

Equity Impact and the Effectiveness of Adjustment Policies with a Segmented Labor Market: The Case of the Philippines

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Based on the segmented labor market hypothesis, this paper analyses the equity impact and the effectiveness of nominal devaluations. Segmentation is defined in terms of the degree of coverage provided by typical labor market regulations. The model is empirically applied to the Philippines, a country characterized by notable labor market segmentation and substantial macro adjustment in recent years. Two hypotheses are tested. First, that given relatively more rigid wages in protected sectors, nominal devaluations will result in expanding wage differentials against the informal sector of the economy. Second, that the presence of labor market distortions reduces the effectiveness of nominal devaluations in achieving a real devaluation of the exchange rate. The empirical results indicate that adjustment policies produce a negative equity impact, but that the degree of ineffectiveness associated to labor market segmentation is not significant.

I. Introduction

Two related questions are important in analyzing the role of the labor market in attaining more effective and equitable adjustments in LDCs. First, the extent to which the effectiveness of a nominal devaluation in attaining a real devaluation is hindered by a low inter-industry labor mobility. Second, the extent to which adjustment policies may expand the existing wage gap between the formal and the informal sector of the labor market, yielding a negative equity impact.

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The presence of labor market segmentation in the economy may provide a rationale for both these questions.

In this paper, a model of labor market segmentation is applied to study both the equity impact and the effectiveness of exchange rate policies in the Philippines. This constitutes a relevant case study due to the presence of labor market segmentation and the application of substantial macroeconomic adjustment in recent years. The impact of exchange rate policies on the informal/formal wage gap, and the influence of prevailing labor market distortions on the level of the real exchange rate and on the effectiveness of nominal devaluations in achieving a real devaluation. The main conclusions are that nominal devaluations expand the formal/informal wage gap, but that the presence of labor market distortions do not significantly affect the effectiveness of nominal devaluations. Given that the existence of a negative equity impact derives from the presence of labor market segmentation and, thus, from government and union intervention, the main policy implication refers to the need to deregulating the labor market to achieve a more effective and equitable adjustment.

Section 2 provides background information with regard to long run economic strategies and recent economic trends in the Philippines. This section also describes the characteristics of the labor market. Section 3 discusses the analytical model and estimate a set of empirical equations to measure the equity impact of exchange rate policies and the effect of labor market distortions on the effectiveness of nominal devaluations. Section 4 contains a summary and enumerates the policy implications.

II. The Philippine Economy

1. Development Strategy and Macroeconomic Trends

During the 30 years that followed the end of World War II, the Philippines followed an industrialization-led development strategy based on import protection. The import substitution strategy (ISS) enjoyed a favorable political climate and allowed for a relatively large industrial sector. The 3% p.a. GDP growth observed in this period notably improved the growth record seen immediately before the War (Hooley, 1985). However, as the strategy was progressively exhausted and although the import substitution strategy resulted in average growth rates in manufacturing of 8.5% p.a.¹ in the period 1949-69, growth notably decelerated in the 1970s.

The consequences of implementating the ISS in the Philippines were similar to those seen in Latin America (Corbo, 1986). Growth was marked by periodic balance of payment crises, requiring increasing state intervention and higher trade barriers. In addition, as the phase of easy-substitution was exhausted by the late 1960s and the sustainability of the growth record became uncertain, the ISS triggered more pervasive intervention, investment rationing in favor of certain industries, product shortages in agriculture and an increasing obstruction of exports (Go, 1988). The ISS also produced a steady drop in the efficiency of manufacturing, shown by a declining trend in total factor productivity adjusted by labor quality and hours worked (Hooley, 1985).

Before the 1970s, the extent of import substitution was important in industries linked to the internal demand, like food processing, textiles and basic metals (Estanislao, 1980). In contrast, in the cases of agriculture and mining, export demand was the most important source of growth. The increasing inefficiency created by the ISS fostered a real revaluation of the exchange rate since the mid-1970s, at the time that inflation swelled in alliance with a growing fiscal deficit (Table 1). This intensified the productive crisis triggered by the ISS, harming the

Table 1
PHILIPPINES: BASIC MACROECONOMIC INDICATORS

	GDP	CPI		Fiscal	Trade	Manufact.
	Growth	Inflation	RER	Deficit	Balance	GDP
	(1)	(2)	(3)	(4)	(5)	(6)
1960	6.2	3.8	63.5	0.1	-0.4	20.3
1965	5.0	3.1	100.0	-1.3	-0.7	19.5
1970	4.3	15.3	141.1	0.1	-0.4	22.6
1975	5.8	6.8	109.4	-1.2	-7.6	24.6
1980	5.0	18.2	97.0	-1.3	-5.5	24.6
1985	-11.2	23.1	123.6	-1.8	-1.5	24.6
1989	3.6	10.6	129.7	-2.0	-5.8	23.7

Notes: (1) Yearly Rate of Growth; (3) Real Exchange Rate (Ratio of US CPI to the country's CPI multiplied by the nominal rate, index 1965 = 100); (4), (5) expressed as a ratio of the GDP; (6) Manufacturing GDP as a ratio of the total GDP.

¹ Although this growth rate is of course very respectable, before World War II manufacturing value added was already growing at a 6 percent p.a.

sectors more competitive according to international standards. The first oil price-shock and the availability of easy external credit during the 1970s allowed the government to postpone the reforms needed to restore basic macroeconomic balances in the frame of an open economy.

