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"True Exposure": The Analytics of Trade Liberalization in a General Equilibrium Framework

by

Friedrich L. Sell*

Institut für Weltwirtschaft an der Universität Kiel

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Kiel Institute of World Economics
Department IV
Düsternbrooker Weg 120, D-2300 Kiel 1

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"True Exposure": The Analytics of Trade Liberalization in a General Equilibrium Framework

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Friedrich L. Sell*

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I. Introduction

These is an ongoing debate with regard to the "Timing and Sequencing of Liberalization" in LDC's. The "Capital Account or Trade Account First"-Puzzle is tackled with different methodological tools of analysis, ranging from the "Political Economy Approach" put forward by D. Lal (1987) to the orthodox "Price and Resource Movement Analysis" by S. Edwards (1986).

D. Lal favours a sequencing in which exchange controls are removed first, introducing a free floating exchange rate, and a phased program of trade liberalization should follow. If, instead, trade liberalization is accompanied by a managed exchange rate system requiring capital controls, the real exchange rate will be affected severely by the nominal exchange rates chosen by the government. These choices, in turn, will seldom correspond to the economic requirements as reflected in the balance of payments. When deficits occur, governments may then be tempted to impose new trade controls - "thus aborting the trade liberalization" (Lal 1987, p. 290).

S. Edwards, on the other hand, comes to the conclusion that both types of liberalization, on their own, generate by tendency opposite effects on prices, production, factor allocation and income distribution. As resource movements are not for free, net reallocation costs can be minimized by synchronising the opening of the capital and current accounts. However, given the fact that the capital account tends to adjust faster than the current account, the "synchronization of the economic effects of opening both accounts will require that the current account is opened first" (Edwards 1986, p. 210).

Both approaches seem to be conceptually uncomplete: D. Lal omits to compare the three relevant exchange rate regimes which may be implemented during a trade liberalization process: free, managed and fixed exchange rate. Also, his analysis is not clearcut with

regard to the real exchange rate effects of a trade liberalization.

Whereas Edwards is explicit in analyzing the impact of liberalization (capital, current account) on the real exchange rate, he does so in a Heckscher-Ohlin framework where domestic demand is exogenous and prices are determined solely by input costs. Also, he claims the relevance of substitutionary and income effects generated by a trade liberalization. Due to his merely supply-side oriented procedure these effects are not really incorporated into the analysis. Moreover, they are introduced in a "deus-ex-machina" fashion (see Edwards 1986, pp. 192/193), which is not convincing.

The following contribution aims at overcoming the mentioned deficiencies: our focus will be, however, on trade liberalization alone, although the exchange rate environment and, thus, the prevailing capital account scenarios can be varied.

The presentation will make use of a concept which has been put forward most recently as "True Protection" (Sjaastad 1982, Greenaway/Milner 1987). "True Protection" basically deals with the measurement and analysis of trade barriers and is located in the tradition of relative-prices-analysis. The analytical framework used draws heavily on a pioneer article by Rudiger Dornbusch (1974); his approach, however, is perfectly capable - as Khan/Zahler (1987) have shown - of reversing the investigation target, that is to say to analyze the effects of trade liberalization. With this aim, the present article suggests that this approach should be called "True Exposure".

The paper is organized as follows: In chapter II, "True Exposure" will be conceptually explained from three different approaches ("Shifting Principle", "Graphical Presentation" and "Analytical Version"). Afterwards, in chapter III, we will proceed to the discussion of price, exchange rate and income effects of a trade

liberalization with the means of comparative static equilibrium analysis. Also, the transition process - which is a temporary disequilibrium - between the original and the new equilibrium is dealt with. Special emphasis is put on alternative exchange rate regimes which will hopefully deliver some conclusions with regard to the "sequencing of liberalization debate". Finally, chapter IV will cover some further fields of research and points to be clarified. A short summary (chapter V) concludes the paper.

II. True Exposure: An Exposition of its Dimensions

II.1 The "Shifting Principle"

The direct impact of a tariff reduction[1] or elimination is the decrease in the domestic price of importables. The extent to which importables are truly "liberalized" depends on how much their relative price is reduced. The "relative price" is meant to be the price of a good in terms of its competing goods' prices, and, thus, the prices of nontradeables and exportables.

To illustrate our considerations the following two examples can be given:

(i) with prices of nontradeables decreasing as much as those of importables - after a tariff reduction - true exposure of importables is zero;

(ii) with prices of nontradeables declining less than those of importables, the true liberalization rate is smaller than the nominal rate.

---

[1] Following Greenaway/Milner, "we assume that commercial policy interventions take the form of uniform tariffs on imports and/or uniform subsidies on exports" (1987, p. 202).

Case (i) represents a situation where importables and nontradeables are perfect substitutes which implies that - in the long run - their relative price must equal one. Case (ii) stands for the comparatively "normal" relationship between importables and nontradeables, the two being imperfect substitutes. Analogously, examples can be constructed, mutatis mutandis, for the incidence of tariff reductions on exporters.

Hence, the true exposure concept emphasizes the shift of import price reductions on to exportables and nontradeables after a trade liberalization. The extent of this shift depends "essentially on the degree of substitutability (in demand and production) between the products of the importable sector and the other unprotected sectors" (Greenaway/Milner 1987, p. 201).

II.2 A Graphical and Analytical Presentation

Consider a small open economy which produces and consumes nontradeables, importables and exportables. The domestic prices of importables (M) and exportables are determined by their international prices (*), the nominal exchange rate (E) and domestic import tariffs (t)/export subsidies (s):

$$(1) \quad P_M = E \; P_M^* \; (1 + t)$$

$$(2) \quad P_X = E \; P_X^* \; (1 + s)$$

For the sake of simplicity we will assume s to be zero. Thus, the "domestic terms of trade" are given by

$$(3) \quad \frac{P_M}{P_X} = \frac{P_M^*}{P_X^*} \; (1 + t)$$

Prices of nontradeables are in an equilibrium when the market for nontradeables clears. This, in turn, is associated with a balance of trade equilibrium, when income (Y) equals absorption (A):

$$(4) \quad Y = Y_N + Y_X + Y_M$$

$$(5) \quad A = A_N + A_M + Ax$$

$$(6) \quad Y - A = (Y_N - A_N) + \underbrace{(Y_X - Ax)}_{X} + \underbrace{(Y_M - A_M)}_{-M} = 0$$

