THE WELFARE EFFECTS OF TRADE AND
CAPITAL MARKET LIBERALIZATION:
CONSEQUENCES OF DIFFERENT SEQUENCING SCENARIOS

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Abstract

This paper deals with the dynamics of trade and capital account liberalization in a developing country. The welfare consequences of trade and capital account liberalization under alternative sequencing scenarios are investigated. We draw on standard trade theory results to show that the opening of the capital account in the presence of trade distortions may be welfare reducing if foreign borrowing is used to increase investment. However we demonstrate that this welfare reducing effect of opening the capital account will not occur if shadow prices are used to guide investment decisions.

It is then shown that if capital market restrictions fall disproportionally on investment (as opposed to consumption) a gradual reduction of import tariffs is superior to an abrupt trade liberalization.

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I. Introduction

For many years economists have argued that developing countries should "liberalize" their economies. A number of empirical studies have suggested that this liberalization process -- consisting of freeing domestic markets and opening-up the economy to the rest of the world -- will result in higher rates of growth and more equitable income distribution.[1] However, in spite of this empirical evidence, and of the widespread beliefs among economists of the merits of liberalizing LDCs economies, little serious efforts to that effect have been taken by these countries. Many times liberalization attempts are frustrated at different stages, with these economies reverting to inward-looking developing strategies.

One of the most important problems in the analysis of liberalization reforms and of their failures refers to the _dynamic_ aspects of these processes. The characteristics of the transition between a repressed state and a liberalized economy are not generally understood, and only recently serious research efforts in this area have developed.[2] Among these dynamic aspects those related to the speed and order of liberalization are particularly important. With respect to the former, the main question is how fast an economy should be liberalized, i.e., cold-turkey vs. gradual approaches. Regarding the order of liberalization the main question is what are the welfare consequences of alternative sequencing scenario's (i.e., trade liberalization while maintaining a closed capital account like Chile in the late seventies or capital market liberalization while retaining trade

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[1] See, for example, Little, Scitovsky and Scott (1970); Krueger (1978, 1983); Bhagwati and Srinivasan (1978); Little (1982) and Balassa (1982, 1983).

[2] On the dynamics of liberalization see the general discussion in Krueger (1984). See also Khan and Zahler (1983), and Edwards (1983).

barriers, as was the case in Argentina in the same period).

The purpose of the present paper is to address some aspects of these two problems — speed and order of liberalization. The analysis focuses on the opening-up of the economy to the rest of the world, concentrating on the liberalization of the current and capital accounts of the balance of payments. We investigate the welfare consequences of trade and capital market liberalization processes under alternative sequencing scenarios. The analysis assumes that the simultaneous and instantaneous opening of both accounts of the balance of payments is not considered as a policy option. The recent experience of a group of countries in Latin America is in fact one of partial (i.e., one market only) liberalization. While in Argentina the capital ccount was liberalized, the trade account retained its controls. In Chile the opposite was the case. Moreover, historically trade liberalization has often been implemented during periods of severe constraints on external borrowing (e.g., the IMF routinely pushes for trade liberalization as part of its "rescue programs").

We draw on standard trade theory results to show that the opening of the capital account in the presence of trade distortions may be welfare reducing, if foreign borrowing is used to increase investment and investment decisions are made using domestic market prices, cautioning against following this sequence. However, we demonstrate that this welfare reducing effect of opening the capital account will not occur if shadow prices are used to guide investment decisions for the new capital goods brought in. We also demonstrate that the welfare costs of capital market restrictions are increased if they fall disproportionally on investment as opposed to consumption. This is empirically an important case. We then show that under such circumstances gradual reduction of tariffs is superior to an abrupt liberalization.

The paper is organized in two parts. In Section 2 a one period model is developed and some preliminaries are presented. The analysis in this section is carried out in terms of welfare effects of tansfers and factor movements from abroad, and previous results by Johnson (1967), Bertrand and Flatters (1971), Brecher and Díaz-Alejandro (1977), Grossman (1983) and van Wijnbergen (1983a) are summarized and discussed. This analysis is useful for the investigation of the effect of liberalizing the capital account presented in the following section. The reason for this is that the effects of opening of the capital account can be viewed as the combination of a positive transfer today, plus a (larger) negative transfer tomorrow. In this section we point out that the distinction between transfers in the form of consumption goods and transfer in the form of capital (i.e., machinery) is critical for the welfare analysis. The crucial role of shadow prices in the investment process is also discussed.

In Section 3 a two-period model is developed and the welfare effects of reducing import tariffs in an economy with capital market distortions are analyzed. Here our argument for a gradual trade liberalization in an economy where the capital market distortions fall disproportionately on investment is fully developed. Finally in Section 4 some concluding remarks are presented, and the policy implications of our analysis are discussed.

