

Trade Reform, Efficiency, and Growth

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Countries with well-functioning markets and a diversified production structure benefit more than other countries from the productivity gains through trade reform.

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Summary findings

The main objective of trade reform is to make markets more competitive and, by introducing competition among previously protected domestic firms, to change the behavior and performance of firms. Efficiency gains are achieved through increased productivity — more efficient use of resources — and a shift in resources from inefficient to efficient sectors. As a result of increased efficiency, output grows.

But the transition from a restrictive to an open trade regime can impose short-term adjustment costs for industries newly exposed to external competition. This can be compounded by efforts to restore macroeconomic stabilization, such as reductions in fiscal deficits that could hurt the country's infrastructure.

Ghani and Jayarajah examine the impact of trade reform on productivity and GDP growth, export growth, the diversification of exports, and the trade balance. They also examine whether trade reform affects different reforming countries differently — whether its outcome is related to such factors as the functioning of markets or

the level of diversification in production at the time reform is begun.

Their findings confirm the link between trade reform and efficiency gains. Reduced average tariffs and quantitative restrictions on imports are associated with increased output growth for a given level of investment and capacity use. But the extent to which trade reform helps a country reflects the initial conditions prevailing in the country.

Ghana, Indonesia, and Turkey began their trade reform programs under different conditions. Indonesia and Turkey had a more diversified production structure and a better functioning market than Ghana. All three countries carried out intensive trade reform, but Indonesia and Turkey benefited more than Ghana did.

In short, countries with well-functioning markets and a better human resource base benefit more from productivity gains resulting from trade reform than countries with less well-functioning markets do.

This paper — a joint product of the Country Operations Division, Eastern Africa Department, and the Country Policy, Industry, and Finance Division, Operations Evaluation Department — is part of a larger effort in the Bank to identify sustainable conditions for growth. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Afsar Nokhostin, room J10-285, extension 34150 (17 pages). March 1995.

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The World Bank

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Trade Policy Reform, Efficiency, and Growth

A. Introduction

1. The central objective of trade policy reform is to make markets more competitive and, thereby, change the behavior and performance of firms, i.e., to introduce greater external competition into the previously protected domestic markets and increase economic efficiency at the level of individual firms.^{1/} The efficiency gains are achieved both through increased productivity—more efficient use of existing resources in response to increased competition—and a shift in resources from inefficient to efficient sectors, i.e., gains from freer trade. Improved efficiency, in turn, contributes to increased output growth. The transition from a restrictive to an open trade regime, however, can impose short-run adjustment costs in industries newly exposed to external competition. This may be further compounded by efforts to restore macroeconomic stabilization, such as across-the-board reductions in fiscal deficits that could adversely affect the physical and human infrastructure of the country. This paper empirically examines the impact of trade reform programs for a group of trade reforming countries. In particular, it examines the impact of trade reform on productivity and GDP growth, export growth, the diversification of exports, and the trade balance. This paper also examines if the trade reforms had dissimilar effects across the reforming countries, i.e., whether the outcome of trade reform was related to the initial conditions such as the existing level of diversification of the production structure or the functioning of markets.

2. This paper confirms the link between trade policy reform and efficiency gains. Reductions in average tariff levels on imports are associated with increased output growth, for a given level of investment and capacity utilization. However, the extent to which trade policy reform has a beneficial impact is related to the initial conditions prevailing in the country. Ghana, Indonesia, and Turkey started their trade reform programs with different initial conditions. Indonesia and Turkey had a more diversified production structure and a relatively well functioning market compared to Ghana. Both groups carried out intensive trade reform. The beneficial impact of trade reform was more significant in Indonesia and Turkey compared to Ghana. This confirms that countries with well functioning markets benefit more from productivity-enhancing trade reforms.

^{1/} See R. Harris, "Market Structure and Trade Liberalization: A General Equilibrium Assessment," in T.N. Srinivasan and J. Whalley, eds., General Equilibrium Trade Policy Modelling (Cambridge, Mass.: MIT Press, 1986); W.J. Baumol, J.C. Panzar and R.D. Willig, Contestable Markets and the Theory of Industry Structure (California: Harcourt Brace Jovanovich, 1988); J. Vickers and G. Yarrow, Economic Perspectives on Privatization (Oxford University, 1990).

B. Trade Reform, Productivity and Output Growth

3. The two key variables that can have a major influence on growth include the availability of resources and the government policies that affect the efficiency of resource use. Both variables can determine the level and the rate of growth of output.^{2/} In general, the level of investment declined or remained stagnant in the trade adjusting countries in the 1980s during the adjustment period; this pause in investment activity is well recognized by now and is known to be related to uncertainty arising from changes in policies.^{3/} Any output growth that took place, therefore, had to come from efficiency improvements. There are several channels through which trade reform can improve (firm-level) efficiency and, thus, output growth. First, import competition can force domestic firms to increase productivity.^{4/} Domestic firms can raise productivity by increasing scale-efficiency (producing at minimum efficient scale) and by improving technical efficiency (achieving the maximum possible output from a given bundle of inputs). In effect, import competition changes the structure of the market and, thus, its performance. Second, trade liberalization can also generate beneficial externalities. If external economies, such as technology diffusion, can be transmitted world-wide and are not nation specific, then trade liberalization could benefit technological developments in the adjusting countries.^{5/} The following sections evaluate the impact of trade liberalization on productivity and GDP growth for nine trade adjusting countries.

4. Productivity Gains. Ideally, data on factor productivity are required at the firm level to assess the linkage between trade reform and productivity;^{6/} they are, however, not available for the group of adjusters reviewed here. This paper uses data on labor productivity at the aggregate level. Table 1 reports the annual data on real output per worker in the manufacturing sector for five trade adjusters for the period 1978-86 (Colombia, Indonesia, Mexico, Pakistan and Turkey).^{7/} For the five adjusters as a group annual output per worker increased from 103 in 1978-82 to 130 in 1983-86 (1980=100).

^{2/} For a survey, see W.R. Easterly and D.L. Wetzel, Policy Determinants of Growth: Survey of Theory and Evidence, PRE WP 343, The World Bank, December 1989; R.J. Barro, A cross-country study of growth, savings, and government, NBER Working Paper No. 2855 (Cambridge, MA, 1989).

^{3/} See W.H. Branson and S. Schwartz, "Investment Efficiency and the Financial Sector," August 1989, prepared for the Report on Adjustment Lending II.

^{4/} The efficiency resource costs associated with restrictive trade policies, of course, would be less when trade restrictions are not binding, e.g., smuggling can continue to provide competition to local firms despite import restrictions.

