

Could Trade Integration Solve Balance Sheet Problems?

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Abstract

This paper reveals that the causal link between globalization and vulnerability is not a strict rule. The instability brought about trade integration can only be understood as a temporary problem because, very probably, in mid-long term, international trade could end up solving itself the difficulties caused in the initial stages.

We have created an eclectic model that synthesizes the different versions of the third generation exchange rate crises models, in order to demonstrate how the growth of international trade associated to an increasing global integration of the goods and services markets can make financial crises much less likely.

Key Words: Financial and exchange rate crisis, speculative attacks, financial panic, trade liberalization, trade integration, trade openness.

JEL Classification: F15, F41, F43, F47

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Introduction

The increasing integration of world economy has raised and diversified export opportunities for emerging countries. Likewise, foreign direct investment, especially investment that uses these countries as export platforms is today higher than in previous decades. As a result, there is currently a wide consensus about economic growth based on exports and, in general, greater world trade integration is a hopeful formula of real development for the less advanced countries. But on fostering international trade and finance, emerging economies have increased their exposure to *self-fulfilling crisis*. Hence, this kind of crisis constitutes a threat for the efficient functioning of free market economies and the advance of globalization, since many emerging countries could become protectionists in face of the fragility that outward openness imposes.

This paper, through the construction of a theoretical model and endorsed by certain empirical evidence, emphasizes that the causal link between globalization and vulnerability is not a strict norm. From this perspective, instability caused by the processes of trade integration in emerging economies can only be considered as a transitory difficulty because, very likely, in mid-long term, international trade could solve the initial teething problems.

The work is structured in four parts. The first section analyzes causal relation between trade openness and the vulnerability to exchange and financial crises. In the third part, we have created an eclectic model to explain, in the third section, why international trade intensification can reduce probability of an exchange rate and financial crises. Finally, the last part presents the main conclusions of this paper.

1. Trade integration and the vulnerability to financial crisis

1.1. THE FIRST PRECEDENTS

The idea of international trade growth and export expansion can help to undermine financial fragility in emerging countries is not new. Its precedents go back to 1980s when, as a result of

Latin America *debt crisis*, there was full conviction that outward trade was reducing the probability of suffering an exchange rate and financial crisis.

Krugman (2000) brings up a paradigmatic example of its extreme when he comments that in 1982 before “*debt crisis burst*”, in a classification of riskier countries made by *Institutional Investor*, South Korea was ranking just behind Mexico. Few months later, Mexico was announcing its foreign debt default, triggering episode of Latin America “*debt crisis*”, whose effects were spreading until 1989. In the aftermath of these crises episodes, Mexico and the rest of Latin America countries were thrown out of international capital markets, whereas South Korea and the most of the Asian countries –except the Philippines, the seemingly more Latin country of Eastern Asia– maintained their access to these markets. In fact, according to IMF (2002) over the last 25 years of XX century, the foremost difference between Latin America and East Asian economies has been their international trade openness¹.

Therefore, a relevant aspect to avoid that crisis was not so much the foreign indebtedness level, measured in terms of foreign debt to GDP ratio, but rather the economy’s trade openness and the relative importance of exports to GDP. From this perspective, given a certain level of external indebtedness, the higher exports to GDP ratio the lower the probability of being affected by “*crisis debt*”. Consequently, during the 1980s it was widely believed as Latin America countries were advancing in trade liberalization processes and the external trade importance was increasing in their economic structure, crises like *1982 debt crisis* would become a relic of the past.

However, in 1990s this approach changed radically. The high volume of exports as a share of GDP offered scarce protection to Latin America countries –especially in 1994 Mexico’s exchange rate crisis– and to Eastern Asia emerging economies in their 1997 exchange rate and financial crises. These crises were more damaging than the *1982 debt crisis*, at least for the first year, and became a dramatic characteristic of second half of 1990’s in emerging markets.

¹ Sub-Saharan Africa and Eastern Asia were the areas that registered a higher proportion of countries which were more open to external trade, meanwhile Southern Asia and Latin America Latina presented lower percentages of trade openness. On the contrary, Latin America Latina was the area with a higher number of countries open to external finance whereas Southern Asia had the lowest

In fact, there was the feeling trade opening fed up emerging countries' vulnerability to exchange rate and financial crises, because it increased the economy's exposure to any external or internal shock². Consequently, in demanding times and crisis periods, Governments are considering seriously, the restoration of trade protectionism as an option to regain markets confidence in the economy.

1.2. ORIGIN AND CAUSES OF EXCHANGE RATE AND FINANCIAL CRISES IN EMERGING ECONOMIES DURING SECOND HALF OF 1990's

Traditionally, in a context of limited capital mobility, exchange rate crises had their origin in continuous current account deficits. But increasing financial integration caused by the processes of capital movements' liberalization and the deregulation of domestic financial systems created a new typology of crises: crises called *self-fulfilling crises* by economic literature, which are crises born in the balance of payments' financial account, and where the exchange rate crisis and financial crisis are combined, simultaneously.

In the middle of the 1990s, the economies of Latin America and of Eastern Asia which were more integrated into international capital markets were hit by a string of crisis³ of this nature. According to Hinarejos and Varela (2003), the most striking fact of these episodes of exchange rate and financial crises has been, more than their proximity and frequency in time, their magnitude and severity. Exchange rate crises have been more pronounced than in the past and this has resulted in important costs for the population of the involved countries. The sudden stop of capital inflows hastened a huge liquidity restriction that entailed drastic shortfall of aggregate demand, an abrupt change in current account balance from a deficit to a surplus that ended up by harming the economic activity very negatively.

percentage. In fact, Latin America (that includes Caribbean and Central America) was the only area where financial openness clearly overcame trade openness.

² In fact, Ramey and Ramey (1995) think that higher trade openness is associated to higher GDP volatility, a circumstance that affects output growth negatively. Instead, Romer (1993) finds out that international trade opening is linked to a minor inflation, an extreme which results into lower macroeconomic volatility.

³ The Exchange rate and financial crisis in Mexico, at the end of 1994, spreads rapidly to Argentina. During the third quarter of 1997, the *Asian miracle economies* were hit by a financial crisis, unexpectedly. Thailand, the Philippines, Indonesia, Malaysia, South Korea and, into a lesser extent, Hong Kong, Singapore and Taiwan suffered several banking and financial crises that derived into exchange rate crises. At the beginning of 1999, Brazil was experiencing a financial crisis after mid-1998 Russian crisis. During the following years, a string of banking crises of variable intensity affected several Latin America countries like Ecuador, Colombia and Peru. Chile avoided the crisis but its economic growth slowed down notably. At the end of 2001, excessive domestic and external indebtedness of Argentina economy led to a debt crisis that ended up with Uruguay being contaminated through the banking system.

2. *The model*

At this point, we introduce an eclectic model that systematizes the dynamics of *self-fulfilling* crises, from the consideration of main aspects of three variants of *third generation exchange rate crisis* models⁴. Our analysis implies three basic equations and two functions that allow us to explain why international trade and trade openness could be a shield against exchange rate crisis.

2.1. *GOOD AND SERVICES MARKETS: THE REAL ECONOMY (RE) CURVE*

The first equation of the model reproduces the working of goods and services markets. As we know national output (Y) equals to aggregate demand (AD) in equilibrium.

$$(1) \quad Y \equiv AD = C + I + G + X - M$$

We can breakdown the former equation using the components of aggregate demand (AD), that is the sum of Consumption (C), Investment (I), Government Spending (G), Exports (X) minus Imports (M). Let's now discuss each of these five components in turn.