2. Welfare Effects of Transfers and Foreign Investment in a One-Period Framework

In this section we develop a simple one-period model of a small open economy to analyze the effects of transfers and direct investment on welfare. Regarding transfers, we consider two possible forms in which these can be made: in the form of consumption goods and in the form of capital

(i.e., machines).[3] Since this analysis is based on a one-period model, it cannot really deal with issues of borrowing in the international capital market. However, most of the issues that arise in a two-period model with foreign borrowing and lending are already present in the single-period analysis with exogenous transfers presented here [see Edwards 1983]. The reason for this is that the effect of opening the capital account can be viewed as a positive transfer today (when a foreign loan is obtained), plus a larger negative transfer tomorrow when the foreign loan is repaid, if the capital market distortion takes the form of a quantity constraint on foreign borrowing.

We first look at the effects of a transfer in the form of capital (i.e., the donor ships machines to the recipient country) on the recipient country's welfare. The analysis is developed for the case of a small country with two goods, whose importable is assumed to be capital intensive.[4] The country in question uses convex technology that can be described by a twice differentiable convex revenue function. Similarly, consumer preferences will be summarized by a twice differentiable concave expenditure function. [See Dixit and Norman (1980) for a discussion of the properties of revenue and expenditure functions.] The economy is distorted by production subsidies and consumption taxes on the importable good. The model is given by equations (1) through (4):

$$R(1,q;K,L) + G = E(1,p;U) \tag{1}$$

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[3] In their well-known textbook Caves and Jones (1981, Ch. 4) make a distinction between these two possible forms of making a transfer.

[4] This corresponds to the standard capital intensity assumption for developing countries.

$$G = \beta E_p(1,p,u) - \alpha R_q(1,q,K,L) \tag{2}$$

$$p = p^* + \beta \tag{3}$$

$$q = p^* + \alpha \tag{4}$$

where

R: revenue function

E: expenditure function

q: domestic producer's price of commodity two relative to commodity one

K: stock of capital

L: total labor available in the economy

p*: world price of commodity two relative to commodity one

β: consumption tax on good two

α: production subsidy on good two

$E_p = \dfrac{\partial E}{\partial p}$: compensated demand for good two

$R_q = \dfrac{\partial R}{\partial q}$: supply function for good two

G: government (<u>net</u>) revenue from taxation

Equation (1) is the budget constraint for a distorted economy, where G equals net government revenue. Good one is taken to be the numeraire commodity, and it is assumed that this country imports good two, so that $(E_p - R_q) > 0$. Notice that in the case of a tariff $\alpha = \beta$. The effect of a transfer in the form of capital on welfare can be found by totally differentiating (1), and using (2) through (4):

$$\frac{dU}{dK} = \frac{(R_K - \alpha R_{qK})}{E_u(1 - \beta C_E)} \tag{5}$$

where the subindex refers to a partial derivative with respect to that particular variable. C_E captures the pure income effect of a change in expenditure on good 2; $0 < pC_E < 1$ if both goods are normal. Therefore, $(1 - \beta C_E)$ is positive but smaller than one.[5] R_K is the marginal productivity of capital and R_{qK} is the Rybczynski term, which will be positive if good two (the importable) is capital intensive as we have assumed. The denominator of this expression is positive; however, the numerator can be either positive or negative, depending on whether $R_K \gtrless \alpha R_{qK}$. It follows that a transfer in the form of capital will be welfare worsening in a distorted small economy if

$$R_K < \alpha R_{qK} \qquad (6)$$

This result, of course, is the one obtained by Johnson in his classical 1967 article on capital accumulation in the presence of tariffs.[6] If the transfer results in an intensification of the preexisting distortion welfare may be reduced.

The above discussion assumes capital is accumulated as a result of a transfer from abroad, which is made in the forms of machines. Brecher and Diaz-Alejandro (1977) have analyzed an alternative case where capital accumulation occurs due to foreign investment. This case differs from the previous one in that now foreign investors will take their profits out of the domestic country. In this case the budget constraint (equation (1)), is written in the following form:

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[5]The derivation of (5) uses the identity $E_{pu} = C_E E_u$.

[6]See also Bertand and Flatters (1971).

$$R(1,q,K + dK,L) + G - H = E(1,p,U) \tag{7}$$

where H are profits remitted to the foreign country, and will be given by H = ρdK where ρ is the rate of profit obtained by the foreign investor. The change in welfare is now equal to:

$$\frac{dU}{dK} = \frac{R_K - \alpha R_{qK} - \rho}{E_u(1 - \beta C_E)} \tag{8}$$

If the rate of profits obtained by foreign investors is equal to the marginal productivity of capital in the domestic country (i.e., $\rho = R_K$), expression (8) becomes:

$$\frac{dU}{dK} = \frac{-\alpha R_{qK}}{E_u(1 - \beta C_E)} < 0 \tag{9}$$

This means that if foreign investors repatriate the full rental rate, under the assumption that the importable good is capital-intensive (i.e., $R_{qK} > 0$) <u>welfare will always decrease</u> as a result of foreign investment. This result is independent of the relationship between αR_{qK} and R_K. This is exactly the Brecher-Diaz Alejandro (1977) result. If, however, the return to foreign investment is taxed, it is possible that foreign investment will be welfare improving. The tax required for this to be accomplished has to exceed αR_{qK}, and could conceivably drive the after tax rate of return to foreigners below their alternative rate of return r^*, and so become prohibitive, a point made by Grossman (1983) and van Wijnbergen (1983a).

