

THE STUDY OF FISCAL VULNERABILITY BASED ON PUBLIC DEBT DYNAMIC EQUATION: EMPIRICAL EVIDENCE FOR ADVANCED EUROPEAN UNION COUNTRIES

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Abstract

This paper aims shedding more light in the understanding and the study of fiscal vulnerability. Therefore, it presents a methodology of assessing vulnerability of fiscal policy using a public debt dynamic equation which allows estimating the primary balance that stabilizes public debt. Calculating the primary gap represented by the difference between the stabilizing and the current primary balance, it can be indicated fiscal vulnerability. It is used annual data ranged for 1971 and 2010 and investigated the vulnerability of fiscal policy for the case of 10 advanced economies in the European Union. The results showed only a few episodes of more severe fiscal vulnerability occurring after the financial turmoil. Most of the data analyzed indicates a normal state of fiscal vulnerability that is not induced by the government's failure in achieving the stabilizing primary balance but by not aiming at the stabilization of the public debt.

Keywords: Fiscal policy, primary balance, public debt, intertemporal budget constraint, fiscal sustainability

Introduction

There is a rich body of research showing that fiscal policy has confronted various issues for the last decades: growing social spending (Ghosh, Kim, Mendoza, Ostry and Qureshi, 2011), increasing public debt (Scott, 2010; Reinhart and Rogoff, 2011), ageing

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population (Corsetti and Roubini, 1996; Alesina, 2000; Kotlikoff and Hagist, 2005), solvency risk exposure (Ciarlone and Trebeschi, 2006). Thus, it is believed that fiscal policy is vulnerable and it has some difficulties in absorbing various exogenous shocks that might occur. As a matter of fact, the recent financial turmoil that hit worldwide and the severe economic recession that followed suggested such vulnerability, but this assumption is counterintuitive to some extent. Therefore, the question that naturally arises is how we can better understand fiscal vulnerability. The aim of this paper is to shed some light in the study of fiscal vulnerability by elucidating the conceptual framework and by presenting a way of assessment. For the purpose of achieving its goal, this paper is structured as follows. Section 2 gives the theoretical background and also describes the model used for the study of fiscal vulnerability. Section 3 reports the dataset and the empirical results for the advanced European Union economies. The last section presents the concluding remarks of the study.

The Theoretical Background and the Model of Fiscal Vulnerability:

Stoian (2011a, b) reviewed the existing literature investigating fiscal vulnerability and found only a few papers discussing in more detail this concept. She also indicated the use of related terms such as *fiscal risk* (Brixi, Shalotov and Zlaoui, 2000) which describes any change that goes to an increase of government's payment obligations, hence inducing a certain risk that might generate excessive fiscal deficits and public debt stocks in the long run or *fiscal fragility* and *fiscal stress* (Aizenman and Pasricha, 2010; Baldacci, McHugh and Petrova, 2011; Baldacci, Petrova, Belhocine, Dobrescu and Mazraani, 2011). Only Hemming and Petrie (2000), and Hemming, Kell and Schimmelpfennig (2003) formulated a comprehensive definition of fiscal vulnerability considering government's ability to avoid excessive fiscal deficits and public debt stocks that can threaten macroeconomic stability in the short run and fiscal sustainability in the long run, to design a flexible fiscal policy that assures the immediate reaction to domestic and external disequilibrium, and to assure stable and proper taxation rate that allows for collecting sufficient fiscal revenues for the public budget. The rest of literature studying the vulnerability from the financial crisis perspective (Detragiache and Spilimbergo, 2001; Frankel and Saravelos, 2010; Hayes, 2011) suggests that a country is more vulnerable when there is a liquidity or solvency risk, or if it experiences larger output drops, bigger stock market falls, greater currency weakness, larger loss in reserves, or the need for access to International Monetary Fund financial assistance, or if it relies mostly on short term debt to be serviced or external debt, or it has large government deficits.

Considering previous argues, it can be concluded that fiscal policy is said to be vulnerable whenever the intertemporal government budget constraint cannot be fulfilled, hence exposing the economy to fiscal solvency risk. The study of fiscal vulnerability generally starts with this assumption and tries to investigate the factors that could cause the violation of this condition. In that sense, it is recalled the paper of Rial and Vicente (2004) who examined the vulnerability of Uruguayan fiscal policy using the sensitivity analysis of public debt to changes in economic growth rate, interest rate or exchange rate considered as affecting the public debt dynamic. Also, Baldacci, McHugh and Petrova (2011) and Baldacci, Petrova, Belhocine, Dobrescu and Mazraani (2011) introduced a fiscal vulnerability index that measures the degree of fiscal vulnerability on a continuous basis as departure of key fiscal variables from their historical “norms”, defined as 10-year cross-country averages.

