FEP WORKING PAPERS
FEP WORKING PAPERS

Research Work
in Progress

n. 469 September 2012

Triffin's Dilemma Again and the Efficient Level of U.S. Government Debt

Abel L. Costa Fernandes [1,2]
Paulo R. Mota [1,2]

[1] **FEP-UP, School of Economics and Business, University of Porto**
[2] **NIFIP, Núcleo de Investigação em Finanças Públicas e Política Monetária, University of Porto**

U.PORTO
FEP
ECONOMICS AND MANAGEMENT

Triffin's Dilemma Again and the Efficient Level of U.S. Government Debt

Abel L. Costa Fernandes[1]

University of Porto – School of Economics and Business and NIFIP

Paulo R. Mota

University of Porto – School of Economics and Business and NIFIP

Abstract

The amount of outstanding U.S. sovereign debt has become a reason for worldwide concern especially after S&P downgraded it on August 5, 2011. The underlying analysis conducted by that rating agency followed the same methodological approach it applies to any other country's sovereign debt sustainability, ignoring the special role played by U.S. official debt in the world economy. In fact, that debt is not in the interest of that country alone, but also of governments, private investors and the public in general all over. The U.S. prints the world's most important reserve currency, and its debt provides a most valuable safe-haven asset capable of stimulating real economic activity everywhere and not only in the U.S. Consequently, it is important that the U.S. issue debt not taking into account its intertemporal budget constraint alone, but also the needs of the world at large on the grounds of an efficient world allocation of resources. U.S. government debt generates positive externalities to a vast number of economic entities not directly engaged in its transactions, for which reason the usual sovereign debt intertemporal budget constraint equilibrium solution is not Pareto efficient. The Pareto efficient solution should be larger and achieved through appropriate mechanisms including Pigou subsidies.

Key Words:

Sovereign Debt, Positive Externalities, Pareto Efficient Amount of Sovereign Debt

JEL Codes: G12, G14, H23, H25, H63

[1] Corresponding author: Abel L. Costa Fernandes, Faculdade de Economia, Universidade do Porto, Rua Dr Roberto Frias, 4200-464 Porto, Portugal.
E-mail: abelf@fep.up.pt.
Phone: 351-225571100

1. Introduction

Robert Triffin became famous in the 1960's especially because of the dilemma he so clearly understood and explained in his book *Gold and the Dollar Crisis: The Future of Convertibility* (1960), known from then on as Triffin's dilemma.

The international monetary system was at the time based on the Bretton-Woods agreements which put into practice an adjustable-peg exchange rate regime founded on gold and, equivalently, on the U.S. dollar. For foreign central banks, gold was as good as U.S. dollars since the American currency was freely exchangeable for that precious metal at the official price of USD 35 per troy ounce.

International liquidity was one of the three major problems facing the regime. It was solved by means of large and continuous U.S. balance of payments deficits financed mostly by the accumulation of U.S. dollars on foreign central banks' reserves. Faced with the absence of sound alternatives to the US dollar, U.S. balance of payments deficits were the only way to accomplish two important tasks with respect to international liquidity: a) the redistribution of the existing stock of official gold throughout the regime's participating countries; b) to increase world's liquidity in order to finance growing international trade and the world's GDP expansion. But, at the same time this was happening, the ability of the U.S. government to honor its obligations within the exchange-rate regime (full USD convertibility[2] into gold at the official peg) was continuously eroding, threatening the credibility and sustainability of the Bretton-Woods regime. Therefore, the dilemma was: a) if the U.S. were to stop running deficits on its balance of payments to improve its gold solvency ratio, the world's economic growth fed by rising flows of international trade would come to a halt, and recession and social unrest would follow; b) but if everything continued as usual, ultimately the Bretton-Woods system would break down by a crisis of confidence. Actually, the regime collapsed in August 1971 when President Nixon finally declared the U.S. dollar inconvertibility into gold.

