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EMPLOYMENT EFFECT OF CURRENCY OVERVALUATION:
A PRELIMINARY NOTE ON THE PHILIPPINES*

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EMPLOYMENT EFFECT OF CURRENCY OVERVALUATION A PRELIMINARY NOTE ON THE PHILIPPINES*

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I

The literature on economic development has advanced several reasons for the widespread underutilization of the labor force in less developed countries (LDCs). These reasons include low rates of investment, technological constraints, existence of substantial excess capacity, and failure of factor prices to reflect relative factor endowments. Underlying these factors which contribute to the bias against labor employment are some prevailing policies in the LDCs, as recent studies have suggested.^{1/} However, the influence of exchange rate policy on employment seems not to have been adequately explored yet.

The present note is a preliminary attempt to establish an empirical connection between unemployment and currency overvaluation in the Philippines. Results of previous studies are used to estimate very roughly employment opportunities in manufacturing foregone as a result of the distortion in relative factor prices due to the overvaluation

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^{1/} See, for example, the country studies commissioned by the Organization for Economic Cooperation and Development, the substantive findings of which are summarized in Little, Scitovsky and Scott /4/.

of the Philippine currency in the 1960s.^{2/} Some knowledge of the numerical magnitude of productive employment lost is particularly important in a country where about one-third of the labor force is unemployed or underemployed. The widely-held view that the Philippines has followed consistently a policy of currency overvaluation in the post-war period to the detriment of labor absorption provides additional justification for the present study.

II

The analysis of the impact of distorted factor prices on labor absorption can be cast in the standard neoclassical framework. Assume a CES production function of the form:

$$(1) \quad Q = [h_1 K^{-\beta} + h_2 L^{-\beta}]^{-1/\beta}$$

where Q is output, K is capital services, L is labor, h_1 and h_2 are distribution parameters showing the relative intensities of the factors in the production process, and β is a substitution parameter. The expansion path under competitive conditions is given by

$$(2) \quad \log \frac{L}{K} = \sigma \log \frac{h_2}{h_1} + \sigma \log \frac{r}{w}$$

^{2/} One of the authors has previously investigated the production cost of currency overvaluation in 1961 using a linear programming (fixed coefficients) framework; see Jurado /37/.

where r is the rental value of capital, w is the nominal wage rate, and σ is the elasticity of substitution between labor and capital.^{3/}

If capital and the wage rate are assumed fixed, the rate of labor absorption for any period would depend only on the elasticity of substitution and the growth rate of the rental value of capital. Alternatively, one could express the percentage deviation of actual factor proportion from some equilibrium value (associated with the equilibrium or "shadow" prices of labor and capital) in terms of the elasticity of substitution and the relative extent of factor price distortion.

We propose to examine the employment effect of currency overvaluation through the latter's direct influence on the cost of capital services and, in view of (2), on the choice of technique. As much as 85 per cent of the total supply of capital equipment and machinery in the Philippines is imported. Thus overvaluation of the domestic currency would imply a cheapening of capital relative to its shadow price.

^{3/}The derivation of the expansion path from the production function is straightforward. Solve for the marginal products of K and L :

$$\frac{\partial Q}{\partial K} = h_1 \left(\frac{Q}{K}\right)^{1+\beta}, \quad \frac{\partial Q}{\partial L} = h_2 \left(\frac{Q}{L}\right)^{1+\beta}$$

Assuming competitive factor pricing,

$$\frac{\partial Q}{\partial K} / \frac{\partial Q}{\partial L} = \frac{h_1}{h_2} \left(\frac{L}{K}\right)^{1+\beta} = \frac{r}{w}.$$

Taking logarithms and rearranging terms, we obtain the expansion path given in (2), where

$$\sigma = \left(\frac{\partial Q}{\partial K} \cdot \frac{\partial Q}{\partial L}\right) / \left(Q \cdot \frac{\partial^2 Q}{\partial K \partial L}\right) = \frac{1}{1+\beta}.$$

A partial equilibrium approach will be used that ignores any relationship between the exchange rate and the wage rate. This can be defended to some extent in the case of the Philippines and other surplus-labor IDCs where minimum wage laws govern the behavior of nominal wages generally. However, it seems hard to deny that a change in the exchange rate can exert pressure on the authorities to adjust minimum wage rates.^{4/}

To fix ideas, suppose that the domestic currency is actually overvalued by v per cent. Then imported capital can be obtained v per cent cheaper than in the case where the exchange rate is at the equilibrium level. However, there is a domestic component to total investment, consisting of construction and domestically-produced durable equipment that may or may not be influenced by the price of imported capital goods. The price index for investment goods under the actual exchange rate would then be lower than that under the equilibrium rate but by less than v per cent.