Private Consumption depends on disposable income (YD) and on domestic interest rates. Then we write Private Consumption function as follows:

$$(1a) \quad C = \bar{C} + c_1 \cdot YD - c_2 \cdot r, \quad \frac{\partial C}{\partial YD} > 0 \quad ; \quad \frac{\partial C}{\partial r} < 0$$

As we can see the relation between Private Consumption, disposable income and domestic interest rates is characterized by two parameters: c_1 and c_2 . The parameter c_1 is the propensity to consume whereas c_2 is the sensitivity of consumption to changing interest rates. It seems logical to think a natural restriction on c_1 is that it will be positive and on c_2 is that it will be negative. Thus, consumption demand is positively related to disposable income and negatively related to national interest rates. On the other hand, \bar{C} represents autonomous consumption, which is economy's minimal consumption, essential to cover basic consumption needs.

⁴ The *third generation* financial crisis models revolve around three basic variants. A first version of those models implies a string of investments affected by *moral hazard* that leads to an excessive growth of external debt and afterwards the economy's collapse. This story has its origin in McKinnon and Pill's (1996) article, taken up later by Krugman (1996) and developed in-depth by Corsetti, Pesenti and Roubini (1999). A second version, complementary to the previous one and linked above all to Chang and Velasco (1998a and 1998b), is built around a Diamond and Dybvig's (1983) bankruptcy model applied to an open economy. Finally, the third version analyzes how financial difficulties, which are associated to national currency devaluation, influence

$$(1a.1) \quad C = \bar{C} + c_1 \cdot (Y - tY + \overline{TR}) - c_2 \cdot r, \quad \frac{\partial C}{\partial Y} > 0 \quad ; \quad \frac{\partial C}{\partial t} < 0 \quad ; \quad \frac{\partial C}{\partial r} < 0$$

We suppose disposable income is given by $YD = Y - T + TR$, where Y is domestic income, T is income taxes paid taxpayers and TR is Government transfers received by consumers. In addition, we assume $T = t \cdot Y$, that is taxes are a proportional tax on income. Higher taxes decrease consumption, also less than one for one. We will also take transfers $TR = \overline{TR}$ as an exogenous variable. Then, equation 1a.1 tells us that consumption is a function of income, taxes and domestic interest rates.

Private Investment is a function of domestic interest rates (r) and companies' self-finance capacity (SFC). \bar{I} is the autonomous investment and symbolizes economy's minimal investment.

$$(1b) \quad I = \bar{I} + b_1 \cdot SFC - b_2 \cdot r, \quad \frac{\partial I}{\partial SFC} > 0; \quad \frac{\partial I}{\partial r} < 0$$

The relation of Private Investment with national interest rates and companies' self-finance capacity (SFC) depends on two coefficients: b_1 and b_2 . The b_1 coefficient is the propensity to investment related to SFC. Its value will be positive because the higher companies' self-finance capacity (SFC) the higher companies' investment. The coefficient b_2 is the sensitivity of investment to changing interest rates and its value is negative. This parameter collects companies' expectations.

Here, we suppose that companies' self-finance capacity depends on equity value, the difference between assets (A) and debt value. Debt value is the sum of domestic debt (D) and foreign debt in local currency ($E \cdot D^*$). As we are thinking in terms of emerging countries, we consider there is an "original sin" problem⁵ so national companies can borrow abroad but they only invest in national assets.

Consequently, equation 1b can be written as 1b.1:

domestic firms' solvency and macroeconomic consistence. This last argument is claimed to Krugman (1999b and 1999c) as well as Schneider and Tornell (2000).

⁵ *Original sin* shows how the existence of incomplete capital markets makes it difficult for the emerging economies' ability to issue debt in international bond markets, an extreme that forces them to get into foreign currency debt in order to capture external saving and this puts the national economy at currency risk.

$$(1b.1) \quad I = \bar{I} + b_1 \cdot [A - (D + E \cdot D^*)] - b_2 \cdot r, \quad \frac{\partial I}{\partial r} < 0 \quad ; \quad \frac{\partial I}{\partial E} < 0$$

where $SFC = Equity = [Assets - Debt] = A - (D + E \cdot D^*)$

Thus, any nominal exchange rate depreciation drives up foreign debt value in national currency, and it defines a negative causality between private investment and nominal exchange rate movements.

The third component of demand in our model is Government spending. We will take G as an exogenous variable because, though Government behaviour is predictable, we will suppose there isn't a reliable rule we can write for it.

$$(1c) \quad G = \bar{G}$$

Exports are the part of foreign demand that falls on domestic demand. They depend on foreign income in nominal terms ($p^* \cdot Y^*$) positively because, ceteris paribus, higher foreign income means higher foreign demand for all goods and services. So, higher foreign income leads to higher exports. In the same way, exports also depend on nominal exchange rate (E). The higher the nominal exchange rates, the higher foreign demand for domestic goods, and, the higher exports. Finally, the x_I parameter gauges economy's trade openness. \bar{X} represents autonomous exports.

$$(1d) \quad X = \bar{X} + x_I \cdot E \cdot p^* Y^* \quad , \quad \frac{\partial X}{\partial Y^*} > 0 \quad ; \quad \frac{\partial X}{\partial E} > 0$$

Imports are the part of domestic demand that falls on foreign goods and services. They depend on domestic income in nominal terms ($p \cdot Y$) negatively because, ceteris paribus, higher domestic income means higher domestic demand for all goods and services, both domestic and foreign. So, higher domestic income leads to higher imports. Thus, the propensity to import illustrated by the m_I parameter is negative. \bar{M} represents autonomous imports. Finally, even though imports also depend on nominal exchange rate (E) negatively⁶, we don't consider it explicitly because we show imports in terms of domestic currency.

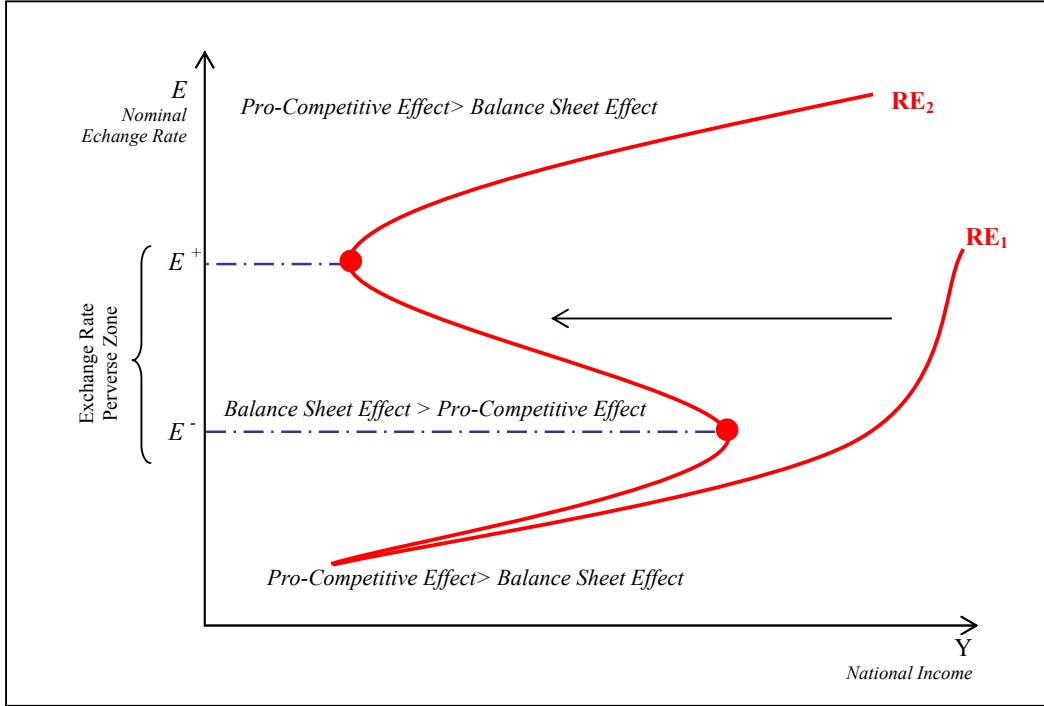
⁶ The higher the nominal exchange rates the lower domestic demand for foreign goods, so they are more expensive and imports will go down

$$(1d) \quad M = \overline{M} + m_1 \cdot p \cdot Y, \quad \frac{\partial M}{\partial Y} = m_1 > 0$$

Putting all these components together, we can construct the RE curve illustrated in figure 1. It plots the functioning of a country's real economy.