Notwithstanding, the U.S. dollar went on playing the role of sole international currency due to the U.S. economic, military and political pre-eminence worldwide, as well as the country's political, institutional, social and financial stability topped by generalized confi-

[2] As long as they were held by foreign official reserves.

dence in the central bank's commitment to price stability. In fact, from 1971 up to the present the world has been in a dollar standard; the role played by currencies like the British pound, the Swiss franc, the Japanese yen and even the euro failed to lead to a multipolar system. It is mostly the opportunity to invest in U.S. treasuries that encourages public and official foreign entities to accept U.S. dollars in payment for the goods and services they sell in world markets. Besides being issued in its own currency, the market for U.S. treasuries has no equal when it comes to liquidity and depth, and expectations of default are non-existent. In so being, in an environment of rising international trade, the continuation of this dollar standard requires high and systematic U.S. general government deficits year after year.[3] Starting in the mid seventies, the U.S. federal government debt held by the public has followed an upward trend, going from about 23.9% of U.S.A.'s GDP in 1974 to a projected 74% by the end of 2011.[4] In fact, the amount of debt issued shot upwards in 2008 and following years especially because of the counter-cyclical fiscal policies adopted to stabilize the economy and financial markets,[5] but also due to structural imbalances between revenues and expenditures.[6] Hence, Triffin's dilemma hits again: either the U.S. keeps feeding the market with more debt in spite of its implications for its government solvency, or the world looses an invaluable safe haven asset, moreover capable of stimulating world's real GDP.

On August 5 2011, S&P downgraded the credit rating of the U.S. government debt from AAA to AA+. The critical argument offered by the rating agency in support of its decision was that, contrary to countries like Germany and France where the debt to GDP ratio is even higher than the U.S.A.'s, it does not expect the reversal of its ascending trajectory any time soon. In its base scenario, the agency projects debt to increase to 85% of GDP by 2021, and to 101% in its worst scenario. In doing so, S&P was conveying two fundamental ideas of its own: a) at 74% of GDP, the U.S.A. has attained an unsustainable debt level; b) the economic analysis concerning the sustainability of sovereign debts is no different for the U.S.A.

[3] Since the collapse of the Bretton-Woods regime, the budget of the federal government was in surplus in the period from 1998 to 2001 only.

[4] Debt held by the public is a gross value because the value of the financial assets acquired by the government is included. Even though public debt held by the public net of financial assets is a better measure of the government's financial condition and overall impact on financial markets, quite often there are considerable difficulties in its correct evaluation. As an average for the period 1974-2010, 5% of the debt held by the public is in the hands of the FED.

[5] Both national and foreign. The latter give rise to positive externalities.

[6] By the end of fiscal year 2007, federal debt in the hands of the public amounted to 36.2% of GDP. In the following three years, that amount turned out to be 40.3%, 53.5%, and 62.2%.

as for any other country. Therefore, *ceteris paribus* we should expect that following the downgrade of American's government debt, its yield would raise reflecting higher credit risk. Yet, as a refuge asset, yields on U.S. treasuries are negatively correlated with market volatility and risk aversion for which reason their yields in fact decreased instead of going up! For comparative purposes, the table below shows the evolution of some ten-year maturity triple A sovereign debt yields as well as U.S.A.'s along the mentioned time period.

Table 1. *Yields of Selected Ten Year Maturity Sovereign Debts (in %)*

Country	January 5th, 2011	July 5th, 2011	August 5th, 2011	August 8th, 2011	August 16th, 2011	%Change August 5th-August 8th	%Change August 5th-August 16th
Finland	3.17	3.31	2.94	2.64	2.68	-10.20	-8.84
France	3.36	3.48	3.25	3.11	2.96	-4.31	-8.92
Germany	2.97	2.98	2.35	2.27	2.28	-3.40	-2.98
Netherlands	3.17	3.34	2.79	2.69	2.66	-3.58	-4.66
Sweden	3.23	2.93	2.36	2.25	2.19	-4.66	-7.20
U.K.	3.55	3.33	2.77	2.66	2.50	-3.97	-9.75
U.S.A.	3.49	3.13	2.55	2.34	2.22	-8.24	-12.94

This table displays some noteworthy information deserving to be looked at attentively. First, in the period prior to the downgrade, debt issued by Germany and Sweden benefited from the lowest yields in this selected AAA sample. At the beginning of the year, the spread of the U.S.A. debt with respect to Germany's was 52 basis points. Secondly, in the first trading day subsequent to that event all the yields in the sample took lower values but, second only to Finland's, the yield on U.S.A. debt was the one which dropped the most, exactly 21 basis points, or 8.24% in comparison to its previous value. Thirdly, this downward movement continued in the trading days ahead, such that on August 16 the yield on the American sovereign debt was 12.9% lower, the same as 33 basis points, when compared to its value immediately before the credit rating downgrade and, with Sweden's exception, became the lowest among all the countries in the sample.