$$(6a) \quad A_N - Y_N = X - M$$

Or, as (6a) demonstrates, when income equals expenditure (Y- A = 0) an excess demand for nontradeables will always be accompanied by a balance of trade surplus (Dornbusch 1974, p. 180). Theoretically, it can be removed by a rise in the price of nontradeables and/or a drop in the price of tradeables, consequently an appreciation of the nominal exchange rate. Hence, with (6) prevailing, demand for nontradeables is assumed to be a mere function of relative prices:

$$(7) \quad D_N = D_N \left(\frac{P_M}{P_N}, \frac{P_X}{P_N}\right)$$

Let us assume that nontradeables are substitutable for exportables and/or importables in production as well (Greenaway/Milner 1987, p. 202):

$$(8) \quad S_N = S_N \left(\frac{P_M}{P_N}, \frac{P_X}{P_N}\right)$$

All prices (P_M, P_X, P_N) are then simultaneously explained, when the market for nontradeables clears [(7) equals (8)] and the relative price of traded goods (3) is exogenously given. The latter can be represented graphically by a ray through the origin (OT) in a $\left(\frac{P_M}{P_N} / \frac{P_X}{P_N}\right)$ diagram. The market equilibrium for non-

tradeables is a negatively sloped schedule (NN) whenever "home goods substitute with both tradeables. A fall in P_M (relative) to P_N generates negative excess demand for nontradeables and must be offset by an increase in P_X (relative to P_N)" (ibid, pp. 202/ 203). Total equilibrium is where OT and NN intersect (A), as depicted in Figure 1.

A full trade liberalization connected with a drop of the tariff rate (t) to zero rotates OT to OT' as the domestic relative price of exportables in terms of importables rises by the amount of the nominal tariff reduction (Greenaway/Milner 1987, p. 203). The first impact of the tariff reduction will thus consist of a lowering of the price of importables "in terms of both exportables and home goods by the amount of the tariff, so that the economy would find itself at point C" (Dornbusch 1974, p. 180). At C, however, there is an excess supply ($S_N > D_N$) of non-traded goods. At a fixed nominal exchange rate and prices fully flexible downwards, a new market equilibrium for non-traded goods (B) can be attained through subsequent price reductions of home goods. "The change in the price of importables relative to home goods" (Greenaway/ Milner 1987, p. 204) serves now as a measure of the "true exposure effect" (TEE) the tariff reduction has on the sector of importables:

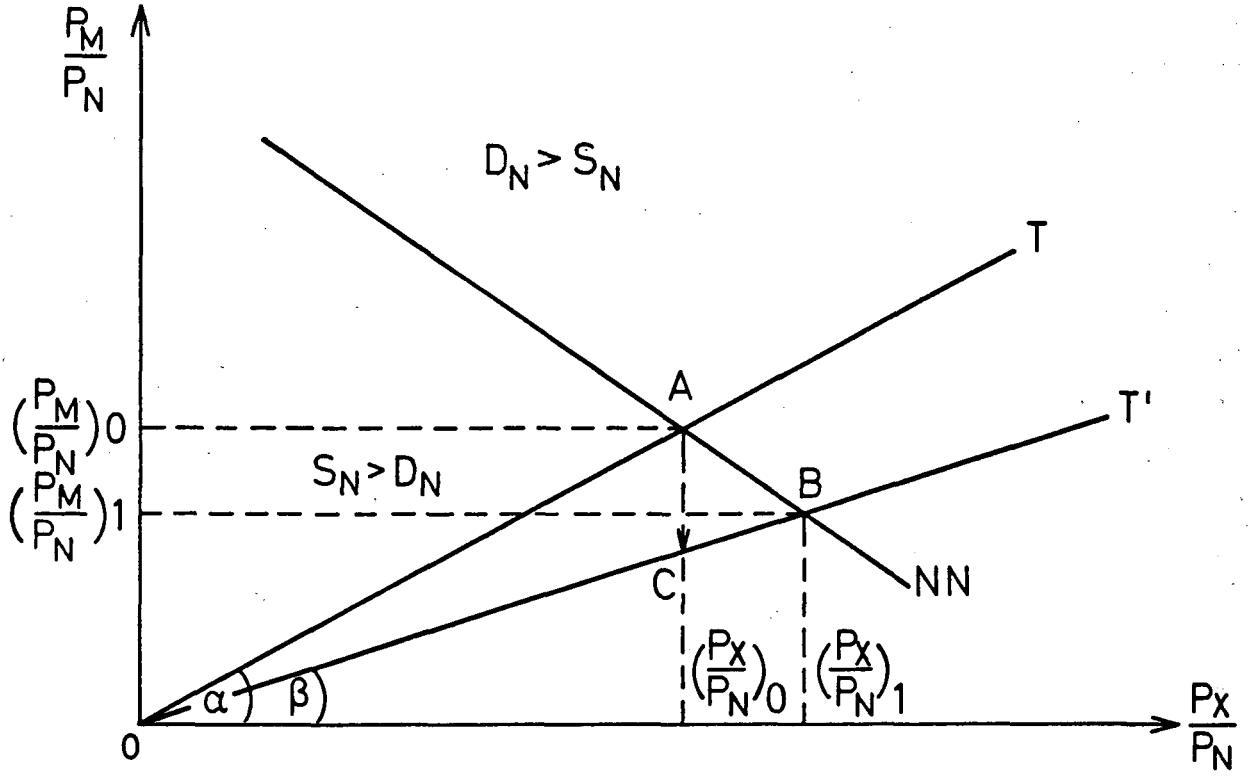
$$(8) \quad TEE^* = \left(\frac{P_M}{P_N}\right)_1 - \left(\frac{P_M}{P_N}\right)_0 = \Delta \left(\frac{P_M}{P_N}\right)$$

Mutatis mutandis, the "true export subsidy effect" is given by

$$(8) \quad TES^* = \left(\frac{P_X}{P_N}\right)_1 - \left(\frac{P_X}{P_N}\right)_0 = \Delta \left(\frac{P_X}{P_N}\right)$$

As Dornbusch pointed out (1974, p. 179), the original NN curve was "constructed... so that along the schedule real income is constant" (ibid). This implies the total redistribution of tariff proceeds by the government to compensate the direct reduction of

Figure 1 (Case 1+2)



"purchasing power of a given level of spending" (Dornbusch 1980, p. 65).