FIGURE 1.

GOODS AND SERVICES MARKETS FUNCTIONING: THE REAL ECONOMY (RE) CURVE



Source: Author's own diagram based on Krugman (2000)

The RE curve is really a function formed by all combinations of nominal exchange rates (E) and domestic output (Y) for which markets of goods and services are in short-term equilibrium. It means aggregate output equals to aggregate demand, as expression 1e shows.

$$(1e) \text{ RE Function} \rightarrow Y = \alpha \left[\overline{S} - (c_2 + b_2) \cdot r + b_1 \cdot (A - D) + (x_1 \cdot E \cdot p^* \cdot Y^*) - (b_1 \cdot E \cdot D^*) \right]$$

where $\alpha = \frac{1}{1 - c_1 + c_1 \cdot t + m_1}$ is the *autonomous spending multiplier*

and $\overline{S} = [\overline{C} + \overline{I} + c_1 \cdot \overline{TR} + \overline{G} + \overline{X} - \overline{M}]$ is the *autonomous spending*

Assuming fixed price levels at home and abroad in the short-term and no foreign debt ($D^* = 0$), the previous RE function can be written as:

$$(1e.1) \text{ RE}_1 \text{ Function} \rightarrow Y = \alpha \left[\overline{S} - (c_2 + b_2) \cdot r + b_1 \cdot (A - D) + (x_1 \cdot E \cdot p^* \cdot Y^*) \right]$$

Here, a rise in nominal exchange rate makes foreign goods and services more expensive relative to domestic goods and services. So, this relative price change caused by nominal depreciation increases domestic goods competitiveness, fostering higher exports. A larger foreign demand explains the rising in aggregate demand that stimulates domestic output growth.

From these arguments we can deduce a positive relation between nominal exchange rate and national income that we will call *pro-competitive effect* and which is gathered through $(x_1 \cdot E \cdot p^* Y^*)$ in expression (1e).

$$\text{Pro-competitive effect: } \frac{\partial Y}{\partial E} = x_1 \cdot p^* Y^* > 0$$

For the moment, this *pro-competitive effect* explains the positive slope of RE_1 curve in figure 1.

Nevertheless, these considerations about the real aftermath of devaluation can change when financial and non financial national companies have too much foreign currency short-termed debt. *Maturity mismatches* as well as *currency mismatches*⁷ generate a latent problem in companies' balance-sheets that could compromise their solvency when a sudden capital flight speeds up national currency devaluation.

In this way, when domestic companies are very short-term leveraged in foreign currency, their financial position will be notably vulnerable, because possible national currency devaluation will reduce expected rate of return on investments in domestic currency and will increase the value of foreign currency debits in terms of domestic currency.

This extreme undermines companies' net asset value, generates liquidity problems and diminishes their investment capacity⁸. This inverse causality between nominal exchange rates and national output is called *balance-sheet effect – balance-sheet problems* in the terminology of Krugman's 1999a and 2000– and explains private investment shortfalls that reduce domestic demand and affect economic activity negatively. Again, expression (1e) catches up this *Balance-sheet effect* by means of $(b_2 \cdot E \cdot D^*)$.

⁷ A *currency mismatch* arises from an asynchrony between currency in which debts are called and currency in which investments are made. A *maturity mismatch* occurs when domestic companies finance long-term investment projects with short-term credits.

$$\text{Balance-Sheet Effect: } \frac{\partial Y}{\partial E} = b_2 \cdot D^* < 0$$

But, when economic downturn caused by those financial difficulties is important enough, the *balance-sheet effect* and, by extension, domestic currency devaluation will have recessive effects on real economy, leading to RE₁ curve in figure 1 bows backwards and changes into RE₂.

$$(1e.2) \text{ RE}_2 \text{ Function} \rightarrow Y = \alpha \left[\bar{S} - (c_2 + b_2) \cdot r + b_1 \cdot (A - D) + (x_1 \cdot E \cdot p^* \cdot Y^*) - (b_1 \cdot E \cdot D^*) \right]$$

We assume that this singularity applies for nominal exchange rate values ranged between E⁻ and E⁺. This interval determines a *perverse zone (PZ)* for which the *balance-sheet effect* overcomes the *pro-competitive effect*. Here any nominal devaluation –given the impact on companies’ balance-sheet– loses their role as instrument of macroeconomic adjustment and it becomes a clear damage for the economy. Mathematically,

$$\text{If } E^+ \geq E \geq E^- \Rightarrow |b_2 \cdot D^*| > |x_1 \cdot p^* Y^*| \text{ and then, } \frac{\partial Y}{\partial E} = [(x_1 \cdot p^* Y^*) - (b_2 \cdot D^*)] < 0$$

Graphically, this relation is represented by the downward-sloping RE₂ between E⁻ and E⁺.

However, for nominal exchange rate levels lower to E⁻ and upper to E⁺, the RE₂ curve keeps its original upward slope.

When exchange rate is located below E⁻, local currency is very solid and the pegged parity credible. In this situation, and in spite of companies’ indebtedness, financial vulnerability is less because there is not a fair exchange rate risk. Then, the *balance-sheet effect* is unimportant and, therefore, the final effect of devaluation on aggregate demand and on economic activity will be positive, because the *pro-competitive effect* rules over the *balance-sheet effect*⁹. As a result, exchange rate and output will move, again, in the same direction in this stretch of RE₂ curve.

Mathematically, this means:

$$\text{When } E < E^- \Rightarrow |x_1 \cdot p^* Y^*| > |b_2 \cdot D^*| \text{ and then, } \frac{\partial Y}{\partial E} = [(x_1 \cdot p^* Y^*) - (b_2 \cdot D^*)] > 0$$

⁸ When companies are much leveraged, their indebtedness capacity is practically void and, then, financing new investment is diminished to self-finance capacity, which is always limited to equity value.

In the same way, for exchange rates above E^+ , domestic currency is much devaluated. Then, the impact of any devaluation on the companies' economic and financial structure will be limited because the most of indebted companies will have already failed. Then the *balance-sheet effect* will be slightly significant and it will hardly be able to make up for the *pro-competitive effect*. In this extreme situation, any devaluation fosters a certain expansion of national output and the RE_2 curve presents a positive slope again. Mathematically, this means:

$$\text{When } E > E^+ \Rightarrow |x_1 \cdot p^* Y^*| > |b_2 \cdot D^*| \text{ and then, } \frac{\partial Y}{\partial E} = [(x_1 \cdot p^* Y^*) - (b_2 \cdot D^*)] > 0$$

2.2. MONEY MARKET AND FOREIGN EXCHANGE RATE MARKET: THE FINANCIAL ECONOMY (FE) CURVE

The second of equations that forms this eclectic model that we are building, represents national money market equilibrium.

$$(2) \quad \frac{M^d}{P} = \frac{M^s}{P}$$

The real money demand $\left(\frac{M^D}{P}\right)$ is the total demand for money in real terms for all households and companies in the economy. We write money demand in real terms as a function of nominal interest rates (r) and domestic income (Y).

$$(2a) \quad \frac{M^d}{P} = L(Y, r) = l_1 Y - l_2 \cdot r, \quad \frac{\partial M^d}{\partial Y} > 0 \quad ; \quad \frac{\partial M^d}{\partial r} < 0$$

As we can see the relation between real money demand, domestic income and national interest rates is characterized by two parameters: l_1 and l_2 . The parameter l_1 is the sensitivity of demand for money to changing domestic income and collects money demand for transaction and precaution reasons. l_1 has a positive value because demand for money will increase in proportion to nominal income.

