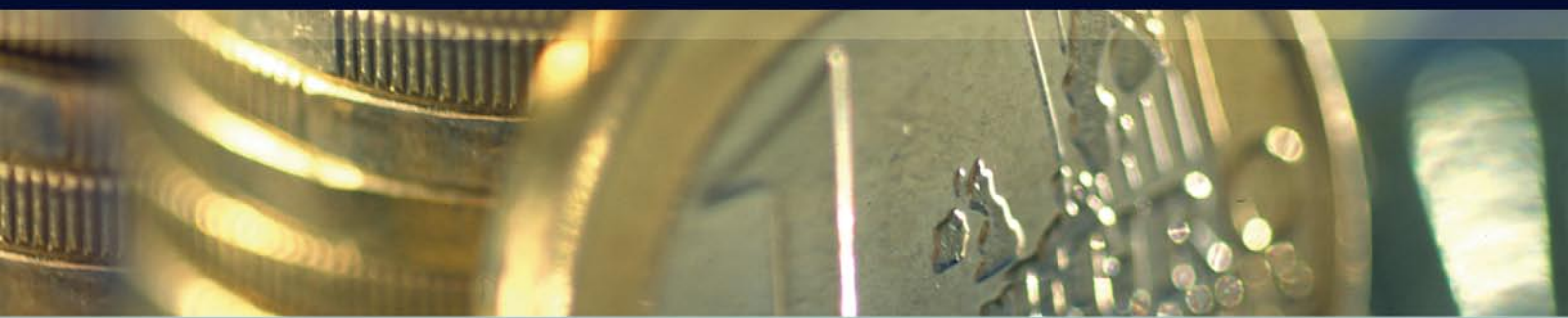


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## Discretionary measures and tax revenues in the run-up to the financial crisis

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# Discretionary measures and tax revenues in the run-up to the financial crisis <sup>(1)</sup>

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This paper examines the influence of governments' discretionary measures on tax revenues and tax elasticity in the European Union during the run-up to the 2008/2009 global financial crisis which was characterised by large swings in tax revenues. Using data collected in the context of the Output Gap Working Group of the Economic Policy Committee we show that while discretionary measures have had a limited impact on tax yields, they have in some cases significantly affected tax elasticities and thereby altered the relationship between tax revenues and the business cycle which plays a key role in the EU fiscal surveillance framework. Furthermore we provide evidence on the pro-cyclical nature of discretionary measures affecting tax revenues whereby governments tend to implement tax cuts during expansionary phases while resorting to tax increases during slowdowns. More generally our results suggest that the availability of detailed projections on the impact of discretionary measures by broad tax category would be instrumental to a better monitoring of tax revenues developments in the EU in order to better identify the role played by non-policy factors (such as asset prices) in driving tax revenues. Given that the time span covered by this database is in most cases still relatively short (covering on average 7 to 8 years) future updates of the data would allow to further dig into the issue of the influence of discretionary measures on tax elasticities as well as to provide elements for a backward assessment of fiscal plans vs. outcome.

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## 1. Introduction

The analysis of short-run variations in tax revenues and their link to the business cycle generally ignores the influence of discretionary policy changes affecting the tax collection. The latter, in particular, implies that the estimated cyclical component of tax revenues can possibly include policy-led changes. At present no systematic information on the estimated impact of discretionary measures on tax revenues and tax elasticities has been performed at EU level although existing, albeit limited, evidence suggests that such information can provide very valuable insights as it allows to proxy policy-induced tax revenues changes at a disaggregated level (i.e. for each specific tax basis), see in particular Morris et al. (2009). Existing country-level evidence suggests that discretionary measures play an important role in explaining short-run variations in apparent tax elasticities although the information available to date is still scant and limited to only a few countries.<sup>2</sup> For instance, Duchene and Levy (2003) show that the discretionary components were often, although not always, the most important component behind estimated changes in budget balance during the period 1998-2004 in France. Using econometric analysis, Wolswijk (2007) also provides supportive evidence for the Netherlands on the need to net-out tax revenue series from discretionary measures in order to correctly assess short-run variations in apparent tax elasticities.

