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IMPORT LIBERALIZATION AND INDUSTRIAL LAY-OFFS

by

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A B S T R A C T

This paper tests the responsiveness of industrial lay-offs to import liberalization using the 1981-1983 trade liberalization as data period for analysis. Contrary to wide expectations industrial lay-offs of both import substituting and export-oriented industries behave in opposite directions with respect to the variations in imports i.e. the former decrease (instead of increase) their lay-offs while the latter increase (instead of decrease) their lay-offs. Some explanation is given to the contrary findings.

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1.0 Introduction

It is a common assertion in discussions of international trade issues that a direct and immediately perceptible impact of a trade and import liberalization effort is a short-run decline in employment among import-substituting industries which find their relative output prices falling vis-a-vis world prices. There is an increasing documentation, at least on developed countries of significant labor displacement arising from increased penetration of imported goods.[1] Since this impact is clearly both economic and political the evidence is being used to show the associated wage and output losses (and suffering) and the necessary adjustments support to bear the costs of liberalization.

Liberalization in a number of developing countries, including the Philippines, differs in several respects from developed country experiences. First of all, the issue of liberalization in developed countries is usually confined (in a relative sense) to a narrower sector such as textile, clothing and footwear and not really an entire

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regime. Second the ensuing distortions are generally marginal since the restrictions imposed (or argued to be lifted) occur in a setting of more open economies. Finally policy reversals, while not completely absent occur perhaps with lesser frequency. Apart from this asymmetry however the removal of restrictions is still seen to impose an immediate effect on unemployment.

The Tariff Reform Program (TRP) of the Philippines which began in 1980 is probably the more fundamental attempt at structural reform of protection and industry since decontrol. This liberalization is therefore not the first one. But because of its all-encompassing nature it was pursued in stages and implemented over a 5-year period. The liberalization has two components - tariff reduction and import liberalization or removal of quantitative restrictions.[2]

This paper is aimed not at estimating and forecasting the employment effects of import liberalization of TRP but at testing the sensitivity of industrial lay-offs to changes in the pace of liberalization and the differential responses of industries. In the next section the behavioral patterns of industrial lay-offs is sketched paying particular attention to the manner by which lay-off decisions behave in a trade liberalization setting. In the third section an attempt is made to statistically quantify the patterns through a focus on the experience in the current liberalization drive. Finally some implications are drawn from the results and from the broader view of the TRP components and how they interact with each

other. Indeed the complicated nature of the protective system which the TRP rationalizes constrains our clear understanding of effects and thus our results.

2.0 Behavioral Patterns During Liberalization

If there is any variable that can capture the immediate displacement of labor that may result from import liberalization it is worker lay-offs. The greater the frequency of this measure the greater the accuracy of indicating employment movements. It is for this reason that we focus on industrial lay-offs rather than employment or unemployment rates.

Tracing the lay-off incidence of liberalization however requires looking into the effects of a freer trade on industrial characteristics. Since import-substitutes in the Philippines employ capital more intensively in their production than exports, increased imports will obviously induce relatively more capital displacement per unit of labor. Such factor specificity does not imply no labor displacement since in the transition the labor associated with the unemployed capital will presumably be laid-off as well.

There is no need for us here to show this factor-proportion property of Philippine manufacturing industry since this is adequately evidenced. Using either input-output data or surveys of establishments the overwhelming documentation is one of heavy capital intensity among

import-substituting industries and low capital-labor ratios in export industries.[3]

Thus when liberalization is pursued, we should expect the response of industry to differ according to its trade-orientation. Import-substitute industries should experience sales decline and adjust by laying off workers, liquidating capital and eventually seeking alternative opportunities elsewhere. Export-oriented industries on the other hand respond by exploiting trade opportunities and decreasing lay-offs.

By what means will liberalization be indicated? Under conditions where all restrictions are removed and exchange rates are allowed to respond to the changing environment, the movement of real effective exchange rate would partly reflect the degree of liberalization in the economy. This is because in one sense overvaluation or implicit protection is being removed. Another indicator would of course be the ratio of black market to official exchange rates. A latent manifestation of import liberalization is obviously an increase in imports (in proportional terms) or a relative increase in manufactured imports to total imports.

More directly, worker lay-offs in specific import-substituting industries would be expected to rise as liberalization proceeds although the incremental increase will not be large, given the high capital

intensity, than in situations of lower factor proportions. The actual absolute amounts depend not only on the movements of real exchange rates but on the relevant elasticities as well.

Formalizing these postulated behaviors, worker lay-offs in industry is

$$LYOF(I)_t = f(M_t \ldots)$$

where $LYOF(I)_t$ is the number of workers laid-off in industry I at time t during the liberalization process and M_t is the value of imports. There is an expected differential behavior here by industry. Export-oriented industries (EO) would tend to reduce their lay-offs while import-substituting industries (IS) would increase their lay-offs. One must however make a distinction between a general environment of import liberalization and the specifics of each industry. A broad import liberalization might be seen for example as the trend in the imports of manufactures in general (M_t) whereas selective liberalization might simply be confined to certain industries $[M(I)_t]$. Thus it may happen that one industry's worker lay-offs are determined by a differential liberalization favoring such industry (leading to increased lay-offs) yet on the basis of a general liberalized environment this may not be true.