The performance of the Philippine economy during the 1970s was nonetheless quite impressive. Average real growth rates were above 5%. Total domestic investment rose from 20% to 30% of GDP by the end of the decade, while public investment grew from 2% to 6% of GDP. However, despite high growth rates in agriculture and manufacturing, a chronic trade deficit was observed, albeit not handled with adequate policies. Moreover, fiscal imbalances and unsustainable high real interest rates produced growing inflation, while the protection granted to key productive sectors hindered the resource mobility and the supply response to macro policies.

Alike the case of Latin American countries, the problems produced by the import substitution strategy demanded the instauration of higher protection.² A growth record biased against agriculture and other exports³ was the unavoidable result. While more direct government intervention in productive activities was required, the failure of the ISS also demanded growing intervention in factor markets, particularly the labor market.

2. Labor Market Regulations in the Philippines

The aim of constructing a welfare state jointly with the ISS produced a wide array of protective regulations in the labor market. Minimum wages, mandated non-wage labor payments and job security regulations were transformed in key instruments of labor market intervention.⁴ The role of these instruments is analytically important as they caused segmentation of the labor market between protected and

² However, average tariff rates in the Philippines never reached the high levels seen in some Latin American economies.

³ Go (1988) has investigated the extent of this bias in terms of the incentives to invest in both the primary and manufacturing sectors. By using the real shadow price of capital in both sectors, he has shown the magnitude of the over-investment in services and manufacturing.

⁴ Tidalgo & Esguerra (1984) conclude that efforts on the part of both the government and the unions had led to various forms of intervention like the Minimum Wage Law of 1951, the Government Service Insurance System Act of 1951, the Industrial Peace Act of 1953, the Blue Sunday Law of 1953, the Social Security Act of 1954 and the compulsory coverage of the State Insurance Fund stated in the labor Code.

unprotected sectors, reducing the inter-industry labor mobility and the market response to economic policies.

As highlighted by some indicators, the Philippines is probably one of the most regulated labor markets in East Asia. For instance, the ratio of non-wage labor costs to wages in 1989 was above 30%, a level much higher than in almost all Asian countries (Riveros 1987, 1989).⁵ Likewise, and albeit the application of job security norms is similar to other East Asian countries and not as constraining as in other LDCs,⁶ it notably contrast with the high labor mobility observed in rural areas and in unprotected urban activities (Tidalgo & Esguerra, 1984). In addition, due to growing inflation in the mid-1970s, the regulatory framework was further tightened as mandated wage adjustments began to take place through benefits like the 13th month, COLA agreements and ad-hoc bonuses. Finally, another indicator of the importance of labor market regulations is that, although wages of unskilled labor have dropped over the long run, real minimum wages have been growing (Table 2, Col. 5), thus resulting in that during the 1980s the MW has been above the wage of an average unskilled worker in the informal sector.⁷

Due both to the actual enforcement of key labor market regulations, as well as to certain exceptions granted in the aim of encouraging small firms,⁸ protective regulations are a source of labor market segmentation. Since the protected sector includes large private firms and the government, while the unprotected one includes small firms and self-employment, this breakdown largely overlaps with the traditional formal-informal dichotomy applied to LDCs. This association is important to empirically study the labor market response to macro-economic adjustment policies and to analyze their distributive effect.

The high economic growth observed in the 1970s did not yield higher wages nor employment. Moreover, during 1958-78 manufactur-

⁵ This figure is concordant with those reported by Price Waterhouse (*Doing Business in the Philippines*, 1985), and by L'Institute de l'Economie Allemande (*Coûts Salariaux et Conditions de Travail dans l'Asie du Sud-Est*, 1986).

⁶ For instance, the cases of Mexico, India and Zimbabwe provide good examples of extreme regulatory frameworks. See, to this respect, Riveros (1989), and Lucas & Fallon (1989).

⁷ The category of unskilled labor corresponds to the definition of "common laborers" contained in the Statistics of the Ministry of Labor. Given that this is probable comparable to the typical informal sector worker, we use the wage for this group as a proxy for informal sector wages.

⁸ For instance, Tidalgo (1983) discusses several cases in which exceptions are provided to the minimum wage law.

ing was the sector that created less employment (Tidalgo & Esguerra, 1984).⁹ In addition, and despite some growth episodes seen in the mid-1960s and in 1980-85, a long term decline in both skilled and unskilled real wages has been observed (Table 2, cols 1 and 2) in combination with active regulations on the labor market. A probably dominant reason for the observed drop in wages over time has been the fast pace of increase in labor supply (IBRD, 1988), but the role of labor market distortions cannot be ignored. For instance, even though a substantial investment growth in the 1970s produced an increase in the output per worker, wages continued dropping throughout. However, the ratio of non-wage labor costs — i.e. including both wage and non-wage items — to wages has grown significantly throughout time (Table 2; Col 4), being an important factor in explaining the widening formal/informal wage gap and an increasing labor market segmentation. The observed growth in the labor supply has apparently declined over time (Table 1) suggesting the real wages behavior is probably more linked to existing labor distortions.

Periods of economic growth have benefitted the informal sector vis-à-vis the formal one, while the inverse has occurred in periods of

Table 2
PHILIPPINES: BASIC LABOR MARKET INDICATORS

	w^s	w^u	w^s/w^u	B	mw/w^u	U	L
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1960	100	100	100	18.8	80	11.1	100
1965	87	102	85	18.0	75	10.7	119.9
1970	87	102	85	18.0	82	8.9	143.3
1975	56	69	81	26.0	86	7.8	116.9
1980	51	47	109	27.3	173	7.9	199.3
1985	55	51	108	29.7	136	10.6	239.5
1989	57	53	108	31.2	143	9.7	257.4

Notes: (1) Wage of Skilled workers; (2) Wage of unskilled workers; (4) Ratio of non-wage benefits to w_s ; (5) Minimum wage as a ratio of w^u ; (6) Open unemployment rate; (7) Labor Force Index (1), (2), (3), (7) are expressed as an index base 1960 = 100.

