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**Fiscal Sustainability of the European Welfare State: Evidence from
Cumulative Excess of the Primary Balance**

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Fiscal Sustainability of the European Welfare State: Evidence from Cumulative Excess of the Primary Balance^{*}

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Abstract

Tanzi and Schuknecht (1997) pointed out that one of the key features of welfare state is to run large fiscal deficits and public debt. This can be explained considering the rise of the social transfers that led to an overall increase of the total government spending. Growing public debt can generate fiscal sustainability issues in the long run. Therefore, the aim of this paper is to study fiscal sustainability using an indicator named the Cumulative Excess of the Primary Balance (CEPB) that avoids the shortcomings induced by non-stationary time series or structural breaks when applying classical econometric tools. CEPB is derived from a simple dynamic model of public debt that allows estimating the primary balance that stabilizes public debt. Applying CEPB for annual data extracted for 1980-2007 period for two distinct European welfare regimes, we find that the Nordic welfare states are less exposed to fiscal sustainability issues in the long run than the Conservative countries.

Key Words: Fiscal sustainability, budgetary deficit, primary balance, public debt, welfare state

JEL Classification: E62, H62, H63

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1. Introduction

Following the Great Depression in 1929-1933, the role of the state in the economy had been strongly reconsidered. The liberal view on minimizing government's actions to avoid large public expenditures had been replaced. Human beings needs for education, healthcare, social security and protection against poverty went to market failure and government intervention was required for the provision of certain goods that satisfied these growing needs. The 'welfare state' became the new concept of government playing a key role in the protection and promotion of the economic and well-being of the citizens. Hence, public pension, public education, healthcare and social security schemes were introduced. This implied large government social transfers that led to a rapidly increase of the general government spending. European governments were, for instance, the firsts that implemented public schemes to provide 'welfare' services to the citizens or to transfer the benefits directly to individuals (International Monetary Fund, 1996). Consequently, the size of total government expenditures rapidly increased due to the rise of social transfers. The data¹ showed that in the early 70s, in Germany, social transfers, including healthcare expenditures, increased from 19% to 27% of GDP that led to an increase of total government spending to-GDP-ratio by almost 10 p.p., from 37% up to 47%; in the Netherlands, the social transfers rose from 22% to 29% of GDP and, consequently total government spending went from 40% of GDP to 50%; in Sweden public social expenditures grew from 22% to 29% of GDP that led to an increase in total government spending of 6 p.p. from 43% to 49% of GDP. Recently, Adema, Fron and Ladaïque (2011) pointed out that since 1980 up to 2007 public social spending has increased by more than 20% across OECD countries and that public expenditure on health and pensions are the largest items. Related to these aspects, there are authors who indicated that the welfare state is usually associated with large budgetary deficit and public debt (Tanzi and Schuknecht, 1997) and there is also a reach body of research predicting that the current fiscal policy of most of the European Union (EU) countries based on growing social spending will be unsustainable in the long run (Corsetti and Roubini, 1996; Alesina, 2000; Kotlikoff and Hagist, 2005). More recently, Balassone, Cuhna, Langenus, Manzke, Pavot, Prammer and Tommasino (2009) indicated that countries currently recording high fiscal surplus (e.g. Finland) or those that have undertaken major structural reforms of their public pension schemes (e.g. Austria, Germany and Italy) tend to have lower sustainability risks.

Therefore, the aim of this study is to investigate fiscal sustainability for the European welfare states using a methodology introduced by Stoian in 2011. For its purpose, the paper is structured as follows. The next section presents aspects concerning the arithmetic of fiscal sustainability and the tools usually used for investigation. Section 3 describes the new methodology proposed to study fiscal sustainability which avoids the shortcoming induced by non-stationary time series or structural breaks when using classical econometric tools. Section 4 presents the database and the results of applying the proposed methodology for the European welfare states. We use the welfare typology given by Esping-Andersen (1990) who grouped the countries on the decommodification index. We study two welfare regimes: the Social-Democratic and the Christian-Democratic. The last section gives the concluding remarks.

2. The arithmetic of fiscal sustainability

Defining fiscal sustainability is not an easy task. Metaphorically speaking, sustainability of fiscal policies means "a good management" of government revenues. Blanchard (1990), and Blanchard, Chouraqui, Hageman, and Sartor (1990) indicated that fiscal policy is sustainable

¹ Authors calculations using data provided by Nicholas Barr in his paper of 1992.

when (i) public debt does not explode, nor governments are forced to increase taxes, decrease spending, monetize fiscal deficit or repudiate public debt, or (ii) public debt, as ratio of GDP, converges to its initial level. Horne (1991) and Croce and Juan-Ramon (2003) also suggested that fiscal sustainability implies governments' ability to run unchanged fiscal policy for undetermined time.