Imports on the other hand would in part be induced by movements of exchange rates, which is postulated to be in real effective terms i.e.

$$M_t = g(RER_t \ldots)$$

where RER_t is an index of real effective exchange rates.

It follows from this that industrial worker lay-offs can also be influenced by RER_t though this need not be the only mechanism for inducing patterns of lay-offs i.e.

$$LYOF(I)_t = h(RER_t \ldots)$$

All industries would behave uniformly with respect to RER_t. A presumption here is that decisions on industrial lay-offs behave on the basis of real factors wherein nominal exchange rates are appropriately adjusted for relative price movements with trading partners.

The manner by which industries behave with respect to RER_t may or may not differ depending on their employment adjustments. It is postulated here that EO and IS industries adjust their worker lay-offs differently according to way by which RER_t enters into their ex ante assessment. For instance if only the current values of RER_t affect $LYOF(I)_t$ then past values of it are immaterial to a lay-off function. On the other hand it is possible that values of RER_t way into the past figure in ex ante lay-off decisions. Still another possibility is that an industry's decision may rely on expected values of RER_t in which case the formation of expected rates is crucial to eventual decisions on lay-offs.

Because of the stickiness of (nominal) exchange rate changes except for discrete jumps, and the easier accessibility to imports by IS industries, a notion can be advanced that their lay-off decisions depend on their expectations of real exchange rate movements. In turn these are formed from past values of the exchange rates. In short while occasional sharp changes may occur in nominal exchange rates, IS industries would generally behave in a manner which says that expected real exchange rates would be maintained close to actual past rates and not on the current values. In other words, IS industries behave as if past RER's will remain the same.

On the part of exporters it is perhaps the current or the most immediate past real exchange rate that matters most in decision to ship and thus on worker lay-offs. For export industries this means that the current real exchange rate matters for current decisions and the pattern of the past's rate diminishes in importance the farther into the past. In short, the decision of exporters with respect to output and employment varies with the current levels of RER.

Although the variations in RER may have other influence on lay-off decisions through indirect changes in prices of other domestic inputs including labor (wages) itself the interest here is in the more direct links between RER and employment through costsof imports that directly compete with import substitutes or lower the relative prices of exports.

It is not possible to offer direct evidence to show this differential behavior. However since the structure for the IS decisions is analogous to a Nerlovian[4] adaptive expectations model

while in EO, it comes closer to a Koyck[5] distributed lag specification, the statistical results and comparisons for the IS and EO become a de facto test of the differential basis for worker-lay off decisions.

The Appendix to this paper sets out these notions formally and provides further interpretation of the statistical results in the next section.

In summary, we do find some intuitive basis for postulating specific behavior regarding industrial lay-offs that may be induced by trade liberalization policies.

3.0 Statistical Analysis and Results

The focus of this analysis of industrial lay-offs is the latest trade liberalization episode which began in 1980, implemented in stages and components. In 1983, due to the economic crisis, the liberalization program was essentially deferred (although the provisions of the new customs and tariff code was pursued on schedule). For the import liberalization component, this affected 1,304 items that have previously been classified as non-essential consumer or unclassified consumer goods (NEC/UC). Some 263 items were liberalized for importation in 1981; 610 in 1982 and 87 (later scaled down to 48) in 1983. There were significant reversals during the period under consideration i.e. reimpositions were made for a number of specific products. What is critical however is that the wholesale reversals occurred in late 1983 with the suspension of exchange transactions.

Given the fact that the tariff reform component affected mostly producer goods and these were freely importable anyhow, what

is relevant to our analysis is the NEC/UC liberalization which completes an environment of trade openness. The 960 items liberalized during 1981-1983 included foods, chemicals, cosmetics, leather products, cork and wood manufactures, textiles and garments, travel goods and electronic and electrical appliances. When these items were re-restricted as a result of the 1983 crisis, they were all later consolidated under Central Bank Circular 1029 (October 1984) which is now the subject for implementation.

This analysis is therefore confined to the 1980-1983 period of the liberalization drive and uses quarterly data until the second or third quarter of 1983.

3.1 Definitions

Since the late seventies the Ministry of Labor and Employment (formerly Department of Labor) has been collecting data on industrial lay-offs (LYOF) and associated measures, originally on a yearly and later on a monthly basis. Their quarterly lay-offs by industry (which were aggregated from monthly data) are what we seek to explain here. They are in absolute number of workers terminated either temporarily or permanently by reporting establishments during the particular period.