On the other hand, the parameter l_2 is the sensitivity of money demand to changing interest rates and shows the function of money as store of value. It seems logical to think a natural restriction

⁹ Obviously, aggregate demand increases and output growth caused by depreciation will be lower than there would have been

on l_2 is that it will be negative because the higher interest rate the higher the opportunity cost of money holdings.

The money supply $\left(\frac{M^S}{P}\right)$ in real terms gauges purchasing power of the amount of money (M^S)

in economy. We suppose money supply in real terms depends on *monetary base* (H) and money multiplier (mm).

$$(2b) \quad \frac{M^S}{P} = mm \cdot H, \quad \frac{\partial M^S}{\partial mm} > 0 \quad ; \quad \frac{\partial M^S}{\partial H} > 0$$

Let H *monetary base* that is the supply of central bank money. We assume H is directly controlled by central bank as well as it can change the amount of H through open market operations. So, the higher monetary base, the higher money supply.

At the same time, the effectiveness of open market operations depends on money multiplier mm .

It implies that a given change in *monetary base* (H) has a larger effect on the money supply in real terms.

Obviously, given price level (P), equilibrium in financial markets requires that real money

demand $\left(\frac{M^D}{P}\right)$ be equal to money supply in real terms $\left(\frac{M^S}{P}\right)$.

$$(2b) \quad \frac{M^d}{P} = l_1 \cdot Y - l_2 \cdot r = (mm \cdot H) = \frac{M^S}{P}$$

And rewriting this previous equation 2b, we find the equilibrium domestic interest rate:

$$(2c) \quad r = -\frac{1}{l_2} \cdot (mm \cdot H) + \frac{l_1}{l_2} \cdot Y, \quad \frac{\partial r}{\partial Y} > 0 \quad ; \quad \frac{\partial r}{\partial H} < 0$$

Related to this, we suppose that *the fear of floating*¹⁰ moves central bank to compensate any change of nominal exchange rate. In order to collect this subordination of monetary policy to the maintenance of certain parity, we introduce the third of the model equations: interest rate parity condition in presence of imperfectly substitute financial assets. Interest parity condition states that foreign exchange rate market is in equilibrium only when expected rates of return on

without this poor *balance-sheet effect*.

domestic and foreign currency deposits plus a premium risk (ρ) –which reflects the spread between national and foreign bonds risk– are equal.

$$(3a) \quad r = r^* + d + \rho$$

In this way domestic interest rates (r) gauge expected rate of return on financial investment in domestic currency deposits (RFIDC). Likewise, the sum of foreign interest rates (r^*) plus depreciation rate (d) is expected rate of return on financial investment in foreign currency deposits (RFIFC).

For a given expected future exchange rate (E^E) and premium risk (ρ), the interest rate parity condition describing foreign exchange market equilibrium –in presence of imperfectly substitute financial assets– is the equation 3b:

$$(3b) \quad r = r^* + \left(\frac{E^E - E}{E} \right) + \rho, \quad \text{where } d = \frac{E^E - E}{E} \quad \text{and} \quad \frac{\partial E}{\partial r} < 0 \quad ; \quad \frac{\partial E}{\partial r^*} > 0$$

We found the equilibrium domestic interest rate in equation 2c. Now, we replace it in equation 3b to get 3c.

$$(3c) \quad r = r^* + \left(\frac{E^E - E}{E} \right) + \rho = -\frac{1}{l_2} \cdot (mm \cdot H) + \frac{l_1}{l_2} \cdot Y = r$$

And if we try to isolate the monetary base (H), expression 3c turns into 3d.

$$(3d) \quad H = \frac{l_1}{mm} Y - \frac{l_2}{mm} \cdot \left(r^* + \frac{E^E - E}{E} + \rho \right), \quad \frac{\partial H}{\partial E} < 0; \quad \frac{\partial M^S}{\partial E} < 0$$

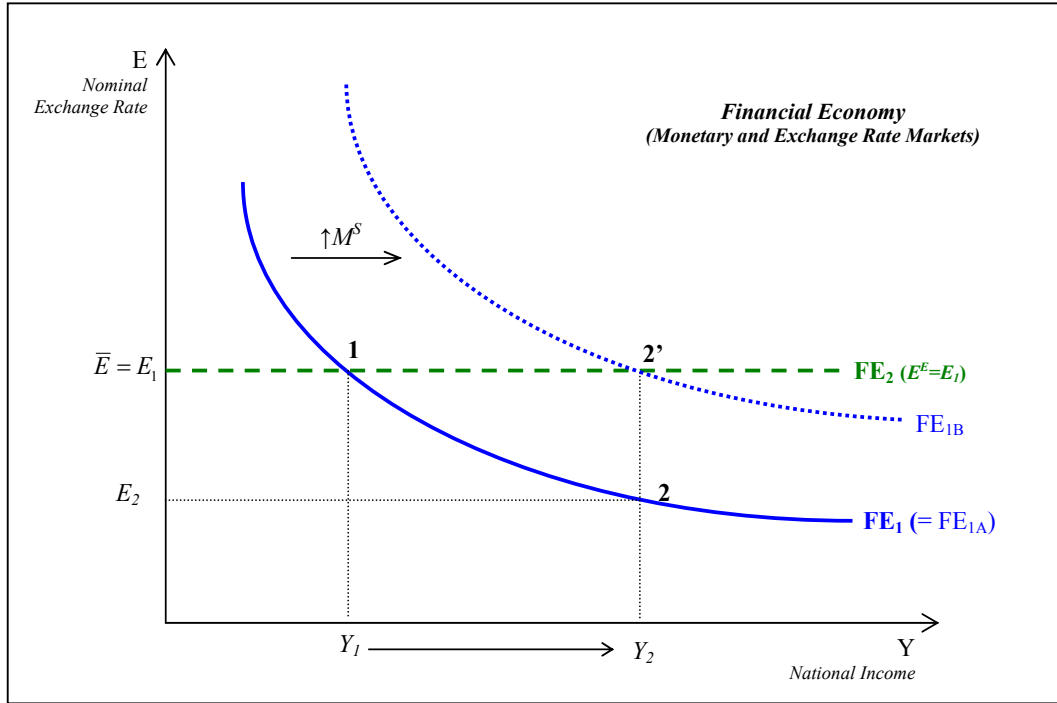
Equation 3d shows clearly monetary policy subordination to the maintenance of certain parity. It means exchange rate and money supply will evolve in opposite directions. If there is a depreciation tendency, central bank will be forced to intervene in foreign exchange markets, selling foreign currency in exchange for domestic currency. This action will reduce international reserves endowment as well as monetary base and money supply. On the contrary, pressures for appreciating domestic currency will force central bank to buy foreign currencies, which will help to widen monetary base.

¹⁰ Calvo and Reinhart (2000) define *fear of floating* as emerging economies reluctance to allow exchange rate free floating. This extreme presses central banks to intervene in foreign exchange markets actively.

Putting all these components together, we can build the FE_1 curve illustrated in figure 2. It plots the functioning of domestic and foreign financial markets. In this way, the FE_1 curve is a function formed by the combinations of nominal exchange rates and national output for which national money market and foreign exchange market are in equilibrium simultaneously.

