Currency and External Debt Crises: a Unifying Framework

BY POMPEO DELLA POSTA

Abstract

The theoretical framework used to analyze fixed exchange rate crises is shown to apply also to external debt crises. As a result, in both cases it is possible to identify three separate regions of the state of economic fundamentals: one of stability, one of instability and an intermediate "gray" region subject to multiple equilibria. In the case of external debt crises, however, expectations may even change the state of economic fundamentals in a self-fulfilling way through the effect they exert on interest rates.

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1. Introduction

Economists and analysts have often been wondering whether the reasons of past crises - especially the 1992-93 European Monetary System (EMS) crisis and the 1997 South-East Asian crisis - had to be found in the weak economic "fundamentals" of the countries whose assets had been subject to attack (currencies in some cases, public and external debt in other ones) or in the role played by self-fulfilling expectations, or maybe in a combination of both. In the case of the EMS crisis, for example, analysts wondered why the French franc had been subject to a speculative attack in 1993, in spite of the fact that French economic fundamentals (inflation rate, fiscal policy, public debt, and so on), were not substantially different from those of Germany. Similarly, when considering the South-East Asian crisis, it is quite remarkable to notice that just a few weeks before its outbreak, the IMF country mission visiting Thailand praised that country for following closely the recommendations given by the IMF itself in terms of the stability of public finances; in doing so the IMF ignored the risks resulting from what turned out to be an excessively high level of both private and external debt, that was perceived as not causing any problems until then.

In the recent euro area crisis, some analysts raised the same issue, since they observed that the level of the public debt/GDP ratio of Spain (subject to attack) was not different from that of the UK (not subject to attack).

In all of these cases, then, emerged the idea that the crisis might have had a self-fulfilling origin.

According to the literature that developed in order to analyze in particular the EMS and the South-Est Asian currency crises, it is possible to distinguish three regions of the state of

domestic economic fundamentals: a region of absolute strength, determined by speculators' optimizing behavior, in which the exchange rate remains fixed and cannot be subject to confidence crises; a region of absolute weakness, determined by the monetary authority's optimizing behavior, in which even in the absence of speculation the domestic currency is devalued by the central bank due to the low level of its economic fundamentals; and an intermediate, "gray" region (in which economic fundamentals are neither too weak nor too strong), characterized by a multiplicity of exchange rate equilibria, depending on the state of expectations.

The literature on speculative attacks focused mainly on fixed exchange rate crises because in the case of Mexico, of the EMS (1992-93) and of South-East Asia (1997), for example, the main (although not exclusive) object of speculation was precisely the fixed exchange rate.

The Brazilian crisis (1999) also hinged mainly on fixed exchange rates, while in the case of Russia (1998) there was a coincidence between fixed exchange rate crisis and public debt crisis, leading the authorities of that country to both devalue the ruble and default on public debt. Similar coincidence of crises (fixed exchange rate and public debt) is found in the case of Mexico in 1982 and 1994, in some of the EMS countries (in 1992 the devaluation of the Italian lira was accompanied by the serious risk of a ruinous confidence crisis on public debt) and in the case of Argentina (2001-2002).

At the origins of some of the recent and past crises, including especially the recent global financial and economic crisis, initiated with the so-called subprime crisis in 2007, and the South-East Asian crisis of 1997-98, however, we find not only and not always an actual (or perceived) excessive level of public debt, but also and in fact mainly, an excessive level of

private debt.[1] In the South-East Asian crisis, in particular, what turned out to be crucial was, again, the share of (private, in this case) debt which was in the hands of foreign residents, given its higher volatility, compared to the one characterizing the private debt which is owned by domestic residents. The sum of both public and private debt which is in the hands of foreign residents is defined as external debt and it is a variable that is closely monitored in international statistics (see, for example, the *International Debt Statistics* provided by the World Bank), precisely for the specific risks that it implies. [2]

Moreover, in all of those cases, both the public and the private debt owned by foreign residents turned out to be critical, being more exposed to the adverse reaction of the markets, compared to the debt owned internally.

In the euro area crisis the presence of external debt (for example, it is well known that a large percentage of the Greek public debt was owned by German and French commercial banks) is also believed to have played an important role if the Macroeconomic Imbalance Procedure (that has been introduced by the European Union in order to monitor and prevent the accumulation of imbalances that might cause future risks of instability) includes the percentage of net international investment position over GDP among the headline indicators

[1] With the benefit of hindsight, it could be argued that the South-East Asian crisis should have been taken more seriously since it contained already in itself some of the elements that would be present in the global financial and economic crisis that would start about ten years later, namely the role played by private debt, as opposed to public debt.

[2] Further risks arise when the debt is denominated in a foreign currency, since a depreciation of the domestic currency would cause an increase of its real burden (as it happened to many developing countries in the 1980s).

of the scoreboard of surveillance of macroeconomic imbalances, and it considers explicitly the net external debt (still as a percentage of GDP) as an additional indicator to be monitored.[3]

Summaries of the current situation (see Stiglitz and Rashid, 2016, Velasco, 2015, United Nations, 2015 and 2016), show that at present capital is flowing out of many of the countries where it flew in during the past years when the low American and European interest rates encouraged both public and private residents to borrow extensively from foreign lenders. As a matter of fact, in spite of the fact that those interest rates remain very low, such foreign lenders are starting to reconsider their financial investment decisions, due to the many causes for concern that have arisen recently, including the slowing down of the Chinese economy and the fall in the price of oil and raw materials in general that may cause a slump in many other emerging markets economies. [4]

The analysis proposed in this paper, based on the role played by external debt in precipitating a crisis, then, is appropriate for an understanding of the events occurred in the past and that may occur even in the near future in many countries, and especially the less

[3] The ratio of the net international investment position over GDP should not be lower than -35%. It includes the net external debt, portfolio foreign direct investments, portfolio equities and financial derivatives.

