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## **Myths and Facts about Fiscal Discretion: A New Measure of Discretionary Expenditure**

Fabrizio CORICELLI, Riccardo FIORITO

**2013.33**



Myths and Facts about Fiscal Discretion:  
A New Measure of Discretionary Expenditure\*

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and

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*Abstract*

*In this paper we suggest a new measure of discretionary government spending for OECD countries over the period 1980-2011. To identify the components of discretionary expenditure, we use the volatility and persistence properties of the expenditure series. Discretionary policy cannot be inertial and should be free from prior obligations. Commonly used measures of discretionary fiscal policy do not satisfy these two criteria. We find that discretionary expenditure accounts on average for about 30 per cent of total primary expenditure, suggesting that most government spending is driven by inertial and automatic components. These features help explain why government expenditure is generally not counter-cyclical even in advanced economies. Furthermore, the small share of discretionary expenditure over total expenditure significantly reduces the room of manoeuvre for counter-cyclical fiscal policy during recessions.*

JEL codes: E32, E62, H5

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## 1. Introduction

The depth of the output fall during the Great Recession has revived the interest in the role of fiscal stimulus, which has been endorsed even by paladins of fiscal rigour such as the IMF (IMF, 2010, 2012a). The broad consensus on the need of a fiscal stimulus has surely been affected by the fact that the last crisis was not a normal cyclical downturn but a deep recession, a rare event in OECD countries during the post-war era. However, the simple observation of large budget deficits and soaring government debts during the Great Recession cannot be taken as a signal of an expansionary discretionary action by governments, since a large share of the deterioration in the fiscal accounts originated from the endogenous adjustment to the recession.

The debate on the fiscal stimulus has initially focused on fiscal multipliers. However, with the passage of time, the nature of the stimulus and its temporariness has taken center stage. In the debate on the tightening of fiscal policy and its timing, especially in Europe, one element has often been overlooked, namely the fact that the adjustment mainly relied on the deliberate increase in tax revenue, rather than on the reduction in public expenditure (the most remarkable case is Italy). This suggests that governments face severe obstacle in cutting back expenditure, which proves to be largely inertial, in contrast with textbook analyses and common approaches on cyclically adjusted budgets, which depict expenditure as almost entirely discretionary. Our analysis focuses on government spending as revenues normally reflect their cyclical tax bases, and discretion is virtually confined to occasional tax rate changes and negligible lump-sum receipts.

The objective of this paper is precisely to measure the size and the nature of discretionary spending and link the notion of discretion to reversibility, thus temporariness, of changes in expenditure. We believe that this is a crucial preliminary step to the analysis of the effects of fiscal variables on the economy. Our notion of discretion is based on economic grounds and it goes beyond the legal/institutional aspects relating to the budgetary process, which are nevertheless extremely important (Elmendorf, 2011).<sup>1</sup> Our approach share some similarities with methodologies applied for instance to the identification of exchange rate regimes, whereby *de facto* exchange rate regimes are derived from the properties of the actual time series of exchange rates rather than *de jure* definitions (Levy-Yeyati and Sturzenegger, 2003).

When analyzing the role of fiscal policy in relation to economic fluctuations, not long run growth, one should focus on temporary expenditure, which can be easily reversed as economic conditions change. By contrast, a large component of expenditure reflects entitlements associated

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<sup>1</sup> Elmendorf, Director of the US Congressional Budget Office (CBO) recently stated: “Discretionary outlays—the part of federal spending that lawmakers generally control through annual appropriation acts—totaled about \$1.35 trillion in 2011, or close to 40 percent of federal outlays”.

to social contracts or political exchanges, which are hard to modify. Not only these types of expenditures, such as health, education and pensions, are hard to change, but their use to achieve short-term stabilization is debatable.

Isolating discretionary policies is complicated as every spending component combines automatic, inertial and discretionary elements. Undoubtedly, every item has at one point in time resulted from discretionary decisions, but once decisions are implemented they involve inertial dynamics, which varies depending on the type of expenditure. Automatic components, such as unemployment benefits and income subsidies, respond – at least in principle - to the cyclical conditions of the economy. However, often the automatic components are significantly modified during downturns, through for instance lengthening of the period of entitlement for unemployment benefits, and thus become discretionary rather than automatic.

As we illustrate in Section 2, three main approaches have been followed in the literature: first, discretionary expenditure is derived as expenditure adjusted for the component determined by cyclical fluctuations. Traditionally, such approach identifies only unemployment benefits as non-discretionary expenditure<sup>2</sup>; second, discretionary expenditure is obtained from the estimated residuals of a total expenditure regression, determined by lagged expenditure (inertial component) and some subjective measure of economic activity to approximate cyclical components; third, discretionary expenditure is obtained through a “narrative “ approach, focussing on a few selected episodes, mostly related to policy or administrative decisions.

The cyclically adjusted budget balance assumes that, except for unemployment benefits, all expenditure is discretionary and contributes to determine the so-called fiscal stance. At the other extreme we find the identification of discretionary expenditure with the (possibly) white noise residuals of an estimated expenditure equation. In this approach, discretionary expenditure is thus a negligible proportion of total expenditure.

Identifying discretionary expenditure as residuals from an estimated equation has major drawbacks as it fails to distinguish the nature of different components of expenditure, which have different degrees of inertia or dependence on the cycle. Moreover, in contrast with the above definition, discretionary spending may well react to the state of the economy. Discretion and unpredictability are not synonymous.

Finally, the “narrative” approach, which isolates the policy decisions from a review of the actual behavior of policymakers is closer to our approach, as it emphasizes the diversity of various spending interventions. However, the narrative approach is usually applied to a few large changes in policy decisions and does not apply to more systematic changes in spending to be evaluated on a

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<sup>2</sup> Larch and Turrini (2009) indicate that the European Commission approach to evaluate fiscal stance still relies on a cyclically adjusted budget in which the only automatic expenditure is associated to unemployment benefits.

cyclical basis, using macroeconomic spending variables. Furthermore, the narrative approach requires detailed information on actual decisions taken by governments and assumes that decisions taken are then implemented. In fact, in the phase of implementation, fiscal plans are likely to change and the gaps between de jure and de facto measures may vary across countries depending on institutional and political features. According to Elmendorf: “Congress specifies the amount of budget authority provided each year, but does not directly control when outlays occur” (Elmendorf, 2011, p.3).

We develop a different measure of discretionary expenditure, which tries to avoid some of the drawbacks of the measures associated to the three approaches discussed above. In particular, we evaluate individual components of spending to identify those components that qualify as discretionary, assuming that a necessary condition for discretion is that expenditure has a low degree of inertia. We then aggregate these components to derive our overall measure of discretionary expenditure. This definition is consistent with the view that discretionary spending used to affect short-term output fluctuations has to be temporary.

One of the main findings from our analysis is that discretionary spending is a small component of overall primary expenditure, at around 30 percent in OECD countries. This implies that when faced with the need to use fiscal policy to smooth temporary shocks to output, governments tend to have a small margin of manoeuvre. Economists have generally indicated public debt as a burden for the freedom of manoeuvre of future governments. We identify an additional source of constraint on the room of manoeuvre of governments, which is the high share of inertial and rigid expenditure.<sup>3</sup> Interestingly, we find that during recessions discretionary spending does not always move more than non-discretionary spending and, moreover, in many instances it moves pro-cyclically<sup>4</sup>. During recessions, including the Great Recession, this pro-cyclicality appears stronger for countries facing tight fiscal constraints.

Of course, we do not claim that changes in expenditures that are persistent are irrelevant. In fact, large changes in what we define non-discretionary spending are associated with fiscal reforms, often carried out in the wake of crises. We have several examples of these phenomena during the Great Recession, especially in countries facing deep financial crises and debt crises.<sup>5</sup>

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<sup>3</sup> Stuerle (2013) denotes the large share of rigid expenditure as lack of “fiscal democracy”, as it imposes tight constraints on action of future governments.