Derived from previous definitions, the arithmetic of fiscal sustainability starts with a simple public debt dynamic model with one period. At time t , government has to borrow money (B_t) to finance the primary deficit (the difference between primary expenditures, G_t , and government revenues, R_t), interest payments ($i \cdot B_{t-1}$) and public debt (B_{t-1}) in previous year:

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

where i is nominal interest rate on public debt.

Fiscal sustainability is forward-looking and, therefore, considering the expectations at time t on equation (1) turns into the intertemporal budget constraint (IBC) described by equation (2):

$$B_t = -E_t \sum_{k=0}^{\infty} (1+i)^{-(1+k)} (G_{t+k} - R_{t+k}) + \lim_{k \rightarrow \infty} E_t (1+i)^{-(1+k)} B_{t+k+1} \quad (2)$$

IBC states that the public debt at time t should equal the present value of the expected primary surplus plus the limit value of discounted public debt at a terminal time. IBC also describes the solvency requirement that government should meet to run a sustainable fiscal policy.

The fiscal policy is said to be sustainable if the present value at moment $k+1$ converges to zero. The transversality condition given by equation (3) also describes government's aim in stabilizing public:

$$\lim_{k \rightarrow \infty} E_t (1+i)^{-(1+k)} B_{t+k+1} = 0 \quad (3)$$

Theoretical speaking, intertemporal budget constraint may represent a reliable tool for assessing fiscal sustainability. But it has some limits concerning: the expected values of primary surplus that are difficult to estimate accurately for long time horizon; the discount rate which is assumed to remain unchanged over the years; and the time horizon which is not well defined in the literature.

Empirical study of fiscal sustainability relies on the seminal work of Hamilton and Flavin (1986), Wilcox (1989), and Trehan and Walsh (1991). The methods of investigation can be grouped into three major categories: (i) unit root tests (e.g. Uctum and Wickens, 2000; Afonso, 2000, 2005; (ii) cointegration tests (e.g. Elliot and Kearney, 1988; Hakkio and Rush, 1991; Payne, 1997); (iii) fiscal reaction function (e.g. Bohn, 2005; Greiner, Koeller and Semmler, 2005). But the non-stationary data or time series structural breaks make difficult to apply these methods. Therefore, there are authors (e.g. Cuddington, 1997) who proposed calculating some indicators of fiscal sustainability on more accounting basis. The aim of this study is to present a methodology for investigating fiscal sustainability which is derived from the primary gap suggested by Blanchard in his paper of 1990.

3.The Cumulative Excess of the Primary Balance (CEPB)

The methodology presented in this paper was firstly introduced by Stoian in 2011 (a,b,c) for studying fiscal vulnerability in the short run. Considering that the author followed the generally accepted definition of fiscal sustainability which is closely related to solvency

criterion then the methodology proposed can be also used for assessing fiscal sustainability in the long run.

The methodology bases on the model described by equation (1). Rearranging equation (1), a different form is obtained:

$$B_t - B_{t-1} = G_t - R_t + i \cdot B_{t-1} \quad (4)$$

Considering the variables as ratios-to-GDP (small caps denote that) and using GDP, equation 4 becomes:

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

where p_t is primary balance-to-GDP ratio at time t and g is GDP nominal growth rate.

Government aims at stabilizing public debt, and, thus, it has to ensure that public debt-to-GDP ratio remains unchanged ($b_t = b_{t-1}$). In this context, equation (5) becomes:

$$p_t^* = \frac{i-g}{1+g} \cdot b_t \quad (6)$$

where p_t^* is stabilizing primary balance-to-GDP ratio at time t .

