Emerging market sovereign debt: mitigating the serial default theory and identifying "stressed" countries

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There seems to be a consensus nowadays that emerging market countries globally have insured themselves against sovereign default risk through time. Nevertheless, due to the numerous sovereign default episodes in the emerging countries in recent decades, they have long been considered as condemned to default repeatedly over the course of time. However, as emerging market countries are a very diversified group and present varying types and extents of economic weaknesses from country to country; such results have to be nuanced, in order to break them down based on time horizon and country profile. The methodology presented here to discriminate into different vulnerability regimes enables us to identify countries that are more exposed to sovereign default, depending on their economic profile.

Do emerging market countries' specificities lead to a “typical” default pattern?

Emerging market countries have some specific features that make the explanation of their sovereign default episodes more complex than for developed countries and therefore worthy of study. To begin, higher volatility of their economic variables and imperfect information make their economies less predictable. Mimetic behaviours occurring on sovereign debt markets and not necessarily reflecting the economic fundamentals can then more easily lead to self-fulfilling crises, which can eventually drive a country to sovereign default. Besides, economic policies tend to be less credible in emerging market countries (less anchored monetary commitments and more pro-cyclical budgetary policies, notably due to weaker automatic stabilisers). Finally, they are also characterised by the so-called “original sin”, corresponding to a need to resort to short-term external debt. This last particularity makes these countries more sensitive to currency depreciation, which increases their foreign currency denominated debt burden. Their exposure to currency risk depends on the extent to which they rely on foreign financing and on their exchange rate regime. If currency stability has to be maintained, it limits money creation possibilities, unless there is a sufficient international reserve buffer to satisfy both needs. For these reasons, emerging market countries wanting to monetise their debt face some impediments, because they are constrained either by their fixed exchange rate regime or by currency mismatches which are strengthened by currency depreciation (in the case of a more flexible exchange rate regime).

In this framework, the “serial default” characterisation introduced by Reinhart and Rogoff (according to which inflation and default history are good predictors of a future potential new default episode), should probably be shaded. In fact, after the massive default events of the 80s and 90s (notably in Latin America, Emerging Europe and Africa), some emerging countries have evolved towards more domestic debt, less inflationary pressures, more countercyclical economic policies and/or more generally improved debt management. Nevertheless, not all of them have necessarily been able to do so at the same pace. As there are some countries having insured themselves against the fragilities mentioned above, we tried to identify them as being the ones having left the “debt trap”, defined by Sachs as being an absorbing state, from which it is difficult to escape. The idea is that a country can be more or less exposed to sovereign default (the origins of which can be of a diverse nature) through specific channels, depending on its economic specificities.

Different sources of sovereign default depending on the country’s features

The idea is to look at the axes that enable us to discriminate country-year observations into vulnerability regimes which differ in terms of the factors that can explain sovereign default. Not surprisingly, the lines of approaches appearing to be the most accurate are linked to the emerging markets’ specificities described above: external debt as a share of total exports, domestic savings’ ratio, interest payments compared to public revenues and international reserves as a share of short-term external debt. The advantages of the four corresponding models presented in Box is that they allow to:

1. highlight the axes able to discriminate country*years observations into distinct vulnerability regimes;
2. determine the threshold values defining the frontiers of the vulnerability regimes, along the axes underlined;
3. look at the characteristics that accompany more severe sovereign defaults: these characteristics are different depending on the regime to which they belong.

According to the first model based on external debt on exports for instance (as a threshold variable discriminating the observations into different regimes, see Box), we highlight three different types of sovereign default behaviour. Most countries are in the first regime, characterised by an external debt lower than 258% of exports. For them, a major default is more likely to happen essentially if they face inflation pressures, have a high public debt, and if they did not default recently. The countries whose external debt ratio is in an intermediary range (between 258% and 385%) are characterised by a different framework; they benefit from this “learning effect” even more. This goes against the “serial default” view, as it shows that some countries⁴ are able to learn from their past default errors, tending to face less severe defaults in the future if they had already coped with default in a recent past. Finally, the potential default of countries whose external debt on exports exceeds the 385% threshold goes along with different economic features than for the other regimes. This regime corresponds to extreme external debt situations⁵. These countries could potentially be considered as serial defaulters if they already defaulted in a recent past, as the recent default effect plays in the opposite direction for them. They are also likely to suffer an all the more serious sovereign default if they have to cope with inflation pressures, a depreciating currency, have a high public debt ratio and a deteriorated S&P rating.

This type of model shows that the characteristics going along with an important sovereign default have historically not been the same, depending on the external debt position (in comparison to total exports). Moreover, it underlines the fact that the countries having the highest external debt ratio are not necessarily the ones for which the expected default is the most severe.