^{5/} For an alternative argument, see F. Stewart and E. Ghani, "Do Externalities Matter for Development?," World Development, Pergamon Press, May 1991.

^{6/} For example, see J. Tybout, J. de Melo and V. Corbo, The Effects of Trade Reforms on Scale and Technical Efficiency: New evidence from Chile, PRE Working Paper No. 481, 1990.

^{7/} Time series data on capital productivity for the trade adjusting countries are not available.

**Table 1: LABOR PRODUCTIVITY IN THE MANUFACTURING SECTOR
(1980 = 100)**

Real Output per Worker	1978	1979	1980	1981	1982	1983	1984	1985	1986	Average	
										1978-82	1983-86
Colombia	94.9	104.8	100.0	105.8	101.8	107.4	114.5	128.1	137.3	101.4	121.8
Indonesia	86.1	96.1	100.0	113.1	117.4	128.7	133.0	141.3	155.8	102.6	139.7
Mexico	99.8	102.1	100.0	99.4	97.1	105.0	111.3	112.4	106.7	99.7	108.3
Pakistan	78.4	86.2	100.0	108.4	122.5	136.0	139.3	144.8	152.6	99.1	143.2
Turkey	112.0	95.6	100.0	119.2	126.0	127.8	131.9	138.9	157.9	110.6	139.1
Average	94.2	97.0	100.0	109.2	113.0	120.6	126.0	133.1	142.1	102.7	130.4

Note: 1978-82 is pre-reform period and 1983-86 is adjustment period.

Source: World Tables, World Bank.

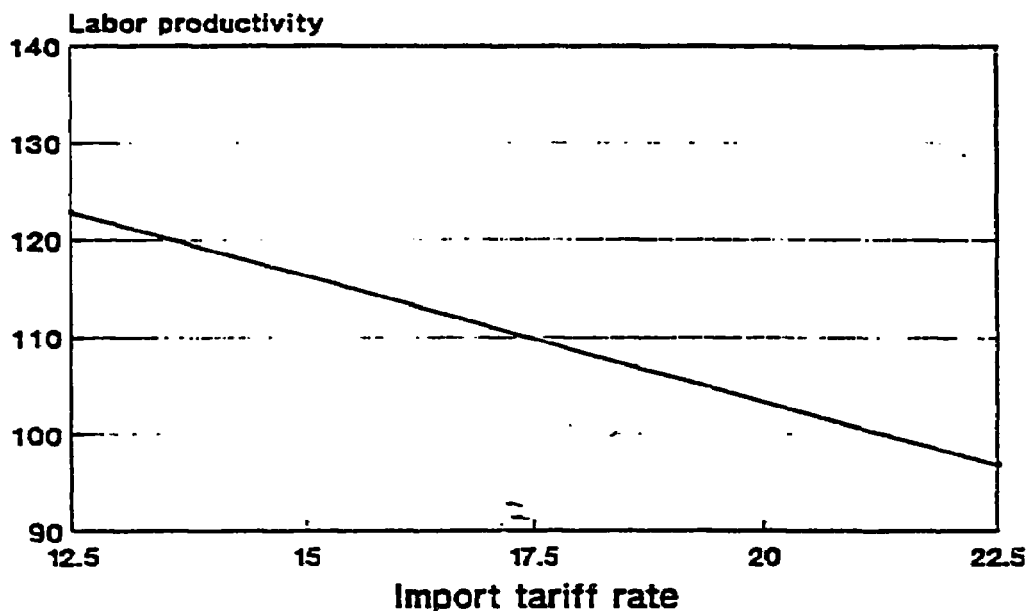
5. The issue is whether the improvement in labor productivity can be linked to trade liberalization, i.e., whether output per worker increased in response to reductions in the level of import protection. This is verified by examining if labor productivity is systematically related to the level of import protection. Import protection is measured by the average tariff rate (ratio of total import duties collected to the CIF value of import) since most trade adjusting countries had managed to reduce QRs on imports.^{5/} Figure 1 plots the relationship between labor productivity and the average tariff rate based on a simple regression equation for labor productivity where the tariff rate appears as the explanatory variable. It shows a negative relationship between the tariff rate and labor productivity, i.e., an increase in labor productivity is associated with a reduction in the tariff rate. When the sample is restricted to include only the intensive adjusters (Indonesia, Mexico and Turkey),^{5/} the explanatory power of the equation increases and the tariff rate becomes more significant (equation 2 under Figure 1). The evidence confirms the linkage between increased import competition and improvements in productivity. The following sections examine the linkage between import liberalization and the GDP growth rate.

6. Output Growth. Table 2 shows the data on annual real GDP growth rate for the nine trade adjusters. For the adjusters as a group, the average annual real GDP growth rate increased from 3.6% in 1978-82 to 4% in 1986-89. The trade adjustment program, therefore, is associated with improved growth performance. The table also compares the average GDP growth rate for the intensive and less intensive trade adjusters. The intensive adjusters increased their annual real GDP growth rate from 3.8% in 1978-82 to 4.7% in 1986-89; the growth rate for the less intensive adjusters did not change significantly. The intensive adjusters, thus, benefitted more from the adjustment programs than did the less intensive adjusters. There were, however, significant differences within the group. While Indonesia's economy expanded more rapidly compared to the other intensive adjusters, Côte d'Ivoire's economy contracted amongst the less intensive trade adjusters.

^{5/} See Thomas, V, and J. Nash, Best Practices in Trade Policy Reform, OUP, and Trade Policy Reforms Under Adjustment Programs, OED, 1991.

^{5/} The intensive trade adjusters reduced QRs as well as the average tariff levels on imports; the less intensive adjusters are classified as those which managed to reduce QRs only but not the tariff levels.

Figure 1: Import Competition and Labor Productivity



Equation: Labor productivity = $a_0 + a_1 \text{ATR}_t$

Notes:

1. Figure 5.1 is based on equation 1.

2. Equation 1: Five adjusters (Colombia, Indonesia, Mexico, Pakistan and Turkey)

$$\text{Labor productivity} = 155.3 - 2.6\text{ATR}$$

(6.7) (-1.7)

R-squared 0.18, DW: 0.44

3. Equation 2: Intensive adjusters (Indonesia, Mexico and Turkey)

$$\text{Labor productivity} = 138.3 - 2.3\text{ATR}$$

(17.4) (-5.6)

R-squared 0.48, DW: 0.78

3. Sample range: 1978-1986, annual data

4. Labor productivity is given by real output per worker in the manufacturing sector (1980=100) and ATR is import duties collected as a percentage of value of CIF imports.