We assume that government should react immediately to shocks on public debt, particularly when the indebtedness ratio is very high and therefore we assume that primary balance responses instantaneously at time t when the shock in public debt occurs at time t . Equation (6) gives the required primary balance that stabilizes public debt. It can be viewed as a fiscal rule that sets the financing requirements for the government considering the rate of growth, the implicit rate on public debt and the public debt at time t . Comparing the stabilizing primary balance (p_t^*) with the actual one (p_t), one can state that fiscal is sustainable whenever $p_t^* = p_t$, or $p_t^* < p_t$ (Pasinetti, 1998). We calculate the differential between the stabilizing primary balance and the actual primary balance at time t and name it the Excess of the Primary Balance (EPB). EPB is described by equation (7):

$$EPB_t = p_t^* - p_t \quad (7)$$

The following different situations occur:

- I. $EPB \leq 0$, which implies that the actual primary balance is at least equal to the stabilizing primary balance. This situation indicates that government is able to meet the fiscal rule in the short-run and we may assume that fiscal policy can be sustainable in the long run.
- II. $EPB > 0$, which implies that the actual primary balance is below the stabilizing primary balance. This situation indicates that government is not able to meet the fiscal rule and fiscal adjustment actions should be taken. If government postpones the adjustments and underachieves the fiscal rule for many consecutive years, we state that fiscal policy is vulnerable and we may assume that will become unsustainable in the long run.

Therefore, in order to avoid the occasional underperformance of fiscal policy and to make the overall inferences concerning the effects of the drifting fiscal policy from the fiscal rule in the

long run, we follow the event studies technique for the capital markets introduced by Fama, Fisher, Jensen and Roll (1969). The EPB of each year is summed up and we obtain the Cumulative Excess of the Primary Balance which is described by equation (8):

$$CEPB_t = \begin{cases} EPB_1, t = 1 \\ EPB_1 + \sum_{i=2}^N EPB_i \end{cases} \quad (8)$$

where N is the number of observations

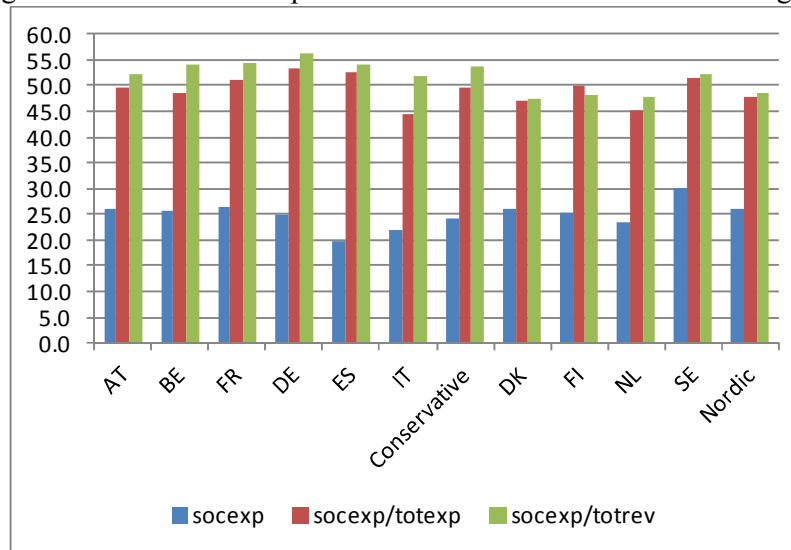
We consider the first signal of vulnerability when CEPB is negative moving towards to zero. Government should be cautious keep under observation the current state of fiscal policy. It still performs better than the fiscal rule but the deviations start decreasing. The second signal of fiscal vulnerability is given by CEPB close to zero. Then, when CEPB turns to be positive and greater than zero, fiscal policy is vulnerable and the exposure to solvency risk increases with the increase of CEPB. Increasing CEPB indicates that the government is not able to generate the primary surplus required to meet its payment obligations and that it postpones the adjustment actions. Therefore, we assume that fiscal policy may turn into unsustainable condition in the long run. Empirical evidence of applying this methodology for the case of the European welfare state is presented in the next section.

4.Database and the empirical evidence

Considering that the welfare state is much ‘blamed’ for the recent economic recession, we think that it is important to investigate whether the fiscal policy conducted by these governments is sustainable in the long run using the methodology described in Section 3. For this purpose, we use the decommodification index introduced by Esping-Andresen (1990) to group the advanced European states into two distinctive welfare regimes: (i) the Social-Democratic regime represented by countries like Denmark, Finland, the Netherlands and Sweden in the following referred to as the Nordic model, and (ii) the Christian-Democrat regime represented by Austria, Belgium, France, Germany, Spain and Italy, following referred as the Conservative model. These two regimes of the welfare state are distinctive in terms of the coverage, the rights and the nature of benefits, the publicly/private provision and financing of the services offered². These differences are reflected, for instance, by the distribution of social public expenditure-to-GDP ratio. Figure 1 shows that during 1980-2007 period social public expenditures on average were higher for the countries representing the Nordic model than for the ones denoting the Conservative regime.

