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UNDERSTANDING POLICY RESPONSES TO EXTERNAL SHOCKS IN DEVELOPING COUNTRIES

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Abstract

This paper shows that trade patterns can be crucial in explaining different policy responses to external shocks, such as the contraction of foreign capital inflows faced by developing countries since 1982. Based on the hypothesis that the same simple political economy explains commercial policy in any developing country, I show that a particular country's policy response to a contraction of foreign capital inflows can be explained as rational choice under the assumed general policy constraint, given the country's comparative advantages in international trade. The main implication is that, contrary to common practice in the development literature, more attention should be paid to structural differences, and less to political idiosyncracies, in order to understand policy behavior in developing countries.

UNDERSTANDING POLICY RESPONSES TO EXTERNAL SHOCKS IN DEVELOPING COUNTRIES

By Aquiles A. Almansi[1]

1. Introduction

The purpose of this paper is to show that trade patterns can be crucial in explaining different policy responses to external shocks, such as the contraction of net foreign capital inflows faced by developing countries since 1982.

Recent studies by Balassa(1984,1986) and Sachs(1985) have provided renewed support to the belief, very popular in the development literature, that the economic growth of a developing country facing an external shock is explained mainly by the country's policy response to it, and not by the shock's direct effects on the country's economy. In particular, different commercial policies are credited with success or failure in preserving economic growth after the onset of the "debt crisis" in 1982.[2] Both Balassa and Sachs point to the fact that developing countries following export-promotion policies, like those in East Asia, have outperformed those following import-substitution policies, like the Latin American countries.

As discussed by Lucas(1986), the empirical connection between trade policies and economic growth pose a still unanswered question to the neoclassical theory, where trade policies are known to affect a country's income level, not

its rate of income growth. Those who think that compelling empirical evidence is an acceptable substitute for a theoretical answer, have to face still another unanswered question: why some countries do not take advantage of this empirical evidence when choosing their policies? In the particular case of the "debt crisis", why did the Latin American countries choose seemingly self-defeating policies?

In seeking an answer to the latter question, Sachs(1985) emphasizes the need "to understand the political economy of export promotion in order to understand the continuing paralysis of the Latin American economies." It is probably the case that many, perhaps most, analysts would prefer to look for policy errors, or even different sorts of cultural handicaps to explain the economic performance of different countries.

The purpose of this paper, accordingly, is to offer an answer to the policy choice question, based on the hypothesis that the same simple political economy explains commercial policy in any type of country. In particular, I assume that resource allocation decisions are taken under the constraint that the import-competing sector must be protected. Furthermore, for reasons that will become apparent later on, I assume that protection takes the form of nontariff barriers (NTBs).[3] This assumption about the nature of protection, which accurately describes actual commercial policies in developing countries, provides a common political economy of trade distortions, avoiding the introduction of ad hoc, idiosyncratic policy processes, and allows for predictions based on observable characteristics of each country's economic structure. Under this hypothesis, I show that a country's particular policy response to a shock in its foreign financing constraint can be explained

as an implication of rational choice under the described policy constraint, given the country's comparative advantages in international trade.

The paper is organized as follows. For illustrative purposes, I describe in section 2 the different patterns of adjustment to the "debt crisis", which have motivated the current debate about policy choices. In section 3 I present the basic model, and discuss optimal adjustment under free trade. In section 4 I analyze the properties of a protection-constrained adjustment. Finally, I close the paper with some concluding remarks in section 5.

2. Patterns of Adjustment

The "debt crisis" of 1982 forced indebted developing countries to improve their current account balances. As Table 1 shows for selected cases, the East Asian countries chose to adjust by expanding both exports and imports, that is, by increasing their participation in international trade. On the other hand, Latin American countries chose to adjust by sharp contraction of their imports, with little or no increase in exports, that is, by reducing their participation in international trade.[4]

TABLE 1

Since most imports of both the Asian and Latin American countries are intermediate goods, imports show a high positive correlation with economic activity. Hence, a

contraction of imports is associated with a contraction in economic activity, as it has been the case in Latin America.