<sup>4</sup> In general, government spending has been shown to be acyclical or even procyclical also in developed countries (Fiorito, 1997; Lane, 2003).

<sup>5</sup> Example in the OECD area are the PIIGs and Iceland, and Latvia for the emerging countries.

Large contractions in public sector employment and public sector wages occurred in these countries.<sup>6</sup> According to our approach, these measures cannot be classified within the realm of short-term measures aimed at stabilizing the economy. The fact that these changes occur during major crises indirectly confirms our view that non-discretionary spending is hard to modify in the short-run, except in exceptional circumstances.

In conclusion, we provide a measure of discretionary spending that is driven by the properties of different components of expenditure. Our approach leads to a transparent and easy way to compute a measure of discretionary expenditure.

The remainder of the paper is organized as follows. In Section 2 we discuss major alternatives in measuring fiscal discretion in recent research. In Section 3 we present our approach. Section 4 contains the results of our analysis and Section 5 concludes.

## **2. Discretion in the empirical literature**

In this section we discuss in some detail the three main approaches to measuring fiscal discretion in the literature: (1) the cyclically adjusted government balances, (2) residuals from feedback equations, and (3) event chronology (“narrative approach”).

### *2.1 Cyclically adjusted balances*

The first approach refers to cyclically adjusted balances as a simple device for removing automatic stabilization from fiscal variables (Blanchard, 2003; Girouard and André, 2005). Despite their wide use in both empirical studies and official documents<sup>7</sup>, adjusted balances have several limitations. First, they do not account for recessions. Second, both corrected and uncorrected balances do not account for differences in government size (Table 3), which are important for characterizing fiscal policy in a structural way. Finally and most importantly, the ability of adjusted balances to remove cyclical fluctuations is clearly overstated.

As Table 1 shows, the adjusted (CAPB) and unadjusted primary balances (CAB) are strongly correlated. Moreover, even though – as expected – adjusted balances are in most cases less volatile, adjusted and unadjusted budgets display similar degrees of persistence. This is a severe

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<sup>6</sup> Table 5a shows how large were in Iceland and Ireland contractions in the compensation of employees and, therefore, also in government consumption.

<sup>7</sup> Cyclically adjusted balances (CAB) or cyclically adjusted primary balances (CAPB) are widely used in IMF, Oecd and European Commission documents. Recently, the IMF “structural balances” (SB) add to CAB other transitory factors like commodity and asset price fluctuations. However, except for 2009, the differences between the CAB and the more subjective SB indicator are not empirically relevant (IMF, 2012b).

limitation, as variables associated to discretionary short-term policies should be less persistent than the unadjusted balances (see Section 3). Of course, if one interprets the adjusted budget as the “structural” budget, which reflects long run structural features of expenditure and taxes, such as for instance the generosity of the social welfare system, the relevance of public education etc., one should also expect a higher degree of persistence of the adjusted than the unadjusted budget. However, in this interpretation, the use of the adjusted balance as an indicator of short-term discretionary measures taken by governments is meaningless.

**Table 1 - Primary balances and cyclically adjusted primary balances (CAPB)**

Country	Range	(1) Primary Balances		(2) CAPB		Correlation (1)-(2)
		Volatility	Persistence	Volatility	Persistence	
Austria	1990-2011	1.44	8.4 (5)	1.10	8.5 (5)	0.84
Belgium	1980-2011	3.80	54.1 (8)	3.41	46.0 (8)	0.97
Denmark	1980-2011	3.82	49.4 (8)	2.93	49.7 (8)	0.97
Finland	1980-2011	3.99	45.5 (8)	2.54	51.6 (8)	0.95
France	1980-2011	1.54	24.3 (8)	1.12	37.2 (8)	0.88
Iceland	1990-2011	4.32	9.7 (5)	4.06	5.2 (5)	0.94
Ireland	1990-2011	6.48	15.7 (5)	3.75	35.7 (5)	0.84
Italy	1980-2011	3.37	89.0 (8)	3.81	75.0 (8)	0.97
Japan	1980-2009	3.34	60.3 (7)	3.00	64.5 (7)	0.99
Netherlands	1980-2011	2.20	12.5 (8)	2.00	6.9 (8)	0.91
Norway	1980-2012	2.35	46.1 (8)	2.36	43.3 (8)	1.00
Spain	1980-2011	3.63	37.8 (8)	2.84	37.4 (8)	0.96
Sweden	1980-2012	4.09	58.1 (8)	3.13	43.1 (8)	0.95
UK	1980-2013	3.36	38.7 (8)	2.90	44.4 (8)	0.96
US	1980-2014	3.17	31.5 (8)	2.71	40.3 (8)	0.98

Source: OECD, *Economic Outlook* # 90. (EO90), November 2011. Primary balance and CAPB are percentage ratios to actual and potential GDP, respectively. As in the rest of the paper, persistence is measured via the Ljung - Box (LB)  $\chi^2$ -statistics. The number in parenthesis refers to the number of autocorrelations for time series having a different length.

## 2.2 Residuals from estimated spending equations

The seminal contribution of this approach is Fatás and Mihov (2003), who estimate percentage changes in the government consumption/GDP ratio as a function of its lag, of real GDP changes and of a set of controls approximating institutional factors. Since the estimated residuals should be free from cyclical components, the authors interpret them as a measure of the discretionary spending in each country. As in Galí (1994), this measure is then shown to be destabilizing in the resulting cross-section estimate. Finally, Fatás and Mihov include in their panel both developed and developing countries even though, as shown in more recent studies, the two groups of countries seem to respond differently to the same fiscal stimuli (Ilzetzki et al., 2011).

Afonso et al. (2008) follow a similar approach, estimating government expenditure and revenues in levels, analyzing both developed and developing countries in the same panel. As in



Fatás and Mihov, government consumption is labeled “government spending” and the estimated residuals are interpreted as discretionary impulses. The same residual approach is also followed in a recent paper by Corsetti et al. (2012), where the panel is formed by more homogeneous Oecd countries and where regression controls include government debt, financial crises and exchange rate variables. In line with previous studies, in Corsetti et al. as well estimated residuals from a government consumption equation are supposed to provide a reliable measure of the discretionary spending interventions.

In general, approximating discretion through the estimated residuals of a subjective equation confines discretionary spending to an unpredictable shock; and this happens in a single equation which cannot produce SVAR impulses, regardless if they are more or less appropriate for the purpose. Moreover, the fact that properly estimated residuals are not cyclical does not imply per se deliberate discretion. Indeed, it is plausible that discretionary spending aims at improving the economy, i.e. that discretionary interventions should only be *less* cyclical than automatic stabilizers, but nevertheless responsive to and oriented towards economic conditions.

### 2.3 *Event studies*

The third approach measures discretionary policy from policy interventions or intentions, taken directly from laws, government enforcement, presidential speeches and alike. This “narrative approach” was first used by Ramey and Shapiro (1998) to extract data from announcements and policy decisions. The approach has also been adopted by Romer and Romer (2010) in their postwar reconstruction on tax legislation in the US, which shows that discretionary interventions have stronger effects than those obtained by cyclical adjustments.<sup>8</sup> Finally, this methodology was used by Ramey (2011) to evaluate the impact of “spending news”, which appear more reliable than SVAR impulses.

The narrative approach is surely promising, as it measures directly policy decisions that are unlikely to be captured by cyclically adjusted balances or particular regression residuals. However, the approach has some limitations, because laws and policy statements identify policy intentions that not always result in approved budget decisions. Moreover, some of the proposals are not precise enough in terms of the involved funding to be approved, and approved budget decisions do not

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<sup>8</sup> In general, the reconstruction of events is costly, especially when the sample includes countries with different languages. This explains why until recently the approach was mainly used for the US. However, two recent IMF studies (IMF, 2010; Devries et al., 2011) provide cross-national evidence.

necessarily imply that actual spending is the same as the approved spending in the reference year (Elmendorf, 2011). Finally, accrual accounting complicates the analysis of government spending in relation to GDP and other macroeconomic variables.