5. Data used are the average for the group of adjusters.

Sources: World Tables, World Bank; IFS and CEM.

Table 2: REAL GDP GROWTH RATES
(In 1980 US Dollars)

Real GDP Growth rate	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Annual Average		
													1978-82	1983-85	1986-89
(A) Intensive trade adjusters															
Ghana *	9.8	-1.7	0.5	-2.9	-6.5	-4.2	8.5	4.5		4.3	5.8	6.3	-0.2	3.0	5.4
Indonesia *	7.7	6.2	7.9	7.4	-0.4	3.3	6.1	2.5	4.0	3.4	16.0	7.4	5.8	3.9	7.7
Mexico	8.2	9.3	8.4	8.8	-0.6	-4.2	3.6	2.6	3.8	1.5	1.6	2.9	6.8	0.7	0.5
Morocco *	2.9	4.5	9.1	-2.8	9.3	-0.3	4.3	6.3	8.4	-2.6	10.4	3.5	-4.6	3.5	2.9
Turkey *	3.3	-0.9	-0.7	4.2	4.9	3.8	5.9	4.9	8.0	7.2	3.8	1.2	2.1	4.9	5.1
Average *	6.4	3.5	5.0	2.9	1.3	-0.3	5.7	4.2	4.3	2.8	7.5	4.2	3.8	3.2	4.7
(B) Less Intensive trade adjusters															
Colombia *	8.4	5.4	4.1	2.1	1.0	1.6	3.5	3.3	6.1	5.3	3.7	3.3	4.2	2.8	4.6
Côte d'Ivoire	13.9	3.0	-0.8	4.4	1.5	-1.3	-4.4	9.3	3.6	-2.9	-6.4	-1.1	4.4	1.2	-1.7
Jamaica *	0.4	-2.1	-6.0	2.2	-10.3	15.1	-1.1	-5.0	2.3	5.5	0.3	4.5	-3.1	3.0	3.2
Pakistan a/b/	8.1	3.7	10.4	7.9	6.5	6.8	5.0	7.5	5.6	6.5	7.4	5.6	7.3	6.4	6.3
Average	7.7	2.5	1.9	4.2	-0.3	5.5	0.8	3.8	4.4	3.6	1.3	3.1	3.2	3.4	3.1
(C) All adjusters															
Average *	7.0	3.0	3.6	3.5	0.6	2.3	3.5	4.0	4.4	3.1	4.7	3.7	3.6	3.3	4.0

* indicates countries where real annual GDP growth rate increased.

** 1978-82 is pre-reform period; 1983-85 is adjustment and 1986-89 is post-reform period.

a/ Fiscal years.

b/ Source: CEM 9233-PAK (FY81-89).

Source: World Bank Database (BESD: National Account).

7. The link between GDP growth and the trade policy reform is verified by estimating standard output growth equations for the two groups of trade adjusters (intensive and less intensive) using pooled data. The dependent variable in the equation is the growth rate in real GDP, and the explanatory variables are the average import tariff rate, the real exchange rate, the investment/GDP ratio and a measure of capacity utilization. It is expected that tariff liberalization, for a given level of investment and capacity utilization, would increase output by improving the efficiency of resource use. The average import tariff rate has several advantages as an indicator of trade liberalization. First, it is the major variable that influenced the level of import protection. Second, the average tariff rate is a direct measure of trade policy unlike the measures based on trade flows (e.g., export/GDP ratio). Indicators of trade policy based on trade flows can be misleading since trade intensity can vary across countries for reasons unrelated to the trade policy, e.g., geographical location of the country.^{10/} Second, the tariff rate does

^{10/} A comparison of export to GDP ratios for Mexico and Jamaica shows that Jamaica is less trade restrictive than Mexico, contrary to the trade reform experience. In general, in cross-country comparisons based on the trade/GDP ratios, small economies turn out to be more open compared to large economies.

not suffer from the subjective nature of the indices constructed on trade policy distortions.^{11/} Some caution, however, needs to be exercised in interpreting the changes over time in the tariff rate as measured here. An elimination of duty exemption or a change in the composition of imports can increase the average tariff rate independent of any changes in the statutory tariff rate.

8. The regression results for output growth are reported in Table 3. The estimate for the group of intensive adjusters shows that the coefficients on the exchange rate and the import tariff rate are significant but the investment to GDP ratio is not. A devaluation of the currency (a fall in the index, 1980=100) has a positive effect on the GDP growth rate. A reduction in the import tariff rate is associated with increased GDP growth rate. When a measure of capacity utilization is included, the coefficient turns out to be significant and positive. Increased capacity utilization, therefore, also played an important role in facilitating growth, at least in the short-run. The evidence, thus, suggests that a reduction in the import tariff rate, for a given level of investment, is associated with an increased GDP growth rate. This finding is consistent with the data on changes in labor productivity for the trade adjusting countries.

9. In the case of less intensive trade adjusters, the coefficient on the tariff rate, although it has the right sign, is not significant. The coefficient on capacity utilization is highly significant. To test whether the regression results merely reflect a trend, a time trend is included in the regression; the coefficient on the time trend turned out to be insignificant. The low explanatory power of the equation, however, suggests that other variables, not included in the regression, may have also contributed to output growth.

10. The estimated output equation for the adjusters as a group constrains the coefficient on the tariff variable to be the same across countries. Trade reform, however, may not have a similar effect across countries. The output growth equations were, therefore, re-estimated individually for the trade adjusters. The regression results are reported in Table 4. They highlight the differential impact of trade reform on output growth. A cross-country comparison of the estimated coefficients on the tariff rate shows that it has a significant effect on output growth in Mexico and Turkey but not in Ghana. Similarly, a devaluation had dissimilar effects on output. The estimated coefficient on the real exchange rate for Turkey is almost twice that of Ghana. The findings here support the view that the impact of trade policy reform is also dependent on the economic structure of the adjusting country.^{12/} Countries with better human infrastructures (i.e., a higher level of education and literacy) and more diversified production tend to benefit more from productivity-enhancing trade reform. More micro studies, however, would be necessary to establish this proposition more rigorously.

^{11/} See L. Pritchett, Measuring Outward Orientation in Developing Countries: Can it Be Done?, PRE WPS 566, January 1991, for a detailed discussion on this subject; see also E. Leamer, "Measures of Openness," in R. Baldwin, ed., Trade Policy Issues and Empirical Analysis (Chicago: University of Chicago, 1988).