Is there any meaningful sense in which the different patterns of adjustment described in Table 1 can be characterized respectively as the right and the wrong policy responses to the same external shock? Table 2 below give us reasons to believe that the differences in economic performance between Latin American an East Asian countries may be entirely unrelated to their respective policy response to the "debt crisis".

TABLE 2

Given that Latin American countries export mainly primary products, and that the East Asian countries export manufactures, their differences seem to be related to much more general patterns of economic performance, where the relevant characteristic of a country is its comparative advantage in international trade. In the remaining of this paper I show that the different patterns of adjustment presented in Table 1 can be explained as an implication of rational choice under identical policy constraints, given the country's comparative advantage.

3. The Model

Consider an economy inhabited by N identical individuals, who produce and consume cereals, X^1, and manufactures, X^2. Time is divided into discrete periods of equal length. An individual's preferences over different consumption bundles in a particular period of time are represented by the utility function $u(c_1,c_2)$. The function u is continuous, strictly increasing, strictly quasi-concave, and twice differentiable.

Two different types of inputs are used in the production process: domestic inputs, z, and imported inputs, m. The economy has an endowment ζ of domestic inputs. Cereals are produced with the technology represented by the production function $X^1(z_1)$, which requires domestic inputs only. Manufactures are produced with the technology represented by the production function $X^2(z_2,m)$, which requires both domestic and foreign inputs. The production functions X^1 and X^2 are both continuous, strictly increasing, strictly concave, and twice differentiable.

There are international markets for cereals, manufactures, and the foreign inputs required by the manufacturing technology. The economy is small in international markets, in the sense that it faces given prices, p_1, p_2, and p_m, for the three types of commodities.

The economy does not have free access to the international capital market; it is supposed to sustain an exogenously determined current account surplus, b, in each period of time.

There are two alternative analytical strategies to

characterize Pareto-optimal resource allocations in this economy. We can either look at the Social Planner problem of maximizing the representative individual's utility subject to the available technology, endowment of domestic inputs, and trade opportunities in international markets, or we can look at the competitive equilibrium of the economy.[5] In this paper I will follow the latter strategy. For comparative purposes, and to present some additional concepts that will be used in the subsequent analysis of protection-constrained competitive equilibria, I conclude this section by describing a free trade competitive equilibrium and discussing how it adjusts to the need of generating a larger current account surplus.

Define an individual's expenditure function as $e(p_1,p_2,u)=\min p_1c_1+p_2c_2$, with respect to c_1 and c_2, subject to $u(c_1,c_2)\geq u$. Given that all individuals are assumed to be identical, we can write aggregate expenditure in this economy as $E(p_1,p_2,u)=Ne(p_1,p_2,u)$.

Let w be the wage rate for domestic inputs. Define a competitive firm's profit function as $\pi(p_1,p_2,p_m,w) = \max p_1X^1(z_1)+p_2X^2(z_2,m)-w[z_1+z_2]-p_mm$, with respect to z_1, z_2, and m. By well known properties of the profit function, the firm's demand for labor, z_1+z_2, equals $-\pi_4$, i.e., minus the partial derivative of the profit function with respect to the wage rate.[6] In order to simplify notation, assume there is only one firm in this economy, and that it behaves competitively in the domestic input market.[7] The equilibrium wage rate is determined by the equilibrium condition $z_1+z_2=\zeta$, or $-\pi_4(p_1,p_2,p_m,w)=\zeta$, where ζ was defined to be the economy's endowment of domestic resources. Given the firm's profit function, and the equilibrium condition in the domestic input market, we define the Gross Domestic Product

function, $G(p_1,p_2,p_m,\zeta)$, as $G=\pi(p_1,p_2,p_m,w)-w\pi_4(p_1,p_2,p_m,\zeta)$, where $-\pi_4(.,w)=\zeta$.

