## **Reply to the Referee Report 1 from 23 June 2015**

First, I thank the first referee for taking the time to read and to comment on my paper. Seemingly the referee works with dynamic stochastic model and maybe that's why he/she has the misunderstanding with my model in which the existence of the multiple equilibria does not depend on the dynamic stochastics. As Calvo (1988) introduced the "good equilibrium" and the "bad equilibrium", he actually used a deterministic model since it suffices to explain the multiple equilibria with a deterministic model. In my paper, I also focus on the explanation of the multiple equilibria and hence do not rely on the dynamic stochastic feature. That is, although I allow the future output to be random, I take it as exogenous and do not attempt to explain its distribution which is taken as given.

In the following I reply to the comments point by point to keep a clear structure:

- 1. The parameter  $\alpha$  represents the weight assigned to the average lender. Here I refer to average lender because it is assumed that the government cannot discriminate between domestic and foreign lenders, hence the government only knows roughly about the lenders, i.e. the government may know that 60% of the lenders are domestic citizens, but it does not know who owns which bond. In the literature the economists used to think that this weight is equal to the share of bonds owned by domestic citizens because the government is by definition an agent of its principles, the domestic citizens, and hence only cares for their wealth which is here the portion of government bonds owned by domestic citizens. This interpretation has been criticized by non-economists, especially the jurists say that the government is bound by laws which requires fair treatment of the lenders regardless of their countries of origin, i.e. also the wealth position of the foreign lenders should be regarded equally well as that of the domestic citizens. In my paper, I stay to the definition of  $\alpha$  as a weight assigned to the average lender and leave it open if it is just the share of domestic debt or more than that. For more details you can read my discussion section.
- 2. I have tried to comply with the common notation as far as possible, however, I could not use the same parameter notations as in each paper surveyed because they themselves also use different parameter notations. For instance, Calvo (1988) uses R<sub>b</sub> to denote the contracted (gross) interest rate, while Eaton and Gersovitz (1981) uses 1+rt to denote the same thing. Since I consider both types of models, I have to find a midway, hence in addition to explaining every parameter verbally when first introducing them, I have also reconsidered examples from Calvo (1988) and Eaton and Gersovitz (1981) in the appendix so that readers familiar with their papers can easily find out which parameter in my paper corresponds to which parameter in the cited paper.

I did not model the private household explicitly because the existence of the multiple equilibria does not depend on the risk aversion of the household, in this sense, my model is a PE (partial equilibrium) model instead of a GE (general equilibrium) model. But it is possible to implement the result into a GE model in which the Euler equation then needs to be added. In Calvo (1988) the debt may be partially repaid in the default case, while in Eaton and Gersovitz (1981), also in Arellano (2008), the debt is either completely repaid or not repaid. Because there is no empirical evidence yet which ultimately refutes any of the assumptions, I consider both types of models and have proven my result concerning the multiple equilibria and the effect of  $\alpha$  for each of them.

The deadweight loss  $x(\tau_t)$  is used in models following Calvo (1988) to explain default in case of purely domestic debt. This term may arise from an endogenous process like distortionary taxation but does not need to. In case that the result should be implemented into a GE model in which also the production sector should be explicitly modeled, then corresponding equations should be added.

Equation (4) seems to imply risk-neutrality of the investors, but it can also be used in case of risk-aversion in which the market return required by investors is higher than the alternative riskless interest rate. Since I do not intend to model risk-aversion, I will add here that this equation in first line applies to risk-neutrality. The endowment  $y_t$  may be stochastic or deterministic, but the distribution (in the deterministic case then a degenerate distribution) is taken as exogenous.