All these limitations make subjective and possibly arbitrary the reconstruction of the selected episodes, as it is difficult to separate actual decisions from mere announcements. In addition, announcements, even if not immediately or consistently followed by corresponding decisions, may equally affect expectations and then market outcomes.

Finally, even if the proposed events can at least produce reasonable dummies, it is difficult to reconstruct in this way how fiscal policy can exert discretion in a more continuous way, as the magnitude of discretionary expenditure depends on the composition of expenditure and on the working of inside and outside lags, which affect actual policy outcomes (Blinder, 2006).

### **3. Discretionary spending: A new measure**

Discretionary and non-discretionary spending are artificial constructs, as they do not have any reference to the national accounts. However, they play a key role in representing how fiscal policy works. Automatic stabilizers do not require policy makers to have knowledge of the current state of the economy and, more importantly, to have political consensus. By contrast, discretionary spending assumes an adequate knowledge of the current and perspective economic conditions. Furthermore, discretion is generally based on the political commitment to improve, more or less immediately, the state of the economy.

A possible clue for separating discretionary from automatic expenditures arises from the fact that legal and political constraints make most components of expenditure *de facto* unavailable for deliberate control. Indeed, several types of government spending follow some sort of obligations, which go beyond the interest payments on debt. Our main assumption is that discretionary expenditure is not compatible with rigid obligations, which make outlays inertial after a spending decision is made. Looking at disaggregate expenditures classified by *uses* would help to identify the degree of potential inertia in different spending categories. However, this approach would be potentially arbitrary.

To reduce the scope for arbitrariness, rather than a “legalistic” approach - often used by the event methodology – we adopt an economic perspective relying on the time series properties of various components of expenditure. Given that obligations deriving from social contracts lead to persistent spending, we distinguish discretionary from non-discretionary spending by evaluating the

persistence and volatility derived from the univariate time-series properties of each, de-trended, expenditure component.

We base our definition and measurement of discretionary spending on a few, rather intuitive, assumptions:

### **i. Discretion cannot be inertial**

Since current policy decisions do not simply, or necessarily, complete past decisions, discretionary spending should be less persistent than automatic stabilizers. In addition, there is no reason that discretionary spending must behave like a white noise process.<sup>9</sup>

We test the persistence requirement by applying Ljung-Box statistics to the univariate cyclical components of each type of spending. Our candidate discretionary variables should be less persistent than the other spending variables.

### **ii. Discretion does not imply obligations**

Discretionary spending should rest more on choice than on obligations. In reality, several expenditures imply several types of *obligations* (e.g. debt payments, compensation of employees, social security pensions), regardless of whether these obligations are legal<sup>10</sup>, contractual or plainly moral in nature. Empirically, the absence or the presence of less stringent obligations should not only imply a *lower* persistence but also a *higher* volatility relative to more automatic types of spending, due to cyclical factors and to the transmission of previous shocks. Thus, combining low persistence and high volatility could provide a reasonable signal for detecting discretion, independently of any particular theoretical assumption.

### **iii. Discretion must be temporary**

Policy interventions should reflect discrete and reversible choices, i.e. *temporary* spending decisions that democratic governments can legally start and cancel.<sup>11</sup> Therefore, temporary

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<sup>9</sup> For instance, public investments or other time-to-build projects need more than one period to be implemented and completed.

<sup>10</sup> Conversely, in an analysis of discretionary spending trends in the US for instance, “essentially all spending on federal wages and salaries is discretionary” (Austin and Levit, 2010, p.3). We do not follow here this wide sense ‘legal’ definition in favor of a more economic interpretation to be tested against detailed cyclical evidence.

<sup>11</sup> In principle, government could also establish ex ante rules ensuring that the relevant expenditure is implemented when certain conditions occur, for instance a fall in GDP, an increase in unemployment or an increase in inflation.

decisions reconcile the lack of persistence requirement with the assumption that (well-behaved) discretionary spending should pursue temporary and reversible goals. Furthermore, temporary decisions do not have to behave like a white noise process because temporary are not necessarily instantaneous interventions to be completed in the same period in which a decision is taken: outside lags in general and time-to-build technologies for capital spending imply some persistence, required at least by the completion time.

### 3.1. *Candidates for discretion*

Given the above assumptions, we identify ex ante discretionary expenditure on the basis of their purpose since certain outlays reflect per se less obligations than others, including the need of being protracted over time. However, for empirical analysis, general government spending is considered here by NIPA variable (see Table 2) rather than by *function* (e.g. defense, health etc.), though spending variables such as wages, investment, interest etc., are easily related to economic purposes, more or less likely to reflect implicit or explicit obligations.<sup>12</sup>

We then look at the time-series properties of the candidate variables to verify that they differ from those found for the other, non-discretionary, expenditures. To do so we use stationary, cyclical, data for assessing in a model-free way the univariate properties of each spending variable in each country.

### 3.2. *Discretion, persistence and volatility of expenditure time series.*

We first computed the cyclical component of each expenditure item using the HP filter. Our chosen series relate to real expenditure variables rather than to expenditure/GDP ratios like in Fatás and Mihov, and Afonso (2008). Scaling expenditure by GDP, while ensuring stationarity of the series, is not an innocuous normalization if the objective is to identify discretionary policy. Indeed, the expenditure-to-GDP ratio varies as a result of changes in GDP. Moreover, as GDP itself is affected by government expenditure, scaling expenditure by GDP creates a circularity in the measure of expenditure dynamics.

We analyzed the autocorrelation function for each cyclical expenditure component and for two aggregate measures, discretionary and non-discretionary spending, defined according to our priors based on persistence and volatility patterns. If a series lacks any persistence - i.e. if the series

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Musgrave (1959) defined such rule-based discretion as “formula flexibility”, which recently regained consensus in the literature.

<sup>12</sup> This is less obvious in the case of government consumption that includes several functions or types of services.

is a white noise process - the coefficients of autocorrelation will be zero at all lags. We then evaluated the presence of persistence in the series through the Ljung-Box statistics, whose value increases along with the degree of persistence. However, the persistence of a time-series affects also its variance. Consider the simplest case of an AR(1) process  $y(t) = \rho y(t-1) + \varepsilon(t)$ , with finite variance of the disturbance term ( $0 < \sigma^2(\varepsilon) < \infty$ ). The volatility of any covariance-stationary variable ( $y$ ) rises with the process persistence defined in this case by the parameter  $\rho$ :  $\text{var}(y) = \sigma^2 / (1 - \rho^2)$ ,  $0 < \rho < 1$ .

In addition, we use the standard deviation as a comparable, scale-free, measure of volatility for cyclical, zero-mean, variables. As the volatility of a series is affected by the degree of persistence of the series, we construct as our preferred measure of the degree of discretion an indicator of volatility corrected for the persistence of the series. Therefore, our summary criterion of “deflated volatility” is simply obtained dividing the volatility of each variable (standard deviation) by the Ljung-Box statistics, which measures the degree of persistence of the series.

Discretion is characterized here by low persistence *and* high volatility. This is not a contradiction if volatility originates from abrupt spending decisions rather than from long transmission of the interventions over time. We consider the volatility and persistence of each spending variable. Such analysis is then applied to an ex ante distinction between discretionary and non-discretionary expenditures based on our priors. The analysis of volatility/persistence is crucial to validate our priors. Starting from individual expenditure series for each country, we derive total discretionary expenditure simply adding up the individual discretionary series.