Given the constraint imposed by the international capital market, this economy attains general equilibrium when $E(p_1,p_2,u)+b=G(p_1,p_2,p_m,\zeta)$, i.e., when the aggregate budget constraint is satisfied. By the Pareto-optimality of a competitive equilibrium, the level of individual welfare, u, that satisfies this constraint is the maximum achievable given the representative individual's preferences, the available endowment of domestic inputs and technology, and the exogenously imposed current account surplus, b.

Consider now the problem of adjusting this economy to a new, higher current account surplus $b'>b$.

At the new equilibrium it must also be true that $E(p_1,p_2,u')+b'=G(p_1,p_2,p_m,\zeta)$, where $u'<u$. This makes evident that the adjustment will take place by reducing consumption of both final goods, X^1 and X^2, given the negative pure income effect suffered by each individual, $(b-b')/N$. There will be no reallocation of resources because, given international prices, equilibrium domestic wages will remain unchanged, as the equilibrium condition still is $-\pi_4(p_1,p_2,p_m,w)=\zeta$. Furthermore, this is true even if the domestic price structure is distorted by any given set of taxes or subsidies, or, more generally, any sort of price distortion, including those imposed on international trade transactions, like tariffs, export subsidies, etc.

Note that the model's prediction about the nature of the adjustment is entirely independent of this economy's patterns of trade with the rest of the world. No matter what its comparative advantage is, i.e., no matter if this economy finds it optimal to export cereals or manufactures, the optimal adjustment to a higher current account surplus

takes place by simply reducing consumption. It cannot possibly be optimal to reallocate resources between the two production activities. In the next section I consider the case of nontariff protection, where it does become optimal to reallocate resources, and the optimal reallocation depends on the economy's patterns of trade.

4. Protection-Constrained Equilibria

Consider now the case where the economy's import competing sector is granted protection by means of nontariff barriers. For simplicity, assume that imports of the relevant final good are prohibited. If an import quota were used, the analytical results would remain unchanged as long as the quota is binding for the entire range of current account surpluses we consider.

If imports of a final good are prohibited, the domestic price of such a good becomes endogenous, i.e., determined by the general equilibrium of the economy. Hereafter, an endogenous price will be denoted by q_h, h=1,2.

The general equilibrium of an economy with comparative advantage in the production of cereals, X^1, can be described by the following two equilibrium conditions: i)the aggregate budget constraint is satisfied, and ii)the domestic market for manufactures is in equilibrium. Formally:

(1) $$E(p_1, q_2, u)+b=G(p_1, q_2, p_m, \zeta)$$

(2) $$E_2(p_1, q_2, u)=G_2(p_1, q_2, p_m, \zeta)$$

where $E_2(.)$, the partial derivative of the aggregate expenditure function with respect to q_2, is the equilibrium demand for manufactures, and $G_2(.)$, the partial derivative of the GDP function with respect to q_2, is the equilibrium supply of manufactures.

Similarly, the general equilibrium of an economy exporting manufactures and protecting the domestic production of cereals, can be described by the following conditions:

(3) $$E(q_1, p_2, u)+b=G(q_1, p_2, p_m, \zeta)$$

(4) $$E_1(q_1, p_2, u)=G_1(q_1, p_2, p_m, \zeta)$$

where $E_1(.)$, the partial derivative of the aggregate expenditure function with respect to q_1, is the equilibrium demand for cereals, and $G_1(.)$, the partial derivative of the GDP function with respect to q_1, is the equilibrium supply of cereals.

From (1) and (2), and (3) and (4), it is apparent that adjustment to a higher current account surplus, b, requires a reduction in consumption and a reallocation of resources, both in economies exporting manufactures and in economies exporting cereals. The resource reallocation is required because the negative income effect will reduce the domestic price of the protected good.[8] In what follows, I discuss the resource reallocation required by each trade pattern.

Manufactures Exporters

To analyze resource allocation issues, we have to study the equilibrium in the two input markets.