These examples suggest that a consistent recording of discretionary measures affecting tax revenues across a wider range of EU countries could be instrumental to a better monitoring of fiscal developments. The availability of data on the impact of discretionary measures could, for instance, allow for a better understanding of the role played by non-policy factors such as, for instance, asset or oil prices, in driving short-run evolutions of tax revenues. These other factors can, in particular, interact with the effect of tax measures taken by governments on a discretionary basis such that the relationship between tax revenues and economic activity gets distorted. For instance direct tax cuts might be decided in the wake of buoyant tax revenue collection for tax categories that are known to be more volatile than others (e.g., corporate or property taxes) possibly reflecting premature assessments regarding the structural nature of tax revenues increases. Such data could thus provide a basis for an assessment of the causes of discrepancy between fiscal plans and outcome at the level of each specific tax category (i.e. consumption, corporate, social security

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<sup>2</sup> See in particular European Commission (2008).

contributions, etc.) which is currently usually done at a more aggregate level, see for instance Turrini (2008). More recently, the sharp deterioration of cyclical conditions linked to the financial crisis has led many EU countries to adopt stimulus measures under the European Economic Recovery Plan (EERP) which, on top of falling tax revenues linked to the economic contraction, are also likely to affect tax revenues through discretionary measures taken by governments and affecting for instance, VAT, reduced taxes on labour or tax exemptions related to car purchases.<sup>3</sup>

The absence of tax series netted of discretionary measures is problematic to the extent that tax revenues developments stemming from policy and/or legislative changes (or other indirect policy-induced measures affecting tax yields) cannot be distinguished from the endogenous behaviour of taxation systems i.e., the development in tax revenues due to the sole evolution of the tax bases in absence of discretionary measures. Following discussions undertaken in the context of the activities of the Output Gap Working Group of the Economic Policy Committee, the Commission services have launched in June 2008 a questionnaire in order to collect information on estimates of the impact of discretionary measures undertaken by the EU Member States. The analysis presented in this paper summarises the data received so far and provides first descriptive evidence and analysis. Such data of course suffers a number of drawbacks. In particular, differences in the accounting rules followed (i.e., data expressed in either accrual or cash) or in the definition of what constitutes a discretionary measure (i.e., differences in the “no- policy change assumption”), represent important limitations for cross-country comparison. Furthermore, as our paper shows, these tax revenue projections are made ex-ante and usually not revised ex-post such that their real value remains limited regarding an analysis of the permanent effect of discretionary measures on tax yields. There are a number of positive elements attached to this data, however. For instance this data is likely to reflect governments' views on the behaviour of tax revenues and tax systems when policy changes are implemented and thus makes it possible to analyse the discrepancy between fiscal plans and outcome at the level of each specific tax basis. This detailed information can in turn help re-construct the source of errors made for the total tax revenue projections which have sometimes been sizeable in the run-up to the financial crisis, see Barrios and Rizza (2010). For instance recent

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<sup>3</sup> See Communication for the Spring European Council, "Driving European recovery", COM(2009) 114.