The across the board decline in those yields is correlated with the rise in equity markets' perceived risk as evaluated by implied volatility. The CBOE volatility index, whose ticker is VIX, measures the implied volatility of the S&P 500 index and, as such, it is a credible barometer of investor sentiment, or risk aversion sentiment. In the period from 2004 through 2010, the correlation coefficient between VIX and the S&P 500 index ranged from -

0.75 in 2009 to -0.85 in 2007, -0.84 in 2008 and again in 2010.[12] On selected years, VIX's maximum close values are listed in table 2.[13]

Table 2. *VIX's Peak Values in Selected Years*

Dates	23-Aug-90	30-Oct-97	8-Oct-98	20-Sep-01	5-Aug-02	16-Aug-06	12-Nov-07	20-Nov-08	8-Aug-2011[16]
VIX`s Values	35.47	38.20	45.74	43.74	45.08	30.83	31.09	80.85	48.00

On August 5 2011, VIX quoted at 32.00, and on the 16th of the same month at 32.85, whereas on January 5 it stood at only 17.07. This data puts into evidence the existing negative relationship between bond yields and volatility in the equity market, as well as the sizeable reduction in investor's confidence caused by the unexpected cut in the U.S.A. sovereign debt credit rating.

The fact that faced with S&P credit rating cut the yield on American Treasury 10 year notes was the one to decrease the most, instead of rising, is a clear indication of the special role played by American debt in today's world economy. With an estimated USD 10.856 billion in circulation at the end of 2011,[17] the market for the U.S.A. sovereign debt enjoys levels of liquidity and depth without parallel. It functions not exclusively to finance American government budget deficits, but also as an asset of refuge for governments and investors worldwide. About 47% of that debt is held by foreign entities; China at the top of the list, followed by Japan, the U.K., the oil exporting countries, Brazil, etc. In so being, when the U.S.A. government issues debt it is rendering very important services to others, which go well beyond its own specific financial and economic interests. Not only U.S.A. debt provides shelter to investors' assets, as it ensures a floor for wealth preservation that generates utility to everybody. This last outcome comes across because wealth preservation helps to stabilize economic conditions, and is a powerful engine for economic recovery once countries are in recession or depression.

Our argument is as follows: besides providing utility to those directly involved, and whose costs and benefits are internalized through the price system, American sovereign debt also generates positive externalities to the world's population in general. Because it preserves

[12] Data source: CBOE, http://www.cboe.com/micro/VIX/pdf/VOLCHARTS_QRG%20tempFORstac.pdf.
[13] Data source: http://finance.yahoo.com/q/hp?s=^VIX&a=0&b=2&c=1990&d=7&e=18&f=2011&g=d&z=66&y=0
[16] August 17th was the last observation available for the year when this text was written.
[17] Federal government debt held by the public.

not only wealth with all the benefits attached, but also because when the U.S. government issues debt to stimulate its economy out of recession it contributes powerfully to the recovery of other country's economies. This same line of argument applies to the benefits that U.S.A. military expenditures extend to its allies in NATO or in any other military organization. Then, by definition, the usual sustainability solutions for the amount of sovereign debt is not Pareto efficient, since it is well known that externalities produce sub-optimum allocation of resources. Three inter-related corollaries follow from this last statement:

a) The world's socially efficient solution for the amount of debt to be issued by the U.S. government is higher that the indicated by the debt sustainability solutions;

b) The assessment of the American sovereign debt credit risk should not follow the standard procedures applied to non-world reserve currency countries;

c) The yield on that debt should be lower than its market solution by the external marginal benefits it generates at the socially efficient solution.

The next chapter attempts at illustrating the mechanics of the argument and of the corollaries stated above.