^{12/} For recent empirical findings that support a structuralist view of adjustment, see R. Faini and J. de Melo, Adjustment, Investment, and the Real Exchange Rate in Developing Countries, PRE Working Paper No. 473, The World Bank, August 1990. See also H. Chenery, "The Structuralist Approach to Development Policy," American Economic Review, 1975; and H. Chenery, S. Robinson and M. Syrquin, Industrialization and Growth, OUP, 1986.

Table 4: TRADE LIBERALIZATION AND GROWTH: 1980-1988
(Dependent variable: real GDP growth)

	RER	ATR(t-1)	I(t)/ GDP(t-1)	Capacity Utilization	T	C	No. of obs.	R2	S.E.R	D.W	F-statistic
(A) Intensive Trade Adjusters											
Ghana	-0.04 (2.41)*	-0.02 (0.35)	-0.06 (0.06)			0.10 (0.48)	9	0.54	0.02	1.66	4.23
	-0.03 (2.63)*	-0.06 (0.57)	0.68 (0.74)	-0.28 (0.83)		-0.03 (0.17)	9	0.50	0.02	1.95	3.02
	-0.06 (1.93)	-0.02 (0.35)	-0.33 (0.26)		-0.002 (0.93)	0.19 (0.74)	9	0.47	0.02	1.65	2.79
Indonesia	-0.06 (0.75)	0.18 (0.20)	-0.34 (0.36)			0.16 (1.03)	9	-0.21	0.02	2.00	0.36
	-0.03 (1.93)	0.44 (1.03)	-0.65 (2.15)*	1.10 (9.18)*		0.17 (3.53)	9	0.87	0.01	3.01	14.47
	-0.21 (1.47)	-0.68 (0.66)	0.38 (0.72)		-0.01 (1.60)	0.46 (1.59)	9	-0.22	0.02	2.25	0.64
Mexico	-0.05 (0.51)	-0.70 (4.50)*	9.82 (2.77)*			-0.02 (0.16)	9	-0.79	0.01	2.50	11.06
	-0.05 (0.41)	-0.70 (4.11)*	9.78 (2.34)*	-0.02 (0.12)		-0.02 (0.15)	9	0.74	0.01	2.51	6.64
	-0.03 (0.25)	-0.59 (1.81)	9.91 (2.41)*		0.001 (0.56)	-0.08 (0.41)	9	0.74	0.01	2.59	6.84
Morocco	0.03 (0.09)	-0.13 (0.25)	2.16 (3.00)*			-0.44 (1.09)	5	0.58	0.01	1.96	4.68
	-0.12 (0.61)	0.14 (0.35)	0.97 (1.58)	1.14 (2.24)*		0.02 (0.07)	9	0.68	0.01	1.66	5.37
	1.08 (1.29)	-0.45 (0.80)	1.57 (1.55)		0.02 (1.44)	-2.38 (1.66)	9	0.64	0.01	1.62	4.50
Turkey	-0.06 (2.90)*	-0.06 (6.38)*	3.97 (1.71)			0.01 (0.09)	9	0.79	0.005	2.56	10.94
	-0.07 (3.02)*	-0.05 (2.26)*	4.85 (1.43)	-0.22 (0.42)		-0.003 (0.03)	9	0.74	0.01	2.87	6.80
	-0.17 (3.41)*	-0.07 (5.81)*	3.51 (1.55)		-0.003 (1.75)	0.24 (1.65)	9	0.81	0.005	2.14	9.47

Table 4 (cont'd)

	RER	ATR(t-1)	I(t)/ GDP(t-1)	Capacity Utilization	T	C	No. of obs.	R2	S.E.R	D.W	F-statistic
(B) Less Intensive Trade Adjusters											
Colombia	-0.07 (0.98)	-0.13 (0.94)	-1.07 (0.22)			0.22 (2.47)	9	0.59	0.004	2.02	4.91
	-0.07 (1.26)	-0.17 (1.61)	-1.72 (0.41)	0.26 (1.37)		0.24 (4.23)	9	0.63	0.004	2.46	4.45
	-0.11 (2.03)	-0.14 (1.81)	-1.48 (0.42)		-0.002 (1.87)	0.30 (5.17)	9	0.69	0.004	2.49	5.49
Côte d'Ivoire	-0.10 (0.60)	-0.24 (1.15)	0.28 (0.24)			0.25 (0.80)	9	-0.034	0.02	2.00	0.91
	-0.12 (0.93)	-0.10 (0.84)	0.65 (1.11)	0.88 (4.16)*		0.24 (1.05)	9	0.55	0.01	1.99	3.42
	-0.21 (1.28)	-0.72 (2.59)*	3.99 (2.26)*		0.02 (2.40)*	0.35 (1.38)	9	0.35	0.02	1.99	2.09
Jamaica	-0.06 (0.37)	0.18 (0.47)	2.50 (1.48)			-0.19 (0.52)	9	-0.11	0.03	2.88	0.74
	-0.08 (0.01)	0.004 (0.01)	1.97 (1.39)	1.10 (3.57)*		-0.09 (0.31)	9	0.35	0.03	2.17	2.07
	0.01 (0.02)	0.04 (0.05)	2.14 (0.85)		0.004 (0.24)	-0.30 (0.44)	9	-0.37	0.04	2.85	0.46
Pakistan	0.04 (0.68)	0.04 (0.34)	-4.85 (1.07)			0.01 (0.08)	9	-0.42	0.01	1.57	0.21
	0.04 (0.54)	0.03 (0.24)	-5.44 (0.72)	-0.59 (0.35)		0.01 (0.06)	9	-0.67	0.01	2.10	0.20
	-0.06 (0.90)	0.07 (0.86)	0.60 (0.05)		-0.004 (2.23)*	0.14 (0.52)	9	0.25	0.01	2.76	1.67

Equation: $(\log \text{GDP}_t - \log \text{GDP}_{t-1}) = a_0 + a_1 \log \text{RER}_t + a_2 \text{ATR}_{t-1} + a_3 \text{I/GDP}_{t-1} + a_4 \text{CU}_t + a_5 \text{T}$

Notes:

1. Sample range: 1980-88.
2. Absolute value of t-statistics in parentheses and * shows significance at 5% level.
3. Estimated by OLS using annual data; Heteroskedasticity-Consistent Covariance Matrix to estimate t-statistics.
4. R2 adjusted for degree of freedom.
5. S.E.R: Standard Error of Regression.
6. D.W.: Durbin-Watson statistic.