Rewriting (7) and (8) in percentage changes considering the market clearing condition (general equilibrium) for non-traded goods gives the expression:

$$(11)\quad \eta_m (\hat{P}_M - \hat{P}_N) + \eta_x (\hat{P}_X - \hat{P}_N) = e_m (\hat{P}_M - \hat{P}_N) + e_x (\hat{P}_X - \hat{P}_N)$$

where a circumflex (^) indicates a percentage change and the η's "represent the demand elasticities for home goods with respect to the prices of importables and exportables, and e_m and e_x are the corresponding supply elasticities" (Oyejide 1986, p. 46).

Rearranging (11) leads to:

$$(12)\quad \gamma_m (\hat{P}_M - \hat{P}_N) + \gamma_x (\hat{P}_X - \hat{P}_N) = 0$$

where

$$(13)\quad \gamma_m = \eta_m - e_m > 0 \quad \text{and}$$

$$(14)\quad \gamma_x = \eta_x - e_x > 0$$

as $\eta_x, \eta_m > 0$ and $e_m, e_x < 0$ [1]

From (12), it follows that

$$(15)\quad \hat{P}_N = \frac{\gamma_m}{\gamma_m + \gamma_x} \hat{P}_M + \frac{\gamma_x}{\gamma_m + \gamma_x} \hat{P}_X \quad \text{with}$$

[1] It is reasonable to assume the production of home goods c.p. to decline when the prices of importables and exportables rise.

$$(16) \quad \omega = \frac{\gamma_m}{\gamma_m + \gamma_x} \; ; \quad 1 - \omega = \frac{\gamma_x}{\gamma_m + \gamma_x}$$

$$\text{as } \gamma_m + \gamma_x = 1$$

The incidence parameter ω ($0 \leq \omega \leq 1$) tells us how much of a tariff reduction (at a given exchange rate E and international prices P_M^*) is shifted to the producers of non-traded goods. With ω equal to one "true exposure" of importables is nil whereas an ω of zero reveals that producers of importables have to bear the full consequences of trade liberalization.

Further examination of ω shows that - as Greenaway and Milner put it - "it is an index of substitutability... in production and demand" (ibid, p. 207) between nontradeables and importables (13) on the one hand and between nontradeables and exportables (14) on the other hand.

So far, our presentation has been basically a review of "True Protection" literature, however, with an inverse focus. In the following, it will be shown how this concept can contribute to evaluate price, exchange rate and income effects of a trade liberalization which were not rigorously considered by Lal and Edwards. The general equilibrium properties of "True Exposure" have more ad- than disadvantages: Although we deal in economic reality primarily with economic disequilibria, it makes sense to start any discussion of policy effects in an equilibrium framework. Even if it only serves as a term of reference, as the widespread partial equilibrium settings - like the one presented by Michaely (1986) - cannot demonstrate the supply-demand-interactions in a three-goods, two-factors world.

III. True Exposure: New Answers to Old Questions?

III.1 Price Effects of a Trade Liberalization

So far, we have basically dealt with the adjustment of relative prices in the course of a trade liberalization. However, "true exposure" also offers insight into the development of absolute prices. This issue is important, for example, when the effects of a trade liberalization on the overall price level and/or the inflation rate are to be investigated.

Even in most recent literature there is still a lot of vagueness if not confusion about what happens to the prices of non-traded goods when import tariffs are removed: "The local-currency prices of import substitutes would presumably need to fall by roughly the same amount as the prices of imports. Under reasonable assumptions about demand and supply elasticities, the local-currency prices of non-traded goods would also need to fall significantly, though less than those of import substitutes" (Mussa 1987, p. 65).

In believing so, Mussa considers only final goods and is not concerned with imported inputs used in the production of non-tradeables and/or exportables. This simplification applies also to our own presentation[1].

The "reasonable assumptions" mentioned by Mussa refer to the substitutability between the three goods with regard to consumption and production. All of these relationships are fortunately reflected in ω.

Let us consider first the theoretically possible cases in production:

---

[1] Buffie (1984) has extended the analysis of trade liberalization by allowing - within his model - "imported inputs to be used in the nontradeables sector" (ibid, p. 130).

Factor Intensities and Substitutability in the Production of Nontradeables, Importables and Exportables

	Factor Intensities	Substitutabilty
Case 1	$(K/L)_X < (K/L)_N < (K/L)_M$	X and N; M and N
Case 2	$(K/L)_M < (K/L)_N < (K/L)_X$	M and N; X and N
Case 3	$(K/L)_N < (K/L)_X < (K/L)_M$	X and N; X and M
Case 4	$(K/L)_M < (K/L)_X < (K/L)_N$	X and M; X and N
Case 5	$(K/L)_X < (K/L)_M < (K/L)_N$	X and M; M and N
Case 6	$(K/L)_N < (K/L)_M < (K/L)_X$	M and N; M and X

Of course, for a typical LDC of today only some out of the total sample of six cases will be relevant. Greenaway/Milner argue that case 1 is "probably appropriate for LDC's pursuing import substitute policies and exporting mainly traditional exports" (Greenaway/Milner 1987, p. 215).

Edwards (1986, p. 190), on the other hand, also considers for LDC's case 3 which claims exportables to have a higher capital-labor ratio than nontradeables.

The cases 4 and 5 may occur, if at all, in industrialized countries where the supply of advanced services is linked to a highly capital-intensive technology. Case 2 can be attributed, for example, to "traditional" developed countries showing a comparatively high endowment with capital which is then reflected in their export production (Heckscher-Ohlin). Due to their specialization, imports will result in comparatively labor-intensive products.

Case 6, finally, may be found in newly industrializing countries which partly have lost their comparative advantage in exporting labor-intensive goods to the so-called "second tier countries" and are now switching to more capital-intensive exports (Singapore).

In order to keep the analysis operational and in an admissable way simple the following three assumptions[1] should hold:

(i) There is perfect symmetry between production and consumption with reference to substitutability and

(ii) a lack of substitutability is interpreted as complementarity;

(iii) those goods that are located at the "extremes" of the factor-intensities-sequence do not show any significant mutual substitutability.

