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Trade Liberalization and Real Exchange Rate Movement

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Although theory suggests that the real exchange rate should depreciate after a permanent trade liberalization but could appreciate temporarily with a transitory one, little empirical evidence exists. Unlike existing studies that use either indirect tests or openness measures that could be unreliable, this paper uses an event study based on individually documented trade liberalization in 45 countries. The result shows that real exchange rates depreciate after countries open their economies to trade. In countries with multiple liberalization episodes, however, real exchange rates do not depreciate at the start of trade liberalization in early episodes, suggesting that partial or transitory trade liberalizations deter adjustments toward the equilibrium exchange rate. [JEL F40, F31]

Since the 1980s, governments in many developing countries have undergone a dramatic change in their development strategies, abandoning statist philosophies in favor of market-based approaches. By the late 1990s, most countries of the world had integrated into the global economy. In the process of introducing market forces into their economies, many countries liberalized foreign trade, loosened control of the capital market, and privatized national industries. The large number of cases of trade liberalization provides an excellent testing ground for examining the effects of trade liberalization on the real exchange rate. In addition, while many early trade liberalizations were partial or partially reversed, liberalizations in the late

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1980s and 1990s were broader and more sustained. This also provides data for comparing the impacts of partial and temporary liberalizations with those of permanent ones.

The equilibrium real exchange rate, which is consistent with both internal and external balances, changes in response to permanent real shocks. One such shock is trade liberalization. When a small country liberalizes its trade, demand for importables increases and demand for nontradables decreases in response to the relative price change. Assuming the Marshall-Lerner condition holds, a real depreciation is necessary to maintain internal and external balances (Edwards, 1989). Calvo and Drazen (1998), however, showed that trade liberalization of uncertain duration could lead to an upward jump in consumption (including nontradables through within-period optimization) and, hence, real appreciation.

The theoretical impact of trade liberalization on the real exchange rate movement has been well examined; however, there is little empirical evidence. Existing studies either use imprecise measurements of trade restrictiveness (or openness) or test the impact indirectly. Pritchett (1991) shows that these indices are poorly correlated, and no evidence indicates that one measure is better than another.

Unlike existing studies, this paper uses an event study based on individually documented trade liberalization events in 45 countries to examine the impact of trade liberalization on real exchange rate movements. The panel data set used in this study contains annual data between 1970 and 1995 for 62 countries, 45 of which liberalized their trade system (some more than once) during the sample period. It also includes, as a control, 17 countries that had low trade barriers throughout the period.[1] Some developing countries in my sample have shorter time spans due to availability of data.

Two key findings emerge from the study. First, controlling for country-specific factors—such as deviation of the real exchange rate from its long-run equilibrium, relative gross domestic product (GDP) growth, terms of trade, the share of government expenditure in GDP, and net capital inflows—the real exchange rate depreciates after a country's most recent episode of trade liberalization. Second, in countries with multiple liberalization episodes, no significant changes in the real exchange rate were found at the start of trade liberalization in early episodes, suggesting that partial or transitory trade liberalizations slow down the adjustment of the real exchange rate toward its equilibrium level.

I. Theory

Several models are available for analyzing the impact of a trade liberalization on the real exchange rate. Dornbusch (1974) developed a model that showed that an increase in tariffs will lead to real appreciation if nontradables are substitutes, a

[1]Because practically all developing countries with reasonable time-series data are included in the sample of trade liberalization, the control sample consists of developed countries, including Australia, Austria, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, Norway, Singapore, Sweden, Switzerland, the United Kingdom, and the United States.

reasonable assumption at this level of aggregation. A variety of theoretical models have been developed to analyze movement of the equilibrium real exchange rate in response to its fundamental determinants, including trade liberalization. For example, Edwards (1989) developed an intertemporal model of the equilibrium real exchange rate and showed that a permanent increase in tariffs will lead to real appreciation, assuming substitution across all goods and that the substitution effect dominates the income effect. In the model of Khan and Ostry (1992), an economy consumes nontradables and importables and produces nontradables and exportables. Assuming all goods are normal and the income effect of a tariff reduction does not dominate the substitution effect of relative price changes, the real exchange rate depreciates in response to a tariff reduction. Calvo and Drazen (1998), however, showed that trade liberalization of uncertain duration could lead to an upward jump in consumption and, therefore, a short-run real appreciation.

The following section first presents a model examining the response of the real exchange rate to trade liberalization and then discusses other factors that affect the real exchange rate.

Response of Real Exchange Rate to Trade Liberalization

As a benchmark, a model based on Dornbusch (1974) is presented to examine the response of the equilibrium real exchange rate to a permanent trade liberalization. The model serves to clarify terms and provide a guide for the empirical analysis. The implication of a transitory trade liberalization is briefly discussed.

Assume the home country consumes and produces three goods: exportables, importables, and nontraded goods. The country is small, so the world relative price of tradables (world terms of trade), P^*, is given. In addition, income equals expenditures, the tariff revenues are redistributed back to the consumers in a lump-sum fashion, and no initial distortion exists. Let N be the excess demand for nontradables; I be income, measured in nontradables; P_m and P_e be the domestic relative prices of importables and exportables relative to nontradables, respectively; and t be the tariff rate. All prices are converted into a common currency. In equilibrium the excess demand for nontradables is zero:

$$N(P_m, P_e, I) = 0. \tag{1}$$

Domestic relative prices of tradables are determined by the world terms of trade and tariffs:

$$T = (1 + t).$$

Therefore,

$$P_m/P_e = P^* T. \tag{2}$$

It can be shown that equilibrium in the nontraded goods market implies trade balance. Define θ_m and θ_e as the compensated excess demand elasticities

of nontradables with respect to the relative prices of importables and exportables, respectively. Totally differentiating equation (1), and noting that the redistribution of tariff proceeds implies that a small change in tariff creates no income effect, we have

$$\theta_m \hat{P}_m + \theta_e \hat{P}_e = 0. \tag{3}$$

Holding the world terms of trade constant and log differentiating equation (2) yields

$$\hat{P}_m - \hat{P}_e = \hat{T} + \hat{P}^* . \tag{4}$$

Solving equations (3) and (4) gives

$$\hat{P}_e = -\frac{\theta_m}{\theta_m + \theta_e} \hat{T}, \tag{5}$$

and

$$\hat{P}_m = \frac{\theta_e}{\theta_m + \theta_e} \hat{T}. \tag{6}$$

In the case where nontradables are substitutes for both traded goods and the cross-price elasticity of excess demand for nontradables θ_m and θ_e is positive, equations (5) and (6) indicate that a reduction in tariffs will lead to a decrease in the relative prices of importables in terms of nontradables and an increase in the relative price of exportables in terms of nontradables. This means that the domestic price of both nontradables and importables decreases vis-à-vis exportables, which is given by the world price. Thus, the domestic price level unambiguously decreases relative to the world price level, and the real exchange rate depreciates.

To show this more formally, assume that the total consumption is a Cobble-Douglas function with α, β, and $(1 - \alpha - \beta)$ as the share of importables, exportables, and nontradables. Let P_n be the price level of nontradables and Q the domestic price index, then

$$Q = (P_m * P_n)^{\alpha} (P_e * P_n)^{\beta} P_n^{(1-\alpha-\beta)} = P_m^{\alpha} P_e^{\beta} P_n. \tag{7}$$

Let Q_t be the price index of world tradables and assume tastes are the same across countries.

$$\begin{aligned} Q_t &= (P^* P_e P_n)^{\frac{\alpha}{\alpha+\beta}} (P_e P_n)^{\frac{\beta}{\alpha+\beta}} \\ &= P^{*\frac{\alpha}{\alpha+\beta}} P_e P_n. \end{aligned}$$

Define the real exchange rate (RER) as the ratio of world tradable price level to domestic prices measured in common currency, that is, $RER = Q_t/Q$. An increase in RER indicates a real depreciation, and

$$\hat{RER} = -\alpha\hat{P}_m + (1-\beta)\hat{P}_e$$
$$= -\frac{\alpha\theta_e + (1-\beta)\theta_m}{\theta_m + \theta_e}\hat{T}.$$

Therefore, when nontradables are substitutes for both traded goods, a reduction in tariffs will lead to an increase in RER and an equilibrium real depreciation.

Noting $\theta_m + \theta_e > 0$,[2] we can show that when nontradables and importables are complements, in response to a reduction in tariffs, the prices of both tradables decline relative to nontradables. The relative change in domestic price level, however, is ambiguous. Similarly, when nontradables and exportables are complements, a tariff reduction will lead to a price decrease in nontradables against both tradables, and domestic price level decreases vis-à-vis world price level.

At this level of aggregation, it is reasonable to assume that nontradables are substitutes for both tradables. Therefore, the real exchange rate should depreciate in response to trade liberalization.