Consider the case where the country obtains a transfer that has to be used for consumption.[7] In this case equation (1) becomes:

$$R(1,q;K,L) + G + T = E(1,p;U) \qquad (10)$$

where T is the transfer. Totally differentiating (10) we obtain:

$$\frac{dU}{dT} = \frac{1}{E_u(1 - \beta C_E)} > 0 \qquad (11)$$

which is always greater than zero: a transfer made in the form of consumption goods, can never be welfare worsening. (We are ignoring "induced" distortions a la Brecher-Bhagwati (1982) and transfer induced changes in the world relative price vector).

In the presence of distorted trade, then, a transfer in the form of capital (i.e., machines) may be welfare worsening; while a consumption transfer will always be welfare improving. This suggests that if a transfer is given partially in terms of consumption goods and partially in terms of capital, a reduction in welfare in the recipient country could result even under stability (which is assured by the small country assumption). This kind of immiserizing transfer is similar to the distortion-induced transfers analyzed by Brecher and Bhagwati (1982). The relevance of this case -- where the transfer is made in capital and goods -- stems from the fact that in the real world it is common to find aid which is given on the condition that part of the resources are used for investment (i.e., to increase the capital stock).

Should we therefore conclude that foreign aid channeled into investment (typical World Bank practice) has dubious welfare effects in distorted

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[7]In Section 3 we will endogenize both size and use of the transfer.

economies, while consumption out of aid is to be encouraged? Clearly this is much too sweeping a statement to be true. In fact, we will show that the immiserizing effects of capital transfers can be eliminated completely by using _shadow prices_ to guide the sectoral allocation of, and technology choice incorporated in, the influx of capital goods.

Consider again our two-sector economy. In order to simplify the exposition we now assume that $\alpha = \beta = \tau$, so that $p = q = (p^* + \tau)$. We already showed that introducing a gift (i.e., transfer) of machines could be welfare derteriorating if allocation and technology choice are governed by the relative price vector $(1,q)$ which can be represented by adding it to K in the argument list of R. However, deciding on allocation and technology choice using _world prices_ $(1,p^*)$, which clearly are the appropriate shadow prices in this context, leads to different results. This can be modelled by introducing a separate revenue function summarizing the optimal allocation of labor use $(\bar{L})$ of the new machines by the Shadow Pricing Agency (note that we have CRT technology). Of course, labor use on new machines means less labor available for old machines: the shadow wage rate is positive. Choosing $\bar{L}$ is clearly equivalent to setting a shadow wage rate. All this boils down to the following structure:

$$R(1,q;K,L - \bar{L}) + \tau(E_q - R_q) + \bar{R}(1,p^*;K^*,\bar{L}) = E(1,q,U) \qquad (12)$$

where K^* is the capital transfer. We assume that output is actually sold at market prices so that if protected goods were to be produced with the new capital goods, the tariff revenue replacement effect exactly cancels that part of total revenues represented by the excess of market price q of over p^*, justifying our use of $\bar{R}(1,p^*)$ which omits that component, and the absence of $\tau\bar{R}_{p^*}$ in the tariff revenue term. It is possible moreover that $\bar{R}_{p^*} = 0$, we

do not impose incomplete specialization on the Shadow Pricing Agency.

Differentiating (12) we obtain:

$$(-R_L + \bar{R}_L + \tau R_{qL}) \, d\bar{L} + \bar{R}_K dK^* = E_u dU \tag{13}$$

Optimally choosing $\bar{L}$ implies setting $\dfrac{dU}{d\bar{L}} = 0$ which yields the intuitively appealing formula for the shadow wage rate $\bar{R}_L$:

$$\bar{R}_L = R_L - \tau R_{qL} \tag{14}$$

This means that the shadow wage rate $\bar{R}_L$ is above or below the market wage depending on whether the Rybczynski term R_{qL} is negative or positive. In our example q is the price of the capital-intensive good, so $R_{qL} < 0$ and the shadow wage is <u>above</u> the market wage. This makes sense: protecting the capital intensive sector leads to overproduction of the capital intensive good; to reconcile that with a fixed aggregate capital labor ratio, overly labor intensive techniques in any given sector have to be chosen so that the market wage is below the wage that would obtain in the absence of relative price distortions.