⁹ Rural wages, although also falling, did not drop as fast as urban wages, since labor absorption in agriculture was more dynamic than in manufacturing and industry (IBRD, 1988).

exchange rate adjustment. If skilled labor is mostly concentrated in the formal sector, while unskilled labor is in the informal sector, relative wages by skill groups are suitable to study the effect of adjustment policies on labor market segmentation. The ratio of wages of skilled to unskilled labor shows a significant decline in 1960-1980 and an increase thereof (Table 2, Col. 3).¹⁰ This increase in the wage gap is associated to the observed GDP growth (Table 1): the period 1960-80 was characterized by relatively high growth, which nonetheless decelerated during the late 1970s. However, this deceleration does not seem to be connected with the steady ratio of skilled to unskilled wages. As Cottani (1980) has shown, the real exchange rate declined during most of the period 1960-80,¹¹ and increased thereafter, suggesting positive correlation with observed trends in the wage gap. This evidence suggests that periods of economic growth have been accompanied by a declining skilled/unskilled wage gap, whereas periods characterized by a growing real exchange rate have been accompanied by a growing skilled/unskilled wage gap. This stylized fact can be explained on the basis of a segmented labor market model.

3. Segmentation and the Philippine Labor Market

The distinction between protected and unprotected sectors greatly overlaps with the common dichotomy of formal/informal labor markets. The degree of enforcement of labor market regulations allows to distinguish protected and unprotected sectors, distinction which is, in turn, related to the size of the firm and, its degree of technological complexity and capital intensity. Also, given the role of regulations and laws, the protected sector is more associated with a high degree of formalization of the jobs inside the firm (internal labor market), which in turn relates to the extent of attachment of the worker to a job.

Jurado & Castro (1978) have supported the idea of segmented labor markets in the Philippines and highlighted the salient role of structural ingredients. The segmented labor market approach has also been used in a number of studies (Armas, 1978; Tidalgo & Jurado, 1973; and

¹⁰ It is important to note that there prevails a steady decline in this ratio until 1979. The data in Tables 1 and 2 couldn't be completed for all the variables, this being the reason why only selected years are included.

¹¹ In 1960-68, that decline was very mild; in 1969-70, a short-lived increase was observed. After 4 years of decline, the real exchange rate increased substantially in 1975, but a deep drop was observed in 1976-1980. Finally, the period 1981-84 has been marked by substantial growth (Cottani, 1980).

Canlas, 1987) analyzing employment and wages in specific economic sectors. Likewise, and using a standard methodology based upon an estimation of intersectoral wage differentials for similar workers,¹² segmentation has been found to be a key element characterizing the labor market and the economic returns to schooling (Riveros, 1987). Empirical results indicate that observed wage differentials among industries are more associated to differences in parameters¹³ than to differences in average human capital across sectors.

In analyzing the equity impact and the effectiveness of adjustment policies, the assumption of a segmented labor market is a critical one. Lal (1983) has explained the observed long term decline in real wages on the basis of the role played by higher capital-labor ratios in the framework of the ISS and an assuming integrated labor market. In explaining aggregate wage trends, this latter assumption is reasonable, given the similar trend displayed by skilled and unskilled wages in the economy. However, in examining the effect of policies on relative prices and wages, and on the labor mobility, the presence of segmentation is a critical factor.

III. A Model of Segmented Labor Markets

1. General Analytical Structure

The standard macroeconomic analysis hinges on the assumption of integrated labor markets. This approach predicts that an increase in the nominal exchange rate will raise the price of tradable goods relative to the price of non-tradables — in order to secure which an ad-hoc expenditure reduction is normally advocated. This will cause a wage decline in terms of tradables (and in terms of the CPI), implying that labor will flow from the production of non-tradables to the production of tradables. In this model, adjustment policies do not cause any significant distributive pattern at the inside of the labor force, while

¹² This methodology requires to regress income on human capital variables. If, after standardizing income levels by average schooling and experience, there remain significant wage differentials across sectors associated to differences in parameters, it is concluded that there is labor market segmentation in the sense of a different wage setting across sectors. This assumes that the formal-informal segments concentrate with similar probability across economic sectors, which is plausible when the average human capital in a country is relatively low. For a review of the literature see Corbo & Stelcner (1983).

¹³ Which, in the formulation of the model, correspond to the rates of return to schooling and experience.

the existence of wage flexibility will allow to transform a nominal devaluation in a real devaluation.

Contrary to the implication of the standard neoclassical model, the presence of labor market segmentation may reduce the effectiveness of exchange rate policies and increase the formals/informal wage gap. Exchange rate policies may produce a negative equity impact due to a different degree of wage flexibility across segments of the labor market, determining that the wage drop in the informal sector in response to macroeconomic policies is always larger than in the formal sector (Fallon & Riveros, 1989). Likewise, given a degree of labor market segmentation associated to distortionary intervention and formal sector wages higher than the notional market equilibrium wage, a nominal devaluation may increase prevailing wages and trigger a drop in the real exchange rate through the effect of wages on the price of non-tradables. The effect of a nominal devaluation on the real exchange rate will be determined by the degree of distortionary intervention and segmentation existing in the labor market.