Therefore, one can assess fiscal vulnerability using the public debt dynamic equation. At time t , the government borrows money (B_t) to finance the primary deficit (the difference between primary expenditures, G_t , and government revenues, V_t), interest payment ($i \cdot B_{t-1}$), and public debt from previous year (B_{t-1}) from the previous year:

$$B_t = G_t - R_t + B_{t-1} + i \cdot B_{t-1} \quad (1)$$

where:

i : nominal interest rate.

Rearranging equation (1), it is obtained:

$$B_t - B_{t-1} = G_t - R_t + i \cdot B_{t-1} \quad (2)$$

Considering the variables as ratios to GDP (small caps denote that) and using GDP deflator (P_t) and real GDP (Y_t), equation 2 becomes:

$$\frac{B_t}{P_t Y_t} - \frac{B_{t-1}}{P_{t-1} Y_{t-1}} \cdot \frac{P_{t-1} Y_{t-1}}{P_t Y_t} = \left(\frac{G_t}{Y_t} - \frac{R_t}{Y_t} \right) + i \cdot \frac{B_{t-1}}{P_{t-1} Y_{t-1}} \cdot \frac{P_{t-1} Y_{t-1}}{P_t Y_t} \quad (3)$$

Defining inflation rate as: $\pi_t = \frac{P_t}{P_{t-1}} - 1$, and real growth rate as: $g_t = \frac{Y_t}{Y_{t-1}} - 1$,

equation (3) can be written as:

$$b_t - \frac{1}{(1 + \pi)(1 + g)} b_{t-1} = p_t + \frac{i}{(1 + \pi)(1 + g)} b_{t-1} \quad (4)$$

Where:

p_t =primary balance-to-GDP ratio (-surplus; +deficit), at time t .

If government confronts increasing public debt and/or large indebtedness ratio over the time, in order to fulfill the intertemporal government budget constraint in the long run, it

will aim at stabilizing public debt. Thus, it ensures that public debt-to-GDP ratio remains unchanged ($b_t = b_{t-1}$). Hence, equation (4) becomes:

$$-p_t = \frac{i}{(1+\pi)(1+g)} b_{t-1} - \frac{(1+\pi)(1+g)-1}{(1+\pi)(1+g)} b_{t-1} \quad (5)$$

Where:

p_t =primary balance-to-GDP ratio (+surplus; -deficit), at time t .

There is a large debated around the time t for which government chooses to stabilize the public debt. Theoretically speaking, the adjustment should be immediate also implying a very flexible fiscal policy that can generate the required primary surplus at the very moment when public debt increases in order to prevent its growth. But there are also some operational delays that might occur (McConnell and Brue (1996) details these aspects). Thus, it is considered acceptable the efforts to stabilize the public debt at the level from previous time ($t-1$).

Rearranging terms in equation (5), it is obtained:

$$p_t = \frac{i - [(1+\pi)(1+g) - 1]}{(1+\pi)(1+g)} b_{t-1} \quad (6)$$

Considering small variations of π ; g , equation (6) can be re-written as:

$$p_t^* = \frac{i - \pi - g}{(1+\pi)(1+g)} b_{t-1} \quad (7)$$

Equation (7) gives the primary balance that should be achieved by governments if it aims at stabilizing public debt. In order to study fiscal vulnerability, it compares the stabilizing primary balance (p_t^*) with the current one (p_t). It can be stated that fiscal policy is vulnerable when $p_t^* > p_t$. This implies that government was not able to achieve the required primary balance to stabilize the public debt, hence issuing more government bonds in order to service its payment obligations. Consequently, if public debt continuously increases and government cannot fulfill the primary surplus, fiscal solvency will be affected in the long run.

Our methodology relies to some extent on primary gap suggested by Blanchard (1990) for the study fiscal sustainability. Pasinetti also employed a similar methodology in his 1998 work. The distinction between the approach proposed in this paper and previous methods is that it calculates the required primary balance on annual basis considering that government plan in stabilizing public debt at the level from the previous year. Then, it is made yearly comparison between the two levels of the primary balance. Hence, it is detected each year when fiscal policy was vulnerable. If government systematically fails in achieving

the stabilizing primary balance for many consecutive years, then it can be stated that fiscal sustainability in the long run could be affected.