Inserting (14) into (13) immediately gives the result that with shadow pricing immiserization is ruled out:

$$\frac{dU}{d\bar{L}} = 0 \Rightarrow E_u \frac{dU}{dK^*} = \bar{R}_K > 0 \tag{15}$$

3. Trade and Capital Market Liberalization in a Two-Periods World

The static framework of the previous section is not really a satisfactory framework for the analysis of capital market distortions. Capital market

distortions are in a sense isomorphic to trade distortions, in that they involve barriers to trade between goods today and goods tomorrow, in the same way that trade barriers interfere with trade in different goods at any moment of time. Accordingly, an intertemporal framework is appropriate.

In this section we develop a simple two period model, similar to the one in van Wijnbergen (1984), and use it to derive expressions for the welfare costs of capital market distortions. In particular we analyze quantity constraints in international capital markets under various rationing mechanisms.

We then extend the model to a two-commodity per period setting in order to analyze trade liberalization under external balance constraints, empirically a very important case.

We draw on recent work on the relation between temporary tariffs and private savings [i.e., Razin and Svensson (1983) and van Wijnbergen (1983b)] to analyze the question of cold turkey versus gradualism in trade liberalization in the case where external rationing falls disportionately on investment. We unambiguously establish that under those circumstances gradualism is the optimal strategy.

3.1 The Welfare Costs of External Capital Market Constraints.

Consider a simple two period-one sector open economy with endogenous investment. Assume first that there are no capital market distortions so that the domestic discount factor δ (one over one plus the interest rate) equals the world discount factor δ^*, (i.e., $\delta = \delta^*$). The model can be summarized by the intertemporal budget constraint with savings and production decisions already solved via the use of revenue and expenditure functions:

$$R^1(K, L) + \delta^* R^2(K + I, L) - I = E(1, \delta^*; W) \tag{16}$$

where δ^* is the world discount factor $[\delta^* = 1/(1 + r^*)]$, or the price of future goods in terms of today's goods. R^1 refers to the revenue function in period 1, while R^2 is the revenue function in period 2. E, on the other hand, is the intertemporal aggregate expenditure function, and gives the minimum discounted value of expenditure required to achieve the level of welfare W, given the discount factor δ^*. Investment (I) is determined by value maximization of the firm, which leads to an equivalent of "Tobin's q" being set equal to one:

$$\delta^* R_K^2(K + I, L) = 1 \tag{17}$$

or

$$I = I(\delta^*); \quad I_{\delta^*} = - \frac{R_K^2}{\delta^* R_{KK}^2} > 0 \tag{17a}$$

If there is a binding external borrowing constraint the current account deficit in period one will be equal to the constant $\bar{T}$:

$$CA^1 = - \bar{T} . \tag{18}$$

The unconstrained first period deficit would have been larger $(CA_1 = - \hat{T} < - \bar{T})$ where "^" indicates a variable from the unconstraint solution. The optimal policy response is clearly to charge a cost of foreign borrowing r above the world rate of interest r^* to consumers and investors alike. A convenient way of parametrizing this is to assume there is a tax on foreign borrowing that pushes the domestic discount factor δ below the foreign one, δ^*:

$$b = \delta^* - \delta > 0 \tag{19}$$

$b = (r - r^*)/((1 + r) (1 + r^*))$, the discounted value of tax payments per

unit repaid. Equation (16) then becomes

$$R^1(K, L) + \delta R^2(K + I, L) + b (R^2 - E_\delta) - I(\delta) = E(1, \delta, W) \qquad (20)$$

where δ is determined by the requirement

$$\delta^*(R^2 - E_\delta) = \bar{T} \qquad (21)$$

or the future surplus discounted at the <u>world</u> rate of interest should equal the maximum allowable deficit today.

Equation (19) simply says that to satisfy the external balance constraint, future goods should be made cheaper in terms of current goods so that people will willingly shift expenditure towards tomorrow. Expression (21) indicates that this process should continue until the constraint just ceases to be binding. Differentiation of (20) gives us the expression for the welfare effects of a change in δ (because of a change in $\bar{T}$):

$$(\delta^* - \delta) \left\{-E_{\delta\delta} + R_K^2 I_\delta\right\} d\delta = E_W dW \qquad (22)$$

Integration then yields the approximate total welfare gain[8] to be expected from such an increase in $\bar{T}$ that δ will equal δ^*, where the constraint just ceases to be binding:

$$E_W \frac{\Delta W}{\Delta \delta} = \frac{1}{2} (\delta^* - \delta)^2 (-E_{\delta\delta} + R_K^2 I_\delta) \qquad (23)$$

Since homogeneity of compensated demand functions implies $E_{\delta\delta} = - E_{\delta 1}/\delta$ $= - E_{1\delta}/\delta$, (23) can be written as

$$E_W \frac{\Delta W}{\Delta \delta} = \frac{1}{2} \frac{(\delta^* - \delta)^2}{\delta} (E_{1\delta} + I_\delta) \qquad (23a)$$

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[8]Approximate because we assume $E_{\delta\delta}$ and I_δ to be constant when performing the integration.

where we used the fact that $\delta R_K^2 = 1$.