There are several weaknesses about this measure that one should be aware of. First, information on worker termination is

based on reports submitted by establishments and not really on a consistent sample throughout. There would be a tendency for lay-offs to vary depending on the degree of voluntary reporting that may be unsystematic. Second, there has been no correction made for the number of reporting establishments or the aggregate labor force employed in those covered by the data. It may be the case that increasing lay-offs are associated with increasing labor employment such that the former would reflect a more normal pattern of turnover than a response to external shock. Third, since the termination measures combine permanent and temporary lay-offs it is assumed that the duration of the latter is a quarter or longer. Finally, there are a number of other variables in the same series that can perhaps give a more direct meaning to the subject of liberalization e.g. number of workers terminated by reason for termination (lack of materials, high production costs, lack of capital funds, restricted dollar allocation, etc.). However since responses to this seem to be erratic, the aggregate measure has been used instead.

The real effective exchange rate at time t (RER_t) which is the measure used here to indicate the degree of trade liberalization is simply the movement of nominal exchange rates relative to a partner country's nominal exchange rate adjusted for the relative prices and the shares of imports i.e.

$$RER_{it} = \frac{\sum_{i \neq j} (m_{ijt}/m_{it}) r_{jt}/p_{jt}}{r_{it}/p_{it}}$$

where RER_{it} is country i's real effective exchange rate at t, m_{ij}/m_i is the share of imports from country j to i's total imports, r_k(k = i or j) is the price of US dollar in terms of k's currency and P_k(k = i or j) is the wholesale price index in k's currency. The RER index uses May 1970 = 100.[6]

On the basis of this definition a real increase in the exchange rate of the liberalizing country i relative to the partner country j's real increase in its exchange rate should reflect a depreciation of i's real effective exchange rate i.e. higher values of RER mean a real appreciation while their lower values reflect a real depreciation.

Imports are all merchandise flows in US dollars c.i.f. except for 1980. These have been decomposed into two groups following the Standard International Trade Classification (SITC) for (1) primary products (SITC 0-4) and (2) manufactures (SITC 5-9).[7] Since the major interest here is on the latter imports as reflecting a broad import liberalization atmosphere, and in order to avoid the adjustment problems to arrive at real imports, what has been used is the ratio of imports of manufactures to total imports (MMFG) as the appropriate measure. Generalized import liberalization is therefore measured as the ratio of manufactured imports to total imports while selective liberalization is the absolute value of imports of an industry.

Throughout the analysis two groups of industries are distinguished and studied i.e. the EO and IS industries. And

within each, specific industries are looked at as follows: (a) in EO, wearing apparel, furniture and wood, and footwear and (b) in IS, textile, chemicals and paper and printing. These are symbolized as appropriate in the analysis. Instead of using the absolute number of workers terminated for the EO or IS industries as our measure of lay-offs, what is used is the ratio of the lay-offs in EO or IS to the total manufacturing lay-offs. The absolute amounts for EO and IS are in turn derived from the number of lay-offs for each of the industries (sampled here) composing the group.[8] This ratio measure is used only for the aggregate EO or IS industries while industry-specific lay-offs are in terms of absolute number of workers laid-off.

The rest of the variables are nominal exchange rates which are the series on the free rate in the IMF International Financial Statistics, rate of growth of current account balance, the growth rate of trade balance and the level international reserves. Again these are symbolized as appropriate.

3.2 Results

Manufacturing lay-offs constitute 60-90 percent of all reported lay-offs. Within manufacturing, the six industries we are looking at constitute 45-75 percent of total (manufacturing) lay-offs. Thus the data used here are a fair bulk of the establishments reporting worker terminations which behavioral responses are the subject of study.

The lay-off pattern of EO and IS industries or other industries $LYOF(I)_t$ are specified as

$$(1) \qquad LYOF(EO)_t = a_1 + b_1 RER_t + c_1 LYOF(EO)_{t-1} + u_1$$

$$(2) \qquad LYOF(IS)_t = a_2 + b_2 RER_{t-1} + c_2 LYOF(IS)_{t-1} + u_2$$

where $LYOF(EO)_t$ and $LYOF(IS)_t$ are the ratios of the number of workers terminated at time t by exported-oriented and import substituting industries to the total lay-offs in manufacturing, respectively; RER_t is the real effective exchange rate at t; a_1 and a_2, are the constants of the regression, and b_1, b_2, c_1 and c_2 the coefficients; while u_1 and u_2 are the error terms assumed to satisfy the usual statistical properties of residuals.

An ordinary least squares (OLS) regression was fitted into the data series in logarithms. The simultaneous estimation of (1) and (2) to the data revealed that the EO industries fit more closely specification (1) and the IS industries (2), using the standard criteria for goodness of fit.

By applying equation (1) on IS industries the RER_t coefficient is the correct sign though insignificant with statistical parameters that are acceptable. Yet when compared with the results using equation (2) the latter fit becomes superior. Conversely fitting equation (2) for EO yields results which show a poor fit relative to the hypothesized behavior for these industries (using equation (1)).[9]

Based on the discussion in 2.0 and the definition of RER above, one would expect that b_1 would be positive and b_2 would be negative i.e. export-oriented industries would ex ante reduce their lay-offs and import-substituting industries would increase their worker termination during a trade liberalization process.