The preceding analysis applies to permanent trade liberalizations. A transitory reform, however, could lead to a real appreciation in the short run. This is because transitory trade liberalizations cause individuals to increase consumption while reform lasts, including higher demand for nontradables, in anticipation of higher prices when the trade liberalization policy is reversed (Calvo and Drazen, 1998). Consequently, the price of nontradables rises. This implies a decline in the relative prices of exportables P_e and importables P_m, holding the world prices of tradables constant. Equation (7) shows that the real exchange rate appreciates.

Other Factors Pertaining to Real Exchange Rate

The real exchange rate is also affected by other factors, including productivity growth, terms-of-trade changes, government consumption of nontradable goods, and inflows of capital. The expected effects of these factors are briefly outlined below.

- *Productivity growth.* The Harrod-Samuelson-Balassa hypothesis states that the real exchange rate appreciates in countries experiencing rapid growth. This is because productivity improvement is more rapid in countries with higher growth rates than those with lower ones. In addition, technological progress is biased toward the tradable sector, leading to a rise in the economy-wide real wage, hence, an increase in the price of nontradables relative to tradables.
- *Terms of trade.* Exogenous movements of the terms of trade—relative world prices of exportables to importables—affect the real exchange rate movement through both income and substitution effects (Edwards, 1989). A decline in the terms of trade causes a reduction in real income and, therefore, a fall in demand and the relative price for nontradables. However, the substitution effect of a terms-of-trade worsening is less straightforward. Again, assuming nontradables and tradables are substitutes, a terms-of-trade worsening will

[2] $\theta_m + \theta_e$ is the negative of the price elasticity of excess demand for home goods.

cause the nontradable price to decline relative to importables but rise relative to exportables, leaving ambiguous the change in the relative price of the nontradables to the tradable as a whole. If we assume that the income effect dominates, we would expect a real depreciation in response to a terms-of-trade worsening.

- *Share of government expenditure.* Changes in the level of government expenditure will also affect real exchange rate movement. Because government spending has a large component of nontradable goods, an increase in government expenditure will lead to a rise in demand for nontradables. This is the substitution effect. However, the increase in government spending has to be financed through higher taxes (either current or future), leading to a decline of disposable income and a fall in demand for nontradables. This is the income effect. In the most plausible case, the substitution effect will dominate, and the real exchange rate appreciates (Edwards, 1989).
- *Capital flow.* In the last decade or so, the world has also witnessed unprecedented capital market opening in developing countries (Henry, 1997a). Concurrent with this opening is a large flow of capital to developing economies. An inflow of capital increases the demand for nontradable goods in the recipient country and thus leads to real appreciation.

The discussion above shows that when testing the response of the real exchange rate to trade liberalization, it is important to control for the effects of productivity growth, terms-of-trade shocks, changes in government spending, and capital flows.

II. Related Literature

This section first provides a brief and selective review of related literature on the response of the real exchange rate to trade liberalization and then discusses various measurements of the openness of trade regimes to establish the case for using an event study.

Although the theoretical effect of trade liberalization on the real exchange rate has been well examined, the empirical evidence is relatively scant and limited in scope. Using parallel market spreads of exchange rates as an index of the severity of trade restrictions and exchange controls, Edwards (1989) showed that restriction of trade causes appreciation of the real exchange rates, based on experiences in 12 developing countries during 1962–84. As will be discussed shortly, the parallel market spread is an inaccurate measure of the restrictiveness of trade policy. Using existing estimates of income elasticity of import demand, price elasticity of import demand, and price elasticity of export supply in developing countries, Khan and Ostry (1992) showed that the equilibrium real exchange rate depreciates in response to a tariff reduction. Elbadawi (1994) used trade intensity (ratio of exports plus imports to GDP) to proximate openness and found that openness has no significant impact on the real exchange rate. As also will be discussed shortly, trade intensity is not an ideal measure of the openness of a trade regime. In one of the most extensive studies on trade liberalization, Michaely, Papageorgiou, and Choksi (1991) examined movement of the real exchange rate during episodes of trade liberalization. They plotted the real exchange rate during the episodes of

trade liberalization and found that there is no consistent pattern to the real exchange rate movement. Their studies, however, failed to control for other factors that may also affect the real exchange rate.

A major challenge of testing empirically the response of the real exchange rate to trade liberalizations is how to measure multidimensional trade restrictiveness. Various measures have been used as a proxy for trade policy stance. These measures can be classified into two broad categories: outcome-based and incidence-based (Baldwin, 1989). The former infers the restrictiveness of a trade regime by examining the variables affected by trade barriers (prices and trade flows). The latter measures the tariff level or counts the occurrences of nontariff restrictions across sectors.

Within outcome-based measures, there are two subcategories: flow-based measures and price-based measures. Flow-based measures include trade intensity (the ratio of exports plus imports to GDP), structure-adjusted trade intensity (the ratio of trade to GDP adjusted for factors affecting trade, including location, external transport cost, country size, etc.), Leamer's (1988) intervention indices (deviation of trade from the predicted trade, based on Heckscher-Ohlin models), and import penetration ratio. Price-based measures include implicit tariff rates (differences between domestic prices and border prices of similar products) and the spread of the black market premium of exchange rates (Pritchett, 1991; and Andriamananjara and Nash, 1997). All the trade flow-based measures are sensitive to assumptions and the construction of a counterfactual scenario of what would have happened without the trade barriers. The implicit tariff is preferable to the flow-based measures because it reflects both tariff and nontariff restrictions. However, these measures are difficult to construct and are limited by data availability. The spread of the black market premium of exchange rates is a good proxy for exchange control. However, the premium is affected not only by excess demand for imports, but also by demand for foreign assets. In addition, it cannot capture the trade restriction caused by tariffs and nontariff measures.

Incidence-based measures include average tariff rates and nontariff restriction indices (Pritchett, 1991; and Andriamananjara and Nash, 1997). The average tariff can be measured either as a simple or weighted (production- or imports-weighted) statutory tariff rate. Because the effect of tariff restrictions depends on the collection rate, which is affected by exemptions and smuggling, average legal rates may not reflect the restrictiveness of the tariff system. An alternative measure of the average tariff rate is the ratio of tariff revenue to imports. This, however, may mask the "escalation" embedded in the rate structure resulting from the high rates on competing imports and low rates on inputs. For this reason, the average legal tariff rate, especially a production-weighted average legal tariff rate, is the preferred measure. One common shortcoming of all tariff-based measures is that they do not reflect the effect of nontariff trade barriers, which could make tariffs redundant for some products. For this reason, measures on the prevalence of nontariff barriers (NTBs) are developed, usually calculated as the share of products subject to NTBs, which include restrictive licensing, quotas, prohibitions, finance restrictions (advanced import deposit, foreign exchange controls, and prohibitions), price controls, and import channel controls (for example, state monopoly) (Erzan and

others, 1989). Because the restrictiveness on trade of various NTBs differs and their impacts vary across products and countries, it is not a reliable measure. In addition to the weakness of incidence-based measures, data on legal tariff rates and NTBs are difficult to obtain, and no continuous time-series data exist; this precludes the use of this type of measure for capturing the change in trade policy regimes.

Because of the problems associated with both outcome-based and incidence-based measures, commonly used measures of trade openness are poorly correlated. Using cross-country data, Pritchett (1991) examined the relationships among trade intensity, structure-adjusted trade intensity, import penetration ratio, Leamer's intervention indices, mean tariff, NTB coverage ratio, and price distortion index (the official exchange rate divided by the purchasing power parity (PPP) exchange rate). He found that they are nearly unrelated. This raises concern as to whether any of these measures accurately reflect the openness of a trade regime.

III. Data

At the center of this project is the compilation of trade liberalization data and measures of the real exchange rate, which are discussed in the following section.

Trade Liberalization

In general, trade liberalization refers to government policy changes that will reduce the distortion of trade flows caused by government intervention. Two types of policy changes are included: (1) price instruments, such as tariffs, duties, surcharges, and taxes; and (2) nontariff restrictions, such as quotas, prohibitions, licenses, import deposits, etc.

The trade liberalization events are organized by episodes. An episode starts on the date when tariffs, nontariffs, or both restrictions—affecting a wide range of sectors—are significantly reduced; it ends when there are no apparent changes or, in some cases, a reversal. Since the response of the real exchange rate to trade liberalization is an equilibrium move that requires some time to materialize, the frequency is measured by year rather than month. The trade liberalization dates are from Papageorgiou, Michaely, and Choksi (1991), various editions of *Trends in Developing Economies* (TIDE), various issues of country reports by the Economist Intelligence Unit, various studies on trade liberalizations, country studies, and publications by General Agreement of Tariffs and Trade (GATT) and the World Trade Organization. (See Appendix I.)

Real Exchange Rate

There are two broad types of real exchange rate indices: multilateral and bilateral. Within each type, the index may vary by the price indices used. Because there is no general agreement on what constitutes the best empirical measurement of the real exchange rate, four sets of real exchange rate indices that are often used in empirical work are compiled.