² For discussion on that topic, see, for instance, Myles and Quadagno (2002).

Figure 1 Public social expenditures in Conservative vs. Nordic regime



Note: OECD database for public social expenditures (*socexp*) and AMECO database for total government expenditures (*totexp*) and for the total government revenues (*totrev*). Data extracted for 1980-2007 period as ratio to GDP.

Related to the size of the total government spending, social expenditures represent almost a half of them, much larger for the case of the Conservative regime than for the Nordic model (see Figure 1, *socexp/totexp*). Recalling that on average the countries representing the two welfare regimes allocate almost the same amount to social expenditures as ratio to GDP, then the difference is given by the total government spending which for the Nordic model is almost 54% of GDP, whilst for the Conservative regime is almost 50% of GDP. We also observe that these countries allocate from the public budget large amounts for the social services and therefore, we find interesting to understand what the correlation is with the total government revenues representing the main source of financing (see Figure 1, *socexp/totrev*). One can notice that the Nordic welfare states use less than a half of the total government revenues to finance the social public expenditures, while the Conservative countries employ more than a half of them. The government revenues are on average 46% of GDP for the Christian-Democrat countries and for the Social-Democrat ones the ratio is almost 53%.

Summing up for the moment, the data imply that countries representing both of the welfare regimes distribute similar amounts for the social public expenditures. But, the size of it out of total government spending/revenues is larger for the Conservatives than for the Nordics with the respect of larger government spending/revenues as ratios to GDP for the Nordics. We find also important to study the relationship between the social public expenditures (*socexp*) and total government expenditures (*totexp*), respectively, total government revenues (*totrev*) to understand the movements between these data sets. The results for the correlation coefficients are presented in Table 1.

Table 1 Correlation coefficients (I)

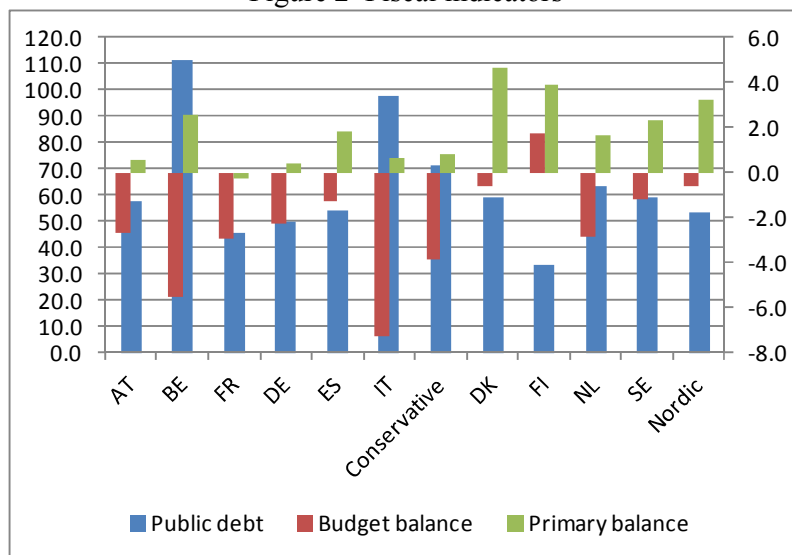
	(socexp,totexp)	(socexp,totrev)
Conservative		
AT	0.1	0.2
BE	-0.3	0.6
FR	0.8	0.9
DE	0.6	0.7
ES	0.2	0.6
IT	0.1	0.7
Nordic		
DK	1.0	0.5
FI	1.0	0.9
NL	1.0	0.9
SE	1.0	0.6

Note: correlation coefficients calculated using annual data for public social expenditures, total government expenditures and total government revenues. Data extracted for 1980-2007 period from OECD and AMECO database.

The results show that for the Nordic countries public social expenditures are strongly and positive correlated with both government spending and revenues and that they move in the same direction when the last increase or decrease. For the Conservative regime, we found only for France and Germany a strong positive correlation with the total government expenditures, while for the rest of the countries we cannot say whether the movements match. Concerning the relationship between public social expenditures and total government revenues, excepting Austria, the results showed a strong positive correlation. Given the limits of the correlation coefficient, we cannot say whether public social expenditures cause the size of total government expenditures and revenues.