So the cost of the distortion, in familiar Harberger fashion, is proportional to (compensated) savings and investment elasticities and to the _square_ of the equivalent price wedge $\delta^* - \delta$ introduced by the distortion. An alternative way of writing (23) may be useful for empirical work; note that the first period current account equals

$$CA^1 = R^1 - I - E_1, \quad CA_\delta^1 = -I_\delta - E_{1\delta}.$$

where $CA_\delta^1 = -\delta^2 \dfrac{\partial CA^1}{\partial r}$. Therefore (23) can be written as

$$E_W \frac{\Delta W}{\Delta \delta} = -\frac{1}{2} \frac{(\delta^* - \delta)^2}{\delta} CA^1_\delta. \tag{23b}$$

Equation (23) gives the social cost of the externally imposed constraint on the current account _if_ the optimal policy response is followed. In practice however rationing often falls disproportionately on investment rather than consumption. It is easily demonstrated that in that case the social loss caused by the constraint is larger.

Since we will use this rationing mechanism below it is useful to elaborate on this point. We will assume, without loss of generality, that _only_ investment is rationed. If we make the simplifying assumption that tax revenues are handed back to the public in the period where they are levied, the model with only investment rationed becomes

$$R^1(K, L) + \delta^* R^2(K + I(\tilde\delta), L) - I(\tilde\delta) = E(1, \delta^*, W) \tag{24a}$$

$$\tilde\delta R^2(K + I, L) = 1 \tag{24b}$$

$$\delta^*(R^2(K + I(\tilde\delta)), L) - E_\delta(1, \delta^*, W)) = \bar{T} \tag{24c}$$

where $\tilde{\delta}$ is the inverse of one plus the market clearing rate of interest under this rationing mechanism.

Comparing (24c) with (21) yields, after linearization:

$$\frac{\delta^* - \tilde{\delta}}{\delta^* - \delta} = 1 + E_{1\delta}/I_\delta > 1 \qquad (25)$$

for positive savings elasticities. Since the distortionary costs are proportional to the square of the price wedge, (25) indicates that the investment rationing scheme leads to larger welfare losses. This rationing scheme however may be the only feasible one available. In the next section we draw on some recent work on the impact of temporary tariffs on the consumption rate of interest and private savings to construct an argument for gradual trade liberalization under such circumstances.

3.2 Trade Reform Under an External Balance Constraint: A Second Best Argument for Gradualism

Consider an extension to two goods of the model of Section 3.1, with an external balance constraint falling on investment only. We will exploit the link between temporary tariffs and private savings via the consumption rate of interest stressed by Razin and Svensson (1983) and van Wijnbergen (1983b) to construct an argument for gradualism in liberalizing trade.

Cold turkey liberalization implies that the pre-liberalization tariff $\bar{\tau}$ is lowered to _zero_ in both periods. Gradualism implies a zero tariff in period 2 but a lower but positive tariff in period one (τ^{**} in Figure 1). The _differential_ welfare effect can accordingly be obtained by evaluating the welfare effect of a tariff τ^{**} in period one under the assumption of a zero tariff in period two.

To do so we of course have to extend the model to at least two traded goods (x and y) each period. By choice of normalization assume that
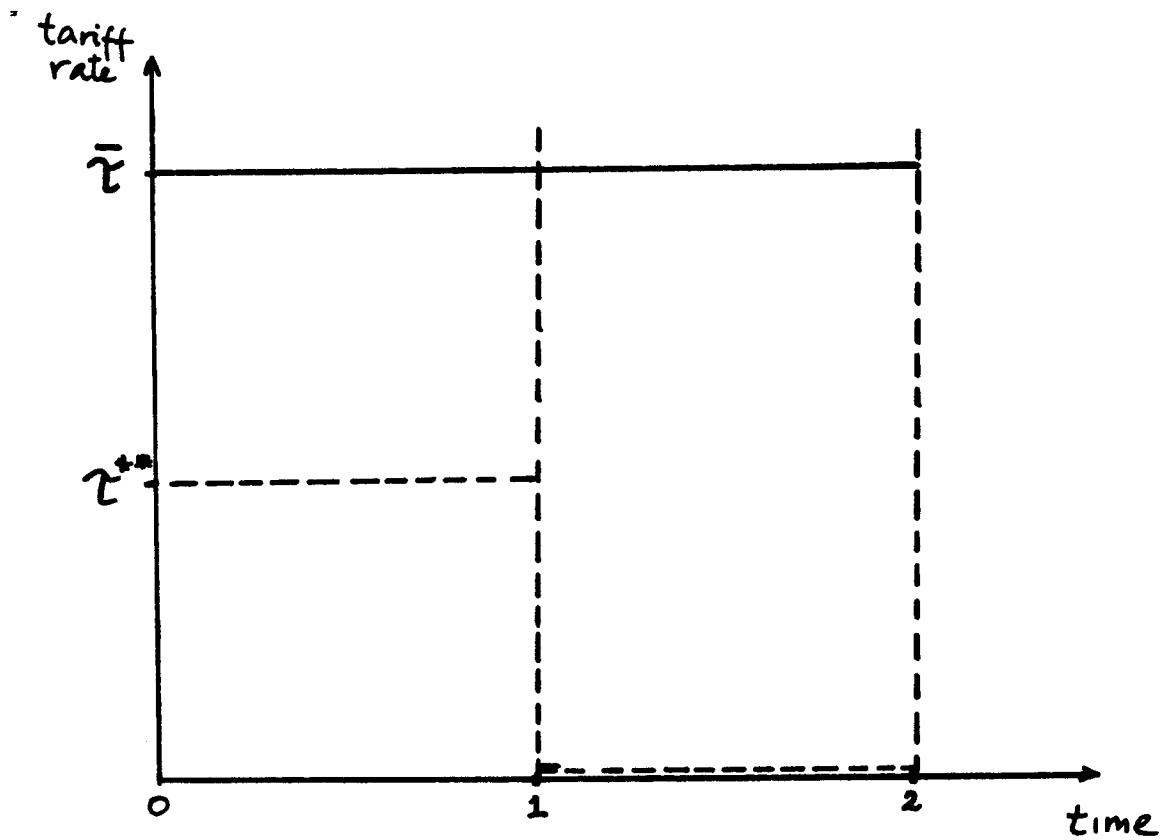
Figure 1: <u>Cold Turkey Versus Gradualism</u>