In compiling these indices, official nominal exchange rates and consumer price indices (CPIs), as a proxy for domestic price levels, are used. The variation among these indices comes from the selection of partner countries and the price indices used for partner countries. These four indices are multilateral real exchange rate with wholesale price indices (WPIs) as the major partner countries' price indices (MLRER), multilateral real exchange rate with CPIs as the major partner countries' price indices (MLRERC), bilateral real exchange rate with respect to the United States using CPI as the U.S. price index (BIRERC), and bilateral real exchange rate with respect to the United States using WPI as the U.S. price index (BIRER). See Appendix II for technical details.

Each of the four indices has its own strength. As illustrated by the model in Section I, when a country liberalizes trade, its domestic price, a composite of tradables and nontradables, should decrease vis-à-vis the world tradable price. This suggests that the CPI, which contains both tradable and nontradable prices, is a reasonable proxy for the domestic price level. It is difficult, however, to find an empirical counterpart to the tradable price index. The WPI, which contains mainly tradable goods, is a more preferable proxy for the tradable price index than the CPI. This means that theoretically BIRER is preferable to BIRERC as a bilateral real exchange rate index. However, BIRERC is the most popular real exchange rate index in policy analyses because of wide availability of CPI data and easy computation compared with a multilateral rate (Edwards, 1989). In addition, the variation across countries in the components of WPIs makes MLRER less consistent than MLRERC. In general, because bilateral exchange rates do not fully reflect a country's price level relative to its major trading partners, it is less preferable than multilateral real exchange rates.

As shown in Table 1, these four indices are highly correlated. The correlation between two multilateral and between two bilateral real exchange rates is higher than the correlation between multilateral and bilateral real exchange rates. This confirms the finding by Edwards (1989) that within a particular class of indices (multilateral or bilateral), the choice of the price index in constructing the real exchange rate is less important than the choice between these two classes.

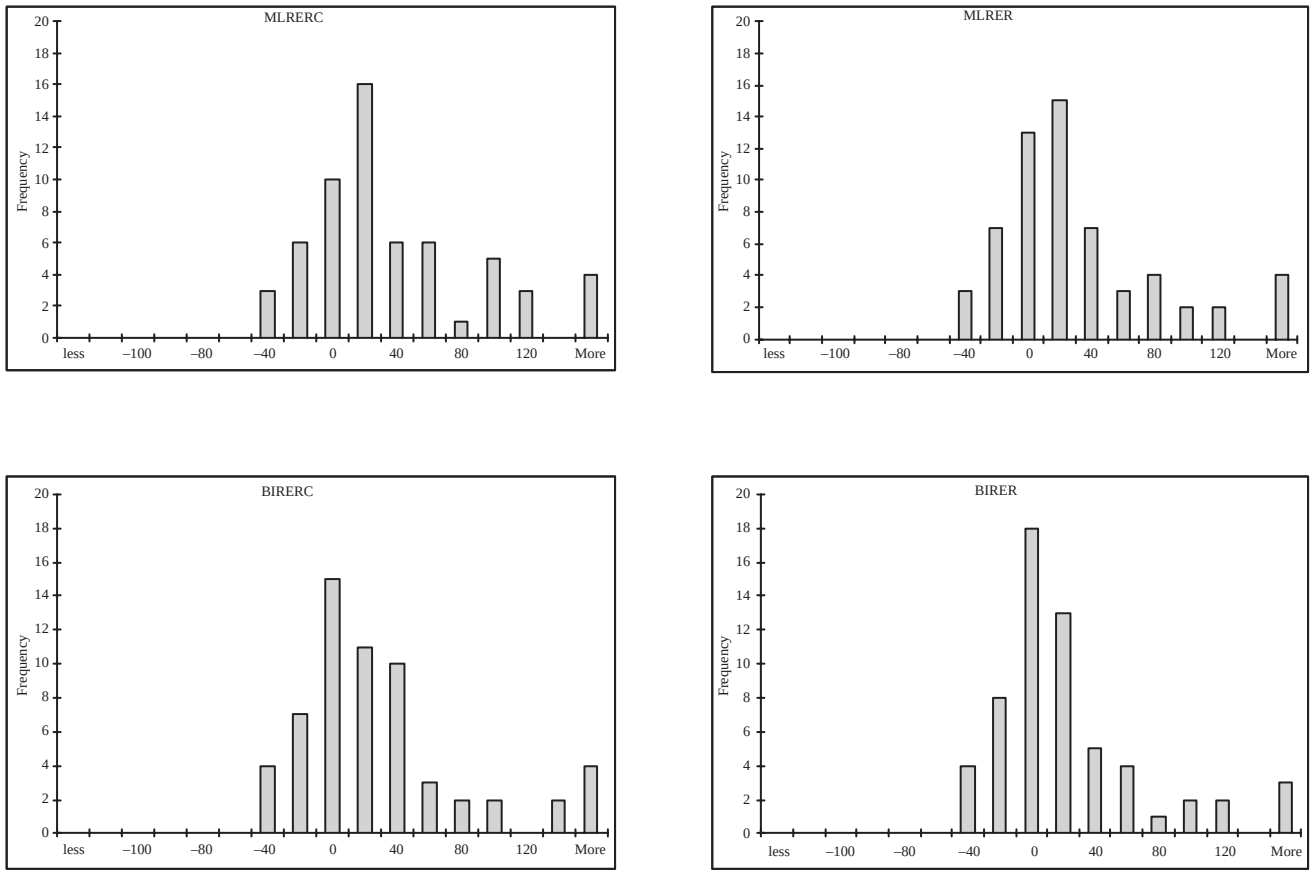
IV. Results

This section first examines the movement of the real exchange rate before and after trade liberalization. Using panel data and controlling for other factors, it analyzes the relationship between the movement of the real exchange rate and trade liberalization.

Table 1. Correlations Between Real Exchange Rate Indices

	MLRERC	MLRER	BIRERC	BIRER
MLRERC	1.00			
MLRER	0.97	1.00		
BIRERC	0.92	0.96	1.00	
BIRER	0.96	0.95	0.97	1.00

Figure 1. Distribution of Percentage Change in the Real Exchange Rate One Year After Trade Liberalization Compared with One Year Before



Real Exchange Rate After Trade Liberalization

This section examines how the real exchange rate moves after trade liberalization without controlling for other factors. The results show that the real exchange rate depreciates significantly after trade liberalizations.

A comparison of the real exchange rate one year after the trade liberalization episode with one year prior to the liberalization shows that most countries experienced real depreciation by all four indices (Figure 1), ranging from 20 to 40 percent. The mean percentage changes vary from 27 to 47, and are all highly significant (Table 2).

To see how the real exchange rate moves on average around the time of trade liberalizations, the cross-section averages of the four indices are plotted in Figure 2. It shows that on average, the real exchange rate was depreciating before the start of trade liberalization and depreciated even more after the initiation of trade liberalization, independent of the indices used. In addition, the real exchange rate appears to depreciate more rapidly at the start of the liberalization, as indicated by the steeper slopes. However, BIRER exhibits a much milder pattern of real depreciation, confirming the finding of Edwards (1989) that it is important to use a multilateral real exchange rate to analyze real exchange rate movement.

In sum, a simplistic examination of the data provides preliminary evidence that the real exchange rate tends to depreciate after trade liberalization, as predicted by theory. On average the real exchange rate depreciates by 27 percent to 48 percent one year after trade liberalization, compared with one year prior to the reform. In addition, most trade liberalizations took place when the real exchange rate was depreciating. The following section examines the movement of the real exchange rate after controlling for other factors.