FIGURE 2.

FINANCIAL MARKETS FUNCTIONING: THE FINANCIAL ECONOMY (FE) CURVE



Source: Author's Own Diagram.

Mathematically, reordering equation 3d and isolating E or Y , we can define the *Financial Economy (FE)* function in terms of equilibrium exchange rate:

$$(3e) \quad \mathbf{FE_1 \text{ Function}} \rightarrow E = \frac{E^E}{1 + \left(-\frac{1}{l_2} \cdot (mm \cdot H) + \frac{l_1}{l_2} \cdot Y \right) - r^* - \rho}, \quad \frac{\partial E}{\partial Y} < 0$$

or the *Financial Economy (FE)* function in terms of equilibrium output:

$$(3e.1) \quad \mathbf{FE_1 \text{ Function}} \rightarrow Y = \frac{1}{l_1} \cdot (mm \cdot H) + \frac{l_2}{l_1} \cdot \left(r^* + \frac{E^E - E}{E} + \rho \right), \quad \frac{\partial Y}{\partial E} < 0$$

FE_1 curve determines an inverse causality between national output and nominal exchange rate.

Nevertheless, the model that we are creating assumes that central bank is committed to exchange rate stability. Let us suppose, there is rise in output from Y_1 up to Y_2 that causes an increase of money demand for transaction reasons. If money supply doesn't change, an excess of demand will occur in national money markets raising national interest. It enhances the rate of return on financial investments in domestic currency deposits, giving rise to a capital inflow that will hasten a local currency appreciation from E_1 to E_2 , if central bank doesn't intervene in foreign exchange markets. Then, financial markets' equilibrium moves from point 1 to point 2. But this is not the case. The subordination of monetary policy to the maintenance of certain parity¹¹ will force central to intervene in foreign exchange markets to avoid domestic currency appreciation. In this scenario, monetary authority must buy foreign currency, widening monetary base and money supply in real terms, in absence of sterilization. Graphically, it causes a scrolling up of FE_{1A} curve as far as FE_{1B} in figure 2.

In this way, central bank's performance achieves to compensate exchange rate downward tendency as well as national interest and capital inflows rising. Consequently, the exchange rate parity will remain constant in E_1 in spite of higher output. It means if there are international reserves enough expected exchange rate equals equilibrium exchange rate ($E^E = E_1$) and then FE function becomes a FE_2 curve completely elastic, plotted in figure 2 too.

$$(3e.2) \quad \mathbf{FE_2 \text{ Function}} \rightarrow Y = \frac{1}{l_1} \cdot (mm \cdot H) + \frac{l_2}{l_1} \cdot \left(r^* + \frac{E^E - E}{E} + \rho \right), \quad \frac{\partial E}{\partial Y} = 0$$

3. Why international trade integration can mitigate financial account crises?

Although, today there is the sensation that trade openness increases countries' exposure to any internal or external shock, we think the opening to external trade could, paradoxically, reduce the frequency of the exchange rate and financial crises; not so much because the intensification of international trade could eliminate real or monetary shocks, but rather because the macroeconomic effects stemming from foreign trade growth¹².

¹¹ It means there is a *de facto* pegged exchange rate system.

¹² This was a frequent reason used to justify both single currency adoption and the creation of European Monetary Union.

3.1. TRADE INTEGRATION AND THE IMPROVEMENT OF PRO-COMPETITIVE EFFECT

Krugman (2000) argues that trade openness fosters adjustment process to a capital inflow downfall. In this way, the existence of a current account deficit joined to the emerging economy's inability to cover its external financing needs on international financial markets imposes a demanding external restriction that it is only possible to correct through export increase or domestic demand shortfall. At this stage, the magnitude of adjustment will be more or less severe according to the export relative importance.

Thus, an emerging economy with poor exports to GDP ratio will need a huge domestic demand reduction, since export growth, related to a given depreciation, will be insufficient to offset external deficit. This means that the depreciation needed to counteract the current account imbalance exclusively via exports will be higher than whatever would have been required with upper export to GDP ratio.

Thus, the growth of emerging economies' trade openness could foster major exports that, in turn, could lead to higher effect of any devaluation on external demand. So, the higher trade openness the higher *pro-competitive effect*.

In our model, this means the parameter x_1 grows up as country's trade openness becomes higher. Knowing the *pro-competitive effect* is gauge by: $x_1 \cdot E \cdot p^* Y^*$ and accepting trade openness in more open countries (x_1^{MO}) will be larger than in less open countries (x_1^{LO}), we can write:

Pro-competitive effect:

$$\left. \begin{array}{l} \text{More Open Economy: } \frac{\partial Y}{\partial E} = x_1^{MO} \cdot p^* Y^* > 0 \\ \text{Less Open Economy: } \frac{\partial Y}{\partial E} = x_1^{LO} \cdot p^* Y^* > 0 \end{array} \right\} \text{and if } x_1^{MO} > x_1^{LO} \Rightarrow x_1^{MO} \cdot p^* Y^* > x_1^{LO} \cdot p^* Y^*$$

Graphically, this reasoning will make the RE_2 curve in figure 3 lose a good part of its backward sloping, transforming itself into RE_3 , as economic integration advances and external trade is soaring.

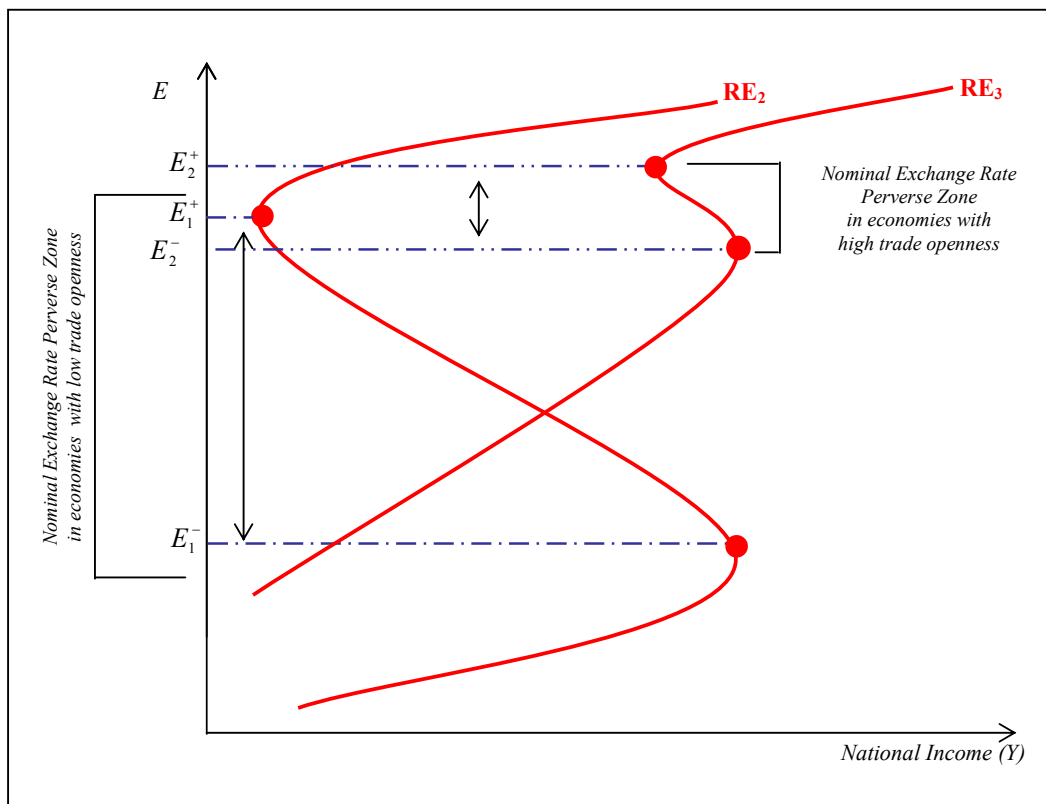
As we can see, as an aftermath of this dynamics, the *exchange rate perverse zone (PZ)* becomes narrowest, diminishing up to an interval described by the parities: E_2^- and E_2^+ .