good x is the untaxed commodity. The budget constraint then becomes

$$R^1(1,p_y^1;K) + \delta^* R^2(1,p_y^2;K+I) - I(\delta) + \tau(E_{p_y^1} - R^1_{p_y^1}) =$$

$$E(\Pi_1(1,p_y^1),\delta^*\Pi_2;W) \tag{26}$$

where p_y^1, the domestic price of good y in period one, equals the world price plus tariff rate, $p_y^1 = p_y^* + \tau$. We assume that aggregate utility W is weakly homothetically identically separable, which allows us to write the expenditure function as a function of within period price indices $\Pi_i(1,P_y^1)$ i = 1,2, the discount factor δ^* and welfare W (see Svensson and Razin (1983)).

The capital market constraint is represented by

$$\delta^*(R^2(1,p_y^2;K+I(\delta)) - \Pi_2 E_{\Pi_2}(\Pi_1(1,P_y^1),\delta^*\Pi_2,W)) = \bar{T} \tag{27}$$

Investment is determined by setting the value of capital (evaluated at the "virtual discount factor" δ, since investment is rationed) equal to its reproduction costs:[9]

$$\delta R_K^2 = 1, \tag{28}$$

where we made the simplifying assumption that investment goods consist of good one only, or, alternatively, that the good-2 components can be imported free of tariffs.

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[9]The concept of "virtual prices" at which rations are willingly consumed is introduced by Neary and Roberts (1980).

Simple differentiation of (26) and (27) and inserting (28) give us

$$\gamma \frac{d\delta}{d\tau} = [(1 - \tau C_{1y})\Pi_2 \Pi_{1_{P^1_y}} \delta^* E_{\Pi_2 \Pi_1}] + [C_{2E}\ \tau(E_{P^1_y P^1_y} - R^1_{P^1_y P^1_y})] \qquad (29)$$

$$\text{(A)} \qquad\qquad\qquad\qquad\qquad \text{(B)}$$

γ is a positive constant (see the Appendix for explicit formulas).

$C_{2E} = E_{\Pi_2 W} E_W^{-1}$, the marginal propensity to spend (on all goods) in period two. Equation (29) tells us that a small tariff will <u>increase</u> δ, or <u>lower</u> the interest rate that has to be charged to investors in order to hit the capital market constraint.

The mechanism is clear: a small tariff <u>decreases</u> the consumption discount factor $\dfrac{\delta^* \Pi_2}{\Pi_1(1,P^1_y)}$ or, equivalently, <u>increases</u> the Consumption Rate of Interest. This leads to higher private savings, leaving more room for investment given the external current account constraint. Accordingly, δ can go up, closer to the world market discount factor δ^*. The effect corresponds to term (A) in (29). If however the tariff is too large, term (B), which is proportional to τ, will dominate and reverse the result.

The reason is once again clear: a large first period tariff will inflict a large first period real income loss; consumption smoothing will then lead to downward pressure on the first period current account. If the real income loss is large enough this effect will offset the positive effect via the CRI. Define τ^* as the tariff rate where these two effects will just cancel each other out in the margin.