[4] While the external debt of developing countries seems still under control (being on average 23.2 per cent of their GDP in 2014), some low-income countries have quite high ratios and in some cases the interest rate they have subscribed – in spite of the recent periods of relative quietness - reaches even 10 per cent. Things, however, may be getting much worse and the interest rate may well increase to much higher levels: by referring to the joint IMF-World Bank Debt Sustainability Analysis, based on the available data on external and public debt, it can be observed that "as of April 2015, 3 low-income countries are in debt distress, 13 are at high risk, 32 are at moderate risk, and only 22 low-income countries are at low risk of debt distress" (United Nations, 2016, p. 101).

developed and developing ones. As a matter of fact, especially in such countries, foreign creditors always monitor the sustainability of both public debt, which increases because of persistent fiscal deficits, and external debt, which increases because of persistent current account deficits.

Needless to say, as long as less developed and developing countries risk to remain trapped in confidence crises having as an object either their currencies or their (public or private) external debt, the perspectives for their economic development are seriously undermined.

The main idea of this paper is that the framework that has been used in order to analyze currency crises also applies to the analysis of external debt crises, no matter whether resulting in attacks against public or private debt: speculators evaluate the state of external debt in order to understand whether a selling attack on it would be profitable or not, while debtors compare costs and benefits of reneging the promise initially made to repay their debt.

As a result, the three regions (one of stability, one of instability and an intermediate one) that have been identified in the literature on currency crises also emerge in the case of external debt crises.

This should not come as a surprise since, if one thinks carefully, reneging the commitment to convert a domestic currency against a foreign one at a given exchange rate is not qualitatively different from reneging the commitment to honor the debt that one has to a foreign creditor.

It should be noted also, as it will be shown below, that when considering speculative attacks against external debt – differently from what it is usually concluded in the case of currency

crises - expectations may change the state of economic fundamentals in a self-fulfilling way through the effect they exert on interest rate spreads.[5]

The rest of the article is composed as follows. Section 2 reviews briefly the literature on speculative attacks on fixed exchange rates. Section 3 presents a simple model of speculative attacks on external debt by considering the benchmark situation of a "good" state of expectations. Section 4 instead analyzes speculative attacks on debt with a "bad" and a "very bad" state of expectations. Section 5 contains some concluding remarks.

2. First and second generation models of speculative attacks on fixed exchange rates

According to the literature on speculative attacks on fixed exchange rates, it is possible to distinguish three regions of the state of domestic economic fundamentals. [6]

The three regions emerge as a synthesis of two different interpretations of speculative attacks on fixed exchange rate systems resulting from two different "generations" of literature.

The first one is based on the role played by economic fundamentals, scrutinized by homogeneous and fully informed *speculators* taking their decisions in a rational way and

[5] The same kind of analysis may be performed by considering speculative attacks against public debt, which is what I do in Della Posta (2016), where I also deal more explicitly with the euro area crisis.

[6] It should be recognized, however, that the actual state of "economic fundamentals", can hardly be considered an objectively measurable index. It is rather a subjectively weighted index composed by an equally subjectively selected number of macroeconomic indicators, including public debt/GDP ratio, public deficit/GDP ratio, current account/GDP ratio, and many other potentially relevant macroeconomic variables and indicators. See Cheli and Della Posta, (2007) for further details.

acting atomistically in deciding whether to attack or not the currency (they will all attack as soon as the state of fundamentals exceeds a stability threshold that can be identified unequivocally by all of them).

In this first approach, initiated by Krugman (1979) and simplified by Flood and Garber (1984), currency crises come as a result of some (exogenous) divergent policy followed by the monetary authority. In these models the current exchange rate (e) is assumed to be a function of the current state of the economic fundamentals (θ) and of the expected future instantaneous variation of the exchange rate itself ($\dot{e}^e$).

Moreover, it is assumed that the private sector is able to check whether the current money supply and its future expected variation are consistent with the central bank's commitment to a fixed exchange rate ($\bar{e}$). In order to do so, speculators compare the latter with the "shadow" exchange rate ($\tilde{e}$) that would prevail in a free float regime. As soon as the state of the "fundamental" variable represented by money creation increases to a level that is expected to be incompatible with the pegging of the exchange rate, the private sector, by taking into due account the transaction cost (t), reacts in order to avoid the losses resulting from an unanticipated devaluation, and the central bank is forced to abandon the parity even before the natural exhaustion of foreign reserves. There exists, then, a unique critical level for the economic fundamental, $\underline{\theta}$, at or below which everybody attacks the currency and above which nobody does it. This is represented in the left part of Figure 1 below.

The second approach is based instead on the role played by self-fulfilling expectations, when the *central bank* compares costs and benefits of the defense of the fixed exchange rate and devalues if the former exceed the latter.

In this second approach, corresponding to the "second generation" of currency crises models, speculative attacks arise because of self-fulfilling expectations: given that the central bank's optimal policy is determined endogenously, if all speculators attack the currency (namely if a proportion of speculators $\gamma = 1$ sells it), the cost for the central bank of defending the exchange rate parity will certainly exceed the benefit of its defense, so that the optimal decision for the central bank will be to devalue, thereby validating in a self-fulfilling way the initial negative expectation of speculators. However, there is a critical level, $\bar{\theta}$, above which fundamentals are so weak (namely θ is so high), that even if no speculators attack (i.e. if $\gamma = 0$), the cost of the defense will exceed its benefit, and the exchange rate will be devalued with certainty. For values of $\theta > \bar{\theta}$, then, there is instability for sure (see the right part of Figure 1 below).

While some of these second generation models seemed to prove that negative shifts of expectations may cause the abandonment of a fixed exchange rate system even in presence of sound fundamentals, either considering the role played by foreign reserves (Obstfeld, 1986) or referring to a costs-benefits analysis (Bensaid and Jeanne, 1997), other works re-established the role played by fundamentals even within this approach: self-fulfilling speculative attacks can only be successful when fundamentals are "weak", that is when they are in the unstable region, identified in the first generation models.