The results of the OLS estimations are shown in equations (3) and (4):

$$(3) \quad \ln LYOF(EO)_t = -14.98 + \underset{(1.60)}{2.71} \ln RER_t - \underset{(-0.48)}{0.16} \ln LYOF(EO)_{t-1} + u_1$$

1980.2 - 1983.2

$\bar{R}^2 = 0.16$

SEE = 0.31

F = 2.07

DW = 1.88

$$(4) \quad \ln LYOF(IS)_t = 8.05 - \underset{(-1.07)}{2.01} \ln RER_{t-1} - \underset{(-2.57)}{0.68} \ln LYOF(IS)_{t-1} + u_2$$

1980.2 - 1983.2

$\bar{R}^2 = 0.30$

SEE = 0.28

F = 3.55

DW = 2.10

Bearing in mind that LYOF(EO) and LYOF(IS) are really ratios of group lay-offs to the aggregate manufacturing lay-offs, the numbers in parentheses show the t-statistics; $\bar{R}^2$'s the adjusted coefficients

of determination, SEE's the standard errors of the estimates, F's the F-statistics and DW's the Durbin-Watson statistics.

Table 1 reports the OLS estimates for five of the six industries considered. The runs for the wood and furniture industry were poor by any of the statistical criteria and thus have not been included.

The result for the export-oriented industries as a group is consistent for the wearing apparel industry but not for footwear and leather. On the other hand in the IS industries the result of Equation (4) is consistent for the textile industries but not for paper and printing and the chemical group. Where the results are consistent or the industry defined is fairly homogeneous the RER coefficients are significant (apparel in EO and textile in IS industries).

Except for Equation (6) of Table 1 there does not seem to be an evident violation of the assumptions regarding residuals. The RER index has almost a similar effect on lay-offs irrespective of EO or IS (though marked differences appear by industry); however its influence is not really highly significant. The implied margin for the lay-off elasticity of EO industries is about 35 percent greater than IS using (3) and (4). From footnote (9) this margin is 300 percent.

The effect of imports on industrial lay-offs is tested by a variation of Equations (1) and (2),

Table 1

COEFFICIENTS FOR REGRESSION OF LAY-OFFS
ON REAL EFFECTIVE EXCHANGE RATE[a]
(IN LOGARITHMS)

Equation	Industry	Constant	RER_t	RER_{t-1}	$LYOF_{t-1}$	$\bar{R}^2$	SEE	F	DW	Period
(5)	Apparel	-20.64	6.50 (1.73)	-	-0.55 (-1.71)	0.23	0.74	2.68	2.08	1980.3-1983.2
(6)	Footwear[b]	103.55	-19.37 (-1.87)	-	-0.70 (-2.20)	0.26	1.18	2.73	1.38	1980.3-1983.1
(7)	Textile	36.35	-	-6.77 (-1.76)	0.60 (2.72)	0.47	0.54	5.99	2.21	1980.3-1983.2
(8)	Paper/ Printing	-1.41	-	0.63 (0.09)	0.68 (2.61)	0.32	0.96	3.55	1.94	1980.3-1983.2
(9)	Chemicals[c]	-12.45	-	3.22 (0.92)	0.49 (1.68)	0.11	0.49	1.69	1.96	1980.3-1983.2

[a]Derived by using Equation (1) or (2) in natural logarithms but using absolute values of lay-offs by industry.

[b]Includes leather

[c]Includes rubber, plastic and petroleum products

$$(10) \quad LYOF(EO)_t = a_1 + b_1 MMFG_t + c_1 LYOF(EO)_{t-1} + u_1$$

$$(11) \quad LYOF(IS)_t = a_2 + b_2 MMFG_{t-1} + c_2 LYOF(IS)_{t-1} + u_2$$

$$(12a) \quad LYOF(I)_t = a_3 + b_3 M(I)_t + c_3 LYOF(I)_{t-1} + u_3$$

$$(12b) \quad LYOF(I)_t = a_3 + b_3 M(I)_{t-1} + c_3 LYOF(I)_{t-1} + u_3$$

Equations (10) and (11) examine the notion that generalized import liberalization (via an increase in the imports of manufactures as a proportion to total imports) influence lay-off decisions differentially among EO and IS industries. Equation (12a) and (12b) on the other hand examine the notion that imports of products by the industry (i.e. selective import liberalization) influence lay-offs differentially again by the group where the industry belongs.

The results for the EO industries were poor in general (except footwear) and thus what is reported in Table 2 are IS industries and manufacturing as a whole. The influence of a generalized import liberalization is insignificant for the EO and IS industries but significant for the rest including the aggregate manufacturing lay-offs. What is odd from the results is the consistent finding that increased imports of manufactures are associated with reduction in industrial lay-offs.

Equations 14 (a and b) and 15 (a and b) contrast the application of the behavioral hypotheses for the two industries. These results convey an impression that both groups of industries seem to follow similar

reactions to import liberalization on their lay-offs. Equations (18a) and (18b) support the notion that it is some past levels of imports that influence lay-off decisions and not their current levels. The results being contrary to expectations remain true however.