evidence suggests that the influence of composition effects, i.e., where differences between tax bases and the overall GDP growth rates differ, have in some cases led to large tax revenue surprises, see European Commission (2008). Using data on the impact of discretionary measures for each tax category thus also permits an assessment of budgetary slippages controlling for the influence of composition effects. The availability of data on discretionary measure also allows a more precise analysis of the relationship between fiscal policy and the business cycle. Traditionally, the expansionary or contractionary nature of fiscal policy changes is analysed using estimates of the real-time and ex-post business cycle position based on filtering techniques (such as the HP filter) or the production function approach to net out fiscal variables for their cyclical component, see for instance, Beetsma and Giuliadori (2008) and Cimadomo (2008) for recent studies of this type. Such proxies of the fiscal stance suffers from the inherent uncertainty related to the business cycle position in real time, however. Real-time forecast errors may therefore be confused with policy-led changes which make it difficult to gauge the fiscal stance using a cyclically-adjusted budgetary balance approach especially so in times of highly uncertain economic outlook. Although governments' ex-ante estimates on the impact of discretionary measures can equally suffer from wrong business cycle assessment, these are more likely to reflect governments' view (independently of a potential political bias) on the impact of tax changes or any other legislative measures affecting tax yields given that these are calculated for each specific tax category. The use of data on discretionary measure can therefore provide relevant complementary information to existing estimates of the fiscal stance.

The data used in this paper cover a large number of EU countries and, although the time span and definitions of the impact of discretionary measures on tax revenues can vary across countries, this data allow us to uncover a number of important results. We find in particular that, although on average discretionary measures are relatively low compared to tax revenues levels, their incidence on tax elasticities (and thus on tax revenue changes in relation to the business cycle) can be very large and lead to significant departure between gross and net (for the effect of discretionary measures) tax elasticities which in turn affect the view on what the fiscal stance really is. In addition, our results show that discretionary measures taken by the EU countries in the run-up to the 2008/2009 global financial crisis were often pro-cyclical thus possibly explaining why countries that had experienced the

most buoyant tax revenues during this period often find themselves in the most difficult budgetary situations once the full effects of the crisis on tax revenues unfold. Our results show in particular that generous tax break affecting direct taxes often lied behind pro-cyclical fiscal policies.

The rest of the paper is organised as follows. Section 2 present the data collected by the Commission services on discretionary measures affecting tax revenues. Section 2 analyses the size and the relevance of discretionary measures for tax levels and variations. In Section 3 the methodology followed to net out discretionary measures from tax revenues is described. Section 4 analyses the differences between gross and net tax elasticities. Section 5 examines, through descriptive statistics, the relation between discretionary measures and the business cycle while Section 6 investigates this relation by mean of econometric analysis. Section 7 summarises our results and discusses future possible use of the data on discretionary measures.

## **2. Discretionary measures affecting tax elasticities: data collected by the European Commission**

Information on discretionary measures was collected in the context of the Output Gap Working Group (OGWG) of the Economic Policy Committee, covering a large sample of EU countries. Member States were invited to report on their estimates of the impact of discretionary measures for broad tax categories used in the calculation of overall budgetary sensitivity to the business cycle as described in Girouard and André (2005). Table 1 shows that the data start in 2000-2001 and end in 2007-2008 in most cases, although coverage varies across countries. Usually the data is recorded on an accrual basis or both in cash and accrual consistent with ESA95 standards.

Tables 2 and 3 provide more detailed information on the data collected and methodology used by the Member States. Estimates on discretionary measures were made systematically available in nearly all EU countries and were in most cases in the responsibility of ministries of finances. In some cases data on measures concerning social security contribution is compiled by ministries of employment and social affairs (e.g., Austria, Belgium, Bulgaria, Czech Republic, Portugal and Slovakia) and by other ministries (e.g., ministry for health). In other countries, the data are complemented by data produced by other institutions (e.g. external research institutes in Germany and the National Central Bank in Belgium). In some