As a matter of fact, Obstfeld (1995, 1996), by merging the first and the second generation of literature, proved the existence of three different regions for the fundamentals of an economy (see Figure 1 below): (1) a region of stability, for $\theta < \underline{\theta}$ (where $\underline{\theta}$ indicates the lower critical level of the fundamental as determined in the first generation of speculative

attacks models), so that no speculators have convenience to launch an attack on the currency since by doing so they would lose money, and no devaluation takes place; (2) a region of instability, for $\theta > \overline{\theta}$, (where $\overline{\theta}$ indicates the upper critical level of the fundamental, as determined in the second generation of speculative attack models), in which θ is in such a bad state that the monetary authority finds too costly to defend the parity even if nobody attacks, so that the currency will be devalued with certainty; and (3) the intermediate "gray" region, for $\underline{\theta} \leq \theta \leq \overline{\theta}$, where anything can happen: the exchange rate will be maintained if only "few" speculators attack, while the central bank will be obliged to devalue if a "high" proportion of speculators attack (see Morris and Shin, 1998 and Goldstein, 2012 for a similar graphical representation).

An attack against a currency, then, will only be successful if fundamentals are "weak". This means that as soon as $\theta \geq \underline{\theta}$, the fixed exchange rate system is already in a region of potential instability. However, the exchange rate will only collapse at the critical value $\underline{\theta}$ if all speculators act atomistically and join in the attack by coordinating their actions. If they do not manage to coordinate (or if not all of them are aware of the "true" bad state of the fundamentals), the proportion of speculators, γ, attacking the currency will be less than 1 and, as a result, the cost for the central bank of defending the currency may not exceed the benefit, so that the exchange rate parity may be maintained.

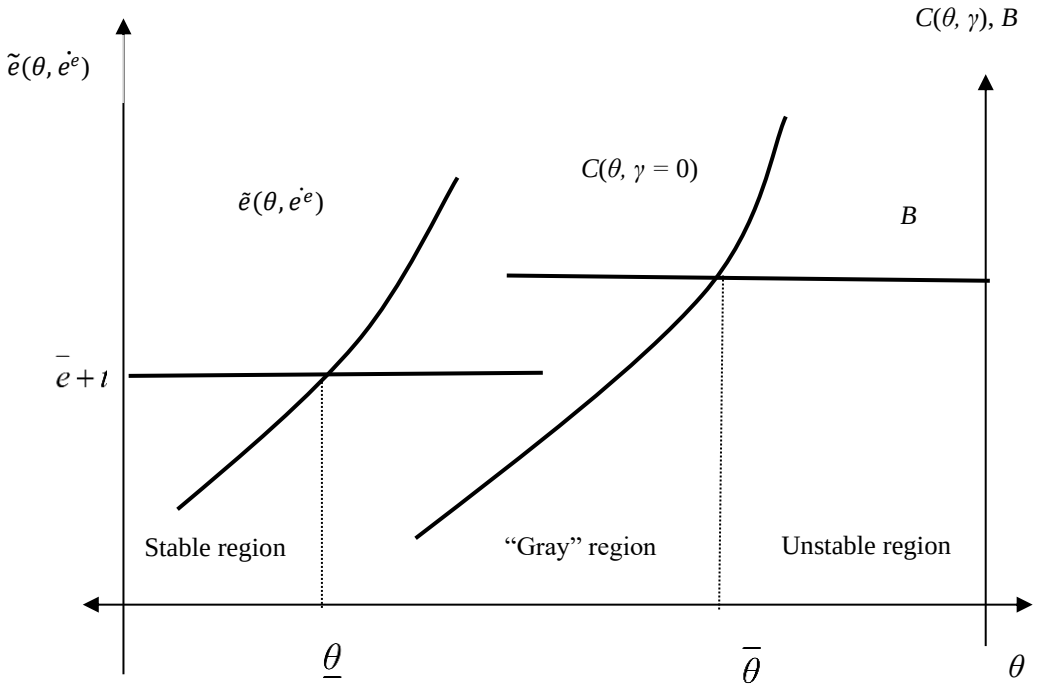

Figure 1: The stable ($\theta < \underline{\theta}$), the unstable ($\theta > \bar{\theta}$) and the "gray" ($\underline{\theta} \leq \theta \leq \bar{\theta}$) regions in currency crises models.

3. A simple model of speculative attacks on external debt

In what follows I present a simple model to show that a similar theoretical setting can be used in order to represent the case of speculative attacks on external debt, namely on public and private debt owned by foreign residents. [7]

[7] De Grauwe (2012), while referring to the public debt euro area crisis, proposes a setting that presents some similarities, although he does not model explicitly the optimization performed by speculators.

3.1 Debtors' costs - benefits comparison

Let us consider a "fundamental" variable θ represented by the ratio between external debt, *D*, and a generic indicator of the future perspectives for the debtor to be able to repay it.

Such an indicator can be any possible proxy for production, income, sales, profits, foreign reserves, country's exports, or any generic available asset to be used as a collateral. The main idea is that the ratio should identify the degree of confidence in the future sustainability of the debt, namely the probability that the debtor should be able to pay it back. External debt is usually compared to gross national income (or to gross domestic product) that we indicate here with capital letter *Y* (but foreign reserves, or exports, are among the other variables that are also considered, especially when referring, for example, to short term external debt – although we do not make this distinction here).[8]

Needless to say, the higher the ratio, the lower such probability. The level of the ratio $\theta = D/Y$ is assumed to be taking value between 0 and 1.

The debtors, no matter whether public or private, may default on the debt if the benefit of doing so exceeds the cost. The cost *C* is assumed to be the constant reputation price that the

[8] Public (and publicly guaranteed) debt is the amount of money that the government, which is a single debtor, is committed to pay back to both domestic and foreign creditors; private debt, instead, is the aggregation of the debt of different private agents (like families or corporations), still owed to both domestic and foreign creditors; external debt, as it has already been mentioned above in the text, is the subset of both public and private debt which is owned by foreign residents. In spite of the fact that it is composed by different debtor categories, financial markets usually look at the aggregate value of external debt, as if all debtors – both public and private - were alike and were characterized by the same credit rating. If this is the case, then, they can be considered as an atomistic player, as I do in what follows.

debtors would pay if defaulting on the debt, independently of its level. The benefit of the default, *B*, instead, increases with θ, since the higher the ratio, the more costly its repayment will be.