The analytical model assumes that the formal sector produces both tradable and non-tradable goods with both skilled and unskilled labor and that the minimum wage is binding for unskilled workers in this sector. The informal sector is a producer of only non-tradable goods and uses unskilled labor.¹⁴ The model assumes that both sectors are profit maximizers and characterized by convex profit functions. Therefore, the demand for skilled labor in the formal sector (L_f^d) depends upon the price of tradables (PT), the price of non-tradables (PN), the capital stock (K) and the (notional) equilibrium wage for skilled labor (W^*).¹⁵ Since there are substitution possibilities between skilled and unskilled labor, the demand for skilled labor also depends on the Minimum Wage (MW). It is assumed that the supply of unskilled labor is a fixed proportion τ of the population in working age (N).

$$(1) \quad L_f^d = L_f^d(PT, PN, W^*, MW, K) = \tau N$$

Demand-supply equilibrium in the formal-skilled market determines the notional wage (W^*). The prevailing market wage (W_s) is

¹⁴ This is an urban labor market model. The assumptions follow the traditional idea that the informal sector is a low productivity one and concentrated in services (non-tradables). The concept of skills we use here correspond to general skills (general human capital) which employers may use as a signal of productivity.

¹⁵ The demand for skilled labor may be also specified depending upon the level of public sector employment and upon the existence of ex-post indexation (Fischer, 1984).

greater than the notional wage (W^*) due to the existence of a distortionary factor θ . The following relationship between the rate of change in actual (W) and notional (W^*) equilibrium wages in the formal market is postulated:

$$(2) \quad W_s = W_s^* + \theta(\Omega_0 + \Omega_1 W_s^* + \Omega_2 MW)$$

where MW correspond to the rate of change in the Minimum Wage. The parameter $\theta(0 < \theta < 1)$ is the prevailing wage distortion. If there is no distortion ($\theta = 0$), notional and actual wages are equal. The Ω_i 's are fixed coefficients responding to the following assumptions: $\Omega_0, \Omega_1, \Omega_2 > 0$; $(\Omega_0 + \Omega_1 \ln W_s^* + \Omega_2 \ln MW) > 0$; $\theta \Omega_1 < 1$. These assumptions imply that W_s is increasing in W_s^* and θ — i.e., W_s is responsive to changes in prevailing labor market conditions. They also imply that the responsiveness of W to W_s^* is affected by the level of the distortion θ . Thus, equilibrium in the formal sector in terms of the actual wage is described in the following reduced form equation (variables in rate of changes):

$$(3) \quad W_s = W(\theta, PN, PT, MW, K, N)$$

+ + + ? + -

The demand for unskilled labor in the formal sector depends upon prices, the capital stock, the wage for skilled labor (W_s) and the wage for unskilled labor employed in the free (informal) sector of the economy (W_u). Given the minimum wage, the employment of unskilled labor in the formal sector is solely determined by the demand of unskilled labor in this sector. Following Harberger (1972), the effective labor supply to the informal sector is equal to the total supply for a given minimum wage minus the total employment of unskilled labor in the formal sector at that minimum wage.

The informal sector is a neoclassical one, where a market clearing wage is determined. The derived demand for labor in this sector depends on PT , PN , the wage for unskilled labor (W_u), the capital stock in the informal sector and the MW , which is the opportunity cost of informal sector workers.¹⁶ The total supply of unskilled labor

¹⁶ Given the total labor supply (S) and the legal MW , the effective supply to the informal sector (S^*) is equal to S minus the employment of unskilled labor in the formal sector. If the MW is above W_u , there will be queuing unemployment in the economy (i.e., those unwilling to work at the ongoing informal sector wage, but with supply price below MW).

depends upon the CPI, W_u , MW and N. The equilibrium wage (W_u) is, thus, represented by the following equation:

$$(4) \quad W_u = W_u(PN, PT, W_s, MW, K, N)$$

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The model concentrates on market wages rather than on the underlying demand-supply functions. One reason for this is the aim of analyzing the response of the formal-informal wage gap to nominal exchange rate policies. Another reason is that, in contrast to relatively homogenous wage data, available employment and labor force series are more deficient.

The price of non-tradables in this model is determined by market clearing conditions. The supply of non-tradables is a function of all wages (W_s , W_u , and MW), the price of both tradable and non-tradable goods and the capital stock. The demand for non-tradables is a function of output prices, and the level of aggregate expenditures in the economy (E). Thus, given that the domestic price of tradables is defined like the world price multiplied by the nominal exchange rate, the market equilibrium implies that the price of non-tradables is also function of the nominal exchange rate. Thus, equilibrium prices in the market for non-tradable goods, are represented by:

$$(5) \quad PN = PN(PT, W_u, W_s, MW, I, E)$$

+ + + + - +

The basic model displayed by eqs. (3), (4) and (5) will be used to implement two different test. In its simplest version, the model will be estimated without imposing any constraint regarding the condition of homogeneity degree one in prices and wages, which derive from the properties of the underlying demand-supply functions. In this version the system will be estimated under the simple assumption that $W_s = \theta W_s^*$. This simplest version will be used to test the homogeneity conditions and the distributive implications of exchange rate policies, thus concentrating on the effect of changes in PT on W_s and W_u .

A second empirical version of the model will be used to analyze the effectiveness issue. In this version the homogeneity conditions are imposed, expressing all variables in terms of the price of tradable goods. Equation (2) — which connects actual and notional wages in the formal sector — will be used instead of the simpler assumption postulated in the basic model.

2. *Comparative Statics of the Model*

Under the standard assumption of a homogeneous labor market, the observed change in the wage gap ($W_s - W_u$) in response to a devaluation of the nominal exchange rate would be basically associated to differences in marginal productivity. A flexible response in both wages would be nonetheless seen in response to a nominal devaluation and the subsequent change in relative output prices. Thus, with flexible wages, a nominal devaluation will result in a decline in real wages throughout the economy, which is the result predicted in a simple two-sector model of a small-open economy (Prachowny, 1974). If there are similar wage rigidities in both sectors of the economy, the observed response to macroeconomic policies would be similar to the case of an integrated labor market with wage rigidity. However, even in this case, there are not a-priori predictable distributive results.