With respect to industry-specific imports, the regression results (not reported here) show a consistent perverse sign similar to the results of Table 2. In each of the IS industries, increased imports of the industry are associated with reduced lay-offs although in every case the t-statistics indicate no significance (a slight one for the chemicals group with $t = -1.62$).

Turning now to an explanation of imports which, as noted earlier in the paper, is a latent manifestation of liberalization, it seems that the movements of exchange rates (whether nominal or real effective) do not have an effect on the ratio of manufactured imports to total imports.

In all cases except imports by the chemicals group, "price" variables are not important to the variations in the imports ratio. What is influential seems to be either the growth rate i.e. the rate of deterioration of the current account balance or the trade balance. On the imports by the chemicals group, it is the previous period's nominal exchange rate that is the important "price" variable.

OLS estimates for the imports show low or negative $\bar{R}^2$'s, insignificant and incorrect signs of the coefficients for most

Table 2

COEFFICIENTS FOR REGRESSION OF LAY-OFFS
ON IMPORT LIBERALIZATION[a]
(IN LOGARITHMS)

Equation	Industry	Constant	$MMFG^{b}_{t}$	$MMFG^{b}_{t-1}$	$LYOF_{t-1}$	$\bar{R}^2$	SEE	F	DW	Period
13	Manufacturing	4.76	-	-2.90 (-2.24)	0.31 (1.02)	0.37	0.35	4.30	2.17	1980.3-1983.2
14a	EO	-1.08	-	1.95 (1.65)	-0.55 (-1.65)	0.17	0.32	2.11	2.42	1980.3-1983.2
14b	EO	-1.53	0.99 (0.74)	-	-0.47 (-1.27)	-0.02	0.36	0.87	1.81	1980.3-1983.2
15a	IS	-2.34	-	-0.68 (-0.70)	-0.78 (-2.87)	0.36	0.27	4.17	2.22	1980.3-1983.2
15b	IS	-1.93	-0.03 (-0.03)	-	-0.75 (-2.71)	0.33	0.28	3.72	2.0	1980.3-1983.2
16	Textiles	1.15	-	-4.06 (-2.22)	0.55 (2.64)	0.54	0.51	7.59	2.21	1980.3-1983.2
17	Paper/Printing	-0.36	-	-6.44 (-1.82)	0.41 (1.57)	0.50	0.82	6.50	2.04	1980.3-1983.2
18a	Footwear[c]	3.44	-	-7.60 (-2.83)	-0.17 (-0.68)	0.35	0.74	4.00	1.72	1980.3-1983.2
18b	Footwear[c]	4.71	-3.66 (-1.07)	-	-0.02 (-0.07)	-0.08	0.96	0.57	2.39	1980.3-1983.2

[a]The dependent variable used is the absolute number of workers laid-off except equation (14) and (15) which use the ratio of lay-offs in either EO or IS industries to total manufacturing lay-offs.

[b]Defined as the ratio of imports of manufactures (SITC 5-9) to total imports (all cif except 1980).

[c]Includes leather.

combinations involving the real effective exchange rate, nominal exchange rate, current account balance, international reserves and trade balance.

3.3 Discussion

During the period of the liberalization episode we have considered, lay-off decisions ex ante behave in a manner we expected them i.e. EO industries reduce their lay-offs with a real depreciation of RER (which operationally means a decline in RER so that the expected coefficient is positive) while IS industries behave in the opposite direction (Cf. Equation (3) and (4) above). The degree of marginal worker termination however is not substantially different between the two industries and this is not consistent with the apparent disparity of group factor proportions (besides being weak in significance). Where the regression coefficients display wide differences are in comparing the lay-off elasticities using Equation (3a) and (4a) in the footnote.

The effect of increased manufactured imports (which is posited as a manifestation of generalized import liberalization) on worker termination appears to be a perverse one in the sense that IS industries decrease and EO industries increase their lay-offs. As imports continue to increase in the course of liberalization import substituting firms would decrease their termination of workers implying in turn increasing industrial activities.

What could possibly be a reason for this perverse finding? There are at least 3 dimensions to reflect in this context, aside from a likely misspecification of the statistical analysis. First it may be that the adjustment process that industries go through during import liberalization is so quick that within a quarter the IS industries require only a short period of immediate worker terminations, and then a rehiring stage follows as the industries enter new-product lines more consistent with a liberalized regime. Because of the aggregative nature of the data used here and the frequency of the data analyzed this point can not be easily dismissed. But what would make this seem implausible is that we should find this also true for EO industries, which is not so the results being opposite one another. It remains true however that a finer disaggregation of this investigation is needed.

Second, it may be that the data do not reveal a real liberalization, of the general kind, taking place during the period of study. It has already been noted above that a number of re-restrictions were imposed during the implementation of the import liberalization program between 1981 and 1983.[10] To the extent that these kinds of disruptions occur more frequently and significantly, they would affect our tracking of the data. But it would seem that the proportion to the total imports of the restricted items scheduled for liberalization has indeed increased despite the portion of the regulated consumer products remaining a small fraction even by 1983.[11]

Finally it may be that the imports that have been flowing in during this liberalization are not really competing with the domestic import-substituting industries. If instead the increased imports are inputs into these industries, worker terminations would decline with liberalization. It would seem that the length and strength of the protection in the past combined with the relatively weak consumer demand and the tariff reform component of the program argue that the imports would be biased towards those of complementary goods for industry. All this is consistent with the perverse finding above for the IS industries.