Cases 1 and 2 are well represented by the NN schedule in Figure 1: with given domestic prices of exports, prices of nontradeables obviously fall $[(P_X/P_N)_1 < (P_X/P_N)_0]$ after the tariff reduction. Consequently, a true export subsidy is given.

Cases 3 and 4 "normally" stand for a weak/semi-strong substitutability between X and N/a weak/semi-strong complementarity between M and N. If X and N were <u>perfect</u> substitutes, the relative price of importables and nontradeables would not exert any more influence on demand and supply of nontradeables ($a_1 = b_1 = 0$, see Appendix)[2]. The market equilibrium schedule NN now becomes a vertical line as depicted in Figure 2[3] and by definition, the export sector is not affected by the tariff reduction. With less than perfect substitutability between X and N, the NN schedule resembles the one of Figure 3. Now, the prices of nontradeables must have risen as $(P_X/P_N)_1 > (P_X/N)_0$. This result, in turn, signifies a "true export tax".

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[1] So far, we continue to regard the exchange rate as fixed.

[2] In that case, M and N are perfect complements and the ratio at which they are consumed/produced is not affected by relative price changes.

[3] With unchanged prices of nontradeables, hence, true exposure equals the nominal tariff reduction!

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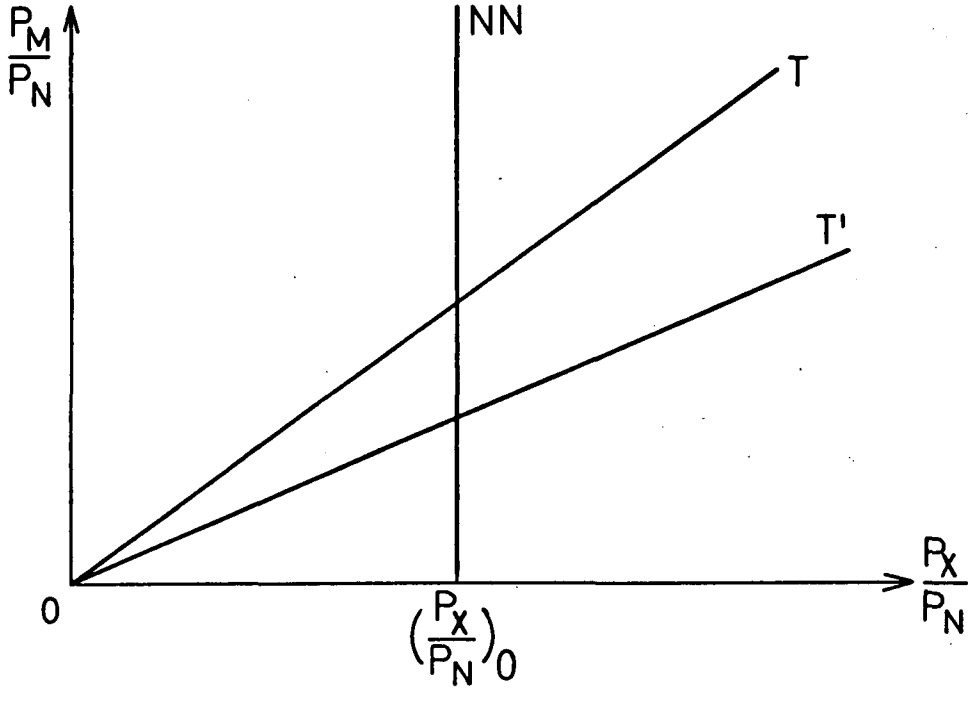
Figure 2