We are now ready to look at the <u>welfare</u> effects of a small first period tariff under the external balance constraint with investment rationing:

$$\gamma_1 \frac{dW}{d\tau} = \Pi_{1_{P^1_y}} \Pi_2 E_{\Pi_2 \Pi_1}(\delta^* - \delta) + \tau(E_{P^1_y P^1_y} - R^1_{P^1_y P^1_y}) \qquad (30)$$

$$\text{(+;C)} \qquad\qquad\qquad \text{(-;D)}$$

where $\gamma_1 > 0$ (see the Appendix for a precise expression). Equation (30) backs up our claim in the introduction to this section: a first period tariff, if not too large, is welfare improving under the external balance constraint-cum-investment-rationing mechanism considered. The first term, C, is proportional to the size of the capital market distortion $(\delta^*-\delta)$ and the compensated sensitivity of savings with respect to the rate of interest $(E_{\Pi_2 \Pi_1})$ and is positive. A temporary tariff will raise the consumption rate of interest, increasing private savings, therefore leaving more room for private investment (which was too low because of the external balance constraint and the rationing mechanism adopted) and so reduces the distortionary costs of the external balance constraint-cum-investment-rationing.

If the first period tariff is too large however, the second term, D, will increase since it is proportional to τ. In that case the static welfare losses because of the first period relative price distortion may offset the dynamic gains via the CRI. Define τ^{**} as the rate where these effects cancel <u>on the margin.</u> It is straightforward to show that $\tau^{**} < \tau^*$, i.e., the marginal welfare effect flips sign as τ increases <u>before</u> the effect on δ is reversed (cf., the Appendix).

Setting the marginal net welfare gain of a first period tariff equal to zero implicitly defines the (second best) optimal first period tariff:

$$\tau^{**} = -\Pi_2 \Pi_{1_{p_y^1}} E_{\Pi_2 \Pi_1} (\delta^*-\delta)/(E_{p_y^1 p_y^1} - R^1_{p_y^1 p_y^1}) > 0 \qquad (31)$$

(31) shows that under the investment rationing scheme adopted in response to the external balance constraint, the first period (second best) optimal tariff is strictly positive. This establishes the superiority of gradualism over cold turkey liberalization under the external balance constraint-cum-

investment-rationing.

To recapitulate, we start off by analyzing the very realistic (for most LDC's) case where an exogenously imposed external balance constraint fell disproportionately on investment rather than on consumption (in fact we assumed, for analytical convenience, that it fell completely on investment; this is immaterial however). Under those circumstances a small first period tariff was shown to be welfare improving because of its favorable effects on private savings (via the CRI) and the ensuing relaxation of the rationing of private investment. Since gradual trade liberalization can be considered as complete liberalization with a small tariff put back on in period 1, this constitutes an argument for gradualism when liberalizing trade under external balance constraints.

It should be emphasized however that this is conditional on investment taking a disproportionate share of the adjustment burden to the external constraint; if a market clearing real interest rate above world levels can be charged to consumers and investors alike, it can be shown that the argument for additional first period relative price distortions via temporary tariffs disappears, the favorable CRI effects not withstanding.[10] However in most LDC's such a first best rationing device is typically unavailable, so that our argument for gradualism stands.

4. Concluding Remarks

In a first best world without externalities, market imperfections and without constraints on commodity taxation the issues addressed in this paper — how to liberalize trade in factors and goods, is of no interest:

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[10]A proof of this statement is available on request from the authors.

instantaneous complete liberalization will always be optimal for a country too small to influence the world relative price vector. However capital market liberalization may be considered while political, distributional or revenue considerations bar instantaneous trade liberalization; alternatively, trade liberalization may be chosen (or imposed) while external constraints prevent foreign borrowing. The recent experience of a group of countries in South America is one of partial (i.e., one market only) liberalization. While in Argentina the capital account was liberalized, the trade account retained its controls. In Chile the opposite was the case.

In this paper we discuss the consequences of these two alternative sequences of liberalization. We first review the literature on immiserizing transfers, extending it in several respects. We discuss immiserizing capital transfers a la Johnson (1967) and capital inflows a la Brecher-Alejandro (1977) and show that immiserization is possible even if the full rental rate differential is taxed. We then show that a transfer in the form of consumption goods will never be welfare reducing. An interesting consequence is that foreign aid that stipulates that at least part of the transwer has to be invested can be immiserizing while aid that is purely consumed cannot (in the small country case). So it is possible to have immiserization, if liberalizing capital market leads to more investment (as it will if the external balance constraint fell on both consumers and investors alike). It is straightforward to show that the private sector will invest both too much and in the wrong sector if tariffs protect the capital intensive sector. We demonstrate that shadow pricing of new investment projects, would avoid that. If, however, imposing the use of shadow prices on the private sector in evaluating new projects is infeasible, opening up capital markets while restricting trade could lead to immiserization, cautioning against this sequence.

Capital market distortions are in a sense isomorphic to trade distortions in that they imply barriers to trade in goods across time rather than between countries at a given moment in time; accordingly, one needs an intertemporal framework for a satisfactory analysis of the welfare cost of capital market constraints. This is provided in Section 3 of this paper.