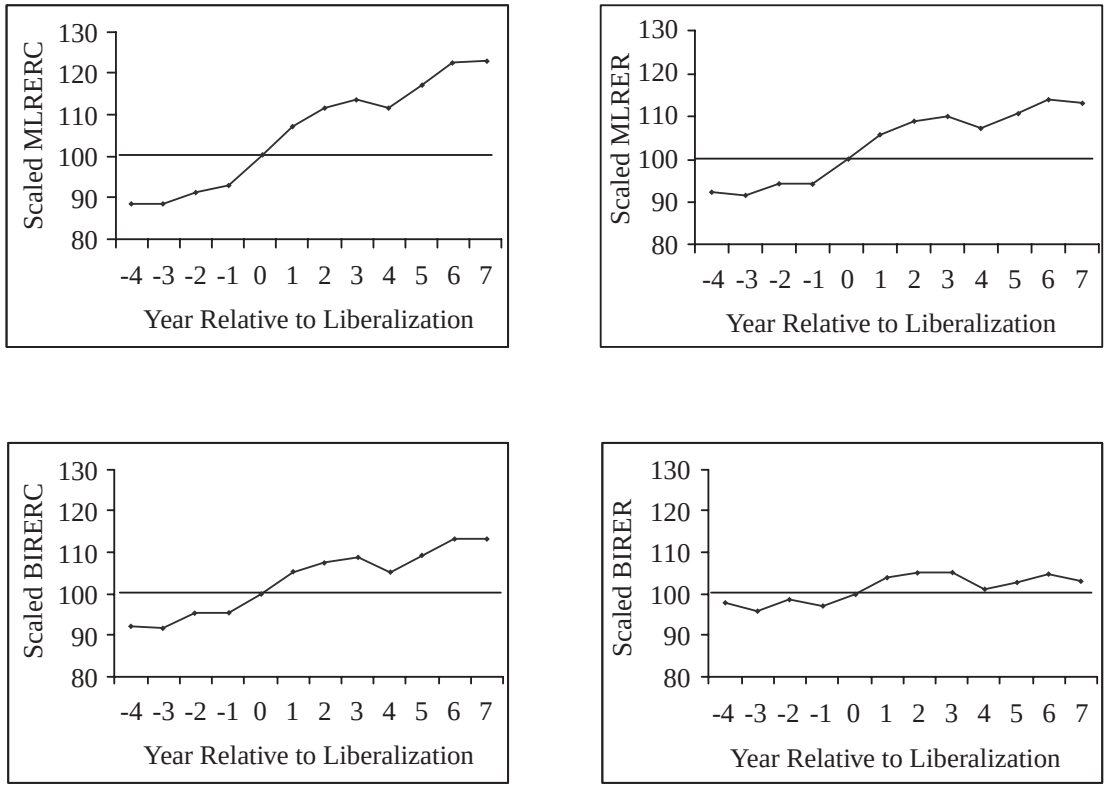
Econometric Evidence

The basic econometric model used to estimate the impact of trade liberalization on the real exchange rate is presented in the equation below. A set of dummy variables is used to distinguish the movement of the real exchange rate at different stages of a trade liberalization. The other variables in the econometric model are based on the theory of equilibrium real exchange rate movements presented in Section I.

$$\hat{RER} = \alpha + \beta_1 LIB_{it} + \beta_2 \Delta LIB_{it} + \beta_3 \Delta OPEN_{it} + \beta_4 RERDEV_{it-1} + \beta_5 RGRW_{it} + \beta_6 \hat{TOT}_{it} + \beta_7 \Delta GOV_{it} + \beta_8 CFLW_{it} + \beta_9 \hat{RER}_{it-1} + \beta_{10} STAB_{it} + \alpha_i + \eta_{it}.$$

$\hat{}$ = percentage change
Δ = change
RER_{it} = real exchange rate index of country i at year t
LIB_{it} = liberalization dummy, assuming one for years during country i's trade liberalization episodes
$OPEN_{it}$ = openness dummy, assuming one once the most recent trade liberalization episode started

Figure 2. Average Real Exchange Rate Across Countries Around Initiation of Trade Liberalization



Note: Real exchange rate indices are first scaled so that in the year when trade liberalization began (Year=0) the indices equaled 100, and then are averaged across the sample. Two exceptional cases, Ghana in 1983 and Guyana during 1988–92, are excluded in the computation; the plots present lower bounds of the average depreciation of the whole sample.

Table 2. Summary Statistics of Percentage Change in the Real Exchange Rate

	MLRERC	MLRER	BIRERC	BIRER
Mean	47.64	38.92	36.12	27.17
Standard Error	17.64	16.44	16.43	15.17
Standard Deviation	136.68	127.32	127.27	117.50
Minimum	–48.11	–51.77	–52.21	–55.89
Maximum	936.55	855.18	866.63	792.13
Observations	60	60	60	60
Hypothesized Mean	0	0	0	0
Degree of Freedom	59	59	59	59
t-Stat	2.70	2.37	2.20	1.79
$P(T\$\leq\$t)$ one-tail	0.00	0.01	0.02	0.04

$RERDEV_{it-1}$ = percentage deviation of the real exchange rate from its long-run equilibrium level[3]

$RGRW_{it}$ = relative GDP growth rate of country *i* at time *t* relative to its major trading partners; a proxy for the relative productivity growth of country *i* at time *t* vis-à-vis its major trading partner[4]

TOT_{it} = terms of trade index

GOV_{it} = share of government expenditure in GDP

$CFLW_{it}$ = ratio of net capital flows to GDP

$STAB_{it}$ = a dummy for stabilization, approximated by setting its value to 1 when the first difference of inflation is –5 percent or less

a = constant

α_i = individual effect

η_{it} = random error

The roles and values of the dummy variables are illustrated in Figures 3 and 4. The preceding graphic analyses indicate that the real exchange rate depreciates faster at the start of the trade liberalization than during the episode, implying a possible "episode effect." To distinguish this episode effect from progressive changes as a trade liberalization unfolds, both *LIB* and Δ*LIB* are included in the model. In addition, Δ*OPEN* is added to examine the potentially different response of the real exchange rate in trade liberalization episodes preceding the most recent one. This is important because in almost all countries, the last or only trade liberalization episode in the sample occurred in the late 1980s and 1990s, when the globalization trend became dominant.[5]

[3]To construct *RERDEV*, the following equation is fitted country by country: $RER = \tilde{c} + \tilde{b}_1 t + \tilde{b}_2 t^2 + \tilde{b}_3 t^3 + D\tilde{E}V$, and $RERDEV = D\tilde{E}V/RER$. Here ~ indicates ordinary least squares estimates.

[4]The following equation is used in calculating the relative GDP growth rate: $1 + RGRW_{it} = (1 + GRWTH_{it})/\Pi_j (1 + GRWTH_{jt})^{Wij}$, where *j* indexes partner countries, *GRWTH* represents the GDP growth rate, and *Wij* is the same trade-based weights used in constructing multilateral real exchange rates.

[5]In the sample, two exceptions are the only trade liberalization episode in Greece (1978–81), when it joined the European Communities, and the second liberalization episode in Korea (1981–94).

Figure 3. Values of Dummy Variables

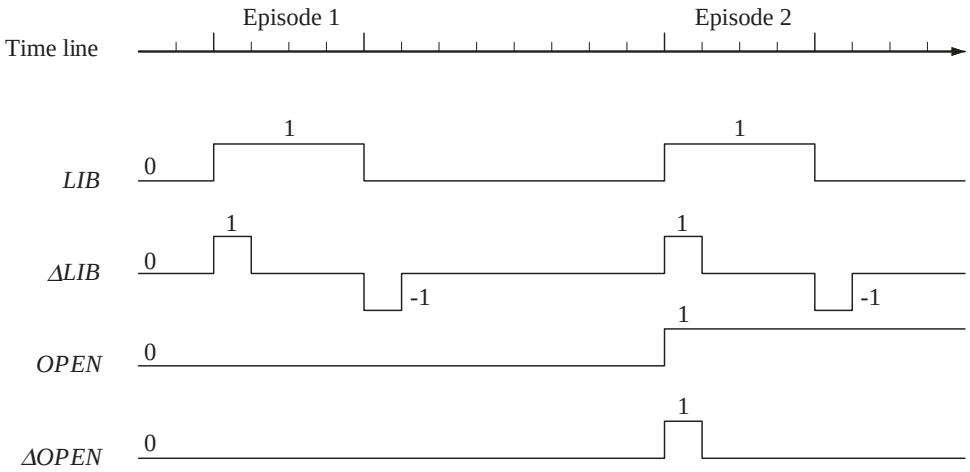
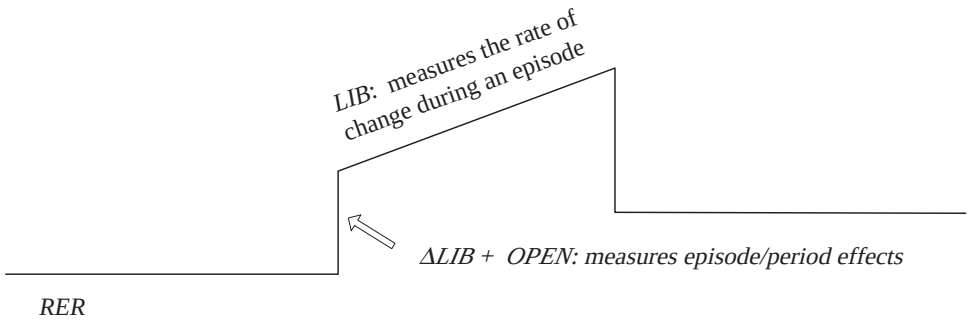


Figure 4. Roles of Dummy Variables



Two variables, *RERDEV* and *STAB*, are added to redress the potential problem of endogeneity and to control for stabilization policy-induced real appreciation. As a right-hand-side variable, *RERDEV*[6] should capture the short-run adjustment of the exchange rate to its long-run equilibrium, alleviating the potential endogeneity problem in the absence of a good instrument. Although it is possible that policymakers systematically choose to liberalize trade when the real exchange rate is undervalued so that the economy is less vulnerable to outside competition, empirically trade liberalization appears to take place often when the real exchange rate is overvalued and depreciating, as observed in the sample shown in Figure 2. A cursory check of the background of these liberalization episodes shows that many countries actually liberalized trade after a period of continued deterioration of economic condition, consistent with the finding of Rodrik (1992) that crises can foster trade liberalization. Because stabilization is often implemented as a part of

[6]This term is, in essence, equivalent to the error-correction term in the error-correction model.

the reform package along with trade liberalization, *STAB* is added to control for short-run real-appreciation-associated stabilization policy. In addition, interaction terms are added to examine whether the economy reacts to shocks differently during and after trade liberalization.