Empirical Evidence for EU Countries:

This methodology is applied for studying fiscal vulnerability in the case of advanced European Union countries which have already joined the Monetary Union. Considering that the public debt dynamic equation assumes that government issues debt in local currency, it is believed that focusing on euro zone member states fulfills this hypothesis. There are also many papers pointing to unsustainable and pro-cyclical fiscal policy of the advanced EU economies. Moreover, looking at the statistical annual data for public debt-to-GDP ratio ranged on 1990-2010 and provided by Eurostat, it is found interesting insights (see Table 1).

Table 1 Descriptive statistics for public debt (% GDP) before and after Maastricht Treaty (MT)

Country	Average All Data	Standard deviation All Data	Average Before MT	Standard deviation Before MT	Average After MT	Standard deviation After MT
Belgium	97.37	26.30	89.34	29.94	107.64	16.64
Germany	44.84	17.42	31.54	9.28	61.85	8.62
Ireland	66.60	26.76	77.20	23.30	53.06	26.06
Greece	66.23	37.99	36.75	21.15	103.89	12.89
Spain	38.89	18.59	26.66	13.91	54.51	9.96
France	46.13	18.37	28.67	6.41	61.65	9.90
Italy	87.45	26.73	68.25	19.69	111.99	6.63
Netherlands	60.11	13.15	59.81	15.53	60.40	11.11
Austria	49.83	17.93	37.79	15.27	65.22	3.43
Portugal	48.87	15.69	39.79	14.96	58.96	8.96

Source: author's estimation based on annual data for public debt-to-GDP ratio available from Eurostat
Note: All data- data spanned between 1970-1992 with some exceptions (France-1977; The Netherlands-1975; Portugal-1973); Before Maastricht Treaty (MT)-data spanned between 1970-1992 with some exceptions (France-1977; The Netherlands-1975; Portugal-1973); After Maastricht Treaty (MT)-data spanned between 1993-2010

All the EU countries considered for this study had on average annual public debt-to-GDP ratio larger than 40%, except Finland. It is difficult to establish a threshold beyond that public debt may negatively affect the national economy or how much a government can borrow to finance its payment obligations without exposing the economy to fiscal solvency risks. Balassone, Franco and Zotteri (2004) argued that governments might impose deficit limits in order to control debt level. The enforcement of Maastricht Treaty (MT) brings also the limits for the deficit and for public debt. However, a closely look to the data before and after introducing MT reveals that for most of the countries investigated, the average of annual public debt-to-GDP-ratio after 1992 is higher than the average ratio before enforcing MT, and it is also larger than 60% of GDP for most of them, thus suggesting some fiscal solvency risk exposure. In addition, there are many studies indicating that fiscal policy in the European Union is mildly pro-cyclical and unsustainable in the long run (Afonso, 2000; Afonso and

Rault, 2008; Fatas and Mihov, 2009; Afonso, Agnello, Furceri and Sousa; Balassone et al, 2009).

Given this context, it is considered important to investigate whether fiscal policy is vulnerable from the perspective of public debt stabilization. Hence, it is estimated the stabilizing primary balance (p_t^*) based on equation (7) and using annual data for the public debt-to-GDP ratio, nominal interest rate on public debt, real GDP growth rate and inflation rate (as changes in GDP deflator) extracted from 1971-2010 (if available) from Eurostat. It is also calculated the difference between the stabilizing and the current primary balance ($p_t^* - p_t$). The results are reported in Table 2:

Table 2 The gap between the stabilizing primary and the current primary balance

Year	Austria	Belgium	Germany	Spain	France	Greece	Ireland	Italy	The Netherlands	Portugal
1971	na	-2.36	-1.94	na	na	na	na	Na	na	na
1972	na	-1.95	-1.32	na	na	na	na	Na	na	na
1973	na	-3.58	-3.06	na	na	na	na	Na	na	na
1974	na	-5.98	0.32	na	na	na	na	Na	na	na
1975	na	-1.59	4.31	na	na	na	na	Na	na	na
1976	1.33	-1.20	1.35	na	na	na	na	Na	na	na
1977	-0.47	1.22	0.86	na	na	na	na	Na	na	na
1978	0.75	2.17	0.71	na	-0.90	na	na	Na	-1.00	1.34
1979	-0.63	3.99	0.51	na	-2.43	na	na	Na	-0.16	-0.32
1980	-0.83	3.79	1.25	na	-2.42	na	na	-5.71	1.02	-0.36
1981	-0.52	11.72	2.39	na	-0.24	na	na	0.73	2.61	2.83
1982	0.63	5.08	1.98	na	-0.19	na	na	0.10	4.06	-0.08
1983	1.65	8.63	1.18	na	-0.20	na	na	0.10	3.24	-5.02
1984	0.44	2.36	0.09	na	0.46	na	na	2.07	2.30	-4.14
1985	0.10	2.89	-0.62	na	0.86	na	2.37	3.49	0.95	-1.74
1986	1.23	4.44	-0.99	na	0.87	na	4.19	3.56	2.43	-3.96
1987	2.32	2.86	0.72	na	0.39	na	0.68	3.73	4.76	-2.56
1988	0.70	-1.43	-0.21	na	0.10	-0.46	-4.04	1.53	0.97	-5.98
1989	-0.79	-2.92	-2.89	na	-0.61	1.70	-9.18	2.73	0.53	-6.00
1990	-1.57	-0.74	-1.51	na	0.65	1.45	-4.50	1.65	0.80	-3.68

Table 2 The gap between the stabilizing primary and the current primary balance (continued)

Year	Austria	Belgium	Germany	Spain	France	Greece	Ireland	Italy	The Netherlands	Portugal
1991	-1.05	1.19	-0.46	na	1.63	-4.95	-0.74	2.58	-1.65	-0.73
1992	-1.16	1.65	-0.42	na	3.22	-0.28	-2.96	4.90	0.79	-2.47
1993	2.56	3.44	1.72	na	6.19	1.80	-4.48	6.65	0.47	4.96
1994	1.89	-2.07	-0.06	na	3.73	-4.67	-5.02	2.16	-0.60	2.49
1995	2.85	-0.35	7.79	1.82	3.75	-2.40	-8.52	-2.23	5.16	0.46
1996	1.84	1.53	2.47	1.05	2.48	-2.86	-8.07	-0.47	-1.77	0.83
1997	0.53	-3.66	1.39	-0.84	1.44	-4.34	-11.35	-2.93	-3.88	-1.16
1998	-0.26	-3.82	0.62	-1.34	-0.06	-4.81	-11.15	-2.06	-3.10	-1.11
1999	-0.16	-3.92	-0.07	-3.13	-0.24	-3.44	-9.85	-2.14	-4.66	-0.82
2000	-1.51	-6.42	-2.83	-4.13	-1.65	-4.18	-11.48	-5.57	-6.72	-0.48
2001	-1.62	-3.65	1.40	-3.89	-0.76	-2.90	-4.88	-2.22	-3.44	1.53
2002	-1.35	-3.59	2.78	-3.34	1.14	-2.16	-3.33	-1.34	0.09	0.45
2003	0.11	-2.80	3.44	-3.52	2.29	-3.86	-2.61	0.14	1.86	1.72
2004	1.69	-4.95	2.33	-3.14	0.97	0.25	-3.32	-0.83	0.25	1.20
2005	-1.31	-1.07	2.31	-4.47	0.36	0.21	-4.07	1.32	-2.08	4.01
2006	-1.68	-4.79	-0.95	-5.40	-0.79	-1.87	-5.36	-0.73	-3.19	1.43

2007	-3.05	-4.24	-3.20	-4.57	-0.30	-1.28	-2.02	-2.78	-2.61	-0.37
2008	-1.95	-1.04	-1.95	2.92	1.37	3.88	8.06	0.72	-2.79	1.55
2009	5.10	7.79	6.10	12.71	8.20	14.92	19.48	8.09	7.80	11.08
2010	3.05	3.41	2.70	9.93	6.23	8.56	34.20	2.17	5.29	6.59

It can be stated that each time $p_t - p_{t-1} \leq 0$ implies that fiscal policy is not vulnerable because government managed to achieve or to exceed the stabilizing primary balance. Assuming that governments of these countries aimed at stabilizing the public debt at the level from the previous year, the results show when they failed in realizing the required primary surplus allowing the fulfillment of this goal. It is also reported some statistics about the fiscal vulnerability episodes in Table 3:

Table 3 Fiscal vulnerability statistics for EU countries

Country	Observations (total)	Fiscal vulnerability (all)	% of total observations	Fiscal vulnerability Before MT	% of observations before MT	Fiscal vulnerability After MT	% of observations after MT
Belgium 1971:2010	40	17	42.50	13	32.50	4	10.00
Germany 1971:2010	40	24	60.00	12	30.00	12	30.00
Ireland 1985:2010	26	6	23.08	3	11.54	3	11.54
Greece 1988:2010	23	8	34.78	2	8.70	6	26.09
Spain 1995:2010	16	5	31.25	0	0.00	5	31.25
France 1978:2010	33	20	60.61	8	24.24	12	36.36
Italy 1980:2010	31	19	61.29	12	38.71	7	22.58
Netherlands 1976:2010	35	19	54.29	12	34.29	7	20.00
Austria 1976:2010	35	17	48.57	8	22.86	9	25.71
Portugal 1977:2010	34	15	44.12	2	5.88	13	38.24

Source: author's estimation based on annual data for i , π , g and b_{t-1} available from Eurostat.
Notes: Before Maastricht Treaty (MT)-data before 1992; After Maastricht Treaty (MT)-data after 1992.
Implicit interest rate (i) is derived as nominal interest expenditure divided by previous period debt stock.

It is noticed that only in the cases of Germany, France, Italy and the Netherlands, the results indicate fiscal vulnerability for more than half of the period investigated. Considering the public debt limit imposed by MT, it is also found that only for the case of Belgium, Italy and the Netherlands, fiscal policy was more vulnerable before enforcing the Maastricht Treaty. In the case of Greece, Spain, France, Austria and Portugal, the 60% of GDP constraint hasn't made fiscal policy less vulnerable than before 1992. Balassone and Franco (2000) pointed out that achieving the two required criteria of the Maastricht Treaty allows for fiscal discipline and flexibility and excludes any bias from an unsustainable fiscal policy. But, the empirical evidence seems that disproves Balassone and Franco's point of view.

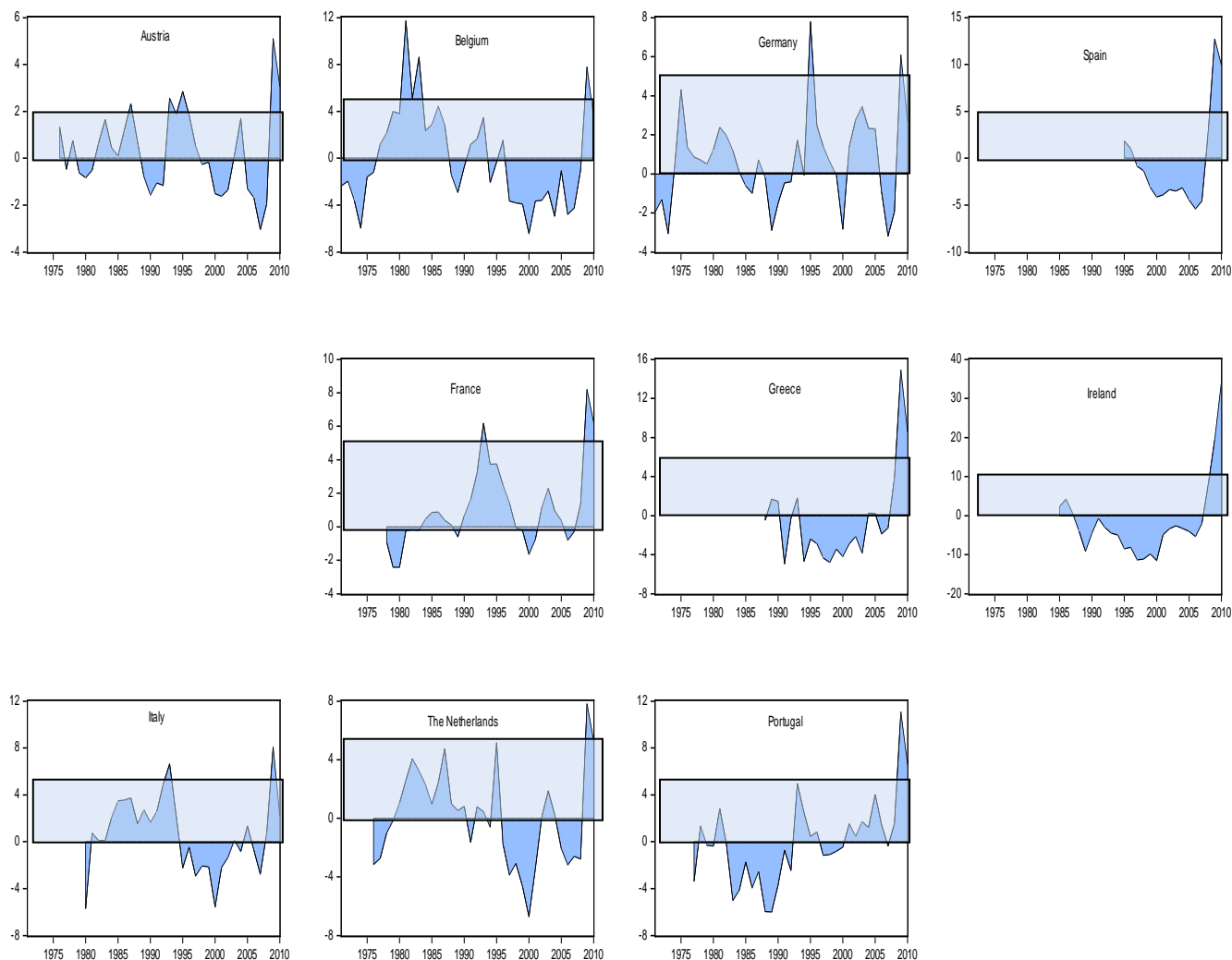
We can also report the results of gap distribution (see Table 4):