Even in the presence of segmentation, if there is wage flexibility in the economy, labor reallocation will occur as production in the economy is reorganized. In the formal sector real skilled wages and the real minimum wage will drop in terms of tradable goods and increase in terms of non-tradables in response to the change in relative prices produced by a nominal devaluation. In the informal sector, the drop in the relative price of non-tradable goods will yield a decline in labor demand and in real wages in terms of tradables. This will imply a shift of workers from the informal to the formal sector if the (expanding) production of tradables is more unskilled-intensive. As a result, output and employment in tradables will increase, wages in terms of tradables will decline and wage in terms of non-tradables will remain constant.

If the market is segmented, in the sense that formal sector wages are "protected" while those in the informal sector are not, an increase in the price of tradables due to a nominal devaluation will positively affect the nominal W_s and MW. Contrarily, the nominal W_u will remain unchanged in face of an increase in the price of tradables. If both W_s and MW are fully fixed in real terms, a devaluation accompanied by fiscal/monetary policies aimed at keeping the nominal aggregate demand constant will not affect the production of tradeables. The output of non-tradables will fall due to the drop in its relative price, thus also resulting in a decline of both the skilled and the unskilled labor demand in the formal sector. The employment drop of unskilled labor in the formal sector will expand the effective labor supply to the informal sector, thus reinforcing the decline in W_u associated to the devaluation (i.e., the decline in the relative price of non-tradables). In brief, under the presence of segmentation in the labor market and full wage indexa-

tion¹⁷ output of non-tradables will fall in both sectors, unemployment of both skilled and unskilled workers will increase and the output of tradables will remain constant. In this case, the devaluation is completely ineffective and contractionary. In addition, the wage gap ($W_s - W_u$) will increase, thus negatively affecting the income distribution.

3. *The Equity Impact of Adjustment Policies: Empirical Results*

Preliminary statistical analysis allowed us to reject the hypothesis of structural differences in the sample.¹⁸ The presence of serial correlation and heteroscedasticity was rejected according to a standard chi-square test. Analysis of the autocorrelation functions revealed that all the series were stationary in their first differences, implying that their levels were cointegrated. The price of tradables was measured as the product of the international price of tradables (PT*), measured by the WPI of the US, and the nominal exchange rate (e). The change in the capital stock was proxied by the ratio between investment and the output level lagged one-period.¹⁹ In the case of the W_u equation, the variable total labor cost (LC) is the sum of skilled wages and non-wage labor costs. W_u is proxied by the wage index of unskilled labor prepared by the Ministry of Labor. Finally, in the PN equation the variable change in disposable income (Y_d) was used as a proxy for the change in aggregate expenditures.

The variable θ is proxied by the observed level of non-wage labor costs, i.e. those associated to fringe benefits, regular bonuses and other contributions to shared funds. Given the role attached to the variable θ in proxying changes in labor market distortions, this is a critical choice for the empirical analysis. Due to the fact that unions and the government normally resort to non-wage benefits in their aim of raising labor incomes, non-wage labor costs may nonetheless be considered an adequate proxy of wage distortions. They are easier to implement administratively, and they definitely cover the formal sector

¹⁷ Strictly speaking, to reach these extreme results we would need full wage indexation in terms of the price of tradables. If wages are indexed in terms of the CPI (that is, they are only partly indexed to PT), we will obtain an intermediate result between the pure neoclassical and the full indexation assumptions (see, Lopez & Riveros, 1989b).

¹⁸ For this purpose, we used a Chow test based on the residuals, and using 1972 or 1974 as alternative benchmarks.

¹⁹ Given a lack of adequate information on the proportional change in capital stock, this variable was proxied by the total domestic investment divided by the output level in period $t-1$. Several other alternatives were also explored, including an estimate of the capital stock prepared on the basis of the investment series.

of the economy. In addition, they are mostly received by the worker in the same period, in spite of the fact that some of those benefits may constitute a future income flow. Given that non-wage benefits are generally exempt of taxes, their observed changes do not reflect actual changes in fiscal policies which may also affect the wage level. Non-wage labor costs are also an adequate proxy in considering that they have been traditionally used in implementing welfare policies aimed at improving the standard of living of modern sector workers. Finally, cross-country studies have suggested that this variable is positively associated to other indicators of labor market distortions in LDCs, like tight job security laws (Riveros 1989), thus also suggesting they are the best quantitative proxy of prevailing labor market distortions available in a time series.

Econometric estimation of the three simultaneous equations involving wages and the price of non-tradeables (Table 3) yield acceptable results. The quality of the fit in all the equations is adequate, specially in considering the sign and significance of the parameters. The size of the F-test indicates that the hypothesis of homogeneity degree one cannot be rejected.²⁰

The negative parameter connecting MW and W_s indicates the existence of complementarity between skilled and unskilled labor in the formal sector (an increase in MW would induce a decline in the employment of unskilled labor and a decline in the labor demand for skilled labor). In both wage equations lagged wages were included, but only in the case of the formal sector this variable was significant. In the case of the W_u equation, it is observed that the impact of changes in labor costs²¹ is significant, thus suggesting that an increase in W_s and the resulting increase in employment of unskilled labor in the formal sector will reduce the effective labor supply to the informal sector. Changes in θ do not affect directly the prevailing wage in the formal sector. However, indirectly through the effect of labor costs on the price of non-tradeables, it accounts for a more significant impact.²²

A crucial observation in connection with the distributive impact of exchange rate policies is that the direct effect of changes in the price of

²⁰ To test this hypothesis we used a standard Chow test in which the constrained model is the one in which we impose the sum equal to one of the coefficients associated to wages and prices.