This would not be true for the export oriented industries since the results are opposite that above. One can perhaps postulate that EO industries react to a manifested import liberalization by reducing lay-offs only if such relaxation took place via movements in the real effective exchange rate. Put differently where the imports variable are "price-determined" the EO industries would behave negatively in terms of worker lay-offs. But it turns out during this period that imports react more to the movements of the current account or trade balances and not to the real effective (or nominal) exchange rates.

The technical specifications that have been used in our analysis here are clearly incomplete, require finer disaggregations, and can be tried with alternative definitions. Under different ramifications it is possible that the goodness of fit may change.

In summary, while the behavior of worker lay-offs with respect to exchange rates was as expected for both groups of industries, their responses to a latent import liberalization (which did not in turn respond to price signals during the episode) were unexpected and in fact contrary to expectations. The link that had been postulated between import liberalization and industrial lay-offs was therefore tenuous and very weak in the context of the trade liberalization program between 1980 and 1983.

4.0 Implications

The claim that generalized import liberalization leads to immediate industrial lay-offs has not been borne out by an analysis of the recent trade liberalization. Devoid of its emotional undertones, it is therefore not valid to easily accept the unemployment incidence of import liberalization.

Despite the fact that decisions on worker terminations are influenced by variations in real effective exchange rates in the right direction generalized imports do not influence these terminations in the right direction. Part of the reason is that the magnitude of imports may have been towards complementary (and needed) inputs by import-substituting industries, confirming a characterization of these as "import-dependent, import-substituting industries." In part this is also because imports themselves are not sensitive to movements of

exchange rates relative to other direct policy but discretionary variables such as licensing and quantitative restrictions. Imports therefore do not effectively mediate between exchange rates and industrial lay-offs in this sense.

Another part of the reason is simply technical i.e. while real effective exchange rate matters in industrial lay-offs it is not all that matters. Since our interest in this paper is just to test the sensitivity of lay-offs to a narrow area of inquiry, we have not fully specified a larger set of independent variables (even perhaps more important than imports). In fact the least that can be said from this study is that industrial decisions regarding factory worker terminations (whether permanent or temporary) are more involved than a simple reaction to a generalized environment of import liberalization. Indeed the net protection that industries eventually receive from a trade liberalization program that modifies input and output tariffs, indirect taxes, and quantitative restrictions is probably the operating guide for factor allocation. Such is a more complicated process to track. But the results of the previous section imply the possibility that protection may have increased during this liberalization episode that is probably due to a net effect coming from tariff rate changes and the removal of quantitative restrictions. What may have happened is that the changes in tariff structure vis-a-vis import liberalization led to a temporary rise in effective protection which in turn induced IS industries to reduce lay-offs. This plus the real appreciation of

the exchange rate supports the perverse findings above. This implication needs to be formally pursued.

Import liberalization (especially of the kind pursued in the Philippines in 1980-1983) per se does not immediately cause industrial lay-offs. To pursue liberalization however without regard for other trade variables is not likely to lead to predictable consequences. In particular the real effective exchange rate must be allowed to adjust in a manner that all prices do an eventual task of allocation. On the other hand liberalization independent of the necessary accompanying policies may lead to undesirable results. For example it is oftentimes pointed out that our perchant for imported goods through-and-through plus the highly inequitable income distribution would not provide a competitive opportunity for domestic substitutes. Thus liberalization might call for an active incomes policy for the latter and a "cultural solution" to the former.

Footnotes

[1]See for example V. Cable (1982). It might be pointed out here with reference to the above paper that for case studies on shoes and cutlery in most instances the duration of unemployment is less than one month.

[2]For a fuller treatment of the third liberalization episode see the forthcoming PIDS discussion paper of F.A. Alburo and G. Shepherd (1985). Although the liberalization program officially became operational on January 1981, discussions and plans for it (as well as some initial de-listing of restricted import items) began as early as 1980 such that we postulate our behavioral period beginning 1980.

[3]See R.M. Bautista (1966) for a seminal work on differential factor proportions in manufacturing; World Bank (1980) for later estimates.

[4]M. Nerlove (1958).

[5]L.M. Koyck (1954).

[6]The data used here have been estimated, assembled and updated by P. Rana of the Asian Development Bank. Thanks are due him for the generous use of his estimates.

[7]Ideally we should remove SITC 67 and 68 (iron and steel and non-ferrous metals) which are not generally considered manufactures.

[8]We did not use the ratio of industry lay-offs to either group totals or the total manufacturing lay-offs because of the small absolute amounts for some industries for some quarters (e.g. furniture and wood, and apparel industries). In any case the OLS runs made using specific industry ratios yielded poorer results than the use of absolute numbers.