Table 4 Gap distribution

Austria	Mean	Obs.	Greece	Mean	Obs.
[-4, -2)	-3.05	1	[-5, 0)	-2.96	15
[-2, 0)	-1.05	16	[0, 5)	1.55	6
[0, 2)	0.99	13	[5, 10)	8.56	1
[2, 4)	2.70	4	[10, 15)	14.92	1
[4, 6)	5.10	1	All	-0.51	23
All	0.25	35	Ireland	Mean	Obs.
Belgium	Mean	Obs.	[-20, -10)	-11.32	3
[-10, -5)	-6.20	2	[-10, 0)	-4.88	17
[-5, 0)	-2.65	21	[0, 10)	3.82	4
[0, 5)	2.69	13	[10, 20)	19.48	1
[5, 10)	7.17	3	[30, 40)	34.20	1
[10, 15)	11.72	1	All	-1.84	26
All	0.00	40	Italy	Mean	Obs.
Germany	Mean	Obs.	[-10, -5)	-5.64	2
[-5, 0)	-1.40	16	[-5, 0)	-1.77	10
[0, 5)	1.67	22	[0, 5)	1.98	17
[5, 10)	6.95	2	[5, 10)	7.37	2
All	0.71	40	All	0.63	31
Spain	Mean	Obs.	The Netherlands	Mean	Obs.
[-10, -5)	-5.40	1	[-10, -5)	-6.72	1
[-5, 0)	-3.24	10	[-5, 0)	-2.45	15
[0, 5)	1.93	3	[0, 5)	1.70	16
[5, 10)	9.93	1	[5, 10)	6.09	3
[10, 15)	12.71	1	All	0.05	35
All	-0.58	16	Portugal	Mean	Obs.
France	Mean	Obs.	[-10, -5)	-5.66	3
[-5, 0)	-0.83	13	[-5, 0)	-1.71	16
[0, 5)	1.51	17	[0, 5)	1.91	13
[5, 10)	6.87	3	[5, 10)	6.59	1
All	1.08	33	[10, 15)	11.08	1
			All	-0.05	34

The results show how gap values distributed on various ranges. Only positive values suggest fiscal vulnerability. It can be looked after the ranges consisting in the highest frequent positive gaps considering that these may indicate a normal state of fiscal vulnerability. The mean calculated for these ranges also shows the value to which the gap converges when fiscal policy is normally vulnerable. Hence, for most of the countries investigated it is found that the gap between the stabilizing and the current primary balance which has the highest positive value lies between 0 and 5 p.p., except the Austria's case for which the range is between 0 and 2 p.p. and Ireland with a range between 0 and 10 p.p. These ranges indicate a normal state of fiscal vulnerability in the sense that even if governments fail in achieving the stabilizing primary balance they might have not aimed at stabilization of public debt. The figure below illustrates the fiscal vulnerability for each country under analysis:

Fiscal vulnerability ranges for EU countries



The shadowed area indicates normal fiscal vulnerability. The values lying above this area point towards more severe fiscal vulnerability and are represented by positive gaps having extreme values. It can be noticed there are only a few years when the primary gap recorded extreme values. Most of them are observed after financial turmoil hit worldwide indicating that fiscal policy has difficulties in absorbing the shock of increasing public debt. For the cases of Austria, Belgium Germany and the Netherlands fiscal policy turned into a severe vulnerable state in 2009, two years after financial crisis occurred, whilst the rest of the countries investigated became fiscal vulnerable one year earlier.