Our candidate variables satisfying the lack of obligation requirement are *subsidies*, *purchases* and *capital spending*. Thus, we exclude from discretion not only interest payments, but also compensation of employees and transfers, which are in most cases dominated by pensions. This means that we exclude from discretionary spending the non-pension components as well (e.g., mainly unemployment and welfare benefits), which behave more as a persistent cyclical component than as an occasional labor market intervention. Thus, government discretionary spending (GD) is obtained adding the following components:

$$(1) \text{GD} = \text{TSUB} + \text{CGNW} + [\text{IG} + \text{TKPG}],$$

where the expression in brackets is total capital expenditure  $[\text{IG} + \text{TKPG}]$ , i.e. the sum of fixed investment (IG) and capital transfers (TKPG); TSUB and CGNW denote subsidies to firms and government consumption purchases, respectively (see Statistical Appendix).

To validate the robustness of our definition, we also tried and tested minor accounting differences: subtracting from capital expenditure a negligible lump-sum receipt component

(TKTRG), or confining capital expenditure to fixed investment only. Since these and other small variants do not significantly affect the pattern of the resulting discretionary aggregate, we maintained definition (1), providing separate information for the two capital spending components.<sup>13</sup>

Moreover, discretionary spending has been calculated by adding the relevant components both in nominal and in real terms. Nominal variables have been used to calculate the discretionary share with respect total government expenditure and nominal GDP [Tables 2 and 5]. Nominal variables have been deflated to calculate real expenditure series from which obtaining the persistence and volatility of their cyclical components that we used for evaluating whether actual series conform to our priors. Deflation is important because the relevant price deflators vary significantly across expenditure items. Subsidies (TSUB) in volume are obtained by means of the GDP deflator, while for the two capital expenditure components we used the fixed investment deflator. As far as purchases (CGNW) are concerned, they are derived as the difference between government consumption (CG) deflated by the consumption deflator (taken from the OECD) and wage expenditure (CGW) deflated by the private consumption deflator (see Statistical Appendix).

#### 4. Results

We first present some background data that should help to interpret features and implications of our suggested measure.

##### 4.1 *Stylized facts*

Tables 2a and 2b summarize the distribution of government spending in all countries, while Table 3 displays information on the government size and the debt burden. Overall, government spending declined over time, although the Great Recession reversed this tendency, mainly in those countries where deficits and debt constraints were less binding.

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<sup>13</sup> This additional information is available upon request.

**Table 2a - Government Expenditure by variable (% of Total Government Spending)**

Country	(1) Purchases	(2) Investment	(3) Capital transfers	(4) Subsidies	(5) Welfare	(6) Pensions	(7) Wages	(8) Interests	(9)=(1)+(7) Government Consumption	(10)=(5)+(6) Social Security
	Discretionary Spending				Non-Discretionary Spending				---	---
<b>Austria</b>										
1990-99	15.4	5.4	3.9	6.2	13.6	24.1	23.8	7.5	39.2	37.7
2000-08	18.9	2.6	5.2	7.1	13.4	26.1	20.2	6.5	39.1	39.5
2009-11	19.8	2.3	5.5	7.2	15.4	24.5	19.8	5.5	39.6	39.9
<b>Belgium</b>										
1980-89	16.8	5.6	3.0	4.3	14.3	16.5	23.0	16.5	39.8	30.8
1990-99	18.6	3.6	2.3	2.6	13.3	18.5	22.9	18.2	41.5	31.8
2000-08	22.1	3.5	2.9	3.1	14.1	18.8	25.0	10.5	47.0	32.9
2009-11	23.2	3.3	2.8	4.6	16.2	17.8	24.9	7.1	47.9	34.0
<b>Denmark</b>										
1980-89	15.8	4.2	2.2	2.9	21.7	8.7	32.5	12.1	48.3	30.4
1990-99	14.9	3.2	1.3	4.7	23.0	10.4	31.9	10.5	46.8	33.4
2000-08	17.7	3.7	1.0	4.7	21.6	11.0	35.4	5.1	53.1	32.6
2009-11	19.2	3.9	1.2	4.9	20.8	10.6	35.8	3.5	55.0	31.4
<b>Finland</b>										
1980-89	15.1	8.6	1.6	7.4	15.6	16.6	34.5	0.5	49.6	32.2
1990-99	15.3	6.0	2.2	5.0	22.6	16.9	30.5	1.6	45.8	39.5
2000-08	19.1	5.8	0.8	3.1	17.9	18.6	30.3	4.5	49.4	36.5
2009-11	20.7	5.4	0.9	2.9	19.0	17.4	29.3	4.2	50.0	36.4
<b>France</b>										
1980-89	19.7	6.8	1.9	4.7	13.8	21.3	27.5	4.5	47.2	35.1
1990-99	20.1	6.5	2.4	3.2	11.9	23.3	26.3	6.3	46.4	35.2
2000-08	20.7	6.3	1.9	3.0	10.9	24.8	26.7	5.7	47.4	35.7
2009-11	21.6	6.1	1.8	3.2	12.2	24.8	25.6	4.6	47.2	37.0
<b>Iceland</b>										
1990-99	21.3	10.4	4.9	5.6	11.2	5.7	31.7	9.3	53.0	16.7
2000-08	22.7	9.6	4.7	4.5	9.9	5.0	37.0	6.7	59.7	14.9
2009-11	23.6	6.7	6.0	3.8	11.1	5.5	30.8	12.6	54.4	16.6
<b>Ireland</b>										
1990-99	17.4	6.4	3.6	2.7	20.7	9.2	26.1	13.9	43.5	29.9
2000-08	20.9	12.3	3.3	1.8	18.3	10.5	28.8	4.1	49.7	28.8
2009-11	14.0	7.5	20.7	1.0	22.5	6.8	22.8	4.7	36.0	29.3
<b>Italy</b>										
1980-89	14.8	6.9	3.6	5.3	7.5	22.4	24.0	15.5	30.8	29.9
1990-99	14.6	4.9	3.2	3.0	8.2	23.6	22.4	20.2	37.0	31.8
2000-08	18.8	4.9	3.5	2.3	6.5	29.6	23.0	11.4	41.8	36.1
2009-11	20.2	4.6	3.3	2.2	10.2	28.2	22.4	9.0	42.6	38.4

Note: (1) = CGNW; (2) = IGAA; (3) = TKPG; (4) = TSUB; (5) = Welfare; (6) = Pensions; (7) = CGW; (8) = GGINT; (9) = CG; (10) = SSPG. For the exact definition, see the Appendix.