Definition of variables:

1. Real GDP (in 1980 \$US): BESD National Account.
2. RER: Real Exchange Rates (1980=100); a fall of RER is depreciation: IMF.
3. ATR: Average Tariff Rates (%), given by total import duties collected as % of CIF value of imports; Import duties: various CEMs and IFS documents; value of imports: IFS.
4. I/GDP(t-1): Real gross domestic investment as a ratio of real GDP of the previous year: World Bank Database (National Account).
5. CU: Capacity utilization is the difference between actual logGDP and fitted values of logGDP, where fitted values are estimated by $\text{LogGDP} = c + \text{Time Trend}$.

C. Export Performance

11. Export growth. Table 5 shows the data on real export growth rates. The average annual export growth rate for the nine trade adjusters increased from 6% in 1978-82 to 9.3% in 1986-89. The intensive adjusters achieved higher growth rates compared to the less intensive adjusters. Ghana, an intensive trade adjuster, and Côte d'Ivoire, a less intensive adjuster, make an interesting comparison. Both Ghana and Côte d'Ivoire had a similar production structure prior to the reforms. Ghana achieved an export growth rate of 24% per annum in 1986-89 compared to the negative growth (-1.3%) for Côte d'Ivoire. This is explained by the differences in the design of the trade adjustment programs for the two countries. Ghana devalued whereas Côte d'Ivoire was not able to do so. In Côte d'Ivoire, the lack of currency devaluation was further compounded by the relatively high cost of domestic and imported inputs. The price of electricity and petroleum, as a result of the divestiture efforts, increased in Côte d'Ivoire and is much higher than in Ghana; this reduced the international price competitiveness of Côte d'Ivoire's exports. This is an example of an adjustment program where price liberalization of public enterprises came into conflict with the objectives of export growth in the short-run.

Table 5: GROWTH RATE OF REAL EXPORTS
(in 1980 US\$)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Annual Average*		
												1979-82	1983-85	1986-89
<u>(A) Intensive adjusters</u>														
Ghana	-1.7	-13.6	-8.9	15.2	-45.7	9.5	6.5	41.6	29.4	7.9	18.5	-2.2	-9.9	24.3
Indonesia	2.3	5.5	-18.0	-9.0	4.7	0.6	-8.0	14.4	16.8	-10.3	9.1	-4.8	-0.9	7.5
Mexico	12.1	6.1	11.6	21.8	13.6	5.7	-4.4	3.2	9.8	3.0	1.4	12.9	4.9	4.4
Morocco	0.5	3.6	0.2	4.9	8.1	2.8	4.2	2.2	10.1	18.2	-8.6	2.3	5.1	5.5
Turkey	-9.3	4.1	85.1	40.1	13.7	19.8	12.3	-1.5	27.3	19.7	4.7	30.0	15.3	12.5
Average	0.8	1.2	14.0	14.6	-1.1	7.7	2.1	12.0	18.7	7.7	5.0	7.6	2.9	10.8
<u>(B) Less intensive adjusters</u>														
Colombia	6.4	5.1	-11.8	-1.6	-0.9	10.3	14.4	20.7	8.4	3.5	6.8	0.0	7.9	9.8
Côte d'Ivoire	2.3	12.7	6.9	1.4	-8.0	10.3	-0.9	-3.4	-5.2	-16.9	20.5	5.9	0.5	-1.3
Jamaica	2.0	-1.5	4.0	-12.4	9.4	17.7	11.2	6.7	12.0	2.0	5.2	-2.0	12.8	7.5
Pakistan	13.3	19.5	18.2	-6.0	24.6	-3.7	-0.4	32.8	12.3	-1.6	11.5	11.3	6.8	13.8
Average	6.5	9.0	4.3	-4.6	6.3	8.6	6.1	14.2	6.9	-3.3	12.0	3.8	7.0	7.5
<u>(C) All adjusters</u>														
Average	3.3	4.6	9.7	6.1	2.2	8.1	3.9	13.0	13.4	2.8	8.1	5.9	4.7	9.3

*1979-82 pre-reform period, 1983-85 is adjustment and 1986-89 is post-reform period.

Source: World Bank Database (BESD).

12. Export Diversification. The diversification of exports was an important objective of the trade program; it was aimed at reducing the vulnerability of the trade balance to external shocks. Table 6 shows that the average share of manufactured exports in GDP for the nine adjusters increased from 4% of GDP in 1978-82 to 6.4% in 1986-88. Both Indonesia and Mexico were highly dependent on oil exports for foreign exchange earnings prior to the adjustment programs. Both managed to diversify exports and reduce their reliance on oil exports as a result of the adjustment program. In Indonesia,

manufactured exports increased from less than 1% of GDP in 1978-82 to more than 5% in 1986-89, while in Mexico, it increased from 1.2% to 6.4% during the same period. Ghana is the only intensive trade adjuster where the share of manufactured exports in GDP did not increase (0.6% of GDP).

Table 6: MANUFACTURED EXPORTS AS A PERCENTAGE OF GDP

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1978-82	Average** 1983-85	1986-88
(A) Intensive trade adjusters														
Ghana	0.7	0.5	0.6	0.8	0.4	0.4	0.2	0.2	0.4	0.6	0.7	0.6	0.3	0.6
Indonesia	0.4	0.9	0.7	0.8	0.9	1.9	2.5	2.8	3.6	5.7	6.6	0.7	2.4	5.3
Mexico	1.6	1.3	1.1	1.1	1.0	2.2	2.4	2.5	5.5	7.0	6.7	1.2	2.4	6.4
Morocco	2.6	2.9	3.0	4.3	4.6	5.7	6.9	6.8	6.2	7.2	8.2	3.5	6.5	7.2
Turkey	1.0	6.9	1.4	3.0	4.9	5.6	8.3	9.8	7.7	9.9	10.6	2.2	7.9	9.4
Average	1.2	1.3	1.4	2.0	2.4	3.2	4.1	4.4	4.7	6.1	6.6	1.7	3.9	5.8
(B) Less intensive adjusters														
Colombia	2.3	2.6	2.4	2.3	1.9	1.5	1.6	1.9	2.3	3.0	2.9	2.3	1.7	2.7
Côte d'Ivoire	2.0	2.3	2.8	3.1	3.3	3.5	3.0	3.8	3.1	2.7	2.9	2.7	3.5	2.9
Jamaica	17.1	17.7	22.9	23.8	15.0	14.1	20.2	17.5	16.2	14.8	13.8	19.3	17.3	15.0
Pakistan	4.8	5.9	5.4	5.3	4.6	6.8	5.8	5.6	7.2	9.1	8.2	5.2	6.1	8.1
Average	6.5	7.1	8.4	8.6	6.2	6.5	7.6	7.2	7.2	7.4	6.9	7.4	7.1	7.2
Average*	3.0	3.6	3.5	3.6	3.3	4.0	3.5	3.8	4.2	4.9	4.6	3.4	3.7	4.80
(C) All adjusters														
Average	3.6	3.9	4.5	4.9	4.1	4.7	5.7	5.7	5.8	6.7	6.7	4.2	5.3	6.4

Notes:

1. Manufactured exports include chemical and related products, basic manufactures, machinery transport equipment, other manufactured articles and goods not elsewhere classified, excluding non-ferrous metals.
2. * excludes Jamaica.
3. **1978-82 is pre-reform period; 1983-85 is adjustment and 1986-88 is post-reform period.