When the market for domestic resources attains an equilibrium, the value of the marginal products of the domestic resources must equal their wage rate in each sector. Formally:

(5) $$q_1 X_z^1(z_1)=p_2 X_z^2(z_2, m)=w$$

Given q_1, and the full employment condition $z_1+z_2=\zeta$, the first equation in (5) describes the different allocations of domestic resources and volume of imports that

equilibrate the market for domestic resources. Assume that the pairs (z_2,m) that satisfy this equilibrium condition are those represented by the ZZ curve in Figure 1.[9]

In equilibrium, it must also be true that the value of the marginal product of the imported inputs equals its international price p_m. Formally:

(6) $$p_2 X^2_m(z_2,m)=p_m$$

Assume that the pairs (z_2,m) that satisfy condition (6) are those represented by the MM curve in Figure 1.[10]

FIGURE 1

The two input markets attain an equilibrium at point A in Figure 1, where the ZZ and MM curves intersect. At the equilibrium point the ZZ curve must be steeper than the MM curve. This follows from the concavity of the production functions $X^1(.)$ and $X^2(.,.)$.[11]

Consider now the resource reallocation induced by the adjustment to a larger current account surplus, $b'>b$. As we saw before, this reduces the domestic price of the protected good, q_1. At the initial resource allocation, a lower q_1 implies a lower value for the marginal product of the domestic resources allocated to the protected sector. From (5), this requires a shift to the right of the ZZ curve, to a location like that represented by Z'Z' in Figure 1. From (6), the MM curve is not affected by the change in q_1. Hence, the new equilibrium will be at the intersection of Z'Z' and MM, point A', which implies a higher level of imports and a reallocation of domestic resources towards the production of manufactures, i.e., the exporting sector. Adjustment clearly produces an increase in the participation in international trade of manufactures-exporting economies.

Cereals Exporters

As in the previous case, in equilibrium the following two conditions must hold:

(7) $$p_1 X_z^1(z_1) = q_2 X_z^2(z_2, m) = w$$

(8) $$q_2 X_z^2(z_2, m) = p_m$$

Given q_2 and the full employment condition $z_1 + z_2 = \zeta$, condition (7) is represented by ZZ in Figure 2. Similarly, given q_2, condition (8) is represented by MM. The initial equilibrium is represented by the intersection of ZZ and MM at point A.[12]

FIGURE 2

As before, adjustment to a higher current account balance, $b' > b$, requires a reduction in the price of the protected good in this economy, i.e., manufactures. From (7), a lower q_2 requires a shift to the left of the ZZ curve, which is represented by Z'Z' in Figure 2. In this case, as is clear from (8), a lower q_2 also requires a shift of the MM curve. Since the lower price reduces the value of the marginal product of the imported inputs at the initial resource allocation, the MM curve must shift to the right. This is represented by M'M'. The new equilibrium is given by the intersection of the Z'Z' and M'M' curves, at point A'. This requires both a fall in the employment of domestic resources in the protected sector, X_2, and in imports. Hence, cereals exporters adjust by reallocating domestic resources to the exporting sector and by reducing imports of the foreign inputs used in the production of manufactures.

This latter aspect of the adjustment imples that cereals exporters have weaker incentives than manufactures exporters to open their economies, if by opening the economy we mean to increase their participation in international trade.

5. Concluding Remarks

In this paper I have shown that noteworthy differences in adjustment patterns to the same external shock among different economies can be explained by optimal decision making under identical policy constraints.

The particular case discussed here, that of current account adjustment to lower capital inflows (higher capital outflows), offers an explanation based on clearly observable structural differences, and policy similarities, between Latin American and East Asian countries. Argentina protects her electronics industry and South Korea protects her agricultural sector, i.e., both of them protect their import competing sectors, and the preferred protective instruments are NTBs. The model predicts that a country like Argentina should contract her imports and that one like South Korea should expand hers. And that is precisely what they have done.

The tendency of exporters of manufactures to adjust by expanding trade (i.e., by "export-promotion"), cannot be considered, on a priori grounds, sounder than the tendency of exporters of primary products to restrict imports. An implication of the model presented here is that both are manifestations of suboptimal, or constrained-optimal, behavior. If they were optimizing to begin with, then they would not want to reallocate resources to adjust to a pure income shock.[13]

The main implication of this paper is that we should pay more attention to structural differences, and less to political idiosyncracies, in order to understand policy behavior in developing countries.