countries with largely decentralised public spending, regional governments also compile data on the impact of discretionary measures (Belgium, Germany). In certain cases not all detailed information is made public (Bulgaria, Malta) nor is the information regularly published (Hungary, Romania Luxemburg.). Furthermore, estimates are usually made ex-ante in gross terms (i.e., without considering the impact of discretionary measures on tax bases) and in few specific cases ex-post revisions are undertaken. Table 3 summarises information on the methodology and definition used by the Member States to compile data on discretionary measures. The answers provided by the Member States show that data is recorded in 15 out of 21 cases on accrual or both accrual and cash basis, thus consistent with ESA95 definition. Six countries only compile estimates on a cash basis only: Bulgaria, Cyprus, Estonia, Finland, Latvia, Romania. Estimates are usually made ex-ante in gross terms (i.e., without considering the impact of discretionary measures on tax bases) and only in few specific cases ex-post revisions are undertaken. The fact that the estimates provided by the Member States are in gross terms is only of minor importance given that the focus is on short-run variations of tax elasticities. Finally the information collected provides indication of the "no-policy change scenario" and, in particular, the consideration of price indexation mechanisms whenever relevant in building these scenarios. The "no policy change scenario" definition used is as a matter of fact fairly general being defined in most cases as if no changes were undertaken in the tax system including often country-specific issues related to indexation mechanisms and country-specificities.

## **2. Discretionary measures affecting tax elasticities: how important are they?**

Table 4 provides summary statistics on the average annual shares of the discretionary measures in tax revenue by broad tax category.<sup>4</sup> In general, looking at an average for the sample of EU countries where relatively long term series are available, the effect of discretionary measures on total taxes tends to be relatively small (1,2% on average for all taxes). With respect to single tax categories, the average effect appears to be larger (2,6%) for direct taxes than for indirect taxes (1,1%) and social contribution (0,6%). However when considering yearly discretionary measures, their share in total revenues can in some years account for considerable amount of the latter. Particular high values have been recorded for

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<sup>4</sup> The disaggregation into three broad tax categories was due to the unavailability of disaggregated information in a number of countries. Broad tax grouping, considering together personal and corporate income taxes) was thus opted for in order to ensure comparability of results across countries.



some of the EU10 member states as Slovakia, Lithuania and Czech Republic. The data reported in Table 4 also show that governments tend to lower tax revenues mainly by the means of direct taxes. In certain cases direct tax cuts are also financed by the increase of indirect taxes.<sup>5</sup> Such pattern can be observed for several countries as for instance Czech Republic and Slovakia which have followed such tax policy for an extended number of years.<sup>6</sup> Discretionary measures affecting social security contributions, on the other hand, have experienced less pronounced changes, excepting few cases such as the UK, which implement sizeable measures, although realized in one single year, to increase government revenues in this tax category. A more detailed investigation of the data suggests that the effects of discretionary measures are highly concentrated in time, which is also suggested by the large differences between average, maximum and minimum values reported in Table 4.

### **3. Correcting the effects of discretionary measures on tax elasticities: Methodology.**

The size of discretionary measures can influence the value of apparent tax elasticities and, by the same token, that of the difference between these and the (estimated) constant elasticities used in EU fiscal surveillance. One should note in particular that discretionary measures can be taken in reaction to the perceived state of the economy so that tax windfalls/shortfalls can either be magnified or compensated by discretionary tax cuts/hikes. These different elements would result in (policy-induced) short-run variations in tax elasticities in response to business cycle developments so that differences between apparent and constant estimated elasticities may themselves have a strong policy-driven cyclical component.

An immediate way to net-out the effect of discretionary measures would seem to simply subtract their annual amounts from the corresponding tax revenues figures. This simple approach, however, would not yield tax revenues series adjusted for the influence of discretionary measures taken in different years since it would implicitly assume that taxation systems remain unaffected. Changes in tax laws, which may be designed to address past fiscal imbalances or may be due to electoral outcomes, naturally make tax revenues for a

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<sup>5</sup> These evolutions could presumably reflect a shift between direct and indirect taxation. Recent evolutions in taxation revenues in the EU suggest that statutory corporate tax rates have experienced a marked decline while implicit tax rates on consumption have been on the rise in the EU since the end of the 1990s/early 2000s, see in particular European Commission (2008), Taxation trends in the European Union, Directorate General for Taxation and Customs Union and Eurostat.