Table 3 presents the results using *MLRERC* as the dependent variable. Column (1) presents the fixed effect estimator when period effect dummies, ΔLIB and $\Delta OPEN$, are excluded to see if the result is sensitive to the construction of the dummy variables. Column (2) contains the fixed effect estimates when period effect dummies are added. *RGRW* and *TOT*, however, are insignificant in these two cases and in subsequent estimations, indicating that the Samuelson-Balassa effect and term of trade are insignificant in determining the short-run real exchange rate. Thus these two variables are excluded when both period effect dummies and interaction terms are added, as in columns (3) to (5). To see whether the result is affected by potential inconsistency of the fixed effect estimate stemming from panel data with a short time span but a large number of cross-section units, the Arellano-Bond linear-dynamic-panel-data (Arellano-Bond) estimator is presented in column (4). To check further whether the result is sensitive to the selection of control countries, column (5) presents the Arellano-Bond estimator excluding control countries.

A comparison of columns (1) to (5) shows that the main conclusion from the analysis is not sensitive to (i) the construction of the dummy variables, which are all highly significant; (ii) the selection of the estimators; and (iii) the inclusion of control countries. In particular, the coefficient for *LIB* is positive and significant across all estimators, indicating that the real exchange rate appreciates during a trade liberalization episode, the period effects are all significant, and tests of combination of the dummy variables yield similar conclusions across specifications.

Detailed discussion of the estimated coefficients is based on the Arellano-Bond estimator with control countries (column (4) in Table 3), theoretically the most robust estimator. The coefficient of *LIB* shows that *RER* appreciates by 14.8 percent each year as the liberalization proceeds. There appears to be a significant difference between earlier trade liberalization and the most recent episode. The coefficient for ΔLIB indicates that the episode effect of earlier trade liberalizations is negative, leading to an insignificant depreciation at the start of the trade liberalization, as indicated by the rejection of the hypothesis that $LIB + \Delta LIB = 0$. It also indicates that the real exchange rate during the earlier trade liberalization episode is more appreciated than any other time, *ceteris paribus.* In contrast, the period effect during the later trade liberalization, $\Delta LIB + \Delta OPEN = 0$, and the RER depreciate at the start of the liberalization, as indicated by the positive and significant sum of $LIB + \Delta LIB + \Delta OPEN$. The coefficient of the share of government spending in GDP is negative and significant, indicating that a 1 percentage point increase in the share of government expenditure will lead to a 1.22 percent appreciation in the real exchange rate. The coefficient for lagged percentage change in the real exchange rate is highly significant, which along with the coefficient for *LIB* indicates that the long-run effect of the trade liberalization is 17 percent real appreciation.

Table 3. Econometric Results
(MLRERC as dependent variable)

	Fixed Effect Estimators			Arellano-Bond Estimators[1]	
					Excl. Control Samples
	(1)	(2)	(3)	(4)	(5)
LIB	4.20	5.80	7.66	14.75	14.77
	(2.25)**	(2.79)**	(3.71)**	(7.00)**	(5.8)**
Δ*LIB*		–11.74	–12.05	–14.95	–15.15
		(–3.99)**	(–4.29)**	(–6.10)**	(–5.05)**
Δ*OPEN*		12.87	12.45	14.55	15.16
		(2.79)**	(2.79)**	(3.87)**	(3.29)**
RERDEV	–0.79	–0.79	–0.78	–0.90	–0.89
	(–46.56)**	(–46.45)**	(–47.53)**	(–62.69)**	(–50.3)**
RGRW	–0.10	–0.93			
	(–0.61)	(–0.57)			
Δ*TOT*	0.05	0.05			
	(0.94)	(0.92)			
Δ*GOV*	–1.11	–1.14	–1.15	–1.22	–1.18
	(–2.41)**	(–2.51)**	(–2.66)**	(–3.27)**	(–2.5)**
CFLOW	0.02	–0.01	0.48	0.77	0.72
	(0.32)	(–0.11)	(2.60)**	(3.80)**	(2.93)**

LIB × *CFL*			–0.76	–1.22	–1.12
			(–2.94)**	(–5.23)**	(–3.95)**
OPEN × *CFL*			–0.51	–0.79	–0.77
			(–2.60)**	(–3.71)**	(–2.92)**
$R\hat{E}R_{-1}$	0.10	0.10	0.11	0.13	0.13
	(5.80)**	(5.73)**	(6.18)**	(9.71)**	(7.53)**
STAB	–2.60	–3.09	–3.43	–3.36	–4.28
	(–1.38)	(1.64)*	(–1.90)*	(–2.19)**	(–2.21)**
a	–0.33	–0.89	–1.44	0.14	0.15
	(0.40)	(–1.06)	(–1.78)	(1.15)	(0.89)
Hypothesis tests					
LIB + Δ*LIB* + Δ*OPEN* = 0		F(1, 1047) = 3.79**	F(1, 1105) = 5.48**	chi2 (1) = 23.44**	chi2 (1) = 16.54**
LIB + Δ*LIB* = 0		F(1, 1047) = 3.58*	F(1, 1105) = 2.09	chi2 (1) = 0.94	chi2 (1) = 0.01
Δ*LIB* + Δ*OPEN* = 0		F(1, 1047) = 0.09	F(1, 1105) = 0.01	chi2 (1) = 0.02	chi2 (1) = 0.00
Number of obs.	1,120	1,119	1,177	1,151	734
Number of groups	62	62	62	61	45
Average obs. per group	18	18	19	19	16

Note: () t-statistics; ** significant at 5 percent; * significant at 10 percent.

[1]Short for Arellano-Bond linear-dynamic-panel-data (Arellano-Bond) estimator (a generalized method of moments estimator), which estimates the first differenced model using as instruments lagged levels of the dependent and the predetermined variables as well as differences of the strictly exogenous variables.

The correlation between the real exchange rate and net capital inflows changes over time. The coefficients for net capital inflows are positive, suggesting that before a country last liberalized its trade regime, a 1 percent increase in net capital inflows is associated with an average 0.8 percent real depreciation. One possible explanation is that capital flows are endogenous with respect to the real exchange rate. When the real exchange rate is overvalued, capital flight occurs. The coefficient for net capital flows captures this upward endogeneity bias. Because there is no good instrument for net capital flows, and the effect of net capital inflows on the real exchange rate is outside the scope of this research, this hypothesis is not tested here. The coefficients for the interaction terms between net capital inflow and the open and liberalization dummy variables ($OPEN \times CFLW$ and $LIB \times CFLW$) are negative and highly significant. This implies that during a trade liberalization period and once a country is open to trade, the economy is more sensitive to capital inflows. In response to a 1 percentage point increase in net capital inflows, the real exchange rate appreciates by 1.2 percent during a liberalization episode and 0.8 percent after the last liberalization, compared with what it was prior to liberalization. This could be a result of a more liberal exchange rate policy stance during and after trade liberalization. Compared with the coefficients for *CFLW,* these two coefficients are less plagued by the endogeneity problem, because the coefficients of the interaction terms measure the differences in the response of the real exchange rate to capital inflows. Assuming the effect of the real exchange rate on capital inflows remains the same across time, one would expect the estimated coefficients for capital inflows before, during, and after the opening to suffer from the same bias, which cancels out in the estimated differences.

The positive period effect of earlier trade liberalization episodes suggests that partial and temporary trade liberalizations dampen the force of depreciation. To test whether this result is caused by the stabilization dummy failing to capture real appreciation due to a time lag in price adjustment to stabilization policies, $STAB_{t+1}$ is used in place of $STAB_t$. The results show that $STAB_{t+1}$ is less significant and even takes the wrong sign.

To check whether the overall conclusion is affected by the selection of the RER indices, results based on the other three RER indices are presented in Table 4. It shows that while the magnitude of the estimated coefficients changed slightly from those based on MLRERC, the main conclusion remains the same.

V. Conclusion

Using an event study based on trade liberalization episodes in 45 countries, this paper shows that permanent trade liberalizations lead to real depreciation, but transitory ones may not have such impact. Although these results are theoretically well founded, empirical evidence is relatively rare. Existing studies have tested this hypothesis only indirectly or by using an imprecise measurement of trade barriers.