**Table 2b - Government Expenditure by variable (% of Total Government Spending)**

Country	(1) Purchases	(2) Investment	(3) Capital transfers	(4) Subsidies	(5) Welfare	(6) Pensions	(7) Wages	(8) Interests	(9)=(1)+(7) Government Consumption	(10)=(5)+(6) Social Security
<b>Japan</b>	Discretionary Spending				Non-Discretionary Spending				---	---
1980-89	22.3	15.3	5.5	3.5	7.7	14.1	19.9	11.6	42.2	21.8
1990-99	24.2	16.1	7.1	2.3	6.5	16.6	17.4	9.8	41.6	23.1
2000-08	30.0	10.4	4.6	2.0	7.2	21.9	16.7	7.1	46.7	29.1
<b>Netherlands</b>										
1980-89	20.5	6.2	3.7	3.8	22.3	11.1	22.6	9.8	43.1	33.4
1990-99	25.6	6.3	1.8	3.3	19.1	12.0	20.9	10.9	46.5	31.1
2000-08	33.9	7.8	0.8	3.1	14.2	11.5	22.4	6.2	56.3	25.7
2009-11	38.0	7.6	2.7	3.1	14.2	9.6	20.7	4.2	58.7	23.8
<b>Norway</b>										
1990-99	16.0	7.2	1.0	7.8	21.0	11.6	29.8	5.7	45.8	32.6
2000-08	18.9	7.1	0.4	5.2	21.1	12.1	31.5	3.8	50.4	33.2
2009-11	20.0	8.0	0.1	5.0	20.3	11.6	31.9	3.2	51.9	31.9
<b>Spain</b>										
1980-89	14.8	8.2	11.8	2.8	12.4	18.5	25.8	5.8	40.6	30.9
1990-99	15.7	9.1	5.8	2.3	10.7	20.3	25.8	10.2	41.5	31.0
2000-08	20.1	9.5	3.8	2.8	9.5	21.6	26.8	5.9	46.9	31.1
2009-11	20.8	9.3	3.0	2.6	14.5	19.1	26.7	4.1	47.5	33.6
<b>Sweden</b>										
1980-89	15.6	7.1	1.5	6.3	15.8	13.2	32.3	8.2	47.9	29.0
1990-99	17.5	5.9	1.1	5.6	19.4	13.7	29.1	7.7	46.6	33.1
2000-08	21.9	6.1	0.3	2.9	18.6	14.8	31.0	4.5	52.9	33.4
2009-11	24.9	7.0	0.2	3.0	17.9	14.6	30.2	2.2	55.1	32.5
<b>UK</b>										
1980-89	19.6	4.9	4.0	2.7	17.5	12.4	28.2	10.8	47.8	29.9
1990-99	21.3	4.6	2.9	1.4	21.8	13.1	26.8	8.2	48.1	34.9
2000-08	25.5	4.1	2.6	1.1	19.1	14.1	27.8	5.7	53.3	33.2
2009-11	25.7	5.6	4.3	0.9	21.2	11.8	25.2	5.2	50.9	33.0
<b>USA</b>										
1980-89	18.2	10.2	0.0	1.4	10.0	17.8	29.7	12.6	47.9	27.8
1990-99	15.6	9.3	0.2	1.3	14.3	17.6	28.6	13.1	44.2	31.9
2000-08	17.1	9.4	0.7	1.3	17.0	17.6	28.4	8.6	45.5	34.6
2009-11	16.5	8.8	2.4	1.0	21.0	17.2	26.4	6.5	42.9	38.2

Note: (1) = CGNW; (2) = IGAA; (3) = TKPG; (4) = TSUB; (5) = Welfare; (6) = Pensions; (7) = CGW; (8) = GGINT; (9) = CG; (10) = SSPG. For the exact definition, see the Appendix.

Government consumption (CG) is everywhere the largest public spending variable, followed almost everywhere by *social security* (SSPG) which contains *pensions* and *welfare* expenditures.<sup>14</sup> Social spending seems mostly made by pensions, with the exception of the Northern countries, Ireland and the UK where welfare transfers dominate (Table 3).

<sup>14</sup> Austria is the exception, since government consumption and social security spending have about the same size.



**Table 3 - Revenues, Government Spending and Debt Size (% of nominal GDP)**

Country	TY	GY	GSIZE	BY	Country	TY	GY	GSIZE	BY
<b>Austria</b>					<b>Japan</b>				
1990-99	50.8	49.8	100.6	64.4	1980-89	31.2	33.3	64.5	65.1
2000-08	49.1	47.4	96.5	69.5	1990-99	32.0	35.7	67.7	86.8
2009-11	48.4	49.1	97.5	77.4	2000-08	32.3	38.3	70.6	160.4
<b>Belgium</b>					<b>Netherlands</b>				
1980-89	47.1	57.0	104.1	108.2	1980-89	52.6	56.4	109	79.1
1990-99	47.6	50.8	98.4	130.6	1990-99	48.9	49.9	98.8	86.2
2000-08	49.2	47.6	96.8	100.4	2000-08	45.1	42.7	87.8	59.8
2009-11	48.5	50.3	98.8	100.1	2009-11	46.2	48.4	94.6	70.2
<b>Denmark</b>					<b>Norway</b>				
1980-89	52.6	54.5	107.1	72.1	1990-99	54.3	47.7	102.0	31.4
1990-99	55.7	54.3	110.0	77.6	2000-08	57.5	40.7	98.2	46.9
2000-08	55.8	49.2	105.0	50.2	2009-11	57.0	42.7	99.7	51.7
2009-11	55.6	54.1	109.7	54.7					
<b>Finland</b>					<b>Spain</b>				
1980-89	48.5	40.2	88.7	17.2	1980-89	33.8	38.8	72.6	41.6
1990-99	55.6	50.8	106.4	51.6	1990-99	38.5	43.0	81.5	64.4
2000-08	53.3	44.1	97.4	47.9	2000-08	38.9	47.9	86.8	53.8
2009-11	52.3	48.8	101.1	56.8	2009-11	36.0	43.7	79.7	68.0
<b>France</b>					<b>Sweden</b>				
1980-89	47.4	47.6	95.0	35.3	1980-89	59.9	57.8	117.7	61.6
1990-99	49.0	50.0	99.0	56.7	1990-99	59.8	59.1	118.9	73.9
2000-08	50.0	49.3	99.3	71.4	2000-08	55.2	49.8	105.0	57.8
2009-11	49.7	52.4	102.1	94.8	2009-11	52.9	49.0	101.9	49.1
<b>Iceland</b>					<b>UK</b>				
1990-99	38.7	40.6	61.2	75.4	1980-89	42.9	44.3	87.2	47.1
2000-08	44.5	41.6	86.1	68.9	1990-99	38.7	40.6	79.3	45.4
2009-11	41.0	46.4	87.4	124.0	2000-08	40.4	38.5	78.9	45.4
					2009-11	40.2	45.5	85.7	81.5
<b>Ireland</b>					<b>USA</b>				
1990-99	39.4	37.7	77.1	57.1	1980-89	32.1	35.5	67.6	52.6
2000-08	35.1	32.1	67.2	35.7	1990-99	33.7	35.2	68.9	67.7
2009-11	35.2	50.2	85.4	94.0	2000-08	33.1	34.2	67.3	60.4
					2009-11	31.6	39.9	71.5	92.3
<b>Italy</b>									
1980-89	37.3	47.8	85.1	90.4					
1990-99	44.7	51.2	95.9	117.6					
2000-08	44.7	46.5	91.2	117.3					
2009-11	46.2	49.5	95.7	126.9					

Note: TY = Total Revenues/GDP; GY = Total Government spending/GDP; GSIZE = (TY + GY)/GDP; BY = Government Debt/GDP. All variables are in nominal terms and refer to General Government definition.

However, government consumption cannot be considered representative of all public expenditure for two main reasons: the first is that government consumption ranges between 40% and 50% of total spending. The second is that government consumption is a heterogeneous aggregate formed for about 2/3 by the *compensation of employees* (CGW), and for the rest by government *purchases*

(CGNW), having a well-known different pattern over the business cycle, which is also confirmed by our results. The sum of government consumption and social security is about 80% of total general government spending, though there are again differences among countries.

Capital spending is the third, much smaller but also more volatile, component obtained by the sum of *fixed investment* (IGAA) and *capital transfers* (TKPG). Public investment is relatively low in all countries, except for Japan where it exceeds 10% of total public spending.

#### 4.2 Evidence from time-series analysis by variable and country

We first derive the cyclical component of each spending variable in volume through the HP filter.<sup>15</sup> We then analyze and compare the autoregressive properties of each de-trended series and of the implied discretionary (GD) and non-discretionary (GN) aggregates. As stated before, our testable prior is that discretionary expenditure has a lower persistence *and* a higher volatility with respect to the other components, inertial or automatic. Table 4 reports for all spending variables the relevant statistics, which include the ratio between volatility and persistence (Dvol), introduced to deflate volatility from what is due to persistence. Comparing first the same variable by country, we see that *purchases* (CGNW) are – as expected - more volatile (Vol) than the wage component of government consumption (CGW). Capital expenditure volatility is a well-known business cycle stylized fact that applies also to public spending. *Capital transfers* (KTPG) are per se extremely volatile while fixed investment volatility reflects not only the discrete type of decisions involved but also the persistence induced by its time-to-build feature.<sup>16</sup>

The last discretionary variable in our scheme is given by *subsidies*, which indicate current, unrequited, payments made to private firms. Given the policy nature of this variable, it is not surprising that the relevant statistics widely differ across countries. In most cases, however, subsidies are persistent and their deflated volatility is smaller than that found for the other discretionary components.