The position of curve *B* is also affected by the market confidence on the stability of θ, which can be represented by the proportion γ of speculators selling the public or private bonds that they hold.

If the market believes in the stability of debt (we define this as a situation of "good" or "normal" state of expectations, represented by superscript *n*), the positively sloped curve B^n will be as close as possible to the horizontal axis. The point at which $B^n = C$ identifies, then, the (relatively high) critical level $\bar{\theta}^n$ below which the debtor will not default on the debt (see Figure 2 below, where γ^n - which is the proportion of speculators attacking when the state of expectations is "good" – is equal to 0).

We define as a "bad" state of expectations the one in which a positive proportion of speculators joins in the attack, but the proportion is such that B^d is above *C* only for values of $\theta > 0$. In such a case, in which $0 < \gamma^d < \bar{\gamma}^d$ (where superscript *d* describes the "bad" state of expectations and $\bar{\gamma}^d$ is the critical level of the proportion of speculators for which $B^d = C$ when $\theta = 0$), B^n shifts leftward to B^d, and the critical level $\bar{\theta}^d$, below which the debtor will not default on the debt when the state of expectations is "bad", gets lower than $\bar{\theta}^n$ (see Figure 2 below).

In the case of a "very bad" state of expectations or panic [9] - defined as the case in which γ^{dd} (the proportion of speculators who joins in the attack) is included between $\bar{\gamma}^{d}$ and 1 - the benefit of defaulting will always exceed the fixed cost of doing it, no matter how strong the level of the economic fundamentals is. In this case it turns out that $\bar{\theta}^{dd} = 0$, where $\bar{\theta}^{dd}$ is the critical level of θ at which, in the case of "very bad" state of expectations, the benefit of default exceeds the cost. A speculative attack on debt may have, then, a self-fulfilling nature and produce a multiplicity of equilibria (see Figure 2 below).

This is similar to the conclusion reached by Obstfeld (1986) in the different context of fixed exchange rates, as recalled above.

3.2 Rational speculators' decision to attack based on economic fundamentals

By following the structure of the literature on speculative attacks on fixed exchange rates, it should be considered not only the point of view of the public and private external debtors, who compare costs and benefits of a debt default, but also the point of view of speculators, who hold that external debt. They should anticipate correctly the critical level of θ above which external debt is not sustainable anymore and at which, then, they should all start selling the public or private bonds that they own.

[9] A situation of panic implies a very high proportion of speculators attacking. This occurs because of strategic complementarities (speculators attack, independently of the state of economic fundamentals, because they fear that all the others will attack).

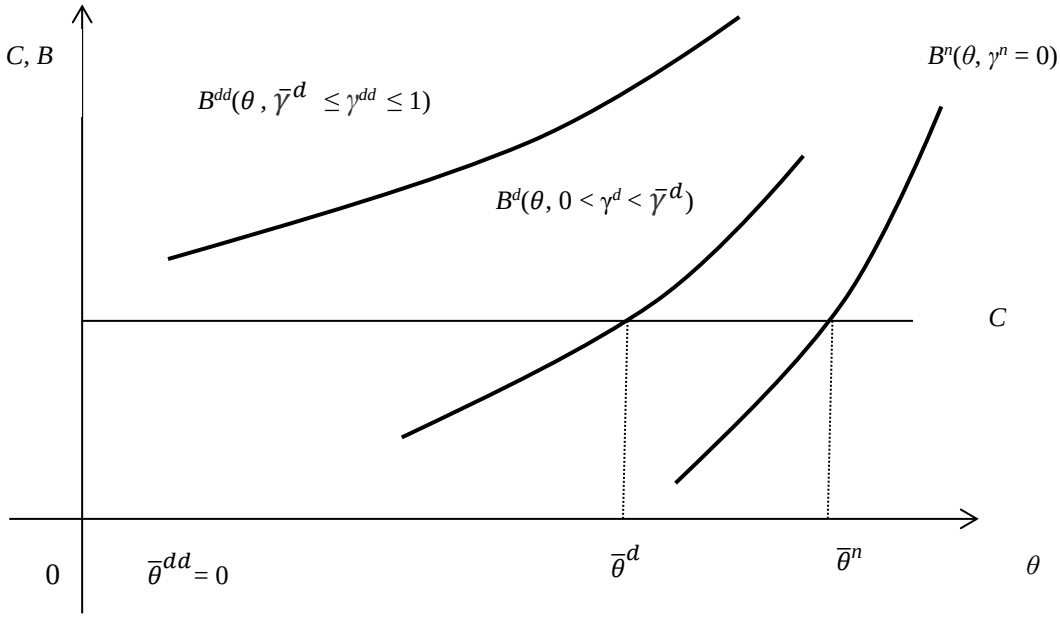

Figure 2: Debtors' comparison between costs and benefits of a default with different states of expectations ("good", "bad" and "very bad").