Three major findings emerge from the analysis. First, without controlling for other factors of trade liberalization, the data show that countries on average experience 27 percent to 48 percent real depreciation after a trade liberalization.

Table 4. Results with Alternative Real Exchange Rate Indices
(Arellano-Bond estimators)

	Real Exchange Rate Index		
	PCHMRER	PCHBRERC	PCHBRER
LIB	13.13	13.09	12.31
	(6.32)**	(5.97)**	(5.62)**
Δ*LIB*	−15.03	−15.37	−15.64
	(−6.17)**	(−6.03)**	(−6.11)**
Δ*OPEN*	14.89	13.87	14.15
	(3.99)**	(3.54)**	(3.59)**
RERDEV	−0.90	−0.88	−0.88
	(−62.78)**	(−58.42)**	(−57.57)**
Δ*GOV*	−1.26	−1.55	−1.58
	(−3.41)**	(−3.97)**	(−4.01)**
CFLOW	0.74	0.75	0.63
	(3.71)**	(3.56)**	(2.93)**
LIB × *CFL*	−1.19	−0.81	−0.74
	(−5.16)**	(−3.35)**	(−3.01)**
OPEN × *CFL*	−0.75	−0.82	−0.67
	(−3.57)**	(−3.65)**	(−2.95)**
$R\hat{E}R_{-1}$	0.13	0.13	0.13
	(9.75)**	(9.09)**	(8.84)**
STAB	−3.54	−3.69	−4.31
	(−2.33)**	(−2.3)**	(−2.66)**
a	0.19	−0.08	−0.12
	−1.44	(−0.7)	(−0.98)
Hypothesis tests	chi2 (1) = 19.45**	chi2 (1) = 14.06**	chi2 (1) = 12.12**
LIB + Δ*LIB* + Δ*OPEN* = 0	chi2 (1) = 0.54	chi2 (1) = 0.70	chi2 (1) = 1.49
LIB + Δ*LIB* = 0	chi2 (1) = 0.00	chi2 (1) = 0.21	chi2 (1) = 0.20
Δ*LIB* + Δ*OPEN* = 0			
Number of observations	1,112	1,087	1,087
Number of groups	62	61	61
Average observations per group	18	18	18

Note: () t-statistics; ** significant at 5 percent; * significant at 10 percent.

Second, controlling for factors—such as deviation of the real exchange rate from its long-run equilibrium, relative GDP growth, the terms of trade, the share of government spending in GDP, and capital inflows—the real exchange rate depreciates by 14.8 percent annually during the trade liberalization years after a country opens its economy to trade, with the long-run effect of the liberalization being 17.0 percent. Third, in countries that underwent multiple episodes of trade liberalization, early trade liberalization episodes appear to be significantly different from the last episode. During early episodes, the real exchange rate is broadly unchanged at the start of liberalization. In contrast, at the start of the last (or only) trade liberalization episode of a country (almost all these episodes occurred after the late 1980s,

when globalization had become the dominant trend), the real exchange rate depreciated in the first year of trade liberalization. Because the earlier episodes were partial liberalizations and some were even partially reversed, this observation lends support to the theoretical finding that a transitory trade liberalization could cause short-run real appreciation pressures, which slow down the adjustment of the real exchange rate toward its long-run equilibrium.

APPENDIX I

Trade Liberalization Episodes

Argentina

1976–79: Significantly cut quantitative restrictions (QRs) and tariffs. Implicit tariff (difference of domestic term of trade and international term of trade) dropped from 57 percent in 1975 to 29 percent in 1979. Implicit tariff rose to 44 percent in 1980 and dropped to 29 percent again in 1983.

1988–91: Cut tariff and QRs. Average tariff declined from more than 40 percent to 12.2 percent, mainly through a series of reforms in October 1988, October 1989, and April 1991. QRs coverage narrowed to less than 2 percent of manufacturing value added. Abolished import licensing.

Sources: Economist Intelligence Unit (1985–97); Cavallo and Cottani (1991); GATT (1992a); Canitrot and Junco (1993); and Henry (1997b).

Table A1.1. Trade Liberalization Episodes

Years	Country	Years	Country	Years	Country
1976–79	Argentina	1985–88	India	1979–81	Peru
1988–91	Argentina	1991–94	India	1991	Peru
1992–94	Barbados	1985–92	Indonesia	1970–74	Portugal
1992–93	Benin	1989–93	Jamaica	1977–80	Portugal
1988–93	Brazil	1988–93	Kenya	1981–83	Philippines
1990–94	Cameroon	1978–79	Korea	1986–86	Philippines
1974–79	Chile	1981–94	Korea	1991–95	Philippines
1985–92	Chile	1993–95	Malaysia	1970–74	Spain
1992–95	China	1988–91	Mali	1977–80	Spain
1973–79	Colombia	1989	Mauritania	1989–93	Sri Lanka
1985–89	Colombia	1983–89	Morocco	1993	Thailand
1992	Colombia	1985–87	Mexico	1994–97	Thailand
1986–87	Costa Rica	1991–93	Nepal	1986–93	Tunisia
1986–92	Ecuador	1984–92	New Zealand	1980–85	Turkey
1986	Gambia	1986–87	Nicaragua	1993–94	Uganda
1988–92	Ghana	1991–92	Nicaragua	1974–81	Uruguay
1987–88	Guatemala	1986–87	Nigeria	1991–94	Uruguay
1987	Guinea–Bissau	1989–95	Pakistan	1989–92	Venezuela
1988–91	Guyana	1986	Paraguay	1992	Zambia
1990–92	Honduras				

Barbados

1992–94: Average tariff dropped from 68.3 percent in 1993 to 11.8 percent in 1995.

Source: Lora (1997).

Benin

1991–93: Eliminated most QRs and reduced the number of import tariff lines. In 1993, eliminated remaining import licensing. In January 1994, number of tariff rates declined from 12 to 4. At the same time, abolished the system of reference values.

Source: World Bank (1993b and 1995).

Brazil

1988–94: Implemented trade liberalization, deregulation, and privatization. Abolished bans on close to 1,800 imports, most quotas, and exchange allocation on imports. Average tariff declined from 74.6 percent in 1986 to 11.64 percent in 1994. Joined Mercosur common market in 1994.

Sources: Economist Intelligence Unit (1985–97); Coe (1991); Canitrot and Junco (1993); World Bank (1995); Henry (1997b); and Lora (1997).

Cameroon

1990–94: In 1990, abolished licensing on most imports that were not subject to tariff and QRs, covering 105 categories of goods. In January 1994, implemented the Central African Customs Union with four-rate common external tariffs of 5, 10, 20, and 30 percent, and an intraunion preferential rate of 20 percent. Under the old regime, highest tariff on imports was 80 percent.

Sources: Economist Intelligence Unit (1985–97); and World Bank (1995).

Chile

1974–79: Cut tariffs three times in 1974 and once in 1975. Simple average tariff rate dropped from 105 percent at the beginning of 1974 to 38 percent by the end of 1975. Lifted all quotas and official approvals for imports in 1974. Abolished direct bans of all but six categories of goods and prior deposits during 1976–79. Following an announcement of tariff reduction plan in 1975, tariffs were reduced to a range of 10–35 percent during 1976–77, and simple average tariff dropped to 10.1 percent. Uniform tariff was raised to 20 percent in 1983, then to 35 percent in 1984. An extra 15 percent tariff on 240 luxury imports was also imposed in 1984.

1985–92: Following a plan announced in 1985, uniform tariff rate was reduced from 25 to 15 percent, while average tariff dropped from 36 percent to 11.97 percent in 1992. Further lowered nontariff barriers.

Sources: De la Cuadra and Hachette (1991); GATT (1991); Henry (1997b); and Lora (1997).

China

1992–95: In 1992, announced a plan with large reductions on 225 tariff lines and abolition of import regulatory duties. In 1994, eliminated foreign exchange retention system and mandatory

import plan. In addition, eliminated import licensing and quotas on 320 items. In 1995, lifted import restrictions on 367 tariff lines. Average tariff fell from 43 percent in 1992 to 36 percent in 1995 and to 23 percent in 1996.

Sources: Economist Intelligence Unit (1985–97); and Thomas and Wang (1997).

Colombia

1973–79: Eliminated foreign exchange allocation on imports. Increased items on free-import list from 3.1 percent in 1971 to 67 percent in 1979. Percentage of items on prior licensing list dropped from 81.0 percent in 1971 to 36.7 percent in 1979. Average tariff (including surcharges) declined from 50.7 percent in 1972 to 34.4 percent in 1980. In 1975, imposed severe controls on capital movements for the private sector. In late 1981, began to reverse the liberalization policy. Between late 1982 and 1984, eliminated free-import list and reestablished prohibited-import list.