(Case 3+4) Figure 3

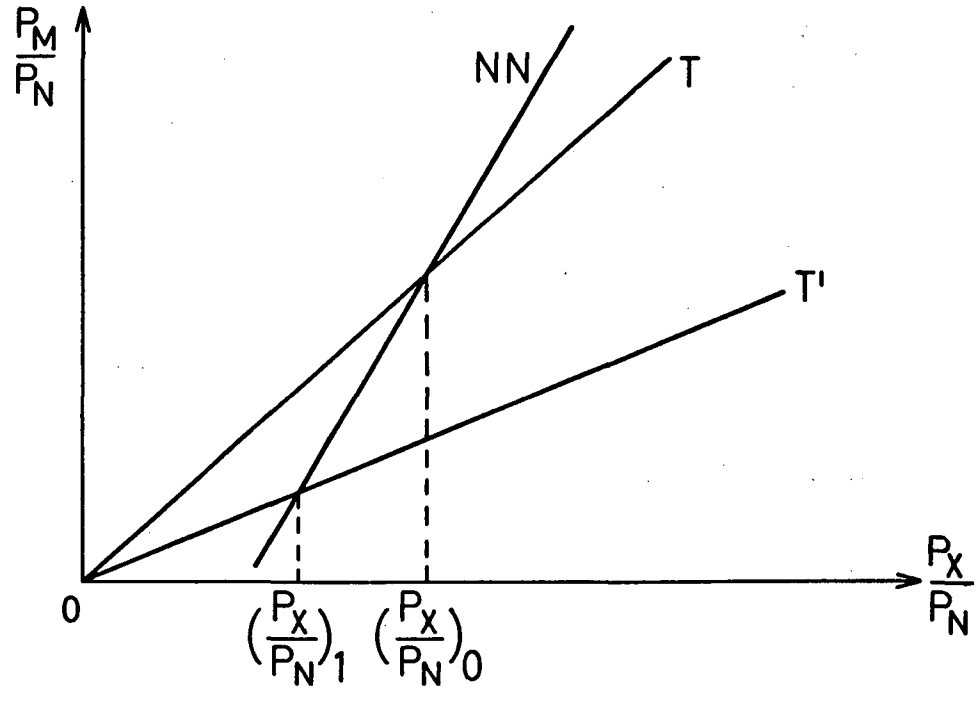
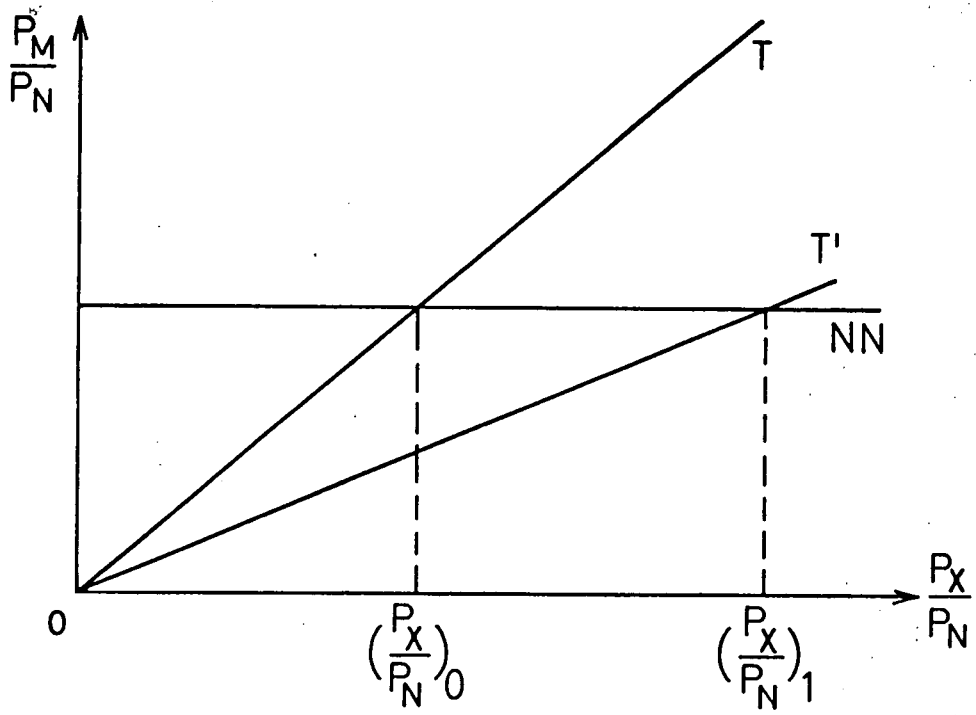
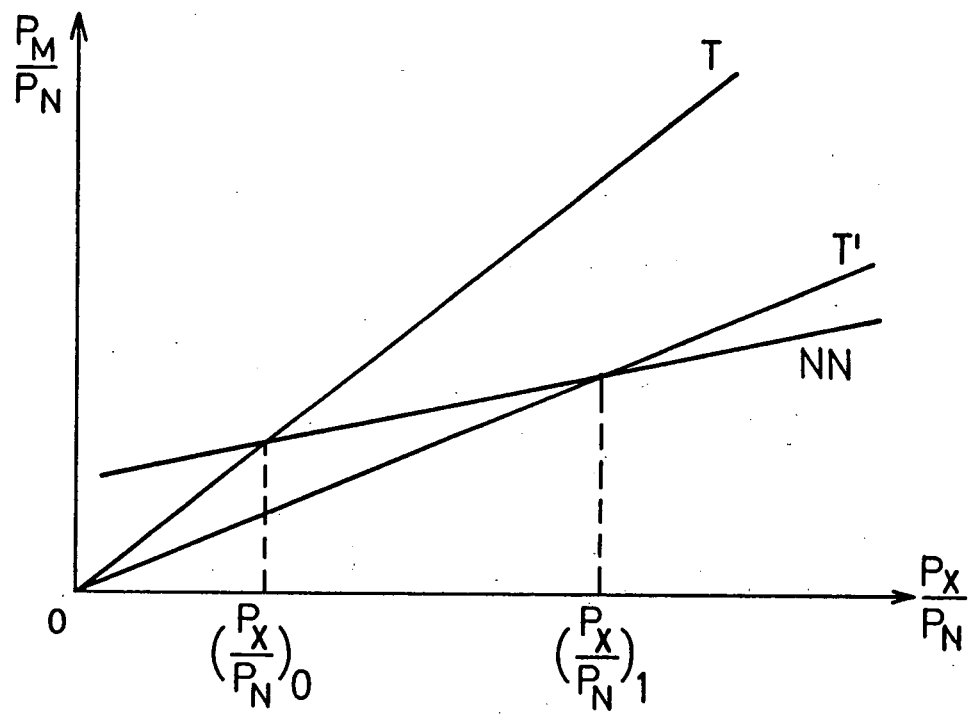


Figure 4



(Case 5+6)

Figure 5



Finally, the cases 5 and 6 consider weak/semi-strong or perfect substitutability in production and consumption between M and N ($a_2 = b_2 = 0$, see Appendix). In the latter case (Figure 4), NN becomes a horizontal line causing a high true export subsidy [$(P_X/P_N)_1 > (P_X/P_N)_0$]. This interesting case is worth for a detailed description of the adjustment process.

The initial drop in the price of importables due to the assumed tariff reduction will cause resources to be diverted from the production of importables towards the production of nontradeables. Demand, in turn, will shift from nontradeables to importables. As a result, prices of nontradeables will decrease; this process tends to continue - if imoprtables and nontradeables are perfect substitutes - "until the initial relative price is restored" (Greenaway/Milner 1987, p. 206). The tariff reduction, hence, lowers in this instance the price of both importables and nontradeables. As, by assumption, there has been no change in the price of exportables, these goods "earn" the total benefit of liberalization as their relative profitability increases relative to both importables and nontradeables.

Again, the comparatively "normal" situation of a weak/semi-strong substitutability between M and N is characterized by the NN schedule in Figure 5. In both cases (Figure 4, Figure 5), the prices of nontradeables will have to decline reducing "true exposure" at the margin (Figure 4) to zero.

With regard to those cases (1,3,6) which we found relevant for LDC's/Newly Industrializing Countries, the following conclusion can be drawn:
The stronger the substitutability between nontradeables and importables in production and demand, the greater the likelihood for decreasing prices of nontradeables in the course of a trade liberalization. This implies, mutatis mutandis, that the probability for a nontradeables' price increase rises with the degree of complementarity (in production and demand) between importables and nontradeables.

III.2 Exchange Rate Effects of a Trade Liberalization

After having analyzed relative and absolute price effects following a trade liberalization, it is reasonable to proceed to the implications for the country's key exchange rates. There is no disagreement concerning the statement that import liberalization is supported by a depreciation of the purchasing power parity (PPP) real effective exchange rate, "which is desirable to maintain export competitiveness " (Lal 1985, p. 649). Also, a depreciation of the real exchange rate, which favours the production of tradeables, is called for.