This is obtained by considering the external debt stability condition:

(1) $$d\theta = ca + (i - y)\theta \leq 0,$$

Where $ca \gtreqless 0$ is the balance of payments' non-interest current account (or trade balance) as a ratio of *Y*. In case of a positive value, the flow is adding to external debt growth, while if *ca* is negative, the debt ratio, θ, is going to be reduced. The symbol *i* represents the nominal interest rate to service the external debt (assuming it is the same for both public and private

debtors sharing the same market's evaluation and rating) and y is the constant rate of growth of Y, namely $y = dY/Y$. [10]

[10] Equation (1) above can be derived easily by considering a simplified version of the dynamic equation of external debt:

$$dD = CA + iD,$$

where D is the level of external debt, CA is the constant level of the external debt flow, namely the variation of external debt resulting from the non-interest current account - and i is the constant nominal interest rate to service the debt. As mentioned in the text, foreign creditors assign the same interest rate i to both public and private debtors, given the assumption that they share the same features and risk profile resulting from the country they belong to. From the equation above, by dividing through by Y, thereby considering the D/Y ratio, it follows that:

$$d\theta = ca + (i - y)\theta$$

In order to keep the argument clean and simple, other elements that may appear in a typical equation representing the dynamics of external debt (and that may be dealt with in future research) – including foreign direct investments, portfolio equity flows, exchange rate variations in the presence of foreign currency denominated debt, inflation tax or seigniorage, foreign reserves, the interest rate to be gained on the foreign assets that are owned by the debtor countries, debt relief, and so on - are ignored here. For a similarly simplified external debt dynamics equation see, for example Prizzon and Vaggi (2013) and Ley (2009). More complete representations of external debt dynamics equations can be found instead, among others, in IMF (2008) and IMF (2013).

Equation (1) above means that for all values of θ such that (1) is satisfied, the *D/Y* ratio will not explode to infinity in the future: rational speculators, then, should have no reasons to attack a stable and sustainable debt. [11]

In order to calculate the stability condition, speculators should use the nominal interest rate i^n prevailing under "normal" conditions, which is determined by an exogenously given benchmark interest rate ($\bar{\imath}$) and a debtor's risk premium that depends linearly on the value taken by θ, according to a sensitivity parameter α (equation (2) below):

(2) $$i^n = \bar{\imath} + \alpha\theta$$

The stability condition for debt that speculators should consider becomes, then:

$$d\theta^n = ca + (\bar{\imath} + \alpha\theta - y)\theta \leq 0$$

If, for simplicity, we consider a zero flow on debt (ca = 0), the stability region is included in the range (0, $\underline{\theta}^n$), where $\underline{\theta}^n$ indicates the value of θ at or below which the stability condition is satisfied and no speculators will sell debt bonds. This is the case since, by doing so, they

[11] More formally: if the external debt-to-GDP ratio is not growing, the No-Ponzi-Game condition is certainly satisfied. This means that at some point the external debt will have to be paid back, namely that the net present value of external debt is lower or at most equal to the net present value of the non-interest current account balances. This also explains why the Debt Sustainability Analysis (DSA) performed within the joint IMF-World Bank's Debt Sustainability Framework (DSF) for both low income and market access countries, also monitors closely the external (together with the public) debt-to-GDP dynamics (IMF, 2008).

would be losing money (simply because they would be getting rid of strong and fully sustainable bonds, whose "shadow" market price - to recall the concepts used in the literature on currency crises - is higher than their selling price).

Equation $d\theta^n = \alpha\,\theta^2 - (y - \bar{\iota})\theta$ reaches its minimum when $\theta = \frac{y-\bar{\iota}}{2\alpha}$ and has a zero value at points $\theta = \underline{\theta}^n = \frac{y-\bar{\iota}}{\alpha}$ and $\theta = 0$ (see Figure 3 below, corresponding to the case in which *ca* = 0 and $0 \leq y - \bar{\iota} \leq \alpha$, which satisfies the initial assumption that $0 \leq \theta \leq 1$).[12]

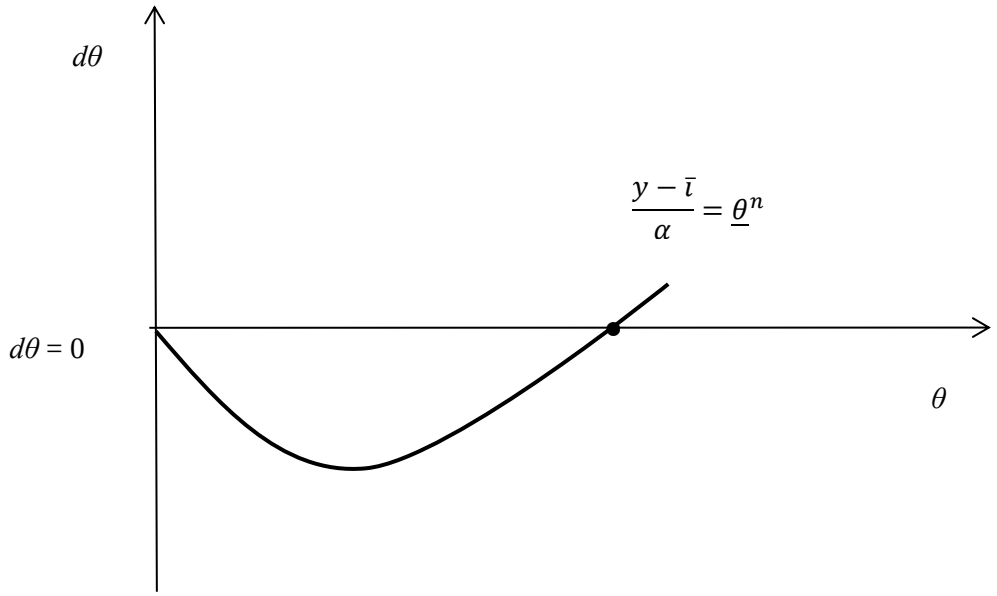

Figure 3: External debt sustainability curve, identifying $\underline{\theta}^n$, the critical value of θ in the case of a "good" state of expectations.

[12] It's easy to see that the stability region would be larger if *ca* < 0 (debt decreases, and the curve would shift downward), and smaller if *ca* > 0 (debt increases and the curve would shift upward).

3.3 Debtors' costs-benefits comparison and speculators' optimal decision considered jointly

By joining curve $B^n(\theta, \gamma^n = 0)$ of Figure 2 together with Figure 3 we obtain Figure 4 below that resembles closely Figure 1, the one which synthesizes the literature on speculative attacks on fixed exchange rates and identifies a region of stability, one of instability and an intermediate "gray" region characterized by multiple equilibria. Let us recall that Figure 4 below represents the situation of a "good" state of expectations.