2. Equilibrium Solution in the Secondary Sovereign Debt Market

American sovereign debt trades in world markets. Both national and international, as well as official and private investors supply funds in this market, which is tantamount to demand bills, notes and treasury bonds.[19] On the other hand, investors demand these funds when they decide to supply debt securities and cash in at their market prices. At any time, we are dealing with stocks of debt, whose existing amount depends on government's present and past budget balances.

Then, the funds supply function in this market, measured as a proportion of GDP at time t, is written in the equation below:

$$\boldsymbol{S = f(y, Cr, V, R)} \tag{1}$$

[19] For example, bills, notes, perpetuities, etc.

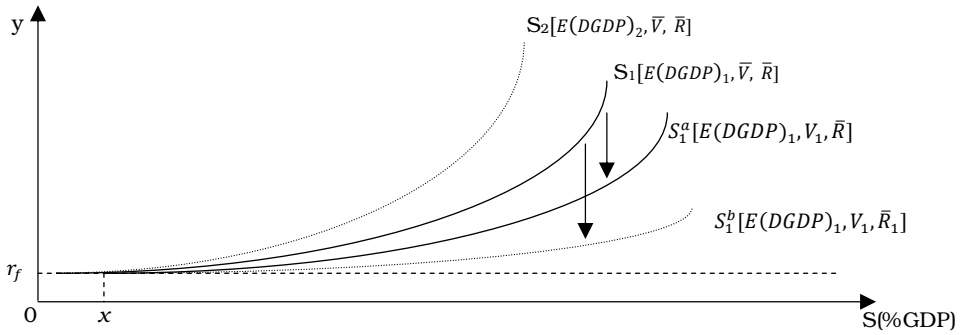
The meanings of the symbols used are: y, the yield on sovereign debt;, the sovereign debt's risk implied in its credit rating; V, the risk level of the equity market as perceived by investors, and measured by a fear index like CBOE's VIX; R, the country's currency quality as an international refuge quantified by means of an index. By its own nature, R is basically a parameter in the short-run though subject to gradual changes in the medium and long-runs.

With respect to Cr we write it as an increasing function of the actual stock of debt as a proportion of GDP, and of its expected growth rate in the medium-run. Accordingly, we have:

$$Cr = g(DGDP, E(DGDP)) \tag{2}$$

$DGDP$ stands for the actual stock of debt at time t as a proportion of GDP, and $E(DGDP)$ as its expected value in the future, based on the best vector of information available at time t.

Figure 1. *Funds Supply Curve in the Secondary Sovereign Debt Market*



We expect the following functional relationships: $\frac{\partial S}{\partial y} > 0$; $\frac{\partial S}{\partial Cr} < 0$; $\frac{\partial S}{\partial DGDP} < 0$; $\frac{\partial S}{\partial E(DGDP)} < 0$; $\frac{\partial S}{\partial V} > 0$; $\frac{\partial S}{\partial R} > 0$. Figure 1 shows the relationship between the supply of funds, as a proportion of GDP, and the yield y.

These supply curves are concave meaning that the offered yield increases at an increasing rate with supply and, in so being, the concavities are an expression of the credit risk arising from the actual relative levels of government indebtedness.

Supply curves S_1 and S_2 relate to two different countries, and assume equal values for V and R. The difference between the supply conditions faced by these countries is that the market expects a higher future upward debt trajectory for country 2 than for country 1. Accordingly, depending on how these expectations change, supply curves will move up or down. At sufficiently low levels of indebtedness, for example, for all values of $S(\%GDP) \leq x$, credit risk does not exist and the risk free interest rate r_f is charged. Therefore, we redefine risk free interest rate in this manner: the interest rate investors are willing to charge when the actual sovereign indebtedness as a proportion of GDP is so low that they do not sense any credit risk whatsoever. This definition is slightly different from the conventional one since I impose a loose condition for the absence of credit risk.

For any values of $E(DGDP)$, increased volatility in the equity market pushes down the supply curve, and this movement is so much stronger the more debt is issued by a worldwide reserve currency country. Investors treat bonds and stocks as substitutes. Let's focus on country 1 again; if volatility increases in the equity market, such that $V_1 > \bar{V}$, the supply curve goes down. If, in addition, country 1 prints international money and, as a consequence, $\overline{R_1} > \bar{R}$, the downward movement is more pronounced and goes as far as curve $S^b{}_1[E(DGDP)_1, V_1, \bar{R}_1]$.