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Footnotes

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2 See for example the discussion in Economic Report of the President, 1986, Chapter 2.

3 This is of course a restrictive assumption. For the purposes of this paper, however, what is methodologically important is that we assume the same policy preferences for every country. The reader unhappy with seemingly arbitrary assumptions could find consolation in the fact that NTBs are indeed widespread, especially in developing countries. For an analysis of why governments prefer nontariff barriers see Deardorff(1986).

4 For a detailed description of the Latin American adjustment since 1982 see L. Sjaastad, A. Almansi, and C. Hurtado(1986).

5 Note that we have insured the existence of a competitive equilibrium by assuming the convexity of the individual's preferences, the production technology, and the set of international trade opportunities.

6 See for example Dixit(1980), or Varian(1978).

7 Since the economy is a price taker in international markets, the only market where a single firm could exercise monopoly power would be the domestic one.

8 From (1) and (2), or (3) and (4), we get $du/db = -1/E_u < 0$. From (2) or (4) we get $dq_h/du = E_{hu}/(G_{hh} - E_{hh})$, h=1,2. Hence, if h is a normal good, $dq_h/db = -(E_{hu}/E_u)/(G_{hh} - E_{hh}) < 0$.

9 The ZZ curve has a positive slope given the concavity of the production functions and the complementarity of Z and M in the production of X^2. Formally:

$$dm/dz_2|_{ZZ} = -(q_1 X^1_{zz} + p_2 X^2_{zz})/p_2 X^2_{zm} > 0$$

10 The MM curve has positive slope given the concavity of $X^2(.,.)$, and the complementarity of Z and M. Formally:

$$dm/dz_2|_{MM} = -X^2_{mz}/X^2_{mm} > 0$$

11 From its definition, the GDP function can be written as $G = \max \phi(z_2, m)$, with respect to z_2 and m, where the function $\phi(z_2, m) = q_1 X^1(\zeta - z_2) + p_2 X^2(z_2, m) - p_m m$. But $\phi(z_2, m)$ is the sum of three concave functions, so it must be concave. Hence, it must be true that $\phi_{zz}\phi_{mm} - (\phi_{zm})^2 > 0$, which is precisely the condition that the ZZ curve be steeper than the MM curve.

12 The ZZ and MM curves are positively sloped, and ZZ is steeper than MM at A, for exactly the same reasons explained above.

13 If there were some true nontraded goods in the model, then some reallocation would take place, even without protection.

TABLE 1
EXPORTS AND IMPORTS IN SELECTED DEVELOPING COUNTRIES
1980-85
(Billions of US Dollars)

Country	Year	Exports	Imports
Argentina	1980	8.021	10.541
	1981	9.143	9.430
	1982	7.625	5.337
	1983	7.836	4.504
	1984	8.107	4.585
	1985	8.396	3.814
Brazil	1980	20.132	24.961
	1981	23.293	24.079
	1982	20.175	21.069
	1983	21.899	16.801
	1984	27.005	15.210
	1985	25.639	14.332
Korea	1980	17.505	22.292
	1981	21.254	26.131
	1982	21.853	24.251
	1983	24.445	26.192
	1984	29.245	30.631
	1985	30.282	31.129
Malaysia	1980	12.945	10.779
	1981	11.770	11.550
	1982	12.030	12.418
	1983	14.104	13.262
	1984	16.484	14.051
	1985	15.442	12.302

Source: IMF, International Financial Statistics, Oct. 1986.

TABLE 2
Real GDP Growth, 1968-85
(in percent)

Predominant Export	68-77	78	79	80	81	82	83	84	85
Primary products	5.4	3.5	4.6	4.2	1.1	0.3	-0.4	3.7	3.5
Manufactures	5.7	9.2	4.3	4.6	4.8	5.0	7.4	8.4	6.4

Source: IMF, Annual Report, 1986.