[9]The results for EO and IS industries using Equation (2) and (1) respectively are:

$$(3a)\quad \ln LYOF(EO)_t = -13.26 + \underset{(0.98)}{2.27} \ln RER_{t-1} - \underset{(-1.39)}{0.48} \ln LYOF(EO)_{t-1} + u_1$$

$$\bar{R}^2 = 0.03 \quad SEE = 0.33 \quad F = 1.17 \quad DW = 1.98 \quad 1980.2\text{-}1983.2$$

$$(4a)\quad \ln LYOF(IS)_t = 1.94 - \underset{(-0.46)}{0.75} \ln RER_t - \underset{(-1.86)}{0.57} \ln LYOF(IS)_{t-1} + u_2$$

$$\bar{R}^2 = 0.23 \quad SEE = 0.29 \quad F = 2.83 \quad DW = 1.94 \quad 1980.2\text{-}1983.2$$

[10]Despite the implementation of the import liberalization in 1981-1983, monitoring and (some) licensing of imports were particularly apparent. Thus even by 1983 out of $1.55 billion imports of regulated commodities, only 11.3 percent were accounted for by high tariff rate items and liberalized consumer durable goods/electronic products.

[11]The rate of growth of imports of restricted items between 1975 and 1983 has been 9.2 percent per year, slightly below the growth rate of imports of 10.1 percent annually. The share of these imports to total has been 23 percent in 1975 and 20.7 percent in 1983. We have no readily available figures in between these years to really warrant the conclusion in the text.

Appendix

LAY-OFF DECISIONS BY EXPORT-ORIENTED AND IMPORT-SUBSTITUTING INDUSRIES

A. Export-Oriented Industries

Assume that an exporter's decision on employment or lay-off is determined not only by the actual levels of the current real effective exchange rate but also by past levels of the rate the weights of which diminish the farther into the past i.e.

$$(1) \qquad LYOF(EO)_t = a_1 + b_0 RER_t + b_1 RER_{t-1} + b_2 RER_{t-2} + \ldots b_n RER_{t-n}$$

$$b_0 > b_1 > b_2 > \ldots > b_n$$

where $LYOF(EO)_t$ is the number of workers terminated by the export-oriented (EO) industries at time t, RER_t is an index of real effective exchange rate and a_1 and $b_0, b_1, \ldots b_n$ the constant and weights respectively.

In a Philippine trade policy environment what this means is simply that exporters just take whatever is the current RER and behave accordingly. Though past rates matter their importance is less than the present. Given the fact that the protective structure of trade is biased against exporters what this also means is that they can not influence the movement of the real (or nominal) exchange rate

in their favor. Assume that the influence of past RER's diminish geometrically with respect to time periods. b_0 can be replaced by vc_1^0, b_1 by vc_1^1, b_2 by vc_1^2 or $b_i = vc_1^i$ where v and c_1 are constants and c_1 is a fraction.

Replace (1) as follows

$$(2) \quad LYOF(EO)_t = a_1 + vRER_t + vc_1RER_{t-1} + vc_1^2RER_{t-2} + \ldots vc_1^nRER_{t-n}.$$

If Equation (2) is true it must also be that

$$(3) \quad LYOF(EO)_{t-1} = a_1 + vRER_{t-1} + vc_1RER_{t-2} + vc_1^2RER_{t-3} + \ldots + vc_1^nRER_{t-n-1}.$$

Multiplying both sides of Equation (3) by c_1,

$$(4) \quad c_1LYOF(EO)_{t-1} = a_1c_1 + vc_1RER_{t-1} + vc_1^2RER_{t-2} + vc_1^3RER_{t-3} + \ldots + vc_1^{n+1}RER_{t-n-1}.$$

Subtracting Equation (4) from Equation (2)

$$(5) \quad LYOF(EO)_t - c_1LYOF(EO)_{t-1} = a_1(1-c_1) + vRER_t - vc_1^{n+1}RER_{t-n-1}.$$

Since c_1 is a fraction the last term approaches zero as n becomes larger and can therefore be dropped leading to

$$(6) \quad LYOF(EO)_t = a_1(1-c_1) + vRER_t + c_1LYOF(EO)_{t-1}.$$

Recall the estimating equation for EO industries:

$$(7) \quad \ln LYOF(EO)_t = -14.98 + \underset{(1.60)}{2.71} \ln RER_t - \underset{(-0.48)}{0.16} \ln LYOF(EO)_{t-1} + u_1.$$

$\bar{R}^2 = 0.16$ SEE = 0.31 F = 2.07 DW = 1.88 1980.2-1983.2

Following from the above it can be seen that $b_0 = 2.71$, $b_1 = 0.43$ and $b_2 = 0.07$ and so on. What this indicates is that the current RER exerts a strong influence on increased lay-offs as the RER increases (i.e. appreciates) and a negligible response from the RER from the past 2 periods. The notion advanced regarding the lay-off decisions of exporters is not rejected by this result. Notice however the insignificance of the lagged dependent variable in the specification.