Conclusion

The recent financial crisis that turned into a severe economic recession requires a flexible fiscal policy which has the capacity for response immediately and as it is expected to various shocks that might occur and that could affect fiscal solvency. There is a rich literature

showing that fiscal policy has confronted multiple difficulties over the last decades that diminished its ability of reaction and increased its vulnerability. Hence, it is strongly believed that the understanding and the study of fiscal vulnerability represents a major topic to be discussed. The aim of this paper was to shed some light on the concept of fiscal vulnerability considering that the existing knowledge provided only few comprehensive definitions in that sense. The general accepted view is that fiscal vulnerability describes government's ability to generate primary surplus to service its payment obligations in the future. Hence, it is strongly related to the fulfillment of the intertemporal government budget constraint and also with the achievement of fiscal sustainability in the long run. The study of fiscal vulnerability indicates the factors that might affect fiscal solvency in short term. If government postpones adjustment actions and it runs a vulnerable fiscal policy for many consecutive years, then the exposure to solvency risk will increase and fiscal sustainability is jeopardized. Therefore, it presents a methodology of studying fiscal vulnerability based on public debt dynamic equation and assuming that the government aims at stabilizing public debt. It is asserted that this approach fits the developments observed for the key fiscal variables in many of the advanced economies in the last decades: growing budgetary deficits and increasing public debt. Given this context, it is believed that governments should have considered the possibility to stop or to slow down public debt growth. For this reason, it is estimated the primary balance that stabilizes public debt at the level from the previous year, hereby allowing for one lag in government's reaction due to operational delays. Then it is compared the stabilizing with the current primary balance. The positive primary gap indicates fiscal vulnerability in the sense that government wasn't able to achieve the required primary balance which is also consistent with the stabilization of public debt. It is investigated fiscal vulnerability for 10 advanced economies of the European Union which also adopted a single currency. It is also found that indebtedness ratio after introducing the Maastricht Treaty was larger than before (except Ireland) and also higher than 60% of GDP. It uses annual data ranged on 1971 and 2010 (if available for each country under analysis). The results showed the time when fiscal policy was vulnerable. Examining the distribution of primary gap it is determined the values for which fiscal policy confronts more severe vulnerability. It is considered that the ranges consisting in positive primary gaps most frequent describe a state of normal fiscal vulnerability, while the ranges comprising extreme positive values indicate more severe fiscal vulnerability. It is observed only a few episodes of more severe fiscal vulnerability mostly occurring after the financial turmoil. The rest of them illustrate normal fiscal vulnerability induced not necessarily by government's failure in accomplishing the

stabilizing primary balance, but by not aiming at the stabilization of public debt. The government likes playing Ponzi games in the sense of postponing the achievement of primary surplus to reduce public debt or to keep its pace of growth down to zero. Exposing fiscal policy to solvency risk for many consecutive years may negatively affect fiscal sustainability in the long run.

References:

Clancy, Tom, Carl Stiner, and Tony Koltz. *Shadow Warriors: Inside the Special Forces*. New York: Putnam, 2002.

Cohen, Andrew, and J.L. Granatstein, eds. *Trudeau's Shadow: The Life and Legacy of Pierre Elliott Trudeau*. Toronto: Random, 1998.

Meidenbauer, Jörg, ed. *Discoveries and Inventions: From Prehistoric to Modern Times*. Lisse: Rebo, 2004.

Puzo, Mario. *The Family: A Novel*. Completed by Carol Gino. New York: Harper, 2001.