Sources: Export (FOB) in custom bases in current US dollars: World Tables; GDP at market price in current US dollars: IEC National Accounts.

13. Indonesia's dependence on oil was substantially reduced by the expansion of traditional manufactured exports of textiles and plywood products. While these exports were important, the non-traditional manufactured exports also increased, e.g., plastics, ceramics, basic metal products, glass, paper, rubber products and footwear. The growth in non-traditional exports was accompanied by a shift in the export destination—away from industrial countries markets to other developing countries. The share of export to industrial countries decreased from an average of 75.1% during 1978-82 to 73.3% during 1986-89, while the share of developing countries increased from 22.8% to 26% during the same period.

14. In Mexico, the growth in non-oil exports was also outstanding. Prior to the trade reform, export earnings were mostly concentrated on natural resources — agriculture, mining, oil and tourism. Trade reform encouraged the exports of manufactured goods. These exports grew by 33% in volume

terms during 1985-87. By 1987, manufactured exports (excluding exports from "maquiladoras") were the single most important source of export revenue, representing 36% of exports of goods and non-factor services. Mining exports generated only 33% of export revenues and agricultural exports about 6%. Even within manufacturing, natural resource based industries (food, beverages and tobacco, wood and paper products) continued to decline in importance – with the notable exception of glass, cement and other non-metal mineral products, whose exports increased significantly during the 1980s. Exports of labor intensive products (textiles and apparel), by contrast, grew significantly during 1985-87, reversing the poor export performance in the 1970s and early 1980s. Among the other metal industries, transport equipment, metal products and machinery, and basic metal industries (including iron and steel) substantially increased their share in total manufacturing exports. The share of exports to the industrial countries increased consistently, reaching almost 90% in 1989, while the shares to developing countries and non-market socialist economies declined. Particularly, the share of exports to developing countries nearly halved from 15% in 1978 to 8.8% in 1989. In conclusion, Indonesia and Mexico succeeded in diversifying both export structure and export markets. This helped to reduce the vulnerability of their trade balance to external shocks.

15. In contrast, in Pakistan, although manufactured exports increased from 5% of GDP in 1978-82 to 8% in 1986-89, the export base remained relatively narrow. Export growth came primarily from the growth in traditional exports, all of which are primary commodity-based, e.g., traditional cotton, cotton textiles and rice exports, which account for two-thirds of merchandise export earnings. The increase in traditional exports also accounts for the increased importance of developed countries' market for its exports. At the same time, the share of exports to developing countries declined. The foreign exchange earnings from the traditional exports, however, fluctuated substantially.

16. Exports and the Exchange Rate. This section verifies whether the improved export performance can be attributed to the exchange rate policies adopted by the adjusting countries.^{13/} Export equations are estimated in which the explanatory variables include the real exchange rate, uncertainty in the exchange rate and the world demand for exports. The estimated export equation, using pooled data for the nine countries, had a poor fit although the real exchange rate had the right sign, i.e., currency devaluation encourages exports and it is statistically significant.

17. The export equation is also estimated for individual adjusters and the results are reported in Table 7. The coefficient on the real exchange rate is significant for most adjusters and it has the correct sign. A cross-country comparison reveals the differential impact of the exchange rate on exports. Both Turkey and Ghana substantially devalued their currency compared to the other adjusters.^{14/} Turkey's coefficient on the real exchange rate is twice that of Ghana, i.e., Turkey's export response to currency devaluation was greater than Ghana's. The differential impact of exchange rate on exports is consistent with the previous finding on the differential impact of the exchange rate on GDP growth.

^{13/} See also B. Balassa, Incentive Policies and Agricultural Performance in Sub-Saharan Africa, WPS 77, The World Bank, August, 1988. This study found a high export response to depreciation.

^{14/} The coefficient on exchange rate uncertainty is significant for both Ghana and Turkey.

Table 7: IMPACT OF THE EXCHANGE RATE ON EXPORTS
(Dependent variable: real exports)

	Colombia	Côte d'Ivoire	Ghana	Indonesia	Jamaica	Mexico	Morocco	Pakistan	Turkey
Real exchange rate(t)	-0.587 (8.41) [*]	-0.753 (2.17) [*]	-1.151 (2.54) [*]	-0.500 (2.18) [*]	-0.337 (1.53)	-0.357 (1.64)	0.585 (0.66)	-0.946 (1.83)	-2.497 (2.65) [*]
Exchange rate uncertainty	0.005 (2.85) [*]	0.016 (1.09)	-0.262 (4.37) [*]	-0.025 (1.79)	-0.012 (0.86)	-0.013 (0.96)	-0.014 (1.46)	-0.001 (0.05)	-0.044 (2.39) [*]
World demand(t)	0.725 (2.81) [*]	-0.087 (0.26)	-22.128 (3.04) [*]	-1.643 (1.39)	1.409 (1.50)	0.846 (2.37) [*]	2.545 (1.82)	0.391 (0.26)	-1.010 (0.54)
Constant	1.663 (0.63)	10.72 (3.53)	214.997 (3.15)	26.595 (2.26)	-3.269 (0.35)	0.528 (0.13)	-15.92 (0.96)	4.475 (0.22)	26.85 (1.29)
R-squared	0.998	0.629	0.705	0.638	0.967	0.823	0.941	0.930	0.961
S.E.R.	0.014	0.075	0.225	0.057	0.050	0.087	0.049	0.079	0.097
D.W.	2.496	1.783	2.256	1.315	2.167	1.333	1.825	2.919	1.778
F-statistics	641.2	2.260	3.183	2.351	39.57	6.182	21.31	17.67	32.87
<hr/>									
Real exchange rate(t)	-0.750 (7.45) [*]	-0.366 (2.42) [*]	-0.089 (0.33)	-0.603 (1.93)	-0.172 (1.44)	-0.385 (2.16) [*]	0.294 (0.59)	-0.423 (0.92)	-2.313 (1.75)
World demand(t)	0.110 (0.29)	-0.507 (1.49)	-0.369 (0.13)	-2.188 (1.60)	1.974 (6.58) [*]	1.264 (2.69) [*]	2.269 (2.42) [*]	1.868 (1.61)	1.038 (0.49)
Constant	7.978 (2.06)	12.854 (3.57)	5.118 (0.19)	31.92 (2.32)	-9.131 (2.92)	-3.208 (0.68)	-12.19 (1.15)	-11.28 (0.90)	7.405 (0.30)
R-squared	0.988	0.534	0.152	0.389	0.959	0.787	0.934	0.888	0.843
S.E.R.	0.027	0.069	0.315	0.099	0.048	0.109	0.046	0.095	0.248
D.W.	2.099	1.709	0.999	1.442	1.504	0.810	1.367	2.327	1.498
F-statistics	242.5	3.440	0.538	1.912	71.07	11.10	42.63	23.90	16.20