²¹ As said before, this variable corresponds to the sum of the wage and the non-wage cost of skilled labor.

²² The numerical value of this effect is equal to the sum of the corresponding parameters (0.32), with standard deviation equal to 0.21.

Table 3
PHILIPPINES: 3SLS ESTIMATES OF THE SET OF STRUCTURAL EQUATIONS

		R ²	h	F
$\dot{W}^S =$	$-11.01 + 0.155 B + 0.788 P_T + 0.379 P_N - 0.167 W + 0.243 I + 0.791 N + 0.932 w - 1$ (-1.22) (0.84) (2.58) (1.43) (-1.25) (0.54) (0.21) (3.38)	0.71	n.a.	0.6
$\dot{W}^U =$	$-1.99 - 1.34 P_T + 0.593 P_N + 0.51 L_c + 2.611 I - 1.543 N - 0.061 W - 0.99 w - 1$ (-0.22) (-0.29) (2.99) (1.27) (4.67) (-5.93) (0.43) (-0.85)	0.88	-1.34	1.1
$P_N =$	$6.60 + 0.370 P_T + 0.043 E + 0.131 w_u + 0.179 L_c + 0.276 W - 0.717 I + 0.551 Y_d$ (1.18) (5.82) (1.72) (1.73) (3.35) (3.98) (-3.65) (3.91)	0.91	1.92	0.91
			DW	

Notes: The h test is the Durbin test for serial correlation in presence of lagged dependent variables. The F test is the value of the Chow test that compares the errors obtained from a regression in which the sum equal to one of coefficients associated to prices and wages against the error obtained from a regression that do not impose such a constraint. The Table values of the distribution implies the no rejection of this hypothesis. Instrumental variables used: Population, Fiscal expenditures, Terms of Trade, Minimum Wages.

tradables on W_s is positive and significant, while statistically equal to zero in the case of informal sector wages (W_u) (Table 3). However, the total effect of an increase in PT on both W_s and W_u is more complex because it must account for all the relationships involved. This total effect is measured by taking to total derivative in the W_s , W_u and PN equations. Using the expressions derived in Appendix A and the estimated parameters (Table 3) an elasticity of formal sector wages with respect to the price of tradables of 0.99 is found. This contrasts with an elasticity of informal sector wages with respect to the price of tradables of only 0.10. Thus, informal sector wages are about 10 time more flexible in face of a nominal devaluation.

This evidence suggests the existence of an important unequitable impact associated to the relative wage rigidity prevailing in the formal sector. A given devaluation will increase the formal/informal wage gap by almost the same proportion.

4. *The Effectiveness of Adjustment Policies: Empirical Results*

The degree of effectiveness of a nominal devaluation, measured by its effect on the real exchange rate, may be negatively affected by the presence of wage distortions. For instance, if the presence of wage distortions makes real wages significantly more rigid, it may also reduce the effectiveness of a nominal devaluation. Similarly, if in response to a nominal devaluation and due to the role of labor market distortions, wages put an upward pressure on the price of non-tradables, the effectiveness of the nominal devaluation will be reduced. An important implication of the likely ineffectiveness of exchange rate policies would be that adjustment policies may lead to a series of failed nominal devaluations which would worsen the distributive situation without exerting any significant effect on production and employment.

Empirically measuring the relationship between labor market segmentation and exchange rate policies requires an explicit relationship between notional and actual wages in the formal sector. The existing wedge between notional and actual formal sector wages is crucial in examining the degree of effectiveness of nominal devaluations. Using the previous results regarding the homogeneity conditions, the following version of (2) is adopted (the variables are expressed in terms of the price of tradables and in logs):

$$(6) \quad w_s = w_s^* + \theta(\Omega_0 + \Omega_1 w_s^* + \Omega_2 mw)$$

The following equilibrium condition for the formal-skilled labor market is adopted:

$$(7) \quad \alpha_0 + \alpha_1 p + \alpha_2 w^* + \alpha_3 mw + \alpha_4 I = \tau N$$

Equation (6) constitutes an explicit market equilibrium condition. The left hand side correspond to the labor demand: p is the relative price PN/PT (the inverse of the real exchange rate), w^* is the notional wage in terms of PT and mw is the minium wage in terms of PT . All price variables are expressed in logs. The right hand side of (6) is the labor supply. The α 's are parameters ($\alpha_2 < 0$, $\alpha_3 < 0$ and $\alpha_1 > 0$, $\alpha_4 > 0$).

Using (6) and (7) the following version of (7) in purely observable variables can be written:

$$(8)^{23} \quad w_s = b_{01} + b_{11}\theta + b_{21}p + b_{31}\theta p + b_{41}mw + b_{51}\theta mw + b_{61}N \\ + b_{71}\theta N + b_{81}I + \mu_1$$

The specification for equilibrium wages in the informal sector is the following:

$$(9) \quad w_u = b_{02} + b_{12}p + b_{22}w_s + b_{32}mw + b_{42}N + b_{52}I + \mu_2$$

where all prices and wages are relative to the price of tradables and expressed in logs.

Finally, the market for non-tradable goods is also assumed to be in equilibrium, which is represented in the following condition:

$$(10) \quad p = b_{03} + b_{13}w_s + b_{23}mw + b_{33}w_u + b_{43}(E/PT) + \mu_3$$

where E is aggregate expenditures; p and the wage variables are in logs.