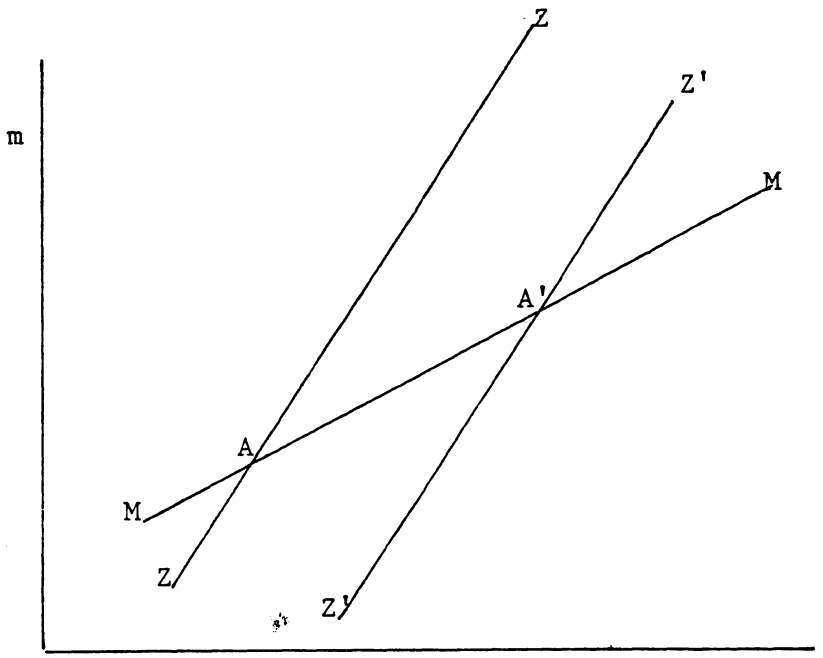

Figure 1: Manufactures Exporters

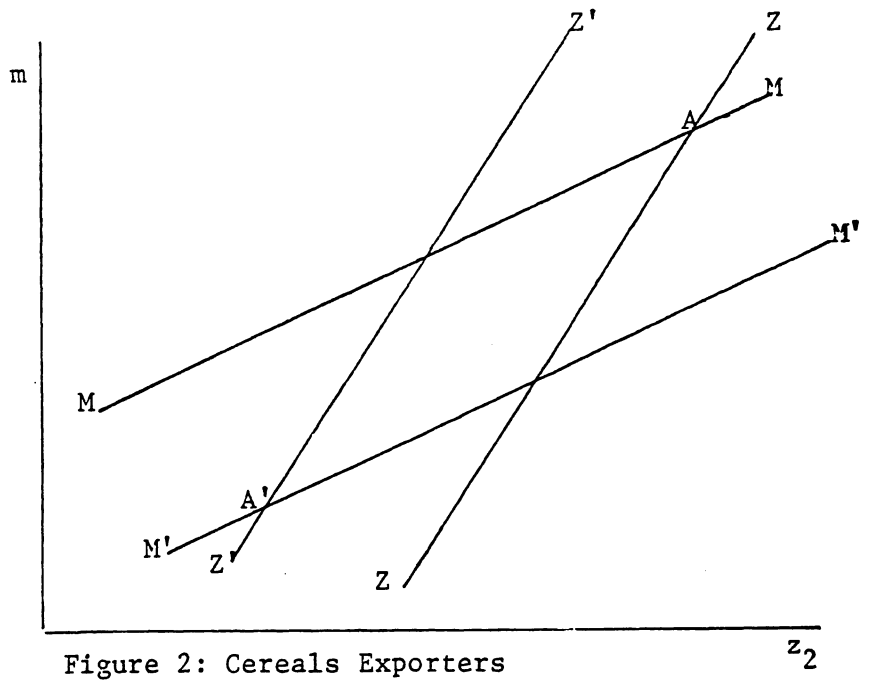

Figure 2: Cereals Exporters