Equations:

$$(1) \log X = a_0 + a_1 \log RER_t + a_2 \log ERU_t + a_3 \log WD_t$$

$$(2) \log X = a_0 + a_1 \log RER_t + a_2 \log WD_t$$

Notes:

1. Sample range: 1981-1988, annual data; absolute value of t-statistics in parentheses and * shows significance at 5% level.
2. Estimated by OLS; Heteroskedasticity-Consistent Covariance Matrix to estimate coefficients.
3. S.E.R.: Standard Error of Regression.
4. D.W.: Durbin-Watson statistic.

Definition of variables:

1. RER: Real exchange rate (1980=100); a fall indicates depreciation.
2. Real exchange rate uncertainty is approximated by two-year moving variance.
3. World demand is approximated by OECD GDP at constant prices.
4. Real export: Value of export in 1980 prices.

Sources: IFS, BESD (National Accounts).

D. Trade Reform and the Trade Balance

18. Since most trade adjustment programs were initiated from an initial position of large macroeconomic imbalance, one concern is whether trade liberalization would conflict with the balance of payments objectives. Table 8 reports the data on the trade balance before and after trade reform. The trade adjusters, as a group, improved their trade balance from a deficit of 3% of GDP in 1978-82 to a surplus of 1% of GDP in 1986-89. A comparison of intensive and less intensive trade adjusters shows that the intensive adjusters succeeded in achieving a higher trade surplus in 1986-89 than in 1983-

85. There are, of course, substantial differences between countries within the group. Among the less intensive adjusters, the trade balance for Jamaica deteriorated sharply in 1986-89, while that of Colombia improved substantially during the same period.^{15/16/} In general, trade reform did not cause the trade balance to deteriorate despite the increases in imports resulting from import liberalization. The improvements in the trade balance is explained by the greater increases in exports in comparison to imports and reduced domestic absorption.

Table 8: TRADE BALANCE AS A RATIO OF GDP*
(in 1980 US\$)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Average**		
													1978-82	1983-85	1986-89
(A) Intensive trade adjusters															
Ghana	0.1	1.4	-0.7	-0.2	4.4	0.5	0.7	-0.1	1.8	0.3	-0.2	0.8	1.0	0.4	0.7
Indonesia	16.1	13.9	12.8	0.0	-2.6	-2.8	2.9	0.6	1.4	4.0	7.0	6.7	8.1	0.3	4.8
Mexico	1.7	0.3	-2.3	-3.1	4.7	9.9	9.4	7.7	9.5	10.6	8.5	6.9	0.3	9.0	8.8
Morocco	-14.4	-14.7	-10.5	-11.3	-10.3	-5.9	-6.1	-5.0	-5.9	-6.2	-3.3	-6.4	-12.2	-5.7	-5.4
Turkey	-8.0	-7.7	-7.8	-4.4	-1.0	-1.6	-3.2	0.0	-5.0	-4.0	0.0	-0.4	-5.8	-1.6	-2.4
Average	-0.9	-1.4	-1.7	-3.8	-1.0	0.0	0.8	0.7	0.4	1.0	2.3	1.5	-1.7	0.5	1.3
(B) Less intensive adjusters															
Colombia	1.3	2.4	0.6	-2.0	-3.5	-2.0	0.0	2.8	5.3	5.9	6.7	6.8	-0.2	0.3	6.2
Côte d'Ivoire	-9.7	-7.5	-6.1	-1.6	2.9	3.1	9.7	10.4	9.1	8.1	7.6	14.3	-4.4	7.7	9.8
Jamaica	-6.3	-1.5	-2.1	-3.3	-8.0	-6.9	-8.5	-12.4	-5.3	-7.4	-20.7	-21.4	-4.2	-9.3	-13.7
Pakistan	-9.8	-14.1	-11.6	-4.0	-4.4	-3.1	-4.6	-5.8	-1.4	0.2	-1.3	-0.1	-8.8	-4.5	-0.6
Average	-6.1	-5.2	-4.8	-2.7	-3.3	-2.2	-0.9	-1.2	1.9	1.7	-1.9	-0.1	-4.4	-1.4	0.4
(C) All adjusters															
Average	-3.2	-3.0	-3.1	-3.3	-2.0	-1.0	0.0	-0.2	1.1	1.3	0.5	0.8	-2.9	-0.4	0.9

* Trade Balance is export-GNFS minus import-GNFS.

** 1978-82 is pre-reform period; 1983-85 is adjustment and 1986-89 is post-reform period.

Source: World Bank Database (BESD National Account).

E. Exchange Rate and the Labor Market

19. The interaction between exchange rate and the labor market is central to the export supply response. Usually, currency devaluation provides an export supply response by reducing real wages and improving the international price competitiveness of exports. It has been argued, however, that a

^{15/} The deterioration in the trade balance in Jamaica, partly, was a result of Hurricane Gilbert.

^{16/} Some adjusting countries were forced to reduce the level of external imbalances before the adjustment process began; this was caused by the change in the international environment for commercial lending. The data for Mexico shows that it increased the surplus on trade balance from 1983 onwards.

cut in real wage can result in output losses by adversely affecting the incentive to work.^{17/} A currency devaluation aimed at reducing real wages can be offset by productivity losses. Table 9 compares the data on real wage and the ratio of output to real wage per worker for five adjusters for which data are available. For the adjusters as a group, real wage per worker increased from 102 in 1978-82 to 111 in 1983-86. The output to wage ratio, however, increased from 100 to 122 (1980=100) during the same period. In Turkey, real wages fell from 111 in 1978 to 98 in 1986 (1980=100), but the output to wage ratio increased from 101 to 161 during the same period. In general, the impact of exchange rate adjustment on the labor market appears to be consistent with the export objectives of the trade programs.