Continuing the puzzle, we add more pieces! Recalling that we study fiscal sustainability, it is important to look to the fiscal indicators. Figure 2 depicts public debt, budget and primary balance to-GDP ratios.

Figure 2 Fiscal indicators



Note: annual averages. Data available from AMECO database and extracted for 1980-2007 period.

One can notice that the Conservative countries reached on average higher public debt, higher budgetary deficits and lower primary surpluses than the Nordic welfare states. Therefore, we may assume that during the period investigated, the Conservatives had a more vulnerable fiscal policy, much exposed to the solvency risk than the Nordics. Calculating the correlation coefficients between public social expenditures (*socexp*), public debt (*pdebt*), budgetary balance (*bbal*), and primary balance (*pbal*), we found a strong positive relationship between social expenditures and public debt, excepting Austria and Denmark (see results from Table 2).

Table 2 Correlation coefficients (II)

	(socexp,pdebt)	(socexp,bbal)	(socexp,pbal)
Conservative			
AT	0.9	0.0	0.0
BE	0.2	0.4	0.4
FR	0.9	-0.4	-0.1
DE	0.9	-0.2	-0.2
ES	0.7	0.1	0.0
IT	0.6	0.8	0.6
Nordic			
DK	0.0	0.0	-0.3
FI	0.8	-0.8	-0.8
NL	0.5	-0.9	-0.4
SE	0.6	-1.0	-0.9

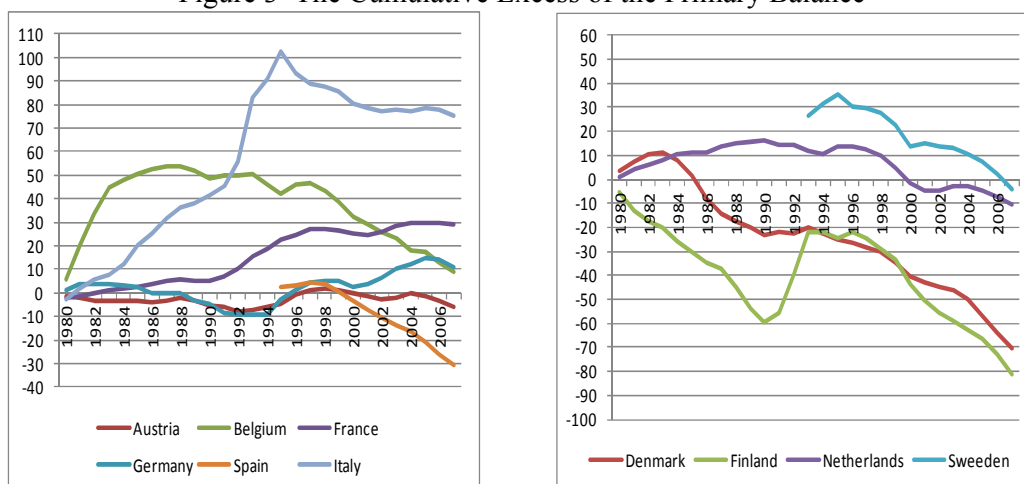
Note: correlation coefficients calculated using annual data for public social expenditures, public debt, budgetary balance and primary balance. Data extracted for 1980-2007 period from OECD and AMECO database.

The results indicate strong positive correlation between public social expenditures and budgetary, respectively, primary balance only for Italy. For the Nordic countries, except Denmark, the relation is strong and negative suggesting an adjusting fiscal policy.

Using the methodology described in previous section, in order to study fiscal sustainability in the long run for the European welfare countries, we estimate the stabilizing primary balance using equation (6) and compare it to the actual one. Based on equation (7) we calculate the Excess Primary Balance and then, summing it up we obtain the Cumulative Excess Primary Balance. We use annual data extracted for 1980-2007 period, for primary balance (p_t), public debt (b_t), for the implicit interest rate (i) on public debt, and for economic growth rate (g). The implicit interest rate is estimated as ratio of current interest expenditures to public debt from previous year, and economic growth rate is calculated as GDP growth rate using nominal data for annual GDP. The CEPB is depicted by Figure 3.