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<sup>15</sup> As in Ravn and Uhlig (2002) we use for annual data a 6.25 smoothing parameter. Using different parameters, however, results do not change remarkably.

<sup>16</sup> A good example is given by the experience of Ireland and Iceland, characterized by strong policy interventions to alleviate recent crisis.

**Table 4. - Volatility (Vol) and persistence (LB) of government spending variables**

Austria 1990-2011	(1) Vol	(2) LB(5)	(3)=(1)/(2) Dvol	Belgium 1980-2011	(1) Vol	(2) LB(8)	(3)=(1)/(2) DVol
<b>Purchases</b>	3.15	5.77	.55	<b>Purchases</b>	1.77	13.3	.13
<b>Fixed investment</b>	5.82	5.26	1.11	<b>Fixed investment</b>	5.28	34.3	.15
<b>Capital transfers</b>	19.6	9.53	2.06	<b>Capital transfers</b>	28.9	16.5	1.75
<b>Subsidies</b>	3.84	15.9	.24	<b>Subsidies</b>	5.23	8.65	.60
Welfare	5.71	10.5	.54	Welfare	2.89	26.6	.11
Interests	2.83	8.66	.33	Interests	4.18	15.2	.27
Pensions	1.01	7.77	.13	Pensions	1.11	11.5	.10
Wages	2.13	11.8	.18	Wages	1.18	8.74	.13
SSPG (Social Security) Shares	Pensions: 64% Welfare: 36%			SSPG (Social Security) Shares	Pensions: 56% Welfare: 44%		
Denmark 1980-2011	Vol	LB (8)	(3)=(1)/(2) DVol	Finland 1980-2011	Vol	LB(8)	(3)=(1)/(2) DVol
<b>Purchases</b>	1.89	27.4	.07	<b>Purchases</b>	1.75	23.4	.07
<b>Fixed investment</b>	6.59	17.6	.37	<b>Fixed investment</b>	5.09	20.7	.25
<b>Capital transfers</b>				<b>Capital transfers</b>	32.1	14.3	2.24
<b>Subsidies</b>	5.58	10.4	.54	<b>Subsidies</b>	3.52	14.3	.25
Welfare	3.04	34.5	.09	<b>Welfare</b>	4.87	12.7	.38
Interests	6.00	12.4	.48	Interests	7.78	18.5	.42
Pensions	2.65	8.31	.31	Pensions	2.37	14.7	.16
Wages	1.34	27.8	.05	Wages	1.99	32.4	.06
SSPG (Social Security) Shares	Pensions: 31% Welfare: 69%			SSPG (Social Security) Shares	Pensions: 48% Welfare: 52%		
France 1980-2011	(1) Vol	(2) LB(8)	(3)=(1)/(2) Dvol	Iceland 1990-2011	(1) Vol	(2) LB(5)	(3)=(1)/(2) Dvol
<b>Purchases</b>	1.18	21.1	.06	<b>Purchases</b>	3.70	23.9	.15
<b>Fixed investment</b>	2.78	6.48	.43	<b>Fixed investment</b>	11.1	16.0	.69
<b>Capital transfers</b>	8.94	14.4	6.20	<b>Capital transfers</b>	57.0	11.8	4.84
<b>Subsidies</b>	4.05	21.5	.19	<b>Subsidies</b>	4.72	3.85	1.23
Welfare	3.02	10.1	2.99	Welfare	5.21	15.7	.33
Interests	4.45	3.78	1.18	Interests	10.6	7.41	1.43
Pensions	.91	8.88	.10	Pensions	3.85	8.61	.45
Wages	.76	12.2	.06	Wages	2.58	12.8	.20
SSPG (Social Security) Shares	Pensions: 65% Welfare: 35%			SSPG (Social Security) Shares	Pensions: 33% Welfare: 67		
Ireland 1990-2011	Vol	LB(5)	(3)=(1)/(2) Dvol	Italy 1980-2011	Vol	LB(8)	(3)=(1)/(2) Dvol
<b>Purchases</b>	3.34	19.5	.17	<b>Purchases</b>	2.20	10.1	.22
<b>Fixed investment</b>	8.97	24.7	.36	<b>Fixed investment</b>	6.35	6.76	.94
<b>Capital transfers</b>	50.7	2.30	22.0	<b>Capital transfers</b>	30.8	8.12	3.79
<b>Subsidies</b>	7.39	15.0	.49	<b>Subsidies</b>	4.59	12.9	.36
Welfare	5.14	11.5	.45	Welfare	8.07	12.0	.67
Interests	5.45	7.27	.75	Interests	5.57	20.3	.27
Pensions	4.15	11.5	.36	Pensions	2.63	8.73	.30
Wages	1.78	8.18	.22	Wages	2.07	7.91	.26
SSPG (Social Security) Shares	Pensions: 31% Welfare: 69%			SSPG (Social Security) Shares	Pensions: 76% Welfare: 24%		

**Table 4 continued- Volatility (Vol) and persistence (LB) of government spending variables**

Japan 1980-2008	(1) Vol	(2) LB(7)	(3)=(1)/(2) DVol	Netherlands 1980-2011	(1) Vol	(2) LB(8)	(3)=(1)/(2) Dvol
<b>Purchases</b>	1.35	21.3	.06	<b>Purchases</b>	1.91	7.93	.24
<b>Fixed investment</b>	3.14	18.5	.17	<b>Fixed investment</b>	2.97	10.8	.27
<b>Capital transfers</b>	25.5	21.8	1.17	<b>Capital transfers</b>			
<b>Subsidies</b>	6.44	13.2	.49	<b>Subsidies</b>	8.87	12.2	.73
Welfare	3.57	6.93	.52	Welfare	2.84	15.3	.19
Interests	2.01	26.4	.08	Interests	3.20	18.8	.17
Pensions	.96	9.67	.10	Pensions	2.18	11.5	.19
Wages	.60	24.2	.02	Wages	1.32	26.5	.05
SSPG (Social Security) Shares	Pensions: 70% Welfare: 30%			SSPG (Social Security) Shares	Pensions: 62% Welfare: 38%		
Norway 1980-2011	(1) Vol	(2) LB(8)	(3)=(1)/(2) DVol	Spain 1980-2011	(1) Vol	(2) LB(8)	(3)=(1)/(2) DVol
<b>Purchases</b>	1.69	22.7	.07	<b>Purchases</b>	2.37	15.8	.15
<b>Fixed investment</b>	4.98	16.6	.30	<b>Fixed investment</b>	6.72	15.5	.43
<b>Capital transfers</b>	49.4	17.4	2.84	<b>Capital transfers</b>	10.6	8.77	1.21
<b>Subsidies</b>	4.34	14.3	.30	<b>Subsidies</b>	6.84	15.9	.43
Welfare	2.59	12.5	.21	Welfare	5.19	15.7	.33
Interests	7.14	9.95	.72	Interests	7.69	30.3	.25
Pensions	1.88	6.69	.28	Pensions	1.12	12.2	.09
Wages	.99	9.50	.10	Wages	1.97	14.4	.14
SSPG (Social Security) Shares	Pensions: 36% Welfare: 64%			SSPG (Social Security) Shares	Pensions: 64% Welfare: 36%		
Sweden 1980-2011	(1) Vol	(2) LB(8)	(3)=(1)/(2) DVol	UK 1980-2011	Vol	LB(8)	(3)=(1)/(2) DVol
<b>Purchases</b>	2.18	7.93	.27	<b>Purchases</b>	1.49	14.2	.10
<b>Fixed investment</b>	3.52	7.90	.45	<b>Fixed investment</b>	18.1	4.45	4.07
<b>Subsidies</b>	3.37	38.3	.88	<b>Subsidies</b>	7.40	8.97	.82
Welfare	3.03	19.9	.15	Welfare	4.02	19.0	.21
Interests	7.66	9.90	.77	Interests	6.90	5.60	1.23
Pensions	1.82	9.49	.19	Pensions	1.53	9.48	.16
Wages	1.78	12.7	.14	Wages	1.28	22.8	.06
SSPG (Social Security) Shares	Pensions: 44% Welfare: 56%			SSPG (Social Security) Shares	Pensions: 40% Welfare: 60%		
USA 1980-2011	(1) Vol	(2) LB(8)	(3)=(1)/(2) DVol				
<b>Purchases</b>	1.29	6.26	.21				
<b>Fixed investment</b>	2.64	27.8	.09				
<b>Subsidies</b>	8.34	17.9	.47				
Welfare	3.57	17.7	.20				
Interests	3.89	27.8	.14				
Pensions	1.14	6.53	.17				
Wages	0.80	20.0	.04				
SSPG (Social Security) Shares	Pensions: 55% Welfare: 45%						