In order to evaluate the impact of a tariff reduction or abolition on the two key exchange rates - (i) the real exchange rate (e) as the internal price of tradeables and nontradeables and (ii) the purchasing power parity real effective exchange rate (ep) which measures the degree of external competitiveness of a country - we will integrate the "true exposure equation" (15) into an own small exchange rate model:

(17) $ep = E \cdot P_F/P_D$ PPP - REER

with

P_F = Foreign Price Level
P_D = Domestic Price Level

(18) $e = P_T/P_N$ Real Exchange Rate

with

P_N = Price of Nontradeables in Domestic Currency

P_T = Price of Tradeables in Domestic Currency

(15a) $P_N = P_M^{\omega} \; P_X^{(1-\omega)}$ True Exposure Equation

(19) $P_T = P_M^{\alpha} \; P_X^{(1-\alpha)}$ Tradeables' Price Equation

(20) $P_D = P_T^{\beta} \; P_N^{(1-\beta)}$ Domestic Price Equation

(1) $P_M = E \cdot P_M^* \; (1 + t)$

(2) $P_X = E \cdot P_X^* \; (1 + s)$

Endogenous: e, ep, P_M, P_N, P_T, P_D, P_X

Exogenous: P_X^*, P_M^*, P_F, E, t, s

Solving for the real exchange rate (e) in terms of percentage changes gives:

(18a) $\hat{e} = [\hat{P}_M^* + \widehat{(1+t)} + \hat{E}](\alpha - \omega) + [\hat{P}_X^* + \widehat{(1+s)} + \hat{E}] \; (\omega - \alpha)$

From this expression it can be seen that the effect of a change in t or an abolition of t on the real exchange rate depends on the share of importables in the price index for tradeables, α, and the shift paramter, ω.

Import tariff reductions will result in a depreciation of the real exchange rate c.p. ($\hat{E} = \hat{P}_M^* = 0$) if and only if

(21) $\omega > \alpha$

Under the same condition reductions in export subsidy rates will lead to real exchange rate appreciations. The analogous expression for the PPP - REER, ep, is:

(17a) $\hat{ep} = \hat{E} - [\hat{P}_M^* + \widehat{(1+t)} + \hat{E}][\beta\alpha + (1 - \beta) \; \omega]$

$- [\hat{P}_X^* + \widehat{(1+s)} + \hat{E}][\beta(1 - \alpha) + (1 - \beta)(1 - \omega)]$

As it always holds that

(22) $\beta\alpha + (1 - \beta)\,\omega > 0$

an "improvement" (depreciation) of ep in the course of a tariff reduction is guaranteed. This result, however, is not surprising, as it has been yet often shown in other contributions.

Thus, a simultaneous achievement of depreciations of the two key exchange rates is feasible. This result is quite different from Deepak Lal's (1985, pp. 699) according to which "a rise in tariffs will lower the real exchange rate... but will lead to a rise in PPP real effective exchange rate". Moreover, ..."a successful liberalization of the trade account will require a real devaluation of the domestic currency" (Edwards 1984, p. 8). The condition to meet this requirement is shown by (21).

III.3 Income Effects of a Trade Liberalization

As with the imposition of tariffs, the occurrence of income effects in the course of a trade liberalization is a function of government's behaviour: without compensation (recollection of former tariff proceeds by other means) "purchasing power at a given level of spending" (Dornbusch 1980, p. 65) is c.p. increased. This important condition which was discussed by Dornbusch already in his 1974 contribution (pp. 178-181) has not been explicitly recognized by recent papers dealing with "true protection"[1].

---

[1] Greenaway/Milner (1987), pp. 200-219) for example, do not even mention the government's role and just "assume" real income to be constant.

Along the NN schedule real income is constant if and only if foregone tariff proceeds are simultaneously recollected when varying the tariff rate (downwards). Then, only substitutionary effects are reflected by the NN curve (Dornbusch 1974, p. 179) and the demand elasticities introduced in (11) represent "pure substitution elasticities" (Dornbusch 1980, p. 64).

Furthermore, holding real expenditure constant enables us to "decompose the price elasticity of our demand for domestic goods in an income effect and (the already mentioned) pure substitution effect" (v. Wijnbergen 1984, p. 471).

This takes into account that tariff reductions which affect the relative prices in an open economy "exert both income and substitution effects" (Dornbusch 1980, p. 4). Any demand elasticity "can therefore be split up into these two effects" (ibid, p. 64). Thus, the compensated or "pure" price elasticity η_m defined above is attained, when the income effect, m, is subtracted from the "broad" demand elasticity, $\bar{\eta}_m$:

$$(23) \quad \eta_m = \bar{\eta}_m - m \qquad (23a) \quad \bar{\eta}_m = m + \eta_m$$

It is obvious from (6) that the shift parameter, _, will c.p. be the lower, the higher the income effect, m, is:

$$(24) \quad \frac{d\omega}{d\gamma_m} = \frac{\gamma_m + \gamma_x - \gamma_m}{(\gamma_m + \gamma_x)^2}$$

$$(24a) \quad \frac{d\omega}{d\gamma_m} = \frac{\gamma_x}{(\gamma_m + \gamma_x)^2} > 0$$

Also, it holds that

$$(25) \quad \frac{d\gamma_m}{dm} = \frac{d\gamma_m}{d\eta_m} \frac{d\eta_m}{dm} = -1$$

Therefore,

$$(24) \quad \frac{d\omega}{d\gamma_m} \quad \frac{d\gamma_m}{dm} = \frac{d\omega}{dm} < 0$$

Hence, from (18a) it can be concluded that the likelihood for a real exchange rate appreciation c.p. increases directly with the strength of the income effect.

III.4 Means of Adjustment After a Trade Liberalization

Within the "true exposure" setting, the "first round impact" of a trade liberalization (A→ C, Figure 1) through tariff reduction/ abolition has to be a trade balance deficit in conjunction with an excess supply of nontraded goods in the domestic market. "The requisite adjustment (C → B, Figure 1) is one of relative prices" (Dornbusch 1974, p. 181). There is no debate about this. No unanimity, however, exists when the contribution of the nominal exchange rate to the adjustment process is questioned:

(i) Following Dornbusch, from a theoretical point of view, it is totally "immaterial" (ibid) whether the adjustment is attained through declining absolute prices of nontradeables at a fixed exchange rate, or by a depreciation of the nominal exchange rate with given nominal prices of home goods (ibid, p. 180).