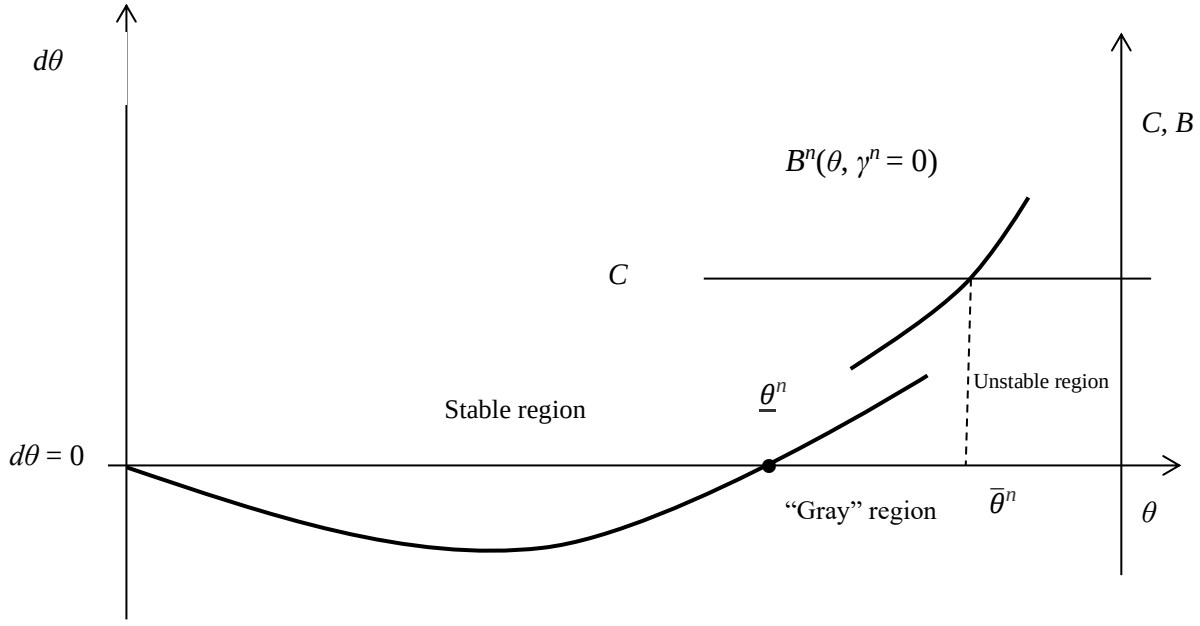

Figure 4: Stable ($\theta \leq \underline{\theta}^n$), unstable ($\theta > \bar{\theta}^n$) and intermediate "gray" ($\underline{\theta}^n < \theta \leq \bar{\theta}^n$) external debt regions with a "good" state of expectations.

4. Self-fulfilling speculative attacks on external debt with a "bad" and a "very bad" state of expectations

While Figure 4 above – obtained by following the theoretical model representing fixed exchange rates crises - provides a nice and intuitive representation of a standard external debt situation in case of a "good" state of expectations, we should ask ourselves what happens when expectations become "bad", even in presence of a relatively good state of economic fundamentals.[13]

By referring to the euro area crisis, for example, De Grauwe and Ji (2013) show that the risk premium that markets apply on interest rates depends not only on the state of economic fundamentals, that can be measured in objective terms (the public debt/GDP ratio, in their case), but also on the state of expectations. In particular, they show that when the state of expectations worsened as a result of the exogenous shock produced by the global financial crisis, *i* overreacted to the state of the public debt/GDP ratio, and a non-linear (quadratic) specification of the model improved the fit of their regression, implying a much higher interest rate response to public debt.

From a qualitative point of view, however, the same result can be represented by considering function i^d (where superscript *d* refers to the "bad" state of expectations), as follows:

[13] In the case of the euro area crisis, for example, De Grauwe and Ji (2013) stress the role of time dependency as reflecting a change in the state of expectations, Favero and Missale (2012) focus on contagion and Attinasi, Checherita and Nickel (2009) concentrate on the changes in international risk aversion.

(3) $$i^d = \bar{\iota} + \alpha'\theta,$$

with $\alpha' > \alpha$, and as a result, $i^d > i^n$.

Equation (3) above says that when the state of expectations is "bad", the nominal interest rate is much more reactive to θ, in qualitative accordance with De Grauwe's and Ji' (2003) findings reported above.

Rational speculators should be aware of the fact that i^d might be a positively biased nominal interest rate, resulting from a (presumably temporary) pessimistic state of expectations, and that in order to calculate the external debt stability condition it might be more appropriate to use interest rate equation (2) prevailing under "normal" conditions.

Quite often, however, markets act in an "emotional" way, by following the pessimistic or optimistic wave of the moment. Moreover, as in the famous Keynes' example of the "beauty contest", even rational speculators may well use such a biased interest rate in order to calculate the stability condition, rather than focusing on the state of the economic fundamentals under "good" and "normal" conditions, if they are expecting that this is the interest rate that markets assign (and may be assigning in the future) to the service on debt.

As a result, if, in a situation of a "bad" state of expectations, speculators (being them either rational or "emotional") use equation (3), rather than equation (2) above to evaluate the debt stability condition (1), the stability area would get reduced, and it would turn out to be included in the interval $(0 - \underline{\theta}^d)$. Still considering the case in which $ca = 0$ and still ignoring the many other elements that one may find in the external debt dynamics equation (see

footnote 7 above) the critical value separating the stable from the potentially unstable region will be $\underline{\theta}^{d} = \frac{y-\bar{\imath}}{\alpha\prime} < \underline{\theta}^{n} = \frac{y-\bar{\imath}}{\alpha}$ (see Figure 5 below).