$$\left. \begin{array}{l} \text{If } x_1 = x_1^{LO} \Rightarrow PZ^{LO} = (E_1^+ - E_1^-) \\ \text{If } x_1 = x_1^{MO} \Rightarrow PZ^{MO} = (E_2^+ - E_2^-) \end{array} \right\} \rightarrow PZ^{MO} = (E_2^+ - E_2^-) < (E_1^+ - E_1^-) = PZ^{LO}$$

All these reasons will make devaluations recover a substantial part of their leading role as a mechanism of macroeconomic adjustment, as they stop being an offence to the economy and the *fear of floating* vanishes. In fact, contractive effects on the domestic expense derived from the *balance-sheet effects* will not be so harsh because the adjustment will be achieved through export increase and import replacement, and, in a lesser extent domestic demand reduction.

FIGURE 3.

TRADE INTEGRATION AND NOMINAL EXCHANGE RATE “PERVERSE ZONE”



Source: Author's Own Diagram based on Krugman (2000).

On the other hand, the evidence that the economic authorities are using exchange rate as an economic policy instrument, will make exchange rate risk more perceptible¹³. Even more when the Government is favourable to an undervalued parity that underpinning export growth.

This extreme will probably dampen foreign currency indebtedness, weakening the possible *balance-sheet effects* associated to any devaluation¹⁴.

In our model, this means domestic companies tend to decrease their leverage in foreign currency. If it is true, D^* level drops as country's trade openness becomes higher. Therefore, in relative terms, companies' leverage in more open emerging economies will be lower than in less open emerging economies. Let L_{MO}^* , leverage ratio for companies in more open economies and L_{LO}^* , leverage ratio for companies in less open economies. In both cases, leverage equals to companies' debt in foreign currency to equity ratio. Likewise, we can write:

$$L_{MO}^* = \frac{D_{MO}^*}{EQ_{MO}^*}, \text{ where } EQ_{MO}^* \text{ is the companies' equity value in more open economies}$$

$$L_{LO}^* = \frac{D_{LO}^*}{EQ_{LO}^*}, \text{ where } EQ_{LO}^* \text{ is the companies' equity value in less open economies}$$

We are assuming $L_{MO}^* < L_{LO}^*$, and because of it, the *Balance-Sheet effect* in more open economy will be lower than in less open economy.

The Balance-sheet effects:

$$\left. \begin{array}{l} \text{More Open Economy : } \frac{\partial Y}{\partial E} = b_2 \cdot D_{MO}^* = b_2 \cdot L_{MO}^* \cdot EQ_{MO}^* < 0 \\ \text{Less Open Economy : } \frac{\partial Y}{\partial E} = b_2 \cdot D_{LO}^* = b_2 \cdot L_{LO}^* \cdot EQ_{LO}^* < 0 \end{array} \right\} \text{ and } L_{MO}^* < L_{LO}^* \Rightarrow b_2 \cdot D_{MO}^* < b_2 \cdot D_{LO}^*$$

Again, these arguments will reinforce the backward sloping of RE curve in figure 3, from ER_2 to ER_3 . And again, the *exchange rate perverse zone (PZ)* becomes narrowest.

¹³ Evidence suggests that after countries moved from fixed to floating exchange rate regimes, the sovereign and corporate sectors have responded by issuing more local currency debt in the very recent past. Tovar (2005) argues that the adoption of flexible exchange regimes by Latin America countries has facilitated the issuance of domestic currency debt in international markets. Galiani, Levy-Yeyati and Schargrodsky (2003) find that Argentina's currency board contributed to the dollarization of companies' balance sheets by fuelling beliefs in an implicit exchange rate guarantee that reduced companies' willingness to pay the cost of hedging their positions. In the case of Mexico, Martinez and Werner (2002) show how the shift from a fixed to a floating exchange rate regime in December 1994 prompted companies to reduce their exposure to exchange rate risk. In the same way, Rossi (2004) reveals that the number of companies exposed to currency risk was significantly lower during the period of floating exchange rate than during the fixed exchange rate regime.

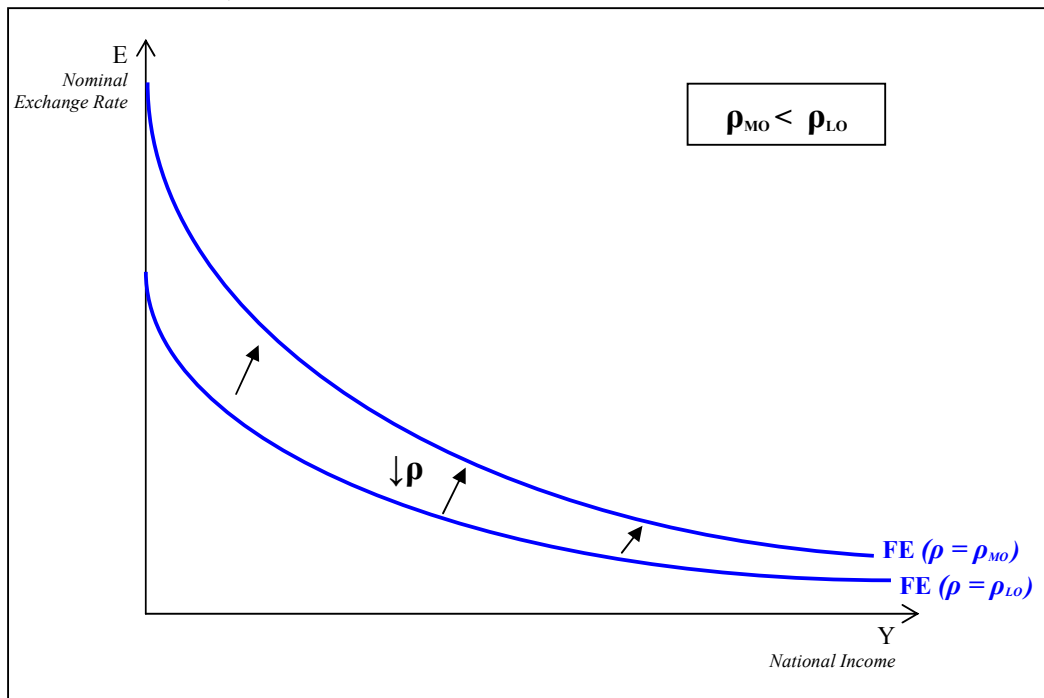
In this context, the opinion of different financial agents will probably shift because they could think that macroeconomic adjustment will become less costly and then exchange rate crises will be less likely or will probably be slightly less damaging.

3.2. TRADE INTEGRATION AND THE IMPROVEMENT OF ECONOMIC SOLVENCY

Trade integration also reduces financial fragility of emerging countries because it helps to improve their solvency, so it fosters their ability and willingness to attend foreign debt. In this way, higher export to GDP ratio means that a real depreciation will provide a major capability of attaining foreign currencies.

FIGURE 4.

FE CURVE, TRADE OPENNESS AND THE IMPROVEMENT OF SOLVENCY



Source: Author's Own Diagram.