1985–89: In 1985, removed prior licensing on 1,360 imports and replaced bans on 760 imports with prior licensing. Imports under free-import regime rose from 27 percent in December 1985 to 39 percent in 1989. Increased flexibility of prior license regime. Average tariff dropped from 31 percent in 1987 to 26 percent in 1989.

1992: Eliminated import quotas and reduced import tariffs from an average effective rate of 44 percent in 1989 to 11.6 percent in 1992. Signed a free trade and custom union agreement with Venezuela.

Sources: Economist Intelligence Unit (1985–97); GATT (1990a); and Garcia (1991).

Costa Rica

1986–87: Reduced tariffs from 53 percent in 1985 to 26 percent in 1987.

Source: Lora (1997).

Ecuador

1986–92: Reduced average tariff gradually from 50 percent in 1985 to 11.6 percent in 1992. Joined a free trade arrangement with Colombia, Venezuela, and Bolivia.

Sources: World Bank (1994b and 1995); and Lora (1997).

Gambia

1986: As a part of a comprehensive macroeconomic stabilization and adjustment program, removed restrictions on all imports under open general license, introduced the market-determined exchange rate, and liberalized foreign exchange control.

Sources: Economist Intelligence Unit (1985–97); and World Bank (1995).

Ghana

1983: With the assistance of the International Monetary Fund (IMF) and the World Bank, started economic recovery program in 1983. Reduced tariffs to a range of 10–30 percent, with 30 percent applied to most dutiables; loosened controls on exchange and imports. Inflation declined from 123 percent in 1983 to 37 percent in 1990.

1986–92: Abolished licensing, prohibition, and foreign exchange rationing. Unified exchange rate. Reduced tariff across the board by 5–25 percent. In 1988, introduced extra import taxes of mainly 40 percent on a range of consumer goods, accounting for half of manufacturing value added; these taxes were reduced to 10 percent in 1992.

Sources: World Bank (1991 and 1995); GATT (1992c); and Leechor (1994).

Greece

1970–81: Reduced tariffs and lifted QRs and import deposits. Cut tariffs each year between 1970 and 1980 except for 1976, 1978, and 1979. Became a member of European Economic Community (EEC) in 1981.

Source: Kopits (1989).

Guinea-Bissau

1987: Liberalized price and exchange rate system, eliminated QRs on 75 percent of imports, reduced import duties, and started reforming the public sector.

Source: World Bank (1993b and 1995).

Guatemala

1987–88: Reduced tariffs from 50 percent in 1985 to 25 percent in 1987. In 1988, unified the exchange rate system, reduced tariffs by 5–25 percent, and cut the import tax from 40 percent to 10 percent.

Source: World Bank (1990 and 1994b).

Guyana

1988–92: As part of an economic recovery program, reduced tariffs and lifted most import prohibitions. Unified and liberalized the exchange rate regime. On October 1992, adopted the four-level CARICOM Common External Tariff of 5, 10, 15, and 20 percent. In 1990, 80 percent of imports were free of duty.

Source: World Bank (1991, 1993a, 1993b, and 1995).

Honduras

1990–92: Average tariff fell from 41.9 percent in 1989 to 17.9 percent in 1995. Abolished import permits and foreign exchange allocations; maximum tariff was first cut to 40 percent and then to 20 percent in January 1993. By 1993, tariff rates were 5–20 percent.

Sources: Economist Intelligence Unit (1985–97); World Bank (1993b); and Lora (1997).

India

1985–88: Expanded list of importables, reduced tariff levels, liberalized export licensing, and reduced custom and excised duties on selective items. In 1988, released a three-year import liberalization package with the following four major changes: (1) classified 745 new items under open general license; (2) eliminated state monopoly for 56 imports; (3) allowed exporters to import capital goods freely, so long as a minimum of 25 percent of production is exported; and

(4) extended export benefits to suppliers of raw materials and components to manufacturing exporters.

1991–94: Maximum tariff reduced from 350 percent in 1990 to 65 percent, lowering average tariff from 87 percent in 1990 to 33 percent in March 1994. Abolished subsidy scheme for exports, lifted almost all licensing restrictions on imports of capital and intermediate goods, liberalized foreign exchange control, and allowed full current account convertibility. Trade liberalizations were part of a comprehensive economic stabilization program and a major economic transformation.

Sources: Whalley (1989); World Bank (1995); and Henry (1997b).

Indonesia

1985–92: In 1985, reduced tariff ceiling from 225 to 60 percent and tariffs for most products to 5–35 percent. Share of imports with nontariff restrictions declined from 43 percent in 1986 to around 13 percent in 1992, while average nominal tariff was halved. Effective protection for manufacturing reduced from 68 percent in 1987 to 52 percent in 1992.

Source: World Bank (1991, 1992, 1993b, and 1994a).

Jamaica

1989–93: Eliminated most QRs and trade monopolies, liberalized exchange rate, and lowered external tariffs. In 1985, average tariff rate was 42.1 percent. By 1995, it had been reduced to 12.5 percent. Trade liberalization is part of a reform program of privatization, tax reform, and liberalization of trade started in 1989.

Sources: World Bank (1995); and Lora (1997).

Kenya

1988–93: Overall production-weighted tariffs fell from 62 percent in 1989–90 to 45.5 percent in 1991–92. Simple average tariffs dropped from 40 percent in 1985 to 34.0 percent in 1991–92. Coverage of QRs dropped from 40 percent of items (12 percent of imports) to 22 percent of items (5 percent of imports) by 1991. Although QRs affected most manufacturing production in 1985–86, they covered only 28 percent in 1990–91. Maximum tariff rate was reduced from 135 percent to 60 percent, and number of tariff categories was reduced from 25 to 12. Reintroduced export retention at a flat rate of 50 percent for all exporters and removed all import controls except for a short negative list.

Sources: Swamy (1994); and World Bank (1995).

Korea

1978–79: Automatic approved (AA) imports increased by 162 items (based on a four-digit Customs Cooperation Council Nomenclature classification). Share of items on AA list rose from 53.8 percent to 68.6 percent. Production-weighted average legal tariff rate dropped from 41.3 percent to 34.4 percent.

1981–94: Increased share of AA items from 68.6 percent in 1980 to 98.5 percent in 1994. Average tariff dropped from 34.4 percent in 1983 to 7.9 percent in 1994. By 1994, 94 percent of tariffs were below 10 percent.

Sources: Kim (1991); GATT (1992b); and Henry (1997b).

Malaysia

1993–95: Lowered and eliminated tariffs on more than 600 items in 1993, on more than 500 items in 1994, and on 2,600 items in 1995.

Source: Thomas and Wang (1997).

Mali

1988–91: Eliminated export and import monopolies, removed export taxation, simplified and cut tariffs, replaced licensing system with a registration system, and phased out QRs. At the same time, fully liberalized domestic marketing and prices.

Source: World Bank (1991, 1993b, and 1995).

Mauritania

1989: Abolished import license and relaxed minimum capital requirements for obtaining an import or export card. Trade liberalization was part of Consolidation Program 1989–91.

Sources: World Bank (1995); and Economist Intelligence Unit (1996–97).

Mexico

1985–87: Substantially reduced QRs starting in mid-1985. Lifted all but a few import licensing requirements. Average tariff declined from 34 percent in 1985 to 11 percent in 1988.

Sources: Rodrik (1992); and Lora (1997).

Morocco

1983–89: Reduced QR coverage, eliminated specific licenses for all imports, and reduced prohibited items to a few products. Share of imports subject to restrictions fell from 100 percent in March 1983 to 12 percent by value (22 percent by tariff headings) by 1989. Reduced maximum duty ceiling from 400 percent in 1983 to 45 percent by 1989. Eliminated many foreign exchange restrictions and implemented full current account convertibility.

Sources: GATT (1990b); and World Bank (1994b).

Nepal

1991–93: Established uniform market-determined exchange rate and removed restriction on current account transactions. Lifted QRs on all but six imports. Reduced tariff on non-Indian imports from 10–55 percent to 3–12 percent. Effective incidence of import duties fell from more than 20 percent in the late 1980s to about 9 percent, and the import-weighted average custom duty rate to 12 percent in 1994. At the same time, started to deregulate industrial licensing and encourage foreign investment.

Source: World Bank (1993b and 1995).

New Zealand

1984–92: Gradually phased out licenses, covering 40 percent of imports in 1984. Eliminated all QRs and other nontariff measures on imports. Cut tariffs gradually by 50 percent. Nominal tariff dropped from 28 percent in 1981–82 to 12 percent in 1992–93.

Sources: Rayner and Lattimore (1991); Lattimore and Wooding (1996); and World Trade Organization (1996).

Nicaragua

1986–87: Average tariff reduced from 54 percent in 1985 to 21 percent in 1987.

