965	0.4929	0.1391	0.5954	0.4751	0.1549
0.64	0.6124	0.4424	0.1976	0.6074	0.5020	0.1380	0.6063	0.4838	0.1562
0.65	0.6231	0.4501	0.1999	0.6183	0.5110	0.1390	0.6173	0.4925	0.1575

* Note: These estimates are derived by taking b=1 in each year.

From the studies made by individual scholars like B.H. Dholakia (1974&1980) on sources of growth, it is almost clear that relative share of labour has a rising tendancy in India during the period under consideration. It was around 60% in 1961, and is likely to have risen to about 63% in 1971, and around 65% in 1981. From the Table 1, it can be immediately found that relative share of males would have steeply increased between 1961 and 1971 and would have remained almost constant between 1971 and 1981. As a result, relative share of female, would have considerably fallen during 1961-71 and would have increased during 1971-81. These observations are based

on our hypothesis of the absence of male-female productivity differential.

It should be noted at this stage that the estimate of the contribution of male workers as obtained from (21) above is the same as the proportion of male workers in the total workers since we are not able to reject the hypothesis of b=1 in all the three years. The contribution of females likewise is the proportion of females in the total working force. These proportions are presented below in a tabular form:

Year	M/W	F/W
1961	0.7224	0.2776
1971	0.8264	0.1736
1981	0.7979	0.2021

Note: (1) The 1961 figures are based on adjusted workers according to the 1971 census concept as given in paper No.1 of 1974 (The Resurvey)

(2) The 1981 figures pertain to main workers designed to be compatable to the 1971 census.

V. Conclusion

The major conclusions of the present study can be summarized as follows:

1. Female workforce participation rate cannot be considered a satisfactory indicator for the extent of economic independence of women in the third world countries.

2. Use of the traditional method of wage-differentials to estimate relative contribution of male and female workers is highly objectionable because of its unrealistic premises.

3. Data for the census years 1961, 1971 and 1981 in India do not seem to contradict the null-hypothesis of absence of productivity differential between male and female workers.

4. Relative share of male workers in the national product seems to have increased considerably between 1961 and 1971 but has remained more or less constant between 1971 and 1981. Relative share of female workers, on the contrary, has appreciably increased during 1971 to 1981 though it experienced a sharp decline during 1961 to 1971.

Foot - notes

*1. It should be noted that L is measured in terms of male worker units only and is, therefore, not the simple sum of male and female workers, unless a = 1.

*2. It should be noted that constant returns to scale or perfect competition are not necessary assumptions for the result.

*3. Such an assumption and the procedure might be less objectionable and perhaps justified in the type of problem Ricardo was trying to tackle.

*4. It may be noted here that the case of differing production functions across the states can be incorporated in the model without affecting the final result given in (20) if the differences in the production functions are confined to capital and land elasticities of output.

*5. The CSO estimates of comparable SDP are only at current prices. In order to preserve consistency with the estimates of capital stock, we have converted these estimates at 1960-61 prices using the State Statistical Bureau implicit price deflators. Moreover, we have taken three yearly average around 1970-71 to avoid short term fluctuations.

References

Auer L. (1979): Regional Disparities of Productivity and Growth in Canada, Economic Council of Canada.

Denison E.F. (1985) : Trends in American Economic Growth, 1929-1982, The Brookings Institution, Washington D.C.

Denison E.F. (1962) : Sources of Economic Growth in United States - Alternatives Before US (New York : Committee for Economic Development)

Denison E.F. and W.K. Chung (1976) : How Japan's Economy Grew So fast - The Sources of post-War Expansion, (Washington : The Brookings Institution).

Dholakia Bakul H. (1974) : The Sources of Economic Growth in India, (Baroda : Good Companions).

Dholakia Ravindra H. (1977) : "Comparability of 1961 and 1971 Census Data on Working Force - An Interstate Analysis," in Anvesak, Vol. VIII, No.2, December.

Dholakia Ravindra H. (1985) : Regional Disparity in Economic Growth in India (Bombay : Himalaya Publishing House)

Duncan O.D. (1958) : "Population Redistribution and Economic Growth : A Review," in Economic Development and Cultural Change, Vol.7, October.

Govt. of India : Census of India 1981. Primary Census Abstract, Series : I, (India, Part II B (i).

Krishnamurthy, J. (1984) : "Changes in the Indian Work Force," in Economic and Political Weekly, Vol. XIX, No.50, Dec. 15.

Nath K (1970) : "Female Work Participation and Economic Development - A Regional Analysis," in Economic & Political Weekly, May 23.

Sinha J.N (1965) : The Indian Working Force : Its Growth and Compogition, Monograph No.11, Census of India 1961.

* Dholakia Bakul H (1980) : The Changing Efficiency of Public Enterprises in India, Somaiya publications Pvt. Ltd; Bombay, New Delhi.