At the same time, trade openness makes countries more vulnerable to creditors' sanctions in case of default, and, this circumstance helps to increase the economic authorities' sensitivity towards external debt (Bulow and Rogoff, 1989). This is explained because the more important

¹⁴ However, the risk of dangerous devaluation doesn't disappear at all, although this possibility is limited to very extreme situations.

exports in economic structure, the more the cost associated to a trade decrease caused by a foreign debt default¹⁵.

In our model, the improvement of solvency in emerging countries implies ρ value goes down, from ρ_{LO} to ρ_{MO} , because the higher trade openness the lower spread between national and foreign bonds risk. Likewise, this causality will raise exchange rate sensitivity to any change in domestic interest rates, shifting up FE curve in figure 4.

$$\left. \begin{array}{l} \text{More Open Economy FE function: } E = \frac{E^E}{1 + \left(-\frac{1}{l_2} \cdot (mm \cdot H) + \frac{l_1}{l_2} \cdot Y \right) - r^* - \rho_{MO}} \\ \text{Less Open Economy FE function: } E = \frac{E^E}{1 + \left(-\frac{1}{l_2} \cdot (mm \cdot H) + \frac{l_1}{l_2} \cdot Y \right) - r^* - \rho_{LO}} \end{array} \right\} \text{if } \rho_{MO} < \rho_{LO} \Rightarrow \left| \frac{\partial E}{\partial Y} \right|_{MO} > \left| \frac{\partial E}{\partial Y} \right|_{LO}$$

As we can see, the higher slope of FE curve implies a higher output for any exchange rate level. Consequently, an export increases reduce the probability of a *sudden stop*, that is an unexpected capital inflow reversion, because the country is better able to serve its foreign currency debt (Catao and Sutton, 2002). This reinsurance is particularly important in emerging countries, where domestic financial markets are not wide and deep enough –*original sin*– and economic and political perspectives are much more uncertain than in industrialized countries.

3.3. TRADE OPENNESS AND THE SPEED OF CRISIS RECOVERY

According to Milesi-Ferreti and Razin (2000) as well as Gupta, Mishra and Sahay (2000) the most open countries to international trade present a major likelihood of experiencing a faster recovery after exchange rate and financial crisis episodes.

An interpretation of this outcome is that export growth is used to establish the basis of economic recovery in the near future. Likewise, nominal devaluation when it entails real devaluation speeds up a rising export demand stimulates output in the tradable goods sector that helps absorbing part of unemployed people caused by previous crisis.

¹⁵ For instance, the economic and financial aftermath derived from debt default for a country whose exports are 7% of GDP are less damaging than where exports to GDP is 35%. If that is true, in the second country benefits associated to debt rescheduling will be higher than costs, hence this economy will probably choose this latter option.

In spite of contextual differences and singularities of every economy, the experience of emerging economies in Latin America and in Eastern Asia between 1997 and 2005 makes it clear that those countries which are most open to international trade show a major tendency to go through a faster recovery after a crisis. In fact, the speed of output recovery in the majority of East Asian emerging economies between 1998 and 1999 was very similar to the experienced by the Mexican economy in 1995 and by Brazil after the crisis at the beginning of 1999. Here, the export growth became *recovery factotum*, economies' engine during the following years to these crises. This evidence contrasts strikingly with the persistence of recession observed in Argentina after the end-2001 debt crisis, where lower trade openness left the output recovery at the expense of domestic demand upturn (Edwards, 2008).

3.4. TRADE INTEGRATION AS A MECHANISM OF EXCHANGE RATE CRISIS PREVENTION

Figure 5 elaborates on consequences of these results and shows the process of adjustment to a sudden stop in two different situations.

In this way, the RE_2 curve represents a situation in which an emerging country shows a limited openness and where a fixed exchange rate introduces a bias towards foreign currency indebtedness. In turn, the RE_3 curve reproduces an alternative situation with an emerging country characterized by a higher openness and where the string of determining factors described earlier limits the appearance of financial fragility.

Initially, and for every one of two cases, the emerging economy considered places at point A in figure 5 that determines an equilibrium output (Y_A) and an equilibrium exchange rate (E_A). In this context, we suppose both countries suffer a sudden stop in capital inflows that makes the coverage of financial needs in external capital markets very difficult. The sudden stop causes a demand excess in foreign exchange markets as well as devaluation expectations.

Case 1. Less Open Economy and the negative effects of devaluations

In the first case, illustrated in figure 5, when trade openness is low, the *fear of floating* associated to high indebtedness in a foreign currency will move central bank to support its

commitment with an E_A parity intervening in foreign exchange markets. Graphically, this behaviour causes FE_{1A} curve move towards right as far as FE_{1B} . Consequently, the exchange rate parity will remain in E_A . For the moment, expected exchange rate equals equilibrium exchange rate ($E^E=E_A$), so FE_1 function keeps on being completely elastic.

As the defence of E_A equals to restrictive monetary policy, central bank must accept the outcome in terms of fewer economic activity and increasing unemployment. And the national output drop to Y_B .

But, paradoxically, this dynamics is going to shape a favourable situation for the burst of a speculative attack, not just for the progressive decrease in international reserves caused by foreign exchange market interventions; but also because increasing cost of defending E_A parity will undermine central bank's willingness to intervene, and will trigger investors' expectations about pegged exchange rate being given up definitively in the next future¹⁶.

This conviction of an implied withdrawal in exchange rate system defence will shift financial markets' expectations and will move FE curve from FE_1 as far as FE_2 . Even more when, given the income level in Y_B , the new equilibrium exchange rate E_B is above E_A , causing the overvaluation of pegged exchange rate.

This extreme will generate further tensions and central bank will have to intervene again and again, until the overwhelming dynamic of foreign exchange markets will cause a speculative attack that will force economic authorities to drop their commitment to E_1 parity. Quite simply, central bank will stop intervening because there comes a time when it is better to assume the loss of credibility that supposes the parity withdrawal, instead to have to bear the cost of supporting an overvalued exchange rate.

After central bank allows free floating, overshooting of nominal exchange rate will move domestic currency parity from an E_A to an E_C , as it's illustrated in figure 5.

Under these conditions, devaluation –because of absolute and devastating relevancy of *balance-sheet effect*– entails a drastic aggregate demand shortfall and an abrupt change in the current account balance from a deficit to a surplus –not so much for export increase but rather for a

sudden import slump, associated with domestic demand decrease—, which would affect the country’s economic activity very negatively. The output downfall, from Y_B to Y_C , reinforces initial process of investment demobilization on behalf of foreign creditors and validates the most pessimistic expectations, causing a fall in private consumption as well as an unwanted investment in inventories that forces companies to reduce their activity even more. As a result of this perverse dynamic, output diminishes severely from Y_A to Y_C , and economy turns out to be immersed inevitably in a great macroeconomic crisis.

Case 2. More Open Economy and the renewed effects of devaluations

When trade openness is higher, the economic authorities have a greater room to articulate their policy in front of any external shock. Figure 5 also shows how higher trade openness could reduce the depreciation needed to correct the external restriction

Here again, sudden stop in capital inflows and given central bank’s commitment with an E_A parity forces it to defend pegged exchange rate. And again, the feeling of an implied withdrawal in exchange rate system defence will shift financial markets’ expectations and will move FE curve from FE_2 to FE_3 . Even more, given the income level in Y_B , when the new equilibrium exchange rate E_B is above E_A , pegged exchange rate is overvaluated.