1991–92: Unified exchange rate, adjusted tariffs to a range of 10 to 40 percent, eliminated most nontariff barriers on imports and exports, and abolished state trading monopolies. Maximum import protection fell to 40 percent by March 1992. Average tariff dropped from 21 percent in 1987 to 17.4 percent in 1995. Trade liberalization was part of structure adjustment.

Sources: World Bank (1993b); and Lora (1997).

Nigeria

1986–87: Abolished import and export licensing, reduced bans on imports from 74 to 16, and eliminated all 11 bans on exports. Lifted 30 percent surcharge and cut 100 percent advance payment for import duty to 25 percent in 1987. Dispersion of tariffs was significantly reduced, and average nominal tariff dropped from 33 percent to 23 percent. In 1988, tariff dispersions were reduced, but average tariff rose to 28 percent. Subsequently, revisions were introduced to increase protection. In 1989 and 1990, duties on 22 items were raised and exports of some agricultural products were banned.

Sources: Rodrik (1992); and Moser and others (1997).

Pakistan

1972–78: Eliminated most import licensing and export bonuses.

1989–95: Reduced nontariff barriers. Reduced maximum tariff from 125 percent to 70 percent by 1995. Trade reform slowed down in 1996. Maximum tariff went down from 70 percent to 65 percent.

Sources: Guisinger and Scully (1991); and World Bank (1991, 1995, and 1996a).

Paraguay

1986–87: Average tariff reduced from 71.7 percent to 19.3 percent.

Source: Lora (1997).

Peru

1979–81: By December 1980, expanded the free-import list to 98 percent of tariff lines from 37.8 percent in 1979. Cut maximum tariff from 355 percent to 60 percent in 1980. Eliminated specific duties and tightened exception rules for imports. Simple average tariff declined from 40 percent in December 1979 to 32 percent in December 1981. Starting in 1982, increased protection. Simple average tariff increased from 32 percent in 1981 to 57 percent in 1984.

1991: Reduced average tariff from 68 percent in 1990 to 17.6 percent in 1992. Unified multiple exchange rates; eliminated export taxes on almost all exports; abolished all licensing, administrative requirements, and official approval of import and export transactions; simplified three-tier tariff system to a two-tier system of 25 and 15 percent. Fifteen percent tariff rate covered about 80 percent of imports after reform.

Sources: Economist Intelligence Unit (1985–97); Nogues (1991); World Bank (1995); and Lora (1997).

Philippines

1981–83: By end of 1983, average nominal tariff fell to 29 percent from 43 percent in 1980. Starting in late 1983, reversed some of the reform.

1986: Liberalized 936 items of the 1,232 import items originally scheduled to be liberalized in early 1980s.

1991–95: Reduced average tariff to 20 percent in 1994 and reduced tariff dispersions. Removed QRs (more than 100 items) on all but a few products. Fully liberalized foreign exchange control for current and capital transactions. Reduced number of import classifications from five to three: (l) freely imported, (2) regulated, and (3) prohibited.

Sources: Shepherd and Alburo (1991); World Bank (1995); Henry (1997b); and Thomas and Wang (1997).

Portugal

1970–74: Substantially reduced tariffs and partially reduced QRs. Completely reversed the liberalization in 1974.

1977–80: Reduced tariffs and relaxed QRs. Lowered import surcharges and removed compulsory import deposits. Liberalization was partially reversed.

Source: Michaely, Papageorgiou, and Choksi (1991).

Spain

1970–74: Cut tariff based on EEC agreement and relaxed QRs. Tariffs at average or above average were reduced by 10 and 20 percent, respectively. In 1975, increased QRs.

1978–80: Cut tariffs across the board and relaxed QRs. Simple average of nominal tariffs decreased by 17.9 percent. Transferred almost all imports subject to a global quota to free-import list.

Source: De la Dehesa, Ruiz, and Torres (1991).

Sri Lanka

1989–93: Significantly liberalized exchange and trade regimes. Maximum tariff rates declined from 60 percent to 35 percent by 1995 and moved some tariffs to lower bands. Abolished essentially all export taxes and import licensing. Eliminated all surcharges except for a few items. Created incentives for both domestic and foreign investment.

Sources: World Bank (1995); and IMF (1998).

Thailand

1990: Abolished exchange control and liberalized current account transactions. Tariff rates on many machineries were cut to 5 percent from 30–35 percent. Eliminated import surcharges. Planned to simplify the tariff structure.

1994–96: Reduced number of tariff rates from 39 to 6, and eliminated most tariffs above 30 percent. Planned to reduce average tariff from 30 percent in 1994 to 17 percent by 1997.

Source: World Trade Organization (1991 and 1995).

Tunisia

1986–93: Expanded freely imported goods, which rose from 18 percent to more than 87 percent of total imports. Reduced dispersion of tariffs by moving maximum and minimum rates toward the middle. Abolished import taxes. Average tariff dropped from 36 percent at onset of liberalization program to about 27 percent in 1988. Gradually fully liberalized current account. Capital account controls were eased on residents and eliminated for foreigners.

Source: Nsouli and others (1993); World Bank (1996b).

Turkey

1980–85: Lowered tariffs and duties; cut advance deposit requirement rates gradually to 1 percent for industrial uses and 3 percent for commercial uses; abolished quota list; transferred more than 60 percent of restricted import items to free-import list; reduced number of items requiring official permission from 1,000 to 245; and eased restrictions on foreign exchange transactions. Average tariff rate declined from 38.8 percent before December 1983 to 25.3 percent after January 1984. Reduced items on the prohibited list from 500 to 3.

Sources: Kopits (1987); Michaely, Papageorgiou, and Choksi (1991); Onis and Riedel (1993); and Uygur (1993).

Uganda

1993–94: First replaced licensing of exports and imports by simple registration, and later abolished all QRs on imports except for those on a small negative list. Eliminated surrender requirement on export earnings; reduced level and dispersion of duties. Gradually liberalized foreign exchange and established a fully liberalized interbank market in November 1993.

Source: World Bank (1992, 1993b, 1994b, and 1995).

Uruguay

1974–81: Eliminated QRs, reduced tariff levels and dispersions, and liberalized exchange transactions and international capital flows. Production-weighted average tariff dropped from 534.5 percent to 52.7 percent.

1991–94: Average tariff rate declined from 27.7 percent in 1990 to 9.6 percent in 1995. Changed from four-tier tariff system at rates of 40–30 percent to 20–15.6 percent. Reduced number of nontariff barriers.

Sources: Favaro and Spiller (1991); and Canitrot and Junco (1993).

Venezuela

1989–92: Unified and floated exchange rate, abolished foreign exchange controls, and reduced number and level of import tariffs. Cut average tariff from 37 to 16 percent and highest tariff from 135 to 20 percent. Greatly reduced agriculture import licensing. Nontariff barriers affected only 2 percent of domestic production after trade liberalization.

Sources: World Bank (1993b); and Lora (1997).

Zambia

1992: Adopted unified and market-determined exchange rate in steps. Increased items on open general import list and converted it to a negative list.

Source: World Bank (1993b).

APPENDIX II

The following equations are used in compiling the real exchange rate indices:

$$MLRERC = \frac{E_{i,us}}{CPI_i} \Big/ \prod_j \left(\frac{E_{i,us}}{CPI_j} \right)^{W_{ij}} \tag{A1}$$

$$MLRER = \frac{E_{i,us}}{CPI_i} \Big/ \prod_j \left(\frac{E_{j,us}}{WPI_i} \right)^{W_{ij}} \tag{A2}$$

$$BIRERC = \frac{E_{i,us} CPI_{us}}{CPI_i} \tag{A3}$$

$$BIRER = \frac{E_{i,us} WPI_{us}}{WPI_i}, \tag{A4}$$

where i indicates home country and j indicates partner countries. $E_{i,\,us}$ is the nominal exchange rate of country i in local currency per U.S. dollar, and W_{ij} is the share of j in country i's total trade with its major partners. An increase indicates real depreciation.

In constructing these indices for 62 countries, the following rules are used:

- The trade weights, W_{ij}, are calculated based on 1985 trading data in the IMF *Direction of Trade Statistics* (1985). All countries whose share in the sample country's trade is larger than 10 percent are selected as major partners in calculating MLRERC and MLRER with the exception of China, Turkey, Hong Kong SAR, Finland, and the former Soviet Union, which are excluded as the partner countries because of incomplete CPI and WPI data.
- Average annual real exchange rates are computed from monthly real exchange rate indices normalized by setting the values in 1990 equal to 100.[7] Some countries have shorter data series due to missing data.
- End-of-month and monthly price data are from *International Financial Statistics* (1997). In calculating MLRER, CPIs are used in place of WPIs for partner countries with incomplete WPIs.

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[7]For the Dominican Republic and Benin, 1990 data are missing. The real exchange rate in 1980 is set to 100 for the Dominican Republic; the real exchange rate in 1991 is set to 100 for Benin.

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