One can observe a much exposure to the solvency risk for the countries representing the Conservative regime. Italy has the most vulnerable fiscal policy considering that CEPB has been positive and had an increasing tendency since 1980. This indicates that Italian government failed in achieving fiscal rule or aimed no stabilization of the public debt for many consecutive years. Therefore, we may assume that fiscal policy will confront with sustainability difficulties in the long run. Since 1993, CEPB has started decreasing pointing to some fiscal adjustment actions, but it has high values above zero still suggesting vulnerable condition of fiscal policy that drifts away from the fiscal rule.

Figure 3 The Cumulative Excess of the Primary Balance



For Belgium's case, which is the highest indebted country among the European welfare states, CEPB shows a vulnerable fiscal policy in the early '80s but it has been continuously improving since 1997. In 2007, before the financial turmoil hit worldwide, CEPB had recorded positive values but close to zero indicating a consistent fiscal policy.

Fiscal policy in France entered into vulnerability area in 1983 and since then has been deteriorating constantly. In 2007, CEPB has positive values still suggesting fiscal vulnerability and adjustment actions to restore fiscal policy drifting from the fiscal rule.

Germany has lower exposure to solvency risk than the rest of the countries discussed before and even if in 1996 fiscal policy turned out to be vulnerable, we could assume that it does not confronts such hard difficulties in achieving fiscal sustainability in the long run.

For Austria and Spain cases, CEPB shows no exposure to solvency risk indicating no difficulties in achieving fiscal sustainability in the long run.

The Nordic regimes reveal much lower exposure to solvency risk than the Conservatives. In the cases of Finland and Denmark, CEPB indicates no fiscal vulnerability and therefore we assume that fiscal policy may not become unsustainable in the long run. For the Netherlands, CEPB shows vulnerable fiscal policy until 1999; afterwards it turned to be negative and decreasing. We also may assume no fiscal sustainability issues in the long run. Sweden has the most exposed fiscal policy to solvency risk, but starting 1997, the exposure has decreased due to the numerical rules that were introduced to reduce the government debt that boosted between 1990 and 1992³. In 2007, fiscal policy has just turned to a non-vulnerable condition.

The findings of this paper reveal that the two distinct European welfare regimes have different exposure to solvency risk. The Cumulative Excess of the Primary Balance shows higher exposure for the Conservative countries rather than for the Nordic ones and we may assume that former will confronts fiscal sustainability issues in the long run. We may argue these results considering the particularities of both welfare regimes. Myles and Quadagno (2002) pointed out that the Christian-Democratic countries allocate a higher amount of public social spending but they put emphasis is on income transfers to cover the income needs of the male breadwinner, whilst the social services that facilitate women's employment or child care and also provide jobs for women are rather modest. The Social-Democratic welfare states allow for universalistic and extensive social rights providing high levels of income distribution and put less emphasis on the private welfare provision. The Nordic regime is more labor oriented and puts emphasis on higher employment. Therefore, government revenues are larger (53% of

³ For more details, see Claeys (2008).

GDP) in Social-Democratic countries than in Christian-Democratic countries (46% of GDP) and public debt is lower for the Nordics (50% of GDP) than for the Conservatives (70% of GDP). Both welfare regimes spend a lot on social services but they do it in different ways that also affect fiscal policy.

5. Concluding remarks

The aim of this paper is to study fiscal sustainability for two distinct European welfare regimes: the Conservative and the Nordic. The methodology used bases on a simple dynamic model of public debt which relates fiscal policy to the solvency constraint and allows estimating the primary balance that stabilizing public debt. This can work as a fiscal rule. The stabilizing primary balance is compared to the actual primary balance and the differential is calculated. Then we sum up the differentials to make the overall inferences that capture the effects of drifting fiscal policy from the fiscal rule. Hence, we avoid the occasional underperformance of the fiscal policy. This indicator is named the Cumulative Excess of the Primary Balance and indicates fiscal policy exposure to the solvency risk when it has positive and increasing values. CEPB shows if government is able to meet its payment obligations in short and medium term, and therefore we can assume whether fiscal policy will confronts fiscal sustainability issues in the long run. Using CEPB to assess fiscal sustainability avoids the limits of the econometric methods induced by non-stationary time series, structural breaks and the shortage of statistical data. Applying CEPB on annual data extracted for 1980-2007 period, we find that the Conservative welfare states are more exposed to fiscal sustainability issues than the Nordic countries. The explanation resides in the fundamentally different ways in which these countries implement the welfare. The Nordic regimes are more labor oriented stimulating employment. Hence, they have lower public debt and higher fiscal revenues.

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