(ii) On the other hand, Mussa (1987, p. 66) argues that in praxi "the best exchange rate policy to accompany a major trade liberalization is likely to be a modest nominal devaluation..."

His reasoning is based on two different time perspectives:

(a) As a secular matter, "a minimum appropriate devaluation is one that would avoid a decline in the long-run equilibrium level of domestic prices" (ibid, p. 66).

(b) In the short-run, there is need for "an adjustment to avoid the deflationary consequences of trade liberalization" (ibid).

(iii) Finally, Corden (1986, p. 16) has pointed out that the desired real depreciation accompanying a trade liberalization - even if condition (21) would principally hold - "will not be some automatic. Other things equal, there has to be some nominal depreciation ... in the absence of downward flexibility of nominal wages and non-tradeable prices ..." (ibid).

These three positions - to be discussed in the following - do basically represent the possible alternatives for exchange rate regimes being implemented during a trade liberalization. Whereas Dornbusch (a) implicitly favours a fully flexible nominal exchange rate, Mussa (b) finds some advantage in managing it. Corden (c), finally, questions the costs implied when the adjustment process runs with a fixed exchange rate.

Transfered into the "sequencing debate", the alternatives mentioned correspond to a fully liberalized (a), more or less controlled (b) and a severely controlled (c) capital account.

(i) If adjustment is left only to the exchange rate - in a flexible exchange rate environment this would come about by a market determined depreciation of the domestic currency - "the final goods terms of trade" (v. Wijnbergen 1984, p. 461) or PPP-REER (equation 17) increases comparatively more. This is due to the fact that nominal prices of non-traded goods enter into ep only according to their share $(1-\beta)$ in domestic prices, whereas the nominal exchange rate

is not under such a constraint[1]. From this point of view, Dornbusch's assertion applies only to the real exchange rate, e. But there is another aspect in Dornbusch's statement. According to Lal (1987) the opening of the capital account implicates "the removal of exchange control and the institution of free float..." (1987, p. 290)[2]. The floating will be free instead of dirty whenever the Central Bank abstains from interventions. Thus, in a "capital account first" environment external competitiveness will c.p. be

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[1] (26) $\hat{ep} = (1 - \beta)\hat{e}$ (Warr 1986, p. 303). We assume that the demand for non-traded goods is a function of the real exchange rate, not of the PPP-REER (Dornbusch 1980, p. 58):

(7) $D_N = \left(\frac{P_M}{P_N}\right), \left(\frac{P_X}{P_N}\right)$ as we know from above, with

(1a) $\frac{P_M}{P_N} = \left(\frac{E}{P_N}\right) P^*_M(1 + t)$

and

(2a) $\frac{P_X}{P_N} = \left(\frac{E}{P_N}\right) P^*_X (1 + s)$

Assuming $P^*_M = P^*_X = 1$ (García García 1981, p. 19), $t = s = 0$ (after a trade liberalization) the movement from C to B (see Figure 1) can be achieved either through a depreciation of the nominal exchange rate, $E > 0$ or by a decline in the prices of non-traded goods, $\hat{P}_N < 0$:

(1b) $\left(\frac{\hat{P}_M}{P_N}\right) = \hat{E} - \hat{P}_N$

(2b) $\left(\frac{\hat{P}_X}{P_N}\right) = \hat{E} - \hat{P}_N$

This implies (García García 1981, p. 19) also, that the demand for imports and the supply of exports are functions of the real exchange rate, not of the final goods terms of trade.

[2] "Lal has proposed that a floating-exchange-rate system with full currency convertibility be implemented before the trade reform takes place. This means, of course, that the capital account should be liberalized before the trade account (Edwards 1984, p. 8).

improved by a trade liberalization more than in a situation where the opening of the capital account comes afterwards. Although, one should remember that ep reflects the purchasing power parity theorem and "movements in it can consequently be thought of as capturing deviations from purchasing power parity" (Warr 1986, p. 303). If the theorem is valid such deviations can only persist in the short-run. Secondly, ep can be misleading as an index of competitiveness as - following a devaluation for example - "the index will misinterpret the actual increase in tradeables' prices as an increase in costs, through its effect on the price level. This will appear as an erosion of the ... gain in competitiveness achieved" (ibid, p. 304) "directly" by the increase of E and the numerator of ep.

(ii) a) The "long-run equilibrium level of domestic prices" in a small country under a fixed exchange rate regime is nothing but the foreign price level[1]. After a removal of trade distortions (tariffs, subsidies) prices which are flexible downwards will c.p. tend to adjust to the foreign prices. A total "assimilation" may be detained by sticky domestic prices causing an appreciation of the final goods terms of trade/a loss in competitiveness. However, as Lal (1987, p. 290) puts it, "the government will have to judge the precise extent of the nominal exchange rate change required to yield the appropriate real exchange rate". Misjudgements will lead to disequilibria in the balance of payments "which the government may be tempted to reduce through import controls - thus aborting the trade liberalization" (ibid). There is, again, an argument in favour of a flexible exchange rate environment when a trade liberalization is to be implemented.

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[1] "... (as long as there are no demand pressures) the domestic rate of inflation will slowly converge through time to the international rate of inflation" (Edwards/Edwards 1987, p. 43).

b) M. Khan and R. Zahler (1987, pp. 51, 52) have shown that there is an endogenous effect which lowers the "threat" of deflation as a consequence of a trade liberalization even "assuming that inflation is zero initially" (ibid, p. 52). In the "worst case" (Figure 4) importables and nontradeables are perfect substitutes and contribute both by the same percentage[1] to a "reduction in the general price level, which in turn creates an excess supply of money and a fall in the domestic interest rate. This stimulates expenditures, that... in the short-run, dampen the fall in the relative price of nontradeable goods" (ibid). This "expenditure increasing effect" (ibid, p. 51) is captured within the "pure exposure concept" by the income effects we found inherent in demand elasticities (23).