Source: OECD *cit.* Data are HP annual cycles; LB(p): Ljung Box  $\chi^2(p)$  statistics; Dvol = Deflated volatility; Discretionary variables are in bold; **Purchases**: Non-wage Gov.t Consumption; (CGNW); **Fixed Investment** = Gov.t fixed investment (IGAA); **Capital transfers**: TKPG; **Subsidies** = Subsidies to firms (SUB); **Welfare** = Social Security (SSPG) – Pensions; **Interests** = Gross Gov.t Interest Payments (GGINTP); Pensions = old age + survivors spending cash benefits (*Social Expenditure Database*); **Wages** = Gov.t Final Wage Consumption (CGW). More details can be found in the Appendix.

As far as the non-discretionary spending is concerned, the *welfare* component is generally characterized by a high degree of cyclicity (Adema et al., 2011) and by a degree of persistence that is inconsistent with the standard view that this type of expenditure should reflect temporary interventions. Conversely, all the other evidence matches our assumptions, including the fact that pensions and wages are very persistent, while interests on debt are volatile too.

### 4.3 Aggregate evidence

On the basis of our definition, the share of discretionary spending (GD) is about 1/3 of total government spending in the OECD (Table 5).

**Table 5 - Discretionary (GD) and non-discretionary spending (GN), % of GDP**

Country	1980-89			1990-99			2000-08			2009-11		
	GD	GN	GY	GD	GN	GY	GD	GN	GY	GD	GN	GY
Austria	-	-	-	31.0	69.0	49.8	33.8	66.2	47.4	34.8	65.2	49.1
Belgium	29.7	70.3	57.0	27.1	72.9	50.8	31.6	68.4	47.6	33.9	66.1	50.3
Denmark	25.0	75.0	54.5	24.2	75.8	54.3	27.0	73.0	49.2	29.2	70.8	54.1
Finland	32.7	67.3	40.2	28.4	71.6	50.8	28.8	71.2	44.1	30.0	70.0	48.8
France	33.0	67.0	47.6	32.2	67.8	50.0	31.9	68.1	49.3	32.7	67.3	52.4
Iceland	-	-	-	42.2	57.8	40.6	41.5	58.5	41.6	40.0	60.0	46.4
Ireland	-	-	-	30.1	69.9	37.7	38.3	61.7	32.1	43.2	56.8	50.2
Italy	30.6	69.4	47.8	25.7	74.3	51.2	29.5	70.5	46.5	30.3	69.7	49.5
Japan	46.6	53.4	33.3	49.7	50.3	35.7	47.0	53.0	38.3	-	-	-
Netherlands	34.2	65.8	56.4	37.0	63.0	49.9	45.6	54.4	42.7	51.4	48.6	48.4
Norway	-	-	-	32.0	68.0	47.7	31.6	68.4	40.7	33.0	67.0	42.7
Spain	37.6	62.4	38.8	33.0	67.0	43.0	36.2	63.8	47.9	35.7	64.3	43.7
Sweden	30.5	69.5	57.8	30.1	69.9	59.1	31.2	68.8	49.8	35.1	64.9	49.0
United Kingdom	31.2	68.8	44.3	30.2	69.8	40.6	33.3	66.7	38.5	36.5	63.5	45.5
United States	29.8	70.2	35.5	26.4	73.6	35.2	28.5	71.5	34.2	28.8	71.2	39.9

Source: *OECD EO90 cit.* Average data; GD = Discretionary spending; GN = Non-discretionary spending; GY = General Government Spending/Nominal GDP ratio.

This is much larger than the discretionary expenditure obtained from estimated residuals, but is much smaller than typically assumed in the earlier econometric models where government spending was by definition an exogenous, controlled, variable. Moreover, although there are significant differences across countries, the share of non-discretionary spending (GN) is generally increasing over time and accounts for the rising ratio of total government spending to GDP (GY). Interestingly, this tendency is reversed in the Great Recession, with a significant increase in discretionary spending, especially in those countries (Table 3) that entered the recession phase with less stringent debt constraints.<sup>17</sup>

Looking at the components of discretionary spending (Tables 2a,b), one can observe a similar pattern across countries: *purchases* are about the 60% of discretionary spending and are always and everywhere the largest component, generally increasing in the last period. *Capital spending* ranks second, at about the 20% of the discretionary aggregate, with differences across countries reflecting unusual episodes (Ireland), or more structural patterns (US, Japan). In all cases, *subsidies* are the third and smallest discretionary component, ranging between 5 and 10 percent.

The components of non-discretionary spending (GN) differ more markedly among countries, partially because *social security* – which is generally the largest component - is mostly made by pensions in Japan, France, Italy and Spain and by welfare expenditures in Northern Europe, in Ireland and in the United Kingdom.

The gap between the first and the second ranking component (*wages*) is not as distant as the one found for discretionary spending. In some cases, compensations of employees exceed (or have about the same weight) than social security. Finally, *interest spending* is the third, much smaller, component, though its share obviously reflects the size of government debt (Table 3).

#### 4.4 Persistence and volatility

In this section we verify whether our priors on the selection of discretionary and non-discretionary components are confirmed by the analysis of the volatility and persistence of these two types of spending. In Table 6 we compare the persistence and volatility statistics relative to both discretionary and non-discretionary government spending aggregates in each country. Similarly to the single variable case (Tables 4.1-4.3), also aggregate data refer to HP-filtered cyclical variables. Regarding the comparison between primary and total government spending, the main finding is that discretionary spending (GD) is *always* more volatile than non-discretionary spending (GN), and

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<sup>17</sup> This increase was particularly high in Ireland and, for different reasons in the Netherlands, where the discretionary share is always increasing, eventually reaching as in Japan about half of total outlays.

more volatile as well than primary and total government spending. Furthermore, non-discretionary spending is generally less volatile than primary (GP) and total government spending (GT).

While total expenditure by definition cannot separate its components, it is interesting to note that primary spending – one of the first empirical proxies for discretion – does not comply with our criteria, since not only is more volatile than the GN aggregate, but it is often also more persistent.