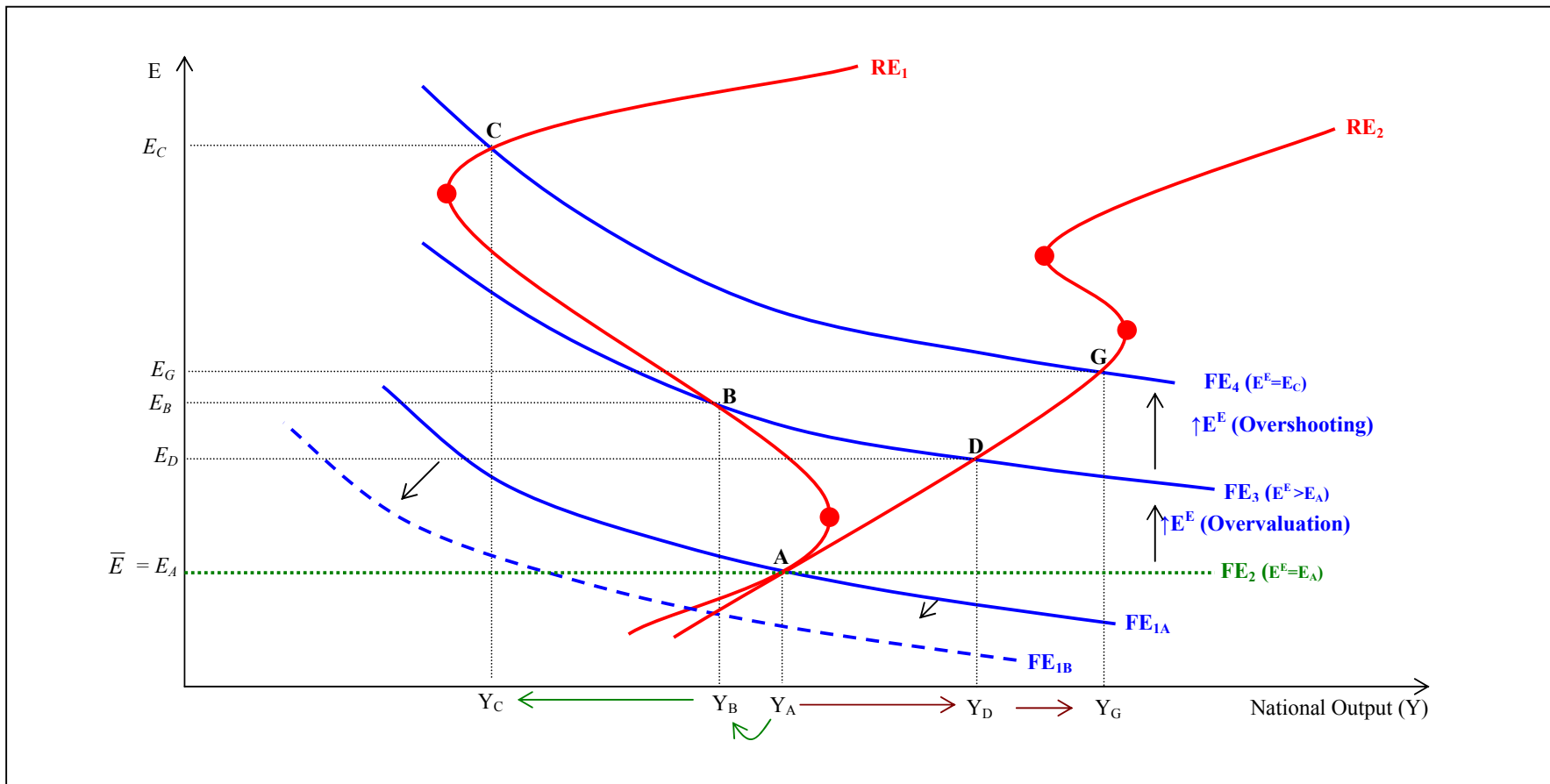
But now, considering the benefits of devaluation —caused by the biggest importance of the *pro-competitive effect*—, it is most likely that the economic authorities, as soon as overvaluation becomes clear, will allow the adjustment of parity or, instead, will opt for a well-organized exit strategy of that pegged exchange rate regime.

The evidence that the economic authorities are using exchange rate as an economic policy instrument, will make exchange rate risk more perceptible. Then, this extreme will have probably dampened foreign currency indebtedness, weakening the possible *balance-sheet effects* associated to any devaluation.

¹⁶ This is the cause for “second generation” exchange rate crises.

FIGURE 5.

IMPORTANCE OF TRADE OPENNESS IN DEPLETION OF VULNERABILITY TO FINANCIAL AND EXCHANGE RATE CRISES



Source: Author's own diagram.

Consequently, this *controlled* domestic currency devaluation from E_A to E_D will be linked to a favourable context for export growth, and to an aggregate demand increase as well as to an output expansion from Y_A to Y_D .

But even if the first option of the monetary authorities had been to keep exchange rate in E_A , the parity defending would be less onerous because depreciation expectations would be minor. Moreover, if in the limit, overvaluation ends up hastening a speculative attack, the effects on output derived from this depreciation would remain being positive, because the *pro-competitive effect* will overcome the *balance-sheets effects*.

So, now, after central bank allows free floating, *overshooting* would put domestic currency in E_G . At the same time, domestic output growth, caused by export expansion, will move economy up to an income level like Y_G , which always will be higher than Y_A or Y_D .

4. Concluding Remarks

The Government's willingness to open progressively domestic markets to external competition and keeping them open has been a key factor in the attainment of economic integration benefits. In fact, international trade liberalization has been one of the foremost elements of economic globalization processes over last decades. The elimination of hindrances which, traditionally, have limited trade flows, especially tariffs, and technology progress have multiplied export and import possibilities and have favoured the worldwide expansion of international trade and, by extension, the countries' capacity to grow. In this sense, a huge diversity of studies reveals that the economies which are most liberalized and with a major exporting vocation experiment a trade growth which is faster than those which are less liberalized.

But at the same time, the economic integration and trade liberalization processes are not exempt from costs, few costs that tend to be more immediate and "*more visible*" than benefits, at least in the short-term¹⁷.

¹⁷ This evidence does not mean that those adjustment costs have to be, necessarily, bigger than the benefits associated to trade and financial economic integration.

So, on the one hand, the increase of competition that endures external openness can displace domestic companies from national markets, and this extreme can raise the rate of unemployment, slow down productive activity and aggravate disparities in income distribution. On the other hand, major trade openness raises the economies' vulnerability because the intensification of external trade increases the degree of foreign dependency of many countries and, this circumstance explains why many countries have become more vulnerable to worldwide economic conjuncture. Related to this, the experience of exchange and financial crises that have characterized the decade of the 1990s and their contagion across trade links justify the worry that those liberalization processes generate.

Because of that, the Governments, in periods of crisis and demanding times, have seriously been considering the possibility of restoring the protectionism as a formula to fight against their vulnerability to *self-fulfilling crises*.

Despite this, the work developed in this paper shows how, paradoxically, the intensification of international trade linked to the increasing integration of global markets on goods and services can make the exchange and financial crises much less probable. This is not so much because higher trade integration could end up eliminating the asymmetric shocks that affect economies, but rather because of the macroeconomic effects that it generates. From this perspective, trade openness reduces the magnitude of devaluation needed to correct any current account deficit.

Simultaneously, an open economy presents, *a priori*, a higher ability to generate foreign currencies and this multiplies its capacity to attend its foreign debt. Under these conditions, emerging countries acquire a *credibility bonus* which rises as a key factor to prevent and avoiding *self-fulfilling crises*. Moreover, the countries which are more open to international trade show a greater tendency to experience a faster recovery after a crisis. The swiftness of recovery in productive activity registered by the Mexican economy in 1995 and Brazil after the 1999 crisis as well as the majority of Eastern Asian emerging economies between 1998 and 1999, contrasts strikingly with the persistence of recession observed in Argentina after the end-2001 debt crisis, where a minor trade openness left the output recovery at the expense of domestic demand.

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