B. Import-Substituting Industries

Suppose that lay-off decisions by import substituting (IS) industries is specified as

$$(8) \quad LYOF(IS)_t = a_2 + bRER^e_t$$

where RER^e_t is some anticipated or expected real effective exchange rate. Suppose further that

$$(9) \quad RER^e_t - RER^e_{t-1} = c_2(RER_{t-1} - RER^e_{t-1})$$

i.e. the change in the expected rate is proportional to the amounts by which the expected rate in the previous period differed from the actual rate in the same period, $0 < c_2 < 1$. If c_2 is zero

$RER^e_t = RER^e_{t-1}$ i.e. IS industries have a fixed notion of expected rate not influenced by actual rates. If $c_2 = 1$, $RER^e_t = RER_{t-1}$

Following the argument above with regard to exporters, one can postulate that IS producers in the Philippines, in this given trade regime, can perhaps influence the real effective exchange rate in such a way that they behave in a manner that the expected rate will remain pretty close to a past rate and will not be influenced by current rates. In short, IS industries expect the RER to remain the same as past RER's.

Their formation of RER^e_t can be a weighted average of past rates

$$(10) \quad RER^e_t = w_1 RER_{t-1} + w_2 RER_{t-2} + w_3 RER_{t-3} + \ldots + w_n RER_{t-n}.$$

Assume now that the influence of past rates again diminishes geometrically as time passes. Let $w_i = c_2 \lambda^{i-1}$ where λ is a positive fraction. Then (10) can be written as

$$(11) \quad RER^e_t = c_2 RER_{t-1} + c_2 \lambda RER_{t-2} + c_2 \lambda^2 RER_{t-3} + \ldots + c_2 \lambda^{n-1} RER_{t-n}.$$

If (11) holds then

$$(12) \quad RER^e_{t-1} = c_2 RER_{t-2} + c_2 \lambda RER_{t-3} + c_2 \lambda^2 RER_{t-4} + \ldots + c_2 \lambda^{n-1} RER_{t-n-1}.$$

Multiplying (12) by λ

$$(13) \qquad \lambda RER^{e}_{t-1} = c_2\lambda RER_{t-2} + c_2\lambda^2 RER_{t-3} + c_2\lambda^3 RER_{t-4} + \ldots + c_2\lambda^n RER_{t-n-1}.$$

Subtracting (13) from (11)

$$(14) \qquad RER^{e}_{t} - \lambda RER^{e}_{t-1} = c_2 RER_{t-1}$$

after dropping the last term of (13).

Consider Equation (11) and assume that all past rates were equal to some rate RER^0. Then (11) reduces to

$$(15) \qquad RER^{e}_{t} = RER^0(c_2 + c_2\lambda + \ldots + c_2\lambda^{n-1}).$$

Consequently if IS producers expect the rate to continue $RER^{e}_{t} = RER^0$ and

$$(16) \qquad 1 = c_2 + c_2\lambda + \ldots + c_2\lambda^{n-1}.$$

Following an analogous procedure from (11) and (13) above

$$\lambda = c_2\lambda + c_2\lambda^2 + \ldots + c_2\lambda^n$$

$$1 - \lambda = c_2 - c_2\lambda^n.$$

Since $c_2\lambda^n \to 0$ as n gets larger

$$\lambda = 1 - c_2$$

Returning to Equation (14)

$$RER^e_t - (1 - c_2)RER^e_{t-1} = c_2 RER_{t-1}$$

(17) $$RER^e_t = (1 - c_2)RER^e_{t-1} + c_2 RER_{t-1}$$

Which is Equation (9) above.

From Equation (8)

(18) $$RER^e_t = (\tfrac{1}{b})LYOF(IS)_t - a_2/b.$$

Substituting to Equation (17) and solving for $LYOF(IS)_t$

(19) $$LYOF(IS)_t = a_2c_2 + bc_2 RER_{t-1} + (1 - c_2)LYOF(IS)_{t-1}.$$

Equation (19) yields an OLS estimate in the text as

(20) $$\ln LYOF(IS)_t = \underset{}{8.05} \underset{(-1.07)}{- 2.01} \ln RER_{t-1} \underset{(-2.57)}{- 0.68} \ln LYOF(IS)_{t-1} + u_2.$$

$\bar{R}^2 = 0.30$ SEE = 0.28 F = 3.55 DW = 2.10 1980.2-1983.2

The implied value of c_2 here is 0.32 which, being closer to zero than unity, implies the stickiness presumption in the text i.e. the degree to which IS producers expect past RER to continue.

While these neat results argue that RER is an important determinant to lay-off decisions it is certainly not the only one that matters (notice the low $\bar{R}^2$ above). In fact as pointed out in

the main study the insensitivity of imports to RER results in the inability of LYOF to react correctly to import liberalization. Nevertheless the behavioral specification above and the assertion that there are differences in the lay-off decisions by the degree of orientation of industry (whether export oriented or import substituting) is not contradicted by the simple empirical tests.

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