**Table 6 – Persistence (LB) and volatility (Vol) of discretionary (GD), non-discretionary (GN), primary (GP) and total spending (GT)**

<b>Austria 1990-2011</b>	<b>(1) Vol</b>	<b>(2) LB</b>	<b>(3) = (1)/(2) Dvol</b>	<b>Belgium 1980-2011</b>	<b>(1) Vol</b>	<b>(2) LB</b>	<b>(3) = (1)/(2) Dvol</b>	<b>Denmark 1980-2011</b>	<b>(1) Vol</b>	<b>(2) LB</b>	<b>(3) = (1)/(2) Dvol</b>
GD	4.28	5.03	.85	GD	3.54	17.3	.20	GD	2.16	8.1	.27
GN	1.28	7.24	.18	GN	1.16	16.0	.07	GN	1.30	26.2	.05
GP	1.55	7.77	.20	GP	1.62	12.9	.13	GP	1.31	28.2	.05
GT	1.41	6.14	.23	GTOT	1.49	4.36	.34	GTOT	1.28	27.8	.05
<b>Finland 1980-2011</b>				<b>France 1980-2011</b>				<b>Iceland 1990-2011</b>			
GD	2.22	13.8	.16	GD	.91	6.6	.14	GD	11.4	5.1	2.23
GN	1.54	17.6	.09	GN	.69	12.1	.06	GN	2.31	5.6	.41
GP	1.14	13.5	.08	GP	.61	3.8	.16	GP	5.77	3.9	1.48
GT	1.22	23.1	.05	GT	.56	10.5	.05	GT	5.34	4.5	1.17
<b>Ireland 1990-2011</b>				<b>Italy 1980-2011</b>				<b>Japan 1980-2008</b>			
GD	16.7	3.94	4.25	GD	2.90	16.4	.18	GD	2.88	12.3	.23
GN	1.72	7.23	.24	GN	1.84	13.9	.13	GN	1.88	12.6	.15
GP	7.7	2.80	2.75	GP	1.01	3.3	.30	GP	2.3	14.4	.16
GT	7.34	2.90	2.53	GT	1.15	5.6	.20	GT	2.54	12.8	.20
<b>Netherlands 1980-2011</b>				<b>Norway 1980-2011</b>				<b>Spain 1980-2011</b>			
GD	3.87	11.3	.34	GD	1.79	26.2	.07	GD	3.46	14.6	.24
GN	1.31	15.2	.09	GN	1.02	12.6	.08	GN	1.83	14.5	.13
GP	1.97	12.9	.15	GP	1.11	26.4	.04	GP	1.93	23.6	.08
GT	1.81	10.8	.17	GT	1.16	20.2	.06	GT	1.84	18.6	.10
<b>Sweden 1980-2011</b>				<b>UK 1980-2011</b>				<b>US 1980-2011</b>			
GD	3.33	11.3	.29	GD	4.05	10.5	.39	GD	1.83	12.7	.14
GN	.98	4.6	.21	GN	1.31	17.4	.08	GN	.80	17.0	.05
GP	1.57	11.8	.13	GP	1.87	9.9	.19	GP	1.23	24.6	.05
GT	1.49	9.5	.16	GT	1.64	10.0	.16	GT	.90	22.6	.04

Source: OECD EO90 cit. All indicators refer to deflated cyclical deviations from an annual HP trend; **Vol** is the standard deviation of the cyclical data. **LB(p)** is the Ljung-Box statistics where  $p = T/4$  is the number of autocorrelations and  $T$  is the number of data points. The **LB(p)** statistics is used as an indicator of persistence; **Dvol** =  $\text{Vol}/\text{LB}$  is an indicator of deflated volatility, i.e. of the volatility not induced by the estimated persistence.

However, as stated above, these results can also reflect the fact that, in any time-series process, volatility is increased by the propagation mechanism of the shocks, especially if they are persistent. Therefore, we deflated volatility from persistence. Looking at the Dvol index, we see that the deflation procedure does not affect the volatility ranking: the fact that discretionary spending volatility is still the highest in all cases but Norway confirms our priors even in a stronger way.

Furthermore, the persistence indicators, reported in Table 6, broadly support the volatility results, though in a weaker way. In ten out of fifteen cases, the non-discretionary spending aggregate is more persistent than the discretionary aggregate. In the remaining cases, however, inertia in discretionary spending is either the same as non-discretionary spending (in Spain), or higher (in Belgium, Italy, Norway and Sweden). Looking at the individual variables in each country (Table 4), this result could either reflect a rising share of somewhat inertial purchases or the time needed to activate and complete fixed investment decisions.

## 5. Conclusions

The Great Recession has revived the debate on the role of fiscal policy to support economic activity in the short run. A large consensus on the need of exceptional fiscal stimuli has emerged. Much of the debate has concentrated on the size of fiscal multipliers. We believe that before deriving econometric results on the effects of fiscal interventions, a better measure of truly discretionary policy is needed. This paper is a step in that direction.

We provide a measure of discretionary spending, which is defined on the basis of three features of expenditure that can be easily approximated for empirical purposes. First, the lack of inertia; second, the lack of prior obligations, and third, temporariness or reversibility. Given the persistence of macroeconomic fluctuations, lack of inertia implies that discretionary spending variables should have a lower persistence than the other spending variables. It is indeed implausible that discretion applies to anything that basically replicates what happened before. This (relative) discontinuity requires also that policymakers can escape from several obligations, far exceeding mere legal or institutional constraints. These obligations reflect social contracts and political preferences. These two patterns finally imply that discretionary spending refers to temporary interventions, partially denying Milton Friedman dictum that nothing is so permanent as a temporary government program.

Persistence and volatility were evaluated using cyclical data in each country. Evaluating cyclical variables, persistence and volatility indicators strongly support the view that discretionary spending should be more volatile and less persistent than the other components of spending, which confirms that our purpose-oriented measure of discretionary spending is basically correct or at least consistent with our definition. Indeed, discretionary spending is *always* more volatile than non-discretionary spending. To account for the interaction between volatility and persistence, we introduced a “deflated” volatility indicator, which corrects the persistence-induced variability by dividing the standard deviation of each cyclical variable by our persistence indicator. The



correction confirms our priors, as the adjusted volatility of discretionary spending is found to be more volatile than non-discretionary spending in 14 out of 15 country cases. Persistence results also supported our hypotheses, though in a weaker form, as we obtained five out of 15 cases in which non-discretionary spending is less persistent than discretionary spending. We attributed this result to the presence of implementation lags for capital expenditure, an important component of discretionary spending.

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## Appendix: Data sources and variable definitions

Data are from the OECD *Economic Outlook* No. 90 (December 2011). Except for GD, GN and WELFARE (our definitions), all variables and acronyms are those used by the OECD.

### NOMINAL VARIABLES:

CGNW: Government final non-wage consumption expenditure

CGW: Government final wage consumption expenditure

IGAA: Government fixed capital formation

SSPG: Social security benefits

SUB: Subsidies to firms

TKPG: Capital Transfers paid and other capital payments

INTERESTS (GGINTP): gross government interest payments

PENSIONS = old age + survivors spending cash benefits (*Social expenditure database*)

WELFARE = Welfare spending (SSPG – Pensions) [Our definition]

### DEFLATORS:

PCG: Government final consumption expenditure, deflator

PCGW: Government final wage consumption expenditure, deflator

PCP: Private final consumption expenditure, deflator

PGDP: Gross domestic product, deflator, market prices

PIG: Government fixed capital formation, deflator; PIT: Gross total fixed capital formation, deflator

### REAL VARIABLES:

Using the nominal definition:  $CG = CGW + CGNW$  and the Oecd deflated total consumption variable (CGQ), real purchases (CGNWQ) have been obtained using the definition  $CGNWQ = CGQ - CGWQ$  where the real compensation of employees (CGWQ) is obtained by using the private consumption deflator:  $CGWQ = CGW / PCP$  (Fiorito, 1997). The other cases are explained in the paper.

$$CGQ = CGNWQ + CGWQ$$

$$IGAAQ = IGAA / PIG$$

$$CGWQ = CGW / PCP$$

$$TSUBQ = TSUB / PGDP$$

$$SSPGQ = SSPG / PCP$$

$$GDPQ = GDP / PGDP$$

$$TKPGQ = TKPG / PIG$$

$$PENSIONSQ = PENSIONS / PCP$$

$$WELFAREQ = WELFARE / PCP$$

$$GGINTQ = GGINT / PGDP$$

### AGGREGATE SPENDING:

Aggregates in volume are obtained by summing the appropriate variable in volume.

$$GD = IGAA + CGNW + TKPG + TSUB$$

$$GN = SSPG + CGW + GGINTP.$$