As a proportion of GDP, we assume that the demand for funds in the secondary sovereign debt market is a negative function of the: a) yield; b) volatility in the stock market; c) index of world reserve currency; d) government's budget balance. And a positive function of the government's debt risk. In effect, the stock of debt outstanding is a consequence of past and present budget imbalances, such that deficits raise the amount of public debt, whereas surpluses reduce it. All variables are referred to time t. Formally, all this is stated in the equation that follows next.

$$\boldsymbol{D = g(y, Cr, V, R, GBB)} \tag{3}$$

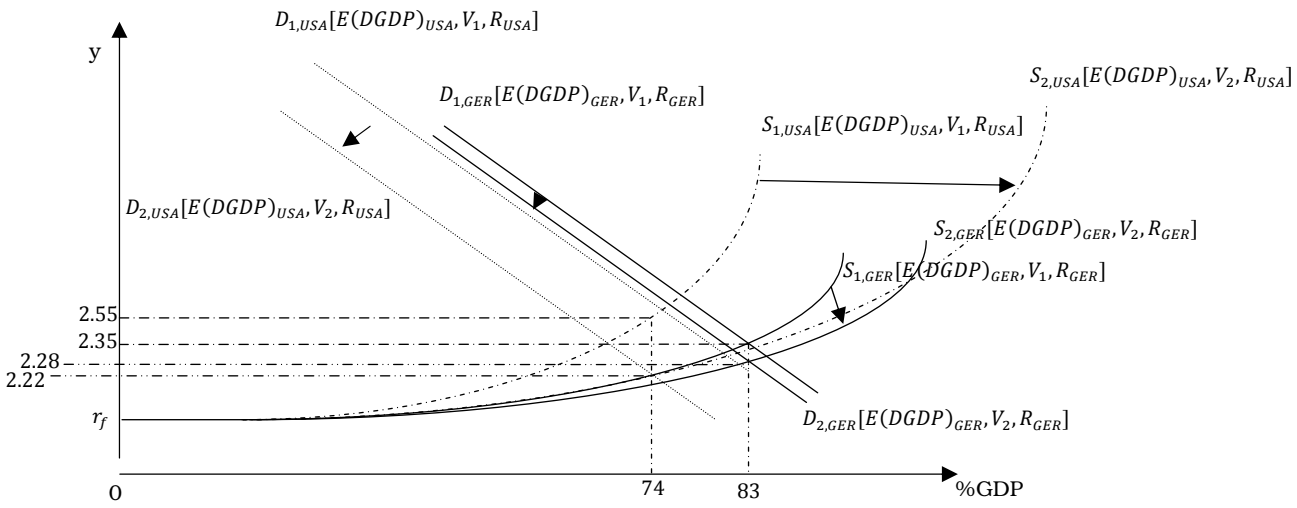
D is the demand function, GBB is the period's government budget balance, and we expect: $\frac{\partial D}{\partial y} < 0$; $\frac{\partial D}{\partial Cr} > 0$; $\frac{\partial D}{\partial V} < 0$; $\frac{\partial D}{\partial R} < 0$; $\frac{\partial D}{\partial GBB} < 0$.

In a two dimensional space, with the yield being measured on the vertical axis, the demand curve is downward sloping. Moreover, it will move to the right or to the left depend-

ing on changes in the values of the other explanatory variables at time t according to the signs of the first order partial derivatives above.

Figure 2 below shows the sovereign debt market's equilibrium solution for two countries, for example, Germany and the U.S.A.. For illustrative purposes, I take the debt values estimated on August 5th, 2011 for year's end, as well as S&P critical assumption that while Germany had embarked on a downward trajectory for its debt to GDP ratio, exactly the opposite was true for the U.S.A.. The initial market equilibrium solution is determined by demand and supply conditions denoted with subscripts 1 for each one of both countries. The interplay between supply and demand shows that, *ceteris paribus*, increases in expected future trajectories of debt leads to higher yields through upward movements on both curves.