The system formed by equations (7), (8) and (9) is estimated with 2SLS by explicitly accounting for the endogeneity of w_s , w_u , p and E . Results are presented in Table 4. The wage and other macroeconomic data were taken from the Central Bank, the Ministry of Labor, the wage council and estimates based upon labor force surveys of the National Institute of Statistics. These surveys also provided data on unemployment and the labor force. Using equations (7), (8), and (9) it

²³ The parameters b_{ij} are all linear combinations of the parameters, Ω_j and α_i in equations (6) and (7).

Table 4
PHILIPPINES: PARAMETERS OF THE SECOND VERSION MODEL

w^s equation		w^u equation		p equation	
b_{01}	2.44 (1.22)	b_{02}	1.55 (2.12)	b_{03}	-4.93 (-4.00)
b_{11}	0.0027 (0.58)	b_{12}	0.099 (0.33)	b_{13}	0.397 (1.89)
b_{21}	-4.20 (-2.32)	b_{22}	0.668 (3.32)	b_{23}	0.211 (1.31)
b_{31}	0.0025 (1.32)	b_{32}	-0.046 (-0.19)	b_{33}	0.148 (1.10)
b_{41}	1.10 (1.30)	b_{42}	-0.00003 (-8.30)	b_{43}	0.195 (2.44)
b_{51}	-0.0005 (-1.03)	b_{52}	0.096 (1.78)		
b_{61}	-0.00015 (-4.7)				
b_{71}	-0.59E-7 (-3.68)				
b_{81}	0.004 (1.02)				
R^2	0.81		0.77		0.90
F	19.52		35.79		43.31
DW	2.03		1.79		1.88

These equations were estimated using 2SLS. Instruments used: Population, Fiscal Expenditures, Terms of Trade, Minimum Wages.

is possible to determine how the effectiveness of a nominal devaluation in terms of the real exchange rate is affected by the distortion prevailing in the formal labor market (θ). More particularly, it is possible to measure how the quantitative effect of PT on p (i.e., the effect of a nominal devaluation on the inverse of the real exchange rate) is affected by the level of θ .

Totally differentiating these equations and solving for $d\ln p/d\ln PT$ (Appendix B) the following expression is obtained

$$(11) \quad \frac{dp}{dPT} = -\frac{b_{43}}{(1-b_{21}(b_{13} + b_{33}b_{22})-b_{33}b_{12}-b_{31}\theta(b_{13} + b_{33}b_{22}))}$$

The sign of (11) is always negative because stability requires that the denominator be positive, while b_{43} is positive (the effect of real expenditures on the relative price of non-tradables). This expression measures the degree of effectiveness of a nominal devaluation and indicates that the effect of PT on p depends upon the level of the labor market distortion θ ; given $(b_{13} + b_{33}b_{22}) > 0$, the effect of θ on the value of (11) crucially depends on the sign of b_{31} . Thus, if $b_{31} > 0$, the effectiveness of a devaluation increases with θ and if $b_{31} = 0$, the extent of labor market distortion has no effect on the effectiveness of a nominal devaluation.

Table 4 presents the estimated parameters of equations (8), (9) and (10). The estimated value of b_{31} is statistically zero, indicating that the degree of labor market distortion does not affect the effectiveness of a nominal devaluation. The estimated elasticity (11) is equal to -0.30^{24} which suggests that, in any case, a nominal devaluation would produce an only small change in the real exchange rate. This is likely due to the prevailing labor market structure.

The second question that can be empirically answered is the effect of labor market distortions on the (inverse of the) real exchange rate. This is a measure of the revaluation caused by an increase in the labor market distortion that may be implemented in response to a nominal devaluation to protect formal sector wages. As said before, if an increase in this distortion significantly raises formal sector labor costs and the price of non-tradeables, this will in turn produce a revaluation of the real exchange rate. Totally differentiating (9) an expression for $dp/d\theta$ is obtained which, multiplied by the average sample value of θ , produces a measure of the elasticity of the (inverse of the) real exchange with respect to the labor market distortion (the derivation is presented in Appendix B).

$$(12) \quad \frac{dp}{d\theta} = \frac{(b_{13}b_{11} + b_{13}b_{31}p^* + b_{13}b_{31}mw^* + b_{13}b_{71}N^*)(b_{22}b_{33} + b_{13})}{(1-b_{21}(b_{13} + b_{33}b_{22})-b_{33}b_{12}-b_{31}\theta(b_{13} + b_{33}b_{22}))}$$

where x^* stands for the sample average of variable x .

²⁴ This value should be interpreted only as indicative of the true elasticity, as the distribution of (11) cannot be simply determined.

Expression (12) is positive given that the denominator needs to be positive for stability and the numerator is the effect of θ on the formal sector wage rate. Using the estimated parameters (Table 4) and the sample average of the variables, the value of 0.03 is obtained for expression (12) (see Appendix B). This implies that a 10% in the labor market distortion increases the relative price of non-tradables to tradables in 0.3%, thus implying a relatively small decline in the real exchange rate.

The above finding strongly suggest that the presence of labor market distortions obstructs the role of a nominal devaluation in achieving a real devaluation. However, the value of the elasticity involved is not drastically high. Although the notion underlying the relationship between labor market distortion and real exchange rate is extremely intuitive, quantitative results must be handled with care. First, because they are conditional to the model specificized here. Second, because the statistical significance of the elasticity cannot be assessed.