We derive a simple expression linking the cost of capital market distortions to the square of the induced interest rate differential and the (compensated) interest elasticity of savings and investment. The same procedure is used to demonstrate the increase in distortionary cost if external rationing falls disproportionately on investment, empirically a vey important case.

We finally draw on recent work on the relation between temporary tariffs and private savings via the consumption rate of interest to analyze the question of cold turkey vs. gradualism in trade liberalization in the case where external rationing falls disproportionately on investment, and establish unambiguously that under those circumstances gradualism is the optimal strategy. Most examples of trade liberalization took place under external balance constraints; in most cases of external balance constraints investment takes a disproportionate share of the adjustment burden; so this conclusion is of great policy relevance.

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APPENDIX

Consider the model of Section 3.3 in differentiated form:

$$
\begin{vmatrix} (1-\tau C_{1y}) - (\delta^*-\delta) \ R_K^2 \\ \\ C_{2E} \qquad - \delta^* \ R_K^2 \end{vmatrix}
\begin{vmatrix} E_W dW \\ \\ I \ d\delta \end{vmatrix}
=
\begin{vmatrix} \tau(E_{P_y^1 P_y^1} - R_{P_y^1 P_y^1})d\tau \\ \\ -\Pi_2 \Pi_{1_{P_y^1}} \ \delta^* E_{\Pi_2 \Pi_1} d\tau \end{vmatrix}
\qquad \text{(A.1)}
$$

The determinant of the matrix on the LHS equals:

$$
\delta = -(1-\tau C_{1y}) \ \delta^* R_K^2 + C_{2E}(\delta^*-\delta) \ R_K^2
$$

$$
\qquad\qquad (-) \qquad\qquad\qquad (+)
$$

which appears of indeterminate sign. However some manipulation yields

$$
\Delta = -(1-C_{2E})\delta^* \ R_K^2 - C_{2E} + \tau C_{1y}\delta^* \ R_K^2 \qquad\qquad \text{(A.2)}
$$

$$
< -(1-C_{2E})\delta^* \ R_K^2 - C_{2E} + P_y^1 C_{1y} \ \delta^* \ R_K^2
$$

$$
- (1 - \frac{\tau}{P_y^1}) \ P_y^1 C_{1y} \ \delta^* \ R_K^2
$$

$$
= - P_x^1 C_{1d} \ \delta^* \ R_K^2 - C_{2E} - (1 - \frac{\tau}{P_y^1}) \ P_y^1 C_{1y} \ \delta^* \ R_K^2 < 0
$$

where we used $P_x^1 C_{1d} + P_y^1 C_{1f} + C_{2E} = 1$ and $\delta^* R_K^2 = 1$.

Cramer's rule applied to (A.1) now gives

$$
I_\delta \frac{d\delta}{d\tau} = \frac{-1}{\Delta} \ [(1-\tau C_{1y}) \ \Pi_2 \Pi_{1_{P_y^1}} \ \delta^* \ E_{\Pi_2 \Pi_1} + C_{2E}\tau(E_{P_y^1 P_y^1} - R_{P_y^1 P_y^1})]. \qquad \text{(A.3)}
$$

which is expression (29) in the text with $\gamma = - \Delta I_\delta$.

The expression for $\frac{dW}{d\tau}$ becomes

$$E_W \frac{dW}{d\tau} = - \frac{\delta^* R_K^2}{\Delta} [\Pi_2 \Pi_{1_{p_y^1}} E_{\Pi_2 \Pi_1} (\delta^* - \delta) + \tau(E_{p_y^1 p_y^1} - R^1_{p_y^1 p_y^1})] \qquad (A.4)$$

which is expression (30) in the text with $\gamma_1 = - \Delta \delta^{*2} R_K$.

Setting (A.3) to zero to derive τ^* and (A.4) to zero to derive τ^{**}

yields:

$$\tau^{**} = \alpha \tau^* - \beta$$

with $\alpha = C_{2E} < 1$, $\beta = \Pi_2 \Pi_{1_{p_y^1}} E_{\Pi_2 \Pi_1} (\delta - \delta^* \tau C_{1y}) > 0$ so $\tau^{**} < \tau^*$.[11]

Finally A.4 immediately shows that $\tau^{**} > 0$, so that the claim made ins

the text is in fact true:

$$0 < \tau^{**} < \tau^*.$$

---

[11]In claiming $\beta > 0$ we assumed $1 - (\tau/p_y^1)(\delta^* p_y^1 C_{1y}/\delta) > 0$. This is a

reasonable assumption: $\tau/p_y^1 < 1$ by construction and $(\delta^* p_y^1 C_{1f}/\delta) < 1$ even

for severe capital market distortions under plausible import shares. The

important result $\tau^{**} > 0$ does not depend on that assumption.