<sup>6</sup> The effects of discretionary measures across tax categories can be detected also by graph 3 and graph 4 plotting the difference between gross and net tax elasticities for direct and indirect taxes.

given year dependent of previous years' taxation revenues. It follows that a correction of tax revenues series for the impact of discretionary measures should consider all years where these measures have been taken. Considering a specific year  $t$  as the base year for instance, the correctly adjusted tax revenue series is the one that would prevail if the base year's tax structure had been in operation for the entire period. A simple approach, termed the "*proportional adjustment method*", can be used to adjust tax revenues for the impact of discretionary measures and thus allows a comparison of tax revenues strands across time.<sup>7</sup> This approach, by adjusting for the dependence of tax revenues on discretionary measures, allows the calculation of apparent tax elasticities (based on annual tax revenue changes) net of the effect of discretionary measures in a consistent manner. Assume the following strand of tax revenues corresponding to a given (unspecified) tax category:

$$T_1, T_2, \dots, T_t$$

where  $t$  is the current year. Let the estimated tax revenue impact of discretionary measures in the years in which they occurred be:

$$dm_1, dm_2, \dots, dm_t$$

and assume that the adjusted (for the impact of discretionary measures) series of tax revenues are equal to:

$$A_1, A_2, \dots, A_t$$

Ideally tax revenues  $A_1-A_t$  should only reflect the effect of (endogenous) evolution of tax bases in order to derive correct measures of tax elasticities reflecting the sensitivity of tax revenues to the tax bases.<sup>8</sup> In order to compare tax revenues across the years one would like to abstract from changes in tax structures, i.e., discretionary measures. Considering a specific year ( $t$ ) as the base year, one would thus like to obtain tax revenues series as if this specific year's tax structure had been in operation for the entire period. Since this specific year is taken as the base, one can thus write that:

$$A_t = T_t$$

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<sup>(7)</sup> This approach is described in Barth and Hemphill (2000).

<sup>8</sup> This is assuming that tax bases currently used are perfect proxies of the true tax bases. In practice this assumption can be severely challenged however, as for instance, in the case of corporate taxes, see for instance, Girouard and André (2005).

Tax revenue values for years 1 to  $t-1$  must then be corrected in order for these to be comparable to the tax revenue in year  $t$ . Under the proportional adjustment assumption, the value of the adjusted tax revenues at  $t-1$  can be written as:

$$A_{t-1} = T_{t-1} * \left( \frac{T_t}{T_t - dm_t} \right)$$

In year  $t-2$ , the adjusted tax revenue should equally be written as:

$$A_{t-2} = T_{t-1} * \left( \frac{T_t}{T_t - dm_t} \right) * \left( \frac{T_{t-1}}{T_{t-1} - dm_{t-1}} \right)$$

More generally, each year the adjusted tax revenue can be written as:

$$A_j = T_j * \prod_{k=j+1}^t \left( \frac{T_k}{T_k - dm_k} \right) \quad \text{for all } j < t$$

The proportional adjustment method has been applied using the information on discretionary measures described above to calculate tax elasticities net of the effect of discretionary measures.

#### 4. Discretionary measures and tax elasticities: Descriptive Analysis.

Graphs 1 and 2 provide a first set of descriptive statistics on the similarities and/or differences between gross and net apparent tax elasticities. Graph 1 shows that in general the two series are fairly highly correlated although in some cases (CZ direct taxes, DK indirect taxes, UK SSC), the co-movement between the two series appears to be weak. Although apparent gross and net tax elasticities appear to be fairly highly correlated in most cases, this should not obscure that the differences between the average values of the two series can sometimes be large. Graph 2 shows that the average level of gross tax elasticities tend to depart in a large number of cases from that of the tax elasticities netted for the effects of discretionary measures, especially for direct taxes, where gross elasticity is often lower than net elasticity<sup>9</sup>. For indirect taxes the divergence between the two elasticities is lower, while for social security contributions the two series appear to be rather more similar. Since discretionary measures have often opposite sign across tax categories the average divergence between the two elasticities for total taxes is in many cases lower than for

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<sup>9</sup> As explained deeper in the followings section this divergence can be due either to tax cut in case of net rising elasticity or to tax hikes when net elasticity is on a downward path.

specific taxes, nevertheless even a small deviation in the value of the elasticity can account for significant amounts of tax revenues.