- 3. I have dropped  $y_t$  in the value function for better legibility because  $y_t$  is exogenous and not of interest here. In models following Eaton and Gersovitz (1981) it is necessary to distinguish between V<sup>d</sup> and V<sup>a</sup> because in the autarky case, the government does not have the possibility of default, hence  $\theta_t$  does not appear here as an optimizer. V<sup>d</sup> and V<sup>a</sup> are usually not equal since in the autarky period, the realized endowment is often not the same as in the default period. In the minor case of deterministic and non-varying  $y_t$ , V<sup>d</sup> and V<sup>a</sup> will happen to have the same numerical value but are still two different functions. When default occurs and V<sup>f</sup> switches to V<sup>d</sup> there is a "jump" in the value function, so it is not differentiable at this point, hence one has to analyze V<sup>f</sup> and V<sup>d</sup> separately.
- 4. Arellano (2008) is based on Eaton and Gersovitz (1981) and also considers purely external debt. I extend their models with the parameter  $\alpha$  so that the debt can be partially owned by domestic investors. Actually, as said,  $\alpha$  just represents the weight assigned to the average lender by the borrowing government. Hence, my extension actually allows the government under consideration to at least partially consider the interest of the lenders, while in their models the wealth position of the lenders is completely left out of consideration by the government so that a default equals a wealth transfer from the foreign countries which benefits the domestic citizens and this inclination to default can only be deterred by threatening with punishment for debt repudiation. Yes, mathematically, increasing  $\alpha$  reduces the wealth transfer effect while increasing debt level enhances this effect, hence the effect of  $\alpha$  is opposite to that of debt level b<sub>t-1</sub>. Calvo (1988) in turn deals with purely domestic debt, I then extend it with  $\alpha$  to cover cases in which the debt is partially owned by foreigners or for some other reasons the lenders are not as well regarded by the government as other domestic citizens.
- 5. I agree that a more full-fledged GE model with accompanying empirical work is more interesting for the practice and I welcome empirical researchers and practitioners to use my result in their work. The current empirical work about sovereign debt is either based on Calvo (1988) or on Eaton and Gersovitz (1981) or on some theoretical work based on either of the two papers. As Calvo (1988) has pointed out, there may be a "bad equilibrium" in which every variable has exactly the opposite effect as in "good equilibrium", this knowledge puts some difficulty on the empirical research which attempts to measure a certain effect of the variables, because if you have measured some effect for the past, you don't know if it holds for the future in which the situation may switch from the "good equilibrium" to the "bad equilibrium". Eaton and Gersovitz (1981) has ruled out "bad equilibrium" by assuming that the government and the investors will always agree on the smallest possible interest rate which maintains the market return. At the beginning of my paper, I have also adopted this assumption, but it is not satisfactory because in practice, people can still argue that they are just unlucky and are stuck in a "bad equilibrium" since the agreed interest rate is too

high. So I have to consider this issue further. In my section about multiple equilibria I then prove that while the "bad equilibrium" indeed exists, it is unstable and hence does not need to be further considered. Hence, empirical result from the past can also be projected for the future and one does not fear that the world may suddenly switch to the "bad equilibrium" in which every measured effect will turn into the opposite direction, because the "bad equilibrium" is unstable and the world will unlikely be in such state, and even in the unlikely case in which the world would enter the "bad equilibrium", it will immediately return to the "good equilibrium" whenever a small shock occurs which actually occurs consistently.

6. I will take a look at the introduction and see if I should give some points more emphasis. All papers cited in the referee report are already cited in my paper, but I'm always open for the suggestion of further related papers. Concerning the word "trust", I will take the suggestion by the referee and remove this word from the title. At the time of writing, the word "trust" seems to be a good choice, because regardless of why the government regards the lenders' interest -- be it because part of them are domestic citizens and can vote for or against the government, or be it because the government is bound by law which prescribes the government to protect lenders -- in any case the more regard of lenders' interest is proportional to the lenders' trust in the government to honor its debt. But after the publication I see that the word "trust" is used heavily in the media, sometimes also in the literature, while the authors often have different understandings about "trust". Hence, to avoid any further misunderstanding, I will remove this word from the title in the revised version.

I thank the first referee again for his/her comments which help me to rule out some common misunderstandings arising from reading my paper. I also thank Economics E-Journal to give the readers the opportunity of anonymous commenting which substantially increases the liveliness of communication. Although I have presented my paper on several conferences and workshops, for lack of time I could never get so many feedbacks as here. I am glad about my decision to submit my paper to Economics E-Journal and will strongly recommend it to scholars who are interested in the communication and discussion with their readers.

## References

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