Let us represent an empirical relation between the price of imported capital (P_{km}) and the domestic price index of investment goods (P_k) as follows:

$$(3) \quad P_k = A P_{km}^b, \quad 0 < b < 1.$$

^{4/} In [1] the annual wage of unskilled industrial workers in the Philippines is shown to be highly correlated ($r^2 = .982$) with the general price level lagged one year and the lagged wage variable. Thus if a currency devaluation induces a rise in domestic prices, such change in the exchange rate can be expected to increase wages.

The parameter b denotes the percent change in P_k induced by a 1 per cent change in P_{km} ; hence a v per cent change in P_{km} would lead to a bv per cent change in P_k .

In addition to some estimate of b , we need quantitative information on the elasticity of substitution, the cost of capital services and the magnitude of the overvaluation of the domestic currency to have an idea about the latter's employment effect.

III

We have three sources of data. For estimates of the elasticity of substitution, we have the comprehensive study of production functions in Philippine manufacturing by G.P. Sicat [7]. Sicat estimated the production functions of organized manufacturing industries at the 2-digit ISIC level using a special tabulation of a sample of responding establishments in the 1960 Annual Survey of Manufactures. He found the Cobb-Douglas function to be a statistically acceptable specification for the 2-digit industries. However, using the CES function, his estimates of the elasticity of substitution showed a very wide range--from 0.368 to 1.806. $\hat{\sigma} = 0.7$ would seem to us reasonable but nothing is lost in trying other σ -values within the range suggested by the Sicat findings, viz: 0.3, 0.7, 1.0, 1.5 and 1.8. In using such range of elasticity values, our purpose is to obtain an approximation of the employment repercussions "at the limits" as well as at the in-between.

For estimates of the degree of overvaluation of the Philippine peso in 1961 (to mean here the required proportional devaluation to

bring it into line with external currencies),^{5/} we use as a benchmark the estimates of John Power /5/. Power suggested that relative to a situation where selective tariffs, an export tax, and an import tax were retained, the Philippine peso in the middle 1960s was overvalued by 11 per cent; relative to a situation of "zero tariffs" (i.e., complete free trade), it was overvalued by 31 per cent. His "best" estimate of the currency overvaluation was from 15 to 20 per cent. Since these estimates related to the post-devaluation (mid-1960s) period, they should be adjusted upward when referring to the early 1960s. Hence, in the present exercise, we employ not just a "low" estimate but also "high" estimates of the required proportional devaluation of the Philippine peso. These estimates are .10, .40, .70, and 1.00. Our own feeling is that the domestic currency was overvalued at the time by about 70 per cent.

For the user cost of capital, we focus attention simply on the price of goods, for reasons to be given below. In turn, we made the price of capital goods dependent upon the price of imported machinery and equipment, using for the former the implicit price index for Gross Domestic Capital Formation in the National Accounts and for the latter the Central Bank wholesale price index for imported machinery and equipment. First differences of the logarithms were used in the

^{5/} In this note we express the currency overvaluation rate in terms of the domestic currency instead of the foreign currency commonly used in devaluation analysis.

regression equation to reduce serial correlation^{6/}, obtaining the following result from annual data for the period 1955-1970:

$$\Delta \log P_k = 0.0107 + 0.638 \Delta \log P_{km} \quad (2.84)$$

$$\bar{R}^2 = .335 \quad \text{D.W. } 1.50$$

The number in parenthesis is the t-value of the regression coefficient which is seen to be significant at the 5 per cent level. The rather low $\bar{R}^2$ is due to two factors: (1) other variables are also acting on P_k , which variables we are not examining for the limited purpose of this exercise;^{7/} and (2) extraneous correlation is removed by first differencing the variables in the regression.