IV. Conclusions and Policy Implications

The effect of labor segmentation in the Philippines is important with regard to the equity impact of typical macroeconomic adjustment policies. Nominal devaluations with a segmented labor market trigger an increase in the formal/informal wage gap, hindering the labor mobility and worsening the income distribution. However, the effect of labor market distortions in reducing the degree of effectiveness of a nominal devaluation through the upward pressures of wages on the price of non-tradables, is quantitatively unimportant. Likewise an increase in existing labor market distortions is not likely to significantly reduce the real exchange rate. These results suggest that the role of labor market distortions in the context of adjustment is more related to distributional issues than to the effectiveness.

These results are important given that distributional problems are at the core of adjustment policies being applied in the Philippines. The formal sector concentrates most of the modern export-oriented economy. An improvement in the exchange rate may significantly increase output and wages in those industries, and indirectly results in more employment and higher wages for the informal sector labor. An increase in labor market distortions aimed at protecting formal sector wages does not affect the effectiveness of the macroeconomic policy, but it clearly worsens the prevailing income distribution. Hence, the political sustainability of the adjustment can be hurt because of the

adoption of protective policies. The empirical results suggest that deregulation of the labor market is advisable to reduce the risk of a deteriorating income distribution and to allocate the outcome of the growth process more fairly among labor force members. The implications of this in terms of domestic savings and investment may be also important, both in connection with an increase in the income of the poorest section and the greater sustainability of a structural change in the economy.

The generality of the central message of this study does not preclude careful consideration of the empirical results. They depend very strongly upon the particular approach used to model segmentation, as well as upon the specific proxies used to measure key variables. However, the results are robust to alternative formulations of the base model. There are many questions left for further research, but most of them will require appraisal of new information.

Appendix A

The estimating equations for W_s , W_u and PN are;

$$W_s = a_{01} + a_{11}PT + a_{21}PN + X_1b_1 + \epsilon_1$$

$$W_u = a_{02} + a_{12}PT + a_{22}PN + a_{32}W_s + x_2b_2 + \epsilon_2$$

$$PN = a_{03} + a_{13}PT + a_{23}W_u + a_{33}W_s + X_3b_3 + \epsilon_3$$

All variables are expressed in rate of changes, a_{ij} are parameters, X_i is the vector of exogenous variables in this analysis, b_i is the corresponding vector of parameters, and ϵ_i 's are random errors. Totally differentiating:

$$dW_s = a_{11}dPT + a_{12}dPN$$

$$dW_u = a_{12}dPT + a_{22}dPN + a_{32}dW_s$$

$$dPN = a_{13}dPT + a_{23}dW_u + a_{33}dW_s$$

solving:

$$\frac{dW_s}{dPT} = a_{11} + \frac{a_{12}(a_{13} + a_{23}a_{12} + a_{33}a_{11})}{1 - a_{23}(a_{22} + a_{32}a_{11} + a_{22}a_{12}) - a_{33}a_{12}}$$

$$\frac{dW_u}{dPT} = a_{12} + \frac{(a_{22} + a_{32}a_{11} + a_{22}a_{12})(a_{13} + a_{23}a_{12} + a_{33}a_{11})}{1 - a_{23}(a_{22} + a_{32}a_{11} + a_{22}a_{12}) - a_{33}a_{12}}$$

Use of the estimated parameters (Table 3) produces the following values:

$$E(W_s, PT) = \frac{dW^s}{dPT} = 0.99$$

$$E(W_u, PT) = \frac{dW^u}{dPt} = 0.10$$

Appendix B

The empirical model is

$$w_s = b_{01} + b_{11}\theta + b_{21}p + b_{31}\theta p + b_{41}mw + b_{51}\theta mw + b_{61}N + b_{71}\theta N + b_{81}I + \mu_1$$

$$w_u = b_{02} + b_{12}p + b_{22}w_s + b_{32}mw + b_{42}N + b_{52}I + \mu_2$$

$$p = b_{03} + b_{13}w_s + b_{23}mw + b_{33}w_u + b_{43}(E/PT) + \mu_3$$

where p and all wages are expressed in logs and in terms of the price of tradables. All the μ_i 's are random errors. Totally differentiating and assuming no change in θ , MW , N and E , the following expression is obtained:

$$dw_s = b_{21}dp + b_{31}\theta dp$$

$$dw_u = b_{12}dp + b_{22}dw_s$$

$$dp = b_{13}dw_s + b_{33}dw_u - b_{43}dPT$$

which implies:

$$\frac{dp}{dPT} = b_{13} \frac{dw_s}{dPT} + b_{33} \frac{dw_u}{dPT} = b_{43}$$

By substitution, it is arrived at

$$\frac{dp}{dPT} = \frac{b_{43}}{(1-b_{21}(b_{13} + b_{33}b_{22}) - b_{33}b_{12} - b_{31}\theta^*(b_{13} + b_{22}b_{33}))}$$

where θ^* is the sample value of non-wage labor costs. Using the parameters in Table 5, this equation produces the following value:

$$\frac{\hat{c}p}{dPT} = -.30$$

Similarly:

$$\frac{dp}{d\theta} = \frac{(b_{13}b_{11} + b_{13}b_{31}p^* + b_{13}b_{51}mw^* + b_{13}b_{71}N^*)(b_{22}b_{33} + b_{13})}{(1-b_{21}(b_{13} + b_{33}b_{22}) - b_{33}b_{12} - b_{31}\theta^*(b_{13} + b_{22}b_{33}))}$$

where x^* represents the sample average of the corresponding variable.

Using the parameters in Table 5, the value of this expression is estimated (0.000017), which we multiplied by the average sample value of θ (1953.4), thus producing an estimated elasticity of the inverse of the real exchange rate to the parameter representing a labor market distortion equal to

$$\frac{(dp)\theta}{d\theta} = 0.034$$

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