Graphs 3-6 plot the evolution over time of gross and net (of the effect of discretionary measures) apparent elasticity for each broad tax category and total tax revenues for selected countries and include indication of the value of the output gap taken from DG Ecfm Ameco database. The net elasticities are derived using the proportional adjustment method described in the previous section. For each tax category, the chosen tax base is the nominal GDP in order to ensure direct comparability with the benchmark OECD/Commission tax elasticities used to calculate the cyclically adjusted balance and also reported in Graph 3-6.<sup>10</sup> Apparent elasticities have therefore been computed by dividing the annual growth of the revenue series (both gross and net) with the nominal GDP annual growth rate. Apparent elasticities appear to be very volatile in the short-run and can sometimes substantially depart from the OECD/Commission benchmark, although in only few cases this difference is due to discretionary measures. The latter is confirmed by the fact that the original revenues series and the corrected series are highly correlated. The impact of discretionary measures on tax elasticity in certain countries/years is large, however, yielding substantial discrepancy between net and gross elasticity in these cases.

Graph 3 provides results for the apparent elasticity of direct taxes with respect to GDP in selected countries. Both net and gross elasticities appear to be very volatile and tend to fluctuate around the OECD/Commission benchmark elasticities which reflect general business cycles variations as shown by the output gap values. Graph 4 performs a similar exercise for indirect taxes displaying also a high volatility of apparent tax elasticities and sometimes significant departure from the OECD/European Commission benchmark also due to overall output variations as indicated by the values of the output gap. Graph 5 which concerns tax elasticities of Social Security Contributions shows lower volatility for both net and gross elasticity and a smaller impact of discretionary measures on tax elasticities. Graph 6 plots gross and net apparent elasticities of the total tax revenues with respect to nominal GDP for a sample of countries where data on the three broad tax categories were available. These results show that in certain cases the effect of discretionary measures on single broad tax categories produces substantial difference between gross and net elasticities, although in

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<sup>10</sup> The OECD/Commission tax elasticities are available in European Commission (2006).

most cases such impact is not enough to divert the core trend in the elasticity motion. These results suggest that gross and net elasticities in total taxes tend often to be more similar since the relatively higher differences between the two elasticities in a specific tax category are compensated by opposite pattern in other tax categories resulting in counterbalancing overall effect on total elasticity. In synthesis in many cases discretionary measures offset each other. This pattern emerges clearly in the case of Czech Republic (1999) Slovakia and Latvia (2004) where direct tax cuts are offset by tax hikes in indirect tax.

##### **5. Discretionary measures and the business cycle: Descriptive analysis.**

In this section we investigate the relationship between discretionary measures and the business cycle. The aim of this section is to test the pro-cyclical bias of discretionary measures. According to this hypothesis, discretionary measures affecting tax revenues may be governed by business cycle evolutions: During good times, governments may undertake tax cuts assuming that good times will last long thus corresponding to structural evolution of the economy. The pro-cyclical behaviour during good times would force governments to implement vigorous consolidation plan during business cycle contraction to curb public deficits. During slowdown or recession discretionary measures would therefore be aimed at increasing tax revenues rather than tend to stabilise output. This behaviour would in turn have direct incidence on tax elasticities. Such assumptions are investigated more closely in this section.