Figure 2. *Equilibrium Solution in the Secondary Sovereign Debt Market*



As mentioned in section 1, the unexpected decision taken by S&P, coupled with additional distressing economic information, resulted in a 50% rise in the VIX index, from Friday 5th to the next trading day, Monday 8th 2011. World investors ran away from stocks and took refuge in bonds. Both supply and demand curves for funds in the secondary market for bonds moved downwards, with special emphasis for U.S. sovereign debt due to its particular standing as the world's most important safe-haven asset. Differently from what one would expect

from commonly used valuation models, the yield on American debt fell substantially, not just in absolute but also in relative terms, instead of rising, largely as an outcome of the U.S. treasury's ability to play that role. In fact, following S&P downgrade, those yields reached historically low levels. That is, the impact explained by its role as a refuge asset more than compensated the one arising from its amplified credit risk. Demand and supply conditions denoted with subscripts 2 for each of the two countries determine market equilibrium solutions following S&P downgrade.

The compensated effect just referred to means, in fact, that market participants didn't value S&P's decision to downgrade in any significant way. Bohn's paper (2011) sheds some light on why that was the case. In spite of negative USA's primary budget balances for the periods 1792-2010 (0.3% of GDP) and for 1915-2010 (1.2% of GDP) (Bohn, 2011, p.5), in average, there was never a case of U.S. government insolvency. Besides having benefited from average interest rates charged on public debt significantly below the U.S's average real growth rate (4.7% compared to 6.7% for the period 1915-2010, (Bohn, p.4)), from a long-term fiscal reaction function that fulfilled the necessary and sufficient conditions for sustainability,[21] on top of that the intertemporal budget constraint has been wholly satisfied by the covariance with the systematic risks reflected in the stochastic discount rate of expected future budget cash-flows (Bohn, 2011, pp.5-6).

3. The World's Socially Efficient Amount of U.S. Sovereign Debt

S&P alleged that the amount of U.S. debt already issued, coupled with its anticipated trajectory, was unsustainable and, therefore, undesirable. By doing so, the rating agency caused deep and widespread commotion. The ensuing impact in the stock markets, on investor's and general public`s expectations concerning the future performance of the American economy and on people's psychology were enormous and depressing. I argue that even though S&P's analysis might be correct under an exclusively national perspective, it is flawed in one important theoretical respect, potentially leading to erroneous evaluations and needlessly global detrimental consequences.

[21] A positive relationship between primary budget surpluses and debt to GDP ratios.

Our argument states that the amount of sustainable U.S. government debt should not be measured in the same manner as any other country's debt. Specifically, we argue that it generates positive externalities that benefit people and organizations not directly involved in its transactions. And, as it is well known, solutions that do not incorporate externalities are socially inefficient. These externalities arise at least from two sources, which are:

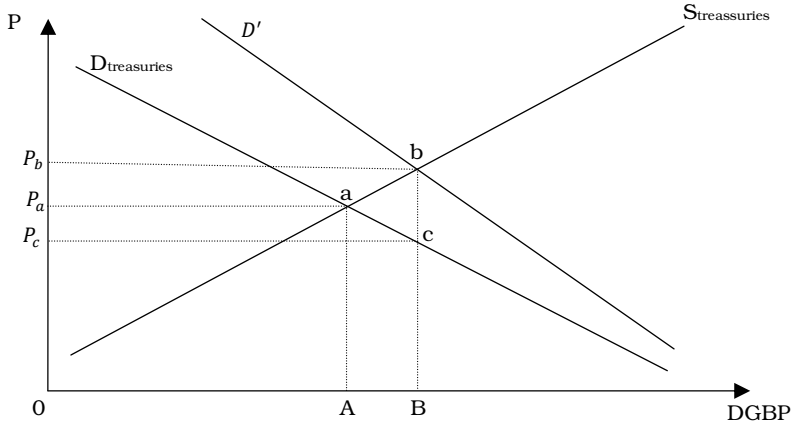
a) Given its role as a refuge asset, that specific debt provides a floor to investor's wealth and, in so doing, it acts as an automatic stabilizer to the world economy; indeed, it is well known from economic theory the influence played by wealth on important macro-economic variables;

b) When the U.S.A. stimulates its own economy out of recession by means of expansionary fiscal policies financed by new debt, it is doing the same to all countries; this same type of argument goes with U.S. defense expenditures concerning the effective protection it effectively accords to its allies both in times of peace and war.