Rowling, J.K. *Harry Potter and the Chamber of Secrets*. New York: Scholastic, 1999

Afonso, A.. *Fiscal Policy Sustainability: Some Unpleasant European Evidence*. ISEG Working Paper, 12/2000/DE/CISEP, August 2000

Afonso, A. and C.Rault. *3-Step Analysis of Public Finance Sustainability. The Case of the European Union*. European Central Bank Working Paper Series No.908/June, 2008

Afonso, A.; L.Agnello; D.Furceri and R.Sousa. *Assessing Long Term Fiscal Developments: A New Approach*. European Central Bank, Working Paper Series No.1032/March 2009

Aizenman, J. and G. Pasricha. *Fiscal fragility: what the past say bout the future*. NBER Working Paper No.16478, October 2010

Alesina, A. *The Political Economy of the Budget Surplus in the United States*. *The Journal of Economic Perspectives*, 14 (3): 3-19, 2000

Balassone, F. et al. *Fiscal Sustainability and Policy Implications for the Euro Area*. European Central Bank Working Paper Series, No. 994/January 2009

Balassone, F.; D. Franco and S.Zotteri. *Public Debt: A Survey of Policy Issues*. Banca D'Italia, 2004

Baldacci, E.; J. McHugh and I.Petrova. *Measuring Fiscal Vulnerability and Fiscal Stress: A Proposed Set of Indicators*. IMF Working Paper WP/11/94, 2011

Baldacci, E.; I. Petrova; H. Belhocine; G. Dobrescu and S. Mazraani. *S. Assessing Fiscal Stress*. IMF Working Paper WP/11/100, 2011.

- Blanchard, O. Suggestions for a New Set of Fiscal Indicators. OECD Economics Department Working Papers, No.79, 1990
- Brixi, H. P.; S. Shalotov and L. Zlaoui. Managing Fiscal Risk in Bulgaria. Policy Research Working Paper 2282, January 2000, The World Bank, 2000
- Balassone, F. and D. Franco. Assessing Fiscal Sustainability: A Review of Methods with a View to EMU, published in „Fiscal Sustainability” essays presented at the Bank of Italy workshop held in Perugia, 20-22 January, pp. 21-60, 2000
- Corsetti, G. and N. Roubini, N. European versus American Perspectives on Balanced Budget-Rules. The American Economic Review, 86, (2): 408-413, 1996
- Detragiache, E. and A. Spilimbergo. Crises and Liquidity: Evidence and Interpretation. IMF Working Paper WP/01/2, 2001
- Fatas, A. and I. Mihov. The Euro and Fiscal Policy. NBER Working Paper No.14722, February 2009
- Frankel, J. and G. Saravelos, G. .Are Leading Indicators of Financial Crisis Useful for Assessing Country Vulnerability? Evidence from 2008-09 Global Crisis. NBER Working Paper No.16047, June 2010
- Ghosh, A.; J.Kim; E. Mendoza; J. Ostry and M. Qureshi. Fiscal Fatigue, Fiscal Space and Debt Sustainability in Advanced Economies. NBER Working Paper No.16782, February 2011
- Hayes, S. Fiscal vulnerability: a stocktake. The IFS Green Budget, February 2011
- Hemming, R.; M. Kell and A. Schimmelpfennig. Fiscal Vulnerability and Financial Crisis in Emerging Market Economies. Ocasional Paper 218, IMF, 2003.
- Hemming, R. and M. Petrie. A Framework for Assessing Fiscal Vulnerability. IMF Working Paper WP/00/52, March 2000
- Kotlikoff L. and C. Hagist. Who’s Going Broke? Comparing Growth in Healthcare Costs in Ten OECD Countries. NBER Working Paper Series 2005
- McConnell, C.R. and S.L. Brue. Economics – Principles, Problems and Policies. McGraw-Hill, Inc. Thirteenth Edition, 1996
- Pasinetti, L. The myth (or folly) of the 3% deficit/GDP Maastricht ‘parameter’. Cambridge Journal of Economics, 1998, 22, 103-116, 1998
- Reinhart, C. and K. Rogoff. A Decade of Debt. NBER Working Paper No.16827, February 2011

Rial, I. and L. Vicente. Fiscal Sustainability and Vulnerability in a Small Open Economy: The Uruguayan Experience, in Public Debt, edited by Banca D'Italia, Research Department Public Finance Workshop, 2004

Scott, A. Government Debt After the Crisis, Politics, Economics and Global Governance: The European Dimensions. Policy Paper no.7-March 2010

Stoian, A. A Retrospective Approach on Assessing Fiscal Vulnerability: Empirical Evidence for Overindebted European Countries. Timișoara Journal of Economics, Vol.4(2011), Issue 3(15), pg.183-188, 2011a

Stoian, A. Fiscal Vulnerability vs. Fiscal Sustainability: Theoretical Background. Theoretical and Applied Economics, vol. 5(5(558)(su), pg. 541-547, July 2011, 2011b