This opens the way to the role played by self-fulfilling speculative attacks. If the "bad" state of expectations produces a reduction of the perceived stability area, self-fulfilling speculative attacks become possible even against a debt that was previously considered as sustainable under a "normal" state of expectations.

Such a modification of the equation representing the external debt stability condition has also a quite significant theoretical implication, especially if compared with the case of speculative attacks on fixed exchange rates. In the latter case, rational speculators are assumed to look at the objective state of the economic fundamentals and, at least in the standard and generally accepted versions of the relevant models, the state of expectations plays no role in determining the objectively determined "shadow" exchange rate (which results univocally from the level of economic fundamentals) to be compared with the fixed one. In the case considered here, instead, Equation (1) may resent of the different possible states of expectations, through the effect they play on the nominal interest rate to be considered in order to calculate debt sustainability. This result confirms the position of De Grauwe and Ji (2013) about the role played by expectational 'bubbles' in moving the spreads among the interest rates on public debt in a way that is disconnected from underlying fundamentals and in pushing a country into a bad equilibrium that "has the effect of changing the fundamentals in a self-fulfilling way" (p. 32).

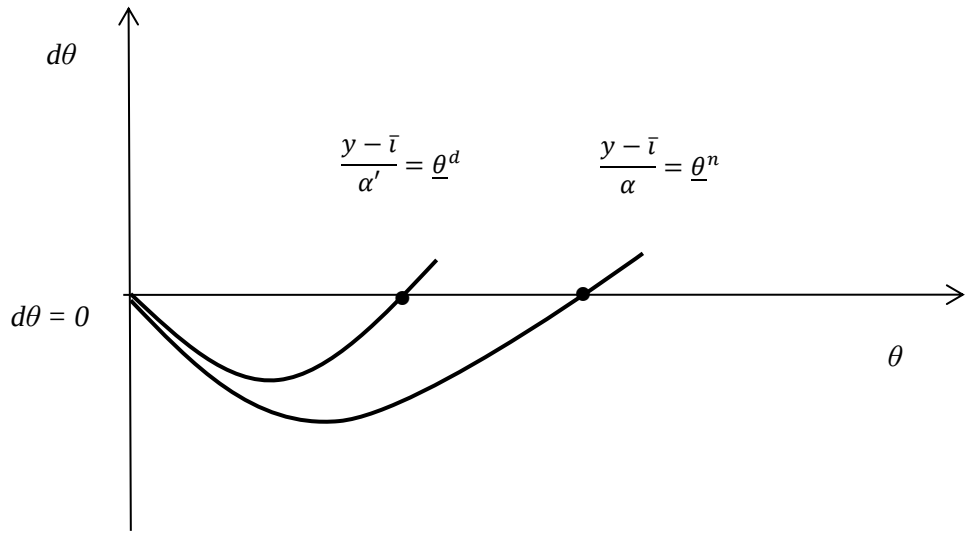

Figure 5: External debt sustainability curve, identifying the different critical values $\underline{\boldsymbol{\theta}}^{\boldsymbol{n}}$ and $\underline{\boldsymbol{\theta}}^{\boldsymbol{d}}$ in the case, respectively, of a "good" and a "bad" state of expectations.

Figure 6 below represents the three regions (stable, unstable and "gray") in the case of a "bad" state of expectations in which rational speculators calculate the nominal interest rate according to Equation (3) above and in which $0 < \gamma^d < \bar{\gamma}^d$.

It appears clearly that the stability region has shrunk ($\underline{\theta}^d < \underline{\theta}^n$) while at the same time the instability region has enlarged ($\bar{\theta}^d < \bar{\theta}^n$), compared to Figure 4 above.

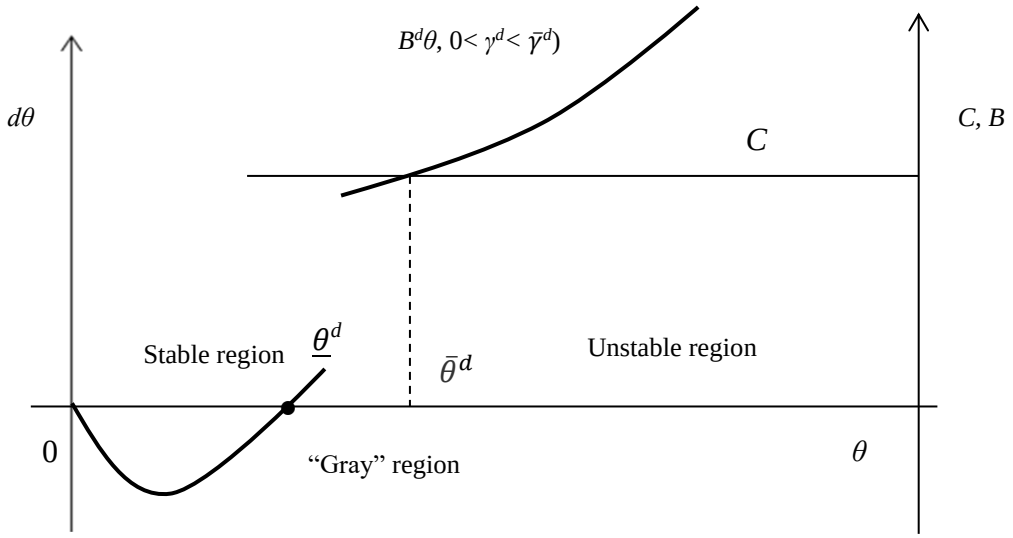

Figure 6: Stable ($\theta \leq \underline{\theta}^d$), unstable ($\theta > \bar{\theta}^d$) and intermediate "gray" ($\underline{\theta}^d < \theta \leq \bar{\theta}^d$) external debt regions with a "bad" state of expectations

When the state of expectations worsens further, the risk premium component of the nominal interest rate on debt would increase together with the increase of the proportion of speculators joining in the attack, so that both the critical level $\bar{\theta}^d$ and the critical level $\underline{\theta}^d$ get lower.