Similarly, the other models (based on the three other axes cited above) also enable the sample to be broken down into different vulnerability regimes (differing in the sovereign default pattern). Therefore, according to its position along these axes, a country can be more or less prone to sovereign default depending on its economic profile.

A mosaic of less and more vulnerable states across countries and time: some countries still on the viewfinder

These four frameworks allow us to classify countries into different regimes depending on their position on these axes and to see if some of them have moved from one regime to another through time. As a matter of fact, some

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4 Whose external debt ratio does not exceed the 385% of exports threshold, which is estimated through the model.

5 Like Argentina in the 1980s and 2000s for example.
countries globally have moved along these axes through time, towards “a priori” less vulnerable regimes. This is for instance the case for Peru, Chile and Bulgaria, which all suffered severe defaults around 1990 and are no longer expected to default on the basis of 2013 data, using any of the four models presented above.

On the contrary, believing in this framework, some countries do remain prone to a relatively severe default. In fact, if we look over the 44 countries included in the most accurate model (based on external debt on exports), we can identify three for which the predicted amount of debt being in default is higher than 2% of GDP. These are Argentina, Venezuela (both being the most vulnerable), and then Russia as regards 2013 data. Looking at 2014 data, Ukraine also comes out as a vulnerable country. If we look at the model relying on domestic savings, Uruguay, Vietnam and Romania also present a predicted default barely higher than 2% of GDP (for 2013). What is interesting is that these countries are not necessarily in the “a priori” most vulnerable regime regarding the axis highlighted (characterised by high external debt on exports or low domestic savings), but present stressed values on the economic variables to which they seem to be sensitive (depending on the one specific vulnerability regime to which they belong).

Looking at the characteristics of the three most vulnerable countries according to the model based on external debt on exports (see breakdown of the expected amount of debt being in default, Graph 4), we can see that, on the basis of 2013 data:

- Argentina comes out to be the country for which the predicted default is the highest among the countries of the sample (6% of GDP according to this model)\(^6\). As Argentina’s external debt accounts for around 170% of its exports in 2013, it is –as are the large majority of the observations included– located in the “a priori” less vulnerable regime according to this axis. Nevertheless, Argentina’s individual characteristics\(^7\), (which could be linked to substantial restructuring in the past, and limited access to international debt markets for example) explain a generally higher amount of debt in default than in other countries. Then, the features appearing to drive this result are a high public debt ratio (around 40%) and very dynamic prices (11% year-on-year in 2013). After having defaulted heavily in 2002 and faced a major debt restructuring several years later, Argentina was consigned to default again on its external debt in 2014 due to “vulture funds” (i.e. funds having bought the restructured debt and asking for the entire reimbursement, despite the 70% cut accepted by the other creditors involved in the restructuring) asking for their money back. Even though this default is partly due to legal reasons (pari passu clause), this model seemed to be able to underline a stressed situation, based on 2013 data. In fact, according to 2014 data, the predicted default is more important than the year before, due to greater currency depreciation and higher public debt (to a lesser extent).

- Venezuela is apparently in the same situation. It has a rather sane ratio of external debt (around 130% of exports), but is still expected to default rather heavily according to the model (on 3% of its GDP). In fact, even if it benefits from strong individual features (which could be due to the closeness to the United States and the easy outlet it can constitute for oil exports for example), Venezuela suffers much more from inflation pressures (+41% year-on-year) than Argentina, and also more from high public debt (55% of GDP) and currency depreciation (of 46% relative to the US dollar in a year), in 2013. When looking at the 2014 data, this situation seems to deteriorate even more, primarily due to greater inflation and currency depreciation pressures. This is the illustration of the current extreme situation in Venezuela, whose currency recently heavily

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\(^6\) This conclusion is also true for the three other models, as regards Argentina.

\(^7\) Country fixed effects, for the individual characteristics not already taken into account in the other variables included in the model.

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“Argentina, Venezuela and Russia come out as the most vulnerable countries in 2013”
The estimated model is a Panel Smooth Transition Regression developed by Gonzalez, Teräsvirta, and v. Dijk (2005). The dependent variable $y_t$ is the amount of sovereign debt in default (as a share of GDP), and the framework is as follows:

$$y_t = \mu_i + \beta_0 x_{it} + \sum_{j=1}^{r} \beta_j x_{it} g_j(q_{it}, \gamma_j, \zeta_j) + u_{it}$$