Jorgenson [2] has expressed the user cost of capital in terms of the price of capital goods, profit rate tax, discount rate, depreciation rate, ratio of tax deductible depreciation to actual replacement, share of the cost of capital exempt from the profits tax and the share of capital gains in taxable income. Due to data limitations we are forced to use P_k as proxy for the rental value of capital. The same procedure was used by J.G. Williamson [8]. It can be argued, as

^{6/} The regression of $\log P_k$ on $\log P_{km}$ in (3) yielded an implausibly high estimate of b ($= 1.08$) which we think is caused by the significantly positive autocorrelation (D.W. = .44).

^{7/} The assumption has to be made that these other influences on P_k are unrelated to changes in the exchange rate.

Williamson has done, that in the Philippine context the price of capital goods is the most dominant on the cost of capital service.

IV

The effects on factor proportion and employment of currency overvaluation for the different values of the elasticity of substitution (σ) and overvaluation rate (v) are shown in Table 1. The topmost entry in each cell shows the extent of capital intensive bias in terms of the percentage deviation of the actual labor-capital ratio from the equilibrium level due to the overvaluation of the currency. The middle entry gives the amount of employment in organized manufacturing foregone in 1961 as a result of such choice of technique assuming the same input of capital services for the year. Including unorganized manufacturing (based on the 1961 BCCSH Labor Force Survey data), the corresponding figure is given in the last entry.

The general impression one gets from Table 1 is that the impact of currency overvaluation in the Philippines on factor proportion and employment is substantial at least in the reasonable range of values of σ and v . Between the "low" and "high" values of these two parameters, employment opportunities not realized range roughly from 7 to 413 thousand in organized manufacturing activities and from 20 to 1,182 thousand in the whole manufacturing sector. The upper limits imply that manufacturing employment in 1961 would have doubled had the exchange rate been at the equilibrium level. This is of course an unlikely possibility in

TABLE 1

$\sigma \backslash r$	.10	.40	.70	1.00
0.30	.019 6.9 19.7	.077 27.6 78.8	.134 48.2 137.9	.192 68.9 197.0
0.70	.045 16.1 46.0	.179 64.3 183.9	.314 112.5 321.8	.448 160.7 459.6
1.00	.064 23.1 65.7	.256 91.9 252.7	.448 165.0 459.6	.640 229.6 656.6
1.50	.096 34.4 98.5	.384 137.8 394.0	.672 241.1 689.5	.960 344.4 985.0
1.80	.115 41.3 118.2	.461 165.3 473.8	.806 289.3 827.4	1.152 413.3 1,182.0

Note:

Basic employment data for organized manufacturing taken from the 1961 Economic Census and for "all" manufacturing from the 1961 Labor Force Survey, both conducted by the Bureau of the Census and Statistics.

view of the extremely high values of σ and v assumed in this case.

Focusing however on the most reasonable assumption that $\sigma = 0.7$ and $v = 0.7$ we find credible figures on employment foregone of about 113 thousand in organized manufacturing and 322 thousand in "all" manufacturing. The latter represents nearly one-half of the openly unemployed labor force, using the May-October average of 667 thousand from the 1961 BCSSH Labor Force Surveys. Even allowing for as somewhat lower elasticity of substitution in the unorganized sector, one would still likely arrive at the employment effect of currency overvaluation which is substantial enough to reduce significantly total unemployment in 1961.

V

As made clear at the outset, the analysis in this note is highly exploratory and illustrative only of a possible line of approach in studying the relationship between the exchange rate and employment in a labor-surplus, open economy. We have focussed attention on the distortionary effect on relative factor prices induced by currency overvaluation, although here only the impact on the price of capital goods is examined. Our tentative results however are suggestive of the significant influence of the exchange rate on employment even in the context of the severe unemployment problem in the Philippines. Further work appears warranted that would incorporate in the analysis the other factors bearing on the demand for labor which are affected by the exchange rate.

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