In view of what the theory on efficient allocation of resources establishes, the external marginal benefits to the world economy generated by the issuance of U.S. sovereign debt must be taken into account, in addition to the private marginal benefits already incorporated in the demand curve for the "consumption" of debt. Taking advantage of the negative relationship between yield and treasury's market prices, the figure below illustrates the argument in the manner typical to the theory of externalities under partial equilibrium analysis. Implicitly we add demand curve D^* which identifies the marginal benefits collected by those who do not demand treasuries in the market, but nevertheless benefit from other's demand as represented by $D_{treasuries}$, because of the beneficial and unintended spillovers not internalized by the price system. The measure of the social marginal benefits generated by the activity is given by the vertical summation of curves $D_{treasuries}$ and D^*[23], as identified by curve D'.

[23] The demand curve $D^*$is not shown in the figure to not overcharge it.

Figure 3. *Positive Externalities in the Sovereign Debt Market and the Efficient Amount of Debt*



The equilibrium solution given by the intersection point a is the one determined by market demand and supply, abstracting from the externalities generated by this kind of sovereign debt. We assume it corresponds to the debt sustainable solution. The coordinates of point b give the socially efficient solution for debt when positive externalities are taken into account and, accordingly:

a) The amount of debt issued by the world currency country should expand from A to B; the stock of sovereign debt given by A might be associated with its sustainable value in the absence of positive externalities;

b) For that to happen it is necessary that debt is issued at a lower price, P_c, which corresponds to a higher yield, in order for that larger amount be absorbed by demand;

c) The issuing country would require a lower interest rate, higher price, P_b, in order to go along with this normative expansionary result, that is, to ensure its own solvency in face of debt expansion beyond the usual sustainability conditions;

d) All this is tantamount to grant to the issuer reserve currency country a subsidy equal to the segment bc per unit of debt;

e) The amount of that subsidy is equal to the marginal external benefits at the world's socially efficient quantity of debt, B.

The lower offer yield charged on that government's debt is an essential feature of this mechanism because in spite of the higher debt responsibilities, the economically justifiable reduction on interest will keep it on a sustainable path.

The equation for the level of sustainable debt, as a proportion of GDP, is as follows below, Equation (4).

$$\frac{D}{Y} = \frac{\frac{R-G}{Y}}{[r-\dot{y}]} \tag{4}$$

where $(R-G)$ is the primary budget balance, Y is the GDP level, r the real interest rate charged on public debt, and $\dot{y}$ is GDP's real rate of growth. The subsidy on the interest rate, denoted by s, would raise the ratio by lowering the denominator, by $\frac{s}{[r-\dot{y}]-s}\ \% > 0$, since $[r-\dot{y}] > s$.

But, of course, the main question now is who is going to pay for these optimum debt inducing subsidies. Since the critical assumption here is that this particular debt produces utility outside the political borders of the issuing country, foreign beneficiaries are the ones who should be held accountable for paying that subsidy to the U.S. government. On practical grounds this could be done by empowering an international organization like the IMF, whose participating countries were supposed to contribute according to the external benefits they enjoy from U.S. debt stimulus to their economies. In turn, the revenue necessary to cover these payments should be raised by taxes on non-American residents. In fact, this mechanism could take advantage in its implementation of the IMF long-held experience with credit facilities. As acknowledged before, the U.S. government is a creditor in this scheme.

This is a market type mechanism to induce the efficient allocation of resources in the presence of externalities following the tradition of Coase because it would come about through negotiations among the countries involved. In fact, considering the reduced probability attached to the development of a consistent and credible multipolar system of world safe reserve assets,[25] the mechanism we propose is a substitute, and potentially a more stable one, resting on international co-operative agreements that anchor the fiscal capacity of the U.S. government.

[25] The hypothetical Eurobonds would play, if ever issued, this role.