With $\mu_i$ being the country fixed effects, $r$ the number of transition functions $g_j$ from one regime to another, $x_{it}$ the vector of explanatory variables (dummy for recent past default, annual change in exchange rate, year-on-year inflation, public debt ratio, external debt on exports and S&P rating), and $u_{it}$ the error term. The transition function $g_j$ depends on the threshold variable $q_{it}$. The four relevant models respectively rely on the following threshold variables: external debt as a share of total exports, domestic savings’ ratio, interest payments compared to public revenues and international reserves as a share of short-term external debt. It is continuous, bounded between 0 and 1 and related to the parameters as follows:

$$g_j(q_{it}, \gamma_j, \zeta_j) = \frac{1}{1 + \exp[-\gamma_j (q_{it} - \zeta_j)]}$$

With $\zeta_j$ being the thresholds delimiting the different regimes and $\gamma_j$ the parameter characterising the smoothness of the transition (very smooth if $\gamma_j \rightarrow 0$ and abrupt if $\gamma_j \rightarrow +\infty$). In this particular case, it looks like a logistic function, approaching 0 when $q_{it}$ is close to 0 and approaching 1 when $q_{it}$ is high enough. This transition function allows the coefficients $\beta$ linked to the explanatory variables to differ, depending on the value of the threshold variable $q_{it}$. If the transition is rather abrupt, the coefficient characterising the observations of the first regime (for which $q_{it}$ is lower than the threshold $\zeta_j$) is $\beta_0$, whereas the observations of the second regime (for which $q_{it}$ exceeds $\zeta_j$) are characterised by $\beta_0 + \beta_1$ As an example, the results of the model taking external debt on exports as a threshold variable are summarised herein:

<table>
<thead>
<tr>
<th>Dependent variable: amount of debt in default (% of GDP)</th>
<th>Regime 1</th>
<th>Regime 2</th>
<th>Regime 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threshold variable q: External debt (% of exports)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thresholds c</td>
<td>q &lt; 258</td>
<td>258 &lt; q &lt; 385</td>
<td>385 &lt; q</td>
</tr>
<tr>
<td>Part of the sample</td>
<td>91%</td>
<td>6%</td>
<td>3%</td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>Recent past default</td>
<td>-0.695*</td>
<td>-7.186**</td>
<td>13.106***</td>
</tr>
<tr>
<td>Exchange rate</td>
<td>0.027</td>
<td>-0.315**</td>
<td>0.052**</td>
</tr>
<tr>
<td>Inflation</td>
<td>0.108**</td>
<td>0.369*</td>
<td>0.465***</td>
</tr>
<tr>
<td>Public debt</td>
<td>0.042***</td>
<td>0.267***</td>
<td>0.276***</td>
</tr>
<tr>
<td>Ext.debt/Exports</td>
<td>-0.005</td>
<td>-0.006</td>
<td>0.010</td>
</tr>
<tr>
<td>S&amp;P rating</td>
<td>-0.069</td>
<td>-0.655*</td>
<td>-2.583***</td>
</tr>
</tbody>
</table>

Note: The majority of observations, for which external debt is lower than 258% of exports, are broadly characterised by the slope $\beta_0$. The observations for which external debt lies between 258% and 385% of exports are broadly characterised by the slope $\beta_0 + \beta_1$. The “extreme” observations, for which external debt is higher than 385% of exports, are broadly characterised by the slope $\beta_0 + \beta_1 + \beta_2$. Actually, each observation is characterised by a specific slope, varying more or less smoothly between these slopes characterising the extreme parts of each regime. The interpretation of these results is developed in the main text.

depreciated, essentially due to the fall in oil prices (as oil accounts for around 90% of the country’s exports).

- Finally, we would also underline the fragility of Russia, as this is the only other country presenting a predicted amount of debt in default higher than 2% of GDP in 2013, as regards the external debt model. Indeed, Russia suffers from its own country effect, which is the second highest among all countries included in the sample (after Argentina). This could be due for example to the fact that Russia’s economy is not particularly diversified, importantly relies on natural resources to fund interest payments. Inflation and public debt (resp. 7% year-on-year and 14% of GDP in 2013) also play in favour of an amount of debt in default which is likely to be higher. On the contrary, Russia’s S&P rating, which was fairly high in the end of 2013 (BBB) and containing information relative to market expectations, plays favourably, diminishing the expected amount of debt being in default.

Though none of the three countries cited above has effectively defaulted in 2013, the important idea here is to identify (through the description of the factors included in the model of sovereign debt being in default) the deteriorated economic situations which are likely to end in a sovereign default, even if the latter does not occur immediately. In this framework, this model underlined, on the basis of 2013 data (strengthened by 2014 data) the weaknesses of Argentina, Venezuela and to a lesser extent Russia, and could constitute a tool which would enable us to track an emerging market’s exposure to sovereign risk.

2014 data also reveals Ukraine as particularly fragile.

As of 2014 data, Ukraine also comes out to be vulnerable in terms of potential sovereign default.
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