Table 9: REAL WAGE AND UNIT LABOR COST IN THE MANUFACTURING SECTOR OF THE ADJUSTING COUNTRIES
(1980=100)

Real Wage Per Worker										Average ^a	
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1978-82	1983-86
Colombia	109.3	105.3	100.0	101.3	103.5	108.5	117.3	115.9	154.1	103.9	124.0
Indonesia	91.8	93.6	100.0	108.3	123.2	128.4	127.5	139.2	143.4	103.4	134.6
Mexico	103.4	102.4	100.0	103.0	100.6	74.5	72.6	90.9	86.8	101.9	81.2
Pakistan	89.4	96.2	100.0	99.8	103.9	119.3	123.0	124.2	130.4	97.9	124.2
Turkey	110.6	110.5	100.0	104.3	97.8	96.0	84.4	81.4	98.3	104.6	90.0
Average	100.9	101.6	100.0	102.3	105.8	105.3	105.0	110.3	122.6	102.3	110.8

Real Output/ Real Wage											
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1978-82	1983-86
Colombia	86.8	99.5	100.0	104.4	98.3	98.9	97.6	110.5	89.1	97.8	99.0
Indonesia	93.8	102.7	100.0	104.4	95.3	100.3	104.3	101.5	108.7	99.2	103.7
Mexico	96.6	99.7	100.0	96.5	96.6	138.2	153.3	123.7	122.9	97.9	134.5
Pakistan	87.6	89.6	100.0	108.6	117.9	114.0	113.2	116.6	117.0	100.7	115.2
Turkey	101.3	86.5	100.0	114.3	128.9	133.2	156.3	170.6	160.7	106.2	155.2
Average	93.2	95.6	100.0	105.6	107.4	116.9	124.9	124.6	119.7	100.4	121.5

^a1978-82 is pre-reform and 1983-86 is adjustment period.

Source: World Tables, World Bank.

20. It has been argued that a devaluation can be neutralized by an increase in wages. The estimates of the real wage equation, with the real exchange rate and the employment level included as explanatory variables, are reported in Table 10. The data are taken from World Bank tables. The estimate for the five adjusters, using pooled data, shows a significant correlation between real devaluation and the real wage. A real devaluation is associated with a reduction in the real wage level after controlling for the effect of employment. The elasticity of wages, with respect to devaluation, is

^{17/} See J. Stiglitz, "The Causes and Consequences of the Dependence of Quality on Price," Journal of Economic Literature, March 1987.

about 0.5. Adjustment in the real wage was, thus, a major channel through which the adjusting countries improved the international price competitiveness of their exports.^{18/}

Table 10: EFFECT OF EXCHANGE RATE DEVALUATION ON WAGES
(Dependent variable: real wage)

	RER(t-1)	Employ(t-1)	C	No. of Obs	R2	S.E.R.	D.W	F-statistics
(A) Five adjusters	0.532 (3.264)*	0.372 (1.913)*	0.229 (0.377)	30	0.269	0.065	1.006	7.07230
(B) Intensive trade adjusters								
Indonesia	0.182 (0.489)	0.473 (2.025)	0.759 (0.545)	6	0.465	0.032	1.747	3.1706
Mexico	1.164 (8.451)*	-1.546 (9.179)*	2.752 (7.293)	6	0.923	0.017	2.461	31.0236
Turkey	1.079 (3.388)*	2.708 (2.407)*	-5.573 (2.126)	6	0.526	0.029	2.854	3.7726
(C) Less Intensive trade adjusters								
Colombia	0.631 (1.936)	-2.206 (4.175)*	7.681 (7.489)	6	0.849	0.026	2.811	15.0566
Pakistan	0.018 (0.033)	3.043 (2.668)*	-4.102 (1.210)	6	0.698	0.026	1.774	6.7906

Equation:

$$\log \text{ Real Wage} = a_0 + a_1 \log \text{RER}_{t-1} + a_2 \log \text{Employ}_{t-1}$$

Notes:

1. Sample range: 1981-1986, annual data; absolute value of t-statistics in parentheses and * shows significance at 5% level.
2. Estimated by OLS; Heteroskedasticity-Consistent Covariance Matrix to estimate coefficients.
3. S.E.R.: Standard Error of Regression.
4. D.W.: Durbin-Watson statistic.

Definition of variables:

1. Real Wage: Real earnings per employee in the manufacturing sector (1980=100): World Tables, World Bank.
2. RER: Real exchange rate (1980=100); a fall indicates depreciation.
3. Employ: Employment in the manufacturing sector (1980=100): World Tables, World Bank.

^{18/} The regression results for the individual adjusters suggest a far closer relationship between exchange rates and wages for Turkey, Mexico and Colombia as compared to that of Pakistan and Indonesia.

F. Conclusions

21. While the benefits of trade policy reforms have gained widespread recognition, several concerns persist regarding the policy design and impact of these programs. This paper examined the impact of trade reform on efficiency and growth in nine trade adjusting countries: Colombia, Cote d'Ivoire, Ghana, Indonesia, Jamaica, Mexico, Pakistan, and Turkey. Evidence shows that all trade-adjusting countries reduced non-tariff barriers, while some actually managed to proceed further by reducing tariff levels on imports.

22. The countries that managed to reduce the tariff levels on imports experienced a greater increase in output growth in comparison to the countries that merely managed to reduce non-tariff barriers. Similarly, the more intensive adjusters experienced a higher export growth in comparison to the less-intensive adjusters. Increased import competition introduced by intensive trade adjustment forced domestic firms to improve their efficiency. Simple regression estimates suggest that a reduction in the import tariff level is associated with increased labor productivity. At an aggregate level, the reduction in import tariff level, for a given level of investment, is also associated with increased GDP growth rates.

23. A comparison of the individual adjusters highlights the differential impact of productivity-enhancing trade reform. Indonesia and Ghana were intensive trade adjusters. Both traditionally relied on resource-based exports. Indonesia made substantial progress in increasing manufactured export and thus diversifying the export base. In comparison, Ghana's share of manufactured exports in GDP did not change substantially after trade reform. This suggests that countries with better human infrastructure and well-functioning markets tend to benefit more from productivity-enhancing trade reforms. Improvements in supply response in the least developed countries would, therefore, require investment in human and capital infrastructure.

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