4. Conclusions

The present day international monetary system, not the international exchange-rate regime, is a USD standard. However, it is a *de facto* system, not a *de jure* system based on international agreements and supported by governing institutions and rules forcing consistent behavioral patterns by the member states. In an increasingly interpendent world economy, based on free trade and capital flows, it is undeniable the need for an efficiently functioning international currency. By means of the reasons already mentioned in this paper, the USD acquired the role of the sole international currency, but it remains to be addressed the question concerning its efficient provision of that most important function. Moreover, at this time, no other national currency we know of aspires to compete with the USD in this position; quite on the contrary, the present day difficulties and loss of credibility of the euro has only reinforced the unlikelihood of a multipolar reserve system. Among a variety of other reasons, it is quite understandable that other countries with such a potential, like Japan and China, oppose playing such a role, bearing in mind the economic losses they would experience derived by the appreciation of their currencies. That is why the Central Bank of Japan has strongly intervened in the currency market these last weeks.

The informal USD standard from which we benefit today succeeded to minimize the negotiation costs, but suffers from considerable flaws that generate worldwide instability harmful to sustained growth and prosperity. The need for its improvement is visible, the more so under the present economic circumstances. The proposal I present here has as its starting point an obvious market distortion that has not been attended to so far. The question of efficiency demands an organic building of the international USD monetary standard.

References

Bohn, H. (2011), "The Economic Consequences of Rising U.S. Government Debt: Privileges at Risk", *FinanzArchiv: Public Finance Analysis*, 63 (3): 282-302.

Buchanan, J and Stubblebine, W. (1962), "Externality", *Economica*, 29 (16): 371-84.

Coase, R. (1960), "The Problem of Social Cost", *Journal of Law and Economics*, 3: 1-44.

Coase, R. (1988), *The Firm, the Market and the Law*, University of Chicago Press.

Farhi, E. and Gourinchas, P.O. (2011), "Reforming the International Monetary System", CEPR.

Pigou, A. (1918), *The Economics of Welfare*, MacMillan.

Pigou, A. (1942), *A Study in Public Finance*, 3rd ed., MacMillan.

Recent FEP Working Papers

468	Mariana Cunha and Vera Rocha, *On the Efficiency of Public Higher Education Institutions in Portugal: An Exploratory Study*, September 2012
467	Paulo R. Mota, Abel L. Costa Fernandes and Ana-Cristina Nicolescu, *The Recent Dynamics of Public Debt in the European Union: A Matter of Fundamentals or the Result of a Failed Monetary Experiment?*, September 2012
466	Elena Sochirca, Oscar Afonso and Sandra Silva, *Political rivalry effects on human capital accumulation and inequality: a New Political Economy approach*, September 2012
465	Mariana Cunha and Paula Sarmento, *Does Vertical Integration Promote Downstream Incomplete Collusion? An Evaluation of Static and Dynamic Stability*, August 2012
464	Andreea Stoian and Rui Henrique Alves, *Can EU High Indebted Countries Manage to Fulfill Fiscal Sustainability? Some Evidence from the Solvency Constraint*, August 2012
463	João Correia-da-Silva and Joana Pinho, *The profit-sharing rule that maximizes sustainability of cartel agreements*, August 2012
462	Ricardo Biscaia and Paula Sarmento, *Cost inefficiency and Optimal Market Structure in Spatial Cournot Discrimination*, August 2012
461	Pedro Cosme Costa Vieira, *A low cost supercritical Nuclear + Coal 3.0 Gwe power plant*, August 2012
460	Duarte Guimarães, Ana Paula Ribeiro and Sandra Silva, *Macroeconomic Fundamentals of Poverty and Deprivation: an empirical study for developed countries*, May 2012
459	Vera Catarina Rocha, *The Entrepreneur in Economic Theory: From an Invisible Man Toward a New Research Field*, May 2012
458	Abel L. Costa Fernandes and Paulo R. Mota, *The Present Sovereign Debt Crisis of the Euro Zone Peripheral Countries: A Case of Non-Mature Democracies and Less Developed Economies*, April 2012

Editorial Board (wps@fep.up.pt)
Download available at: `http://wps.fep.up.pt/wplist.php`
also in `http://ideas.repec.org/PaperSeries.html`

www.fep.up.pt

School of Economics and Management, University of Porto
Rua Dr. Roberto Frias | 4200-464 Porto | Portugal
Telephone: +351 225 571 100