(iii) Corden's argument essentially refers to the adjustment path after a trade liberalization when the product wage (W/P_N) in the nontradeables-sector is sticky downwards. Referring to Figure 1, the movement from A to C was identified with "an excess demand for tradeable goods and excess supply of nontradeable goods, requiring a fall in (the price of nontradeables)... along OT' so as to restore general equilibrium at point (B)" (Khan/Zahler 1987, p. 51). Thus, at a <u>fixed exchange rate</u> and a supply surplus/constant product wage in the nontradeables-sector, unemployment has to occur. New employment possibilities can c.p. only arise at lower product wages in the tradeables sector. Given the sticky nominal wage rate this result has to be brought about by higher nominal prices of tradeables in domestic currency. Hence, the real exchange rate depreciation associated with the move from C to B (Khan/Zahler 1987, p. 51) may be achieved by a <u>depreciation</u> of the nominal exchange rate which, in turn, is "necessary to close the foreign exchange gap created by the trade deficit" (ibid).

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[1] Which is not necessarily the amount, as the share in the domestic price level has to be considered.

This present paper has shaded some light on TA(CA), that is to say on the liberalization of the trade account at an already liberalized capital account, respectively at a still regulated capital account, TA($\overline{CA}$).

Mutatis mutandis, the liberalization of the capital account with a given trade account - either liberalized, CA(TA), or still regulated, CA($\overline{TA}$) - has still to be evaluated.

As a "rule", the capital-account-first sequencing will be prefered whenever the benefits of

{TA(CA) - TA($\overline{CA}$)} exceed those of
{CA(TA) - CA($\overline{TA}$)}.

V. Summary

The concept of "True Exposure" which is a reversal of "True Protection" (Sjaastad, Greenaway/Milner) is located in the tradition of relative-prices-analysis. Depending on the substitutionary relationships between importables, exportables and nontradeables in production and demand, the burden of being unprotected may be shifted from importables to nontradeables after a trade liberalization. Relative price changes will also affect exportables, thus, "true export subsidies" or "true export taxes" can be detected.

The present paper has put forward a graphical and analytical version of "true exposure", both of them in a general equilibrium setting which traces back to Dornbusch (1974) and Greenaway/Milner (1987).

Furthermore, extending as well as deepening the existing literature, price, exchange rate and income effects of a trade liberalization were analyzed revealing the conditions under which

(i) prices of nontradeables will decrease, stay constant or even rise;

(ii) the real exchange rate may appreciate or depreciate in a fixed exchange rate regime;

(iii) income effects contribute to the likelihood for a real exchange rate appreciation.

Also, "true exposure" is able to capture the real income effects due to overall price reductions - when tariffs are removed - which, in turn, contribute to dampen any deflationary pressures.

Finally, the adjustment process itself - in the course of a trade liberalization - has been reviewed. The main conclusion derived is that flexible exchange rates cope better - in comparison with a fixed exchange rate regime - with the aim of

(i) improving external competitiveness in the short-run;

(ii) reaching the long run equilibrium level of domestic prices;

(iii) avoiding unemployment in an environment of sticky prices and nominal wages.

Hence, this paper argues for a flexible exchange rate/an already liberalized capital account accompanying a trade liberalization.

Application of a similar conceptual procedure to the liberalization of the capital account should give some new insights into the sequencing ("capital account-trade account first") puzzle in developing countries.

APPENDIX

(8a) $$S_N = a_0 - a_1 \frac{P_M}{P_N} - a_2 \frac{P_X}{P_N}$$

(7a) $$D_N = b_0 + b_1 \frac{P_M}{P_N} + b_2 \frac{P_X}{P_N}$$

$$\frac{P_M}{P_N}(b_1 + a_1) = a_0 - a_2 \frac{P_X}{P_N} - b_0 - b_2 \frac{P_X}{P_N}$$

(7b) $$\frac{P_M}{P_N} = \frac{a_0 - b_0}{(b_1 + a_1)} - \frac{(a_2 + b_2)}{(b_1 + a_1)} \frac{P_X}{P_N}$$

Market equilibrium in the market for non-traded goods

$$\frac{P_X}{P_N}(b_2 + a_2) = a_0 - b_0 - (a_1 + b_1) \frac{P_M}{P_N}$$

(8b) $$\frac{P_X}{P_N} = \frac{a_0 - b_0}{(b_2 + a_2)} - \frac{(a_1 + b_1)}{(b_2 + a_2)} \frac{P_M}{P_N}$$

(3a) $$\frac{P_M}{P_N} = c_i \frac{P_X}{P_N} \qquad c_i = \frac{P_M}{P_N} : \frac{P_X}{P_N} = \frac{P_M}{P_X}$$

(3a)=(7b) $$\overbrace{\frac{a_0 - b_0}{(b_1 + a_1)} - \frac{(a_2 + b_2)}{(b_1 + a_1)} \frac{P_X}{P_N}}^{7b} = \overbrace{c_i \frac{P_X}{P_N}}^{3a}$$

Total equilibrium

$$\frac{a_0 - b_0}{(b_1 + a_1)} = \frac{P_X}{P_N} \left[c_i + \frac{(a_2 + b_2)}{(b_1 + a_1)} \right]$$

(3b) $$\frac{P_X}{P_N} = \frac{\left(\frac{a_0 - b_0}{b_1 + a_1}\right)}{c_i + \left(\frac{a_2 - b_2}{b_1 + a_1}\right)}$$

$c_0 = 1 + t$

$c_1 = 1$

$$\frac{1}{c_i} \quad \frac{P_M}{P_N} = \frac{a_0 - b_0}{(b_2 + c_2)} - \frac{(a_1 + b_1)}{(b_2 + a_2)} \frac{P_M}{P_N} \quad (8b) = (3a)$$

$$\frac{P_M}{P_N} \left[\frac{1}{c_i} + \frac{(a_1 + b_2)}{(b_2 + a_2)} \right] = \frac{a_0 - b_0}{(b_2 + c_2)}$$

$$(3c) \quad \frac{P_M}{P_N} = \frac{\left(\frac{a_0 - b_0}{b_2 + c_2} \right)}{\frac{1}{c_i} + \left(\frac{a_1 + b_1}{b_2 + c_2} \right)} \qquad \begin{aligned} c_0 &= 1 + t \\ c_1 &= 1 \end{aligned}$$

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