The occurrence and success of a speculative attack, then, depends more and more on the state of expectations and the proportion of speculators joining in the attack and less and less on the state of economic fundamentals. With a sufficiently large proportion of market participants joining in the attack against debt, the intermediate region may even vanish and the two critical levels of debt separating the stable from the unstable regions may coincide at a lower value, or it may be that $\bar{\theta}^d < \underline{\theta}^d$, as shown in Figure 7 below. In this case stability will be granted as long as $\theta \leq \underline{\theta}^d$.

Finally, as we know, when moving from a "bad" to a "very bad" state of expectations (in which $\bar{\gamma}^d \leq \gamma^{dd} \leq 1$), the critical level $\bar{\theta}^{dd} = 0$. [14] In such a case the risk premium component of the nominal interest rate on external debt may be so high that even the critical level $\underline{\theta}^{dd}$ may get close to 0, in which case we would have the (extreme and absolutely hypothetical) result of a purely self-fulfilling speculative attack, occurring even with an almost zero level of external debt. In this theoretical case a debtor – be it a country or the private sector – would have such a low level of credibility (reflecting in an extremely high risk premium on interest rates) that it would be subject to a rational speculative attack as soon as it starts issuing bonds!

The important qualitative result, however, is that the same level of debt which is considered as stable with a "good" state of expectations, may become unstable when the state of expectations becomes "bad" (and more so when it becomes "very bad"), due to the change of the interest rate reaction function and, in turn, of the equation determining the stability condition of debt. This makes possible the occurrence of self-fulfilling speculative attacks even for relatively low and/or unchanged levels of debt, as the literature stressed being the case, for example, in the public debt euro area crisis, and in many other currency or external debt crises of the past. This is also consistent with the conclusion reached by Obstfeld and Rogoff (1996) who, in asking themselves when is a country bankrupt, conclude that "…a foreign debt crisis can have self-fulfilling elements" (p.69).

[14] This would be the case if, for example, in the "very bad" state of expectations, the parameter α, reflecting the interest rate sensitivity to θ, would be taking extremely large values.

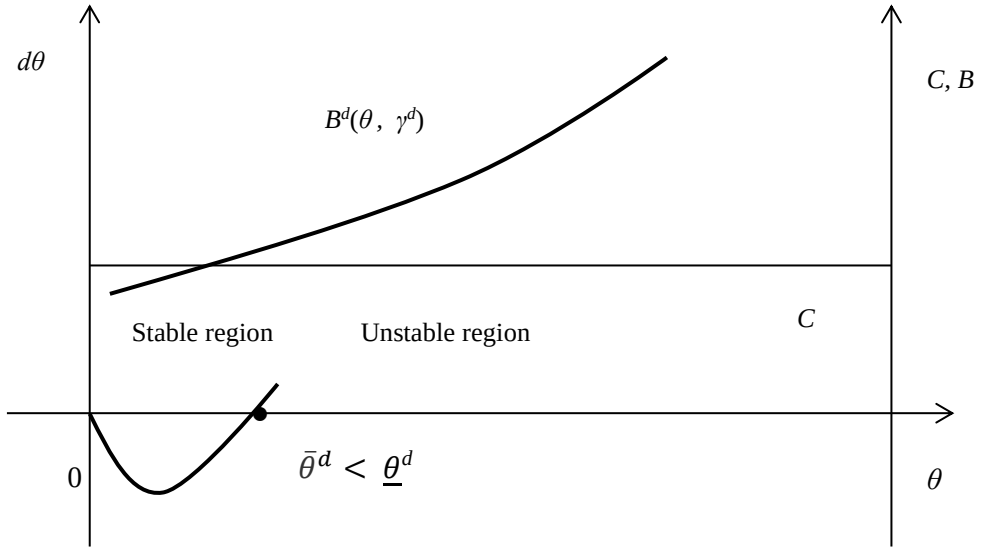

Figure 7: Stable (for $\theta \leq \underline{\theta}^d$) and unstable (for $\theta > \underline{\theta}^d$) external debt regions, in the case of a "bad" state of expectations.

5. Concluding remarks

The literature on speculative attacks on fixed exchange rates merged two competing explanations ("fundamentals driven" and "self-fulfilling" attacks) and identified three regions for the level of economic fundamentals: a region of stability, a region of instability, and an intermediate region of multiple equilibria, where an attack takes place only if speculators are able to coordinate their actions.

In this paper I have shown that speculative attacks on external debt (namely on public and private debt owned by foreign residents), can be interpreted within a similar framework, although in this case expectations may even change the state of economic fundamentals (the

sustainability of external debt) in a self-fulfilling way through the effect they exert on interest rate spreads.

The policy implications of such results are straightforward, although they may point in opposite directions.

A first conclusion may be that while keeping the "house in order", namely keeping sound economic fundamentals, is an objective to be pursued by all countries and debtors, this is especially important for those that may be more easily exposed to sudden changes in the state of expectations. This is the case particularly for less developed or developing countries with a past history of instability or characterized by an "original sin", as some authors described them.

A second conclusion, however, may suggest that since the role of expectations is so powerful, being capable even to overtake relatively strong economic fundamentals, speculation should be discouraged by the presence of institutions that should be credible enough to prevent the occurrence of panic and destabilizing self-fulfilling expectations. This is what ECB's president Mario Draghi did when, in July 2012, pronounced his famous "whatever it takes" speech, in which he played the role of a credible "lender of last resort" and that put an end (at least temporarily) to the euro area crisis. However, this is something that in many less developed and developing countries may be difficult to achieve, for the same reasons outlined above of low credibility and reputation. Moreover, this might have the well-known drawbacks in terms of moral hazard.

A third solution, then, may be to prevent speculation in the first place, by making it just impossible through the introduction of some direct limits or controls – something that the

recent literature is more and more debating - but again this is a measure that implies many pros and cons: the unresolved debate between free marketers and interventionists is still alive and well.

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