Graphs 3-6 provide a first idea on the pro or counter cyclical nature of discretionary measures by comparing the difference between net and gross tax elasticities and the output gap. For instance, for a given level of output growth, net tax elasticity will be higher than the gross tax elasticity in case of tax cuts given that the change in tax revenues in the gross case includes the tax cut while the change in tax revenues in the net case excludes it. Similarly, in case of tax increase, the net tax elasticity will be lower than the gross tax elasticity. Apparent net tax elasticities are higher than the gross tax elasticities when discretionary measures imply a negative variation of tax revenues (i.e. tax cut) and lower when discretionary measures represent a tax revenue increase. The previous arguments can be illustrated by considering the simple case where the change in tax revenues is observed over a two years period, i.e. between  $t$  and  $t-1$  such that the tax revenue net of the impact of

discretionary measures in year  $t-1$  is  $A_{t-1}$  and can be written as follows using the proportional adjustment method:

$$A_{t-1} = T_{t-1} \frac{T_t}{T_t - DM_t}$$

Where  $T_t$  is the gross tax level and  $DM_t$  is the discretionary measure in year  $t$  (i.e. the base year). The variation in tax revenues net of discretionary measures between  $t-1$  and  $t$  will be larger than the variation of gross tax revenues, if:  $T_t - T_{t-1} \left( \frac{T_t}{T_t - DM_t} \right) > T_t - T_{t-1}$  that is if  $DM_t < 0$

One could equally show that  $\Delta A_t < \Delta T_t$  if  $DM_t > 0$ .

Accordingly, during expansionary phases of the cycle, pro-cyclical discretionary measures would yield negative tax revenue variations and thus higher net tax elasticities than in a no-policy change scenario while during slowdown discretionary measures would yield positive tax revenue variations compared to a no-policy change scenario, thus resulting in lower net tax elasticities.

Considering for instance the general case of total tax elasticities depicted in Graph 4 one can observe that in 2003 discretionary measures have tended to be counter-cyclical in several countries such as Austria, Belgium, Finland and Denmark. Conversely in the same years a pro-cyclical impact of discretionary measures on tax elasticities can be observed in Portugal where despite a negative development in the Output Gap the governments have had to implement a fiscal retrenchment while the negative business cycle evolution drove the net elasticity down. The end of the period covered by the database seem to have been characterised mostly by pro-cyclical fiscal behaviour. This is especially apparent in the cases of Finland, Lithuania and to a minor extent in Belgium and Sweden in the years 2005/6-2007/08.<sup>11</sup>

Table 5 provides descriptive statistics on the variance of net and gross tax elasticities for each tax category together with the correlation between discretionary measures and the output gap. The first indicator provides information about the volatility of the two series while it does not give much information about the cyclical nature of discretionary measures.

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<sup>11</sup> One should note that output gap data are subjected to variations, sometimes substantial, over time. Hence, this analysis has to be regarded as an ex-post fiscal policy evaluation. At the time in which discretionary measures were implemented previous output gap computation might have led to different consideration about the cyclical nature of discretionary measures, however.

While one could expect that pro-cyclical discretionary measures would induce higher variance of tax elasticities as they tend to amplify business cycle movements whilst counter-cyclical discretionary policies would tend to reduce it although these hypotheses does not hold in many cases<sup>12</sup>. A better way to consider the pro or counter-cyclical nature of discretionary measures is taking into account their link with the output gap. This exercise is applied here using simple correlation coefficients.<sup>13</sup> A negative correlation coefficient would suggest that discretionary measures are pro-cyclical and a positive coefficient that they are counter-cyclical (i.e. counter-cyclical discretionary measures tend to increases tax revenues during expansionary phases and to decrease it during slowdown). The results shown in Table 5 suggest that there seems to be no clear relationship between business cycle and discretionary measures, independently of the tax category considered, however. Cross-country analysis does not allow identifying an unambiguous trend in discretionary measures behaviour although part of this might be due to differences in time span covered. In order to have an overall view on the cyclical nature of discretionary measures' Graph 7 compares, for a sample of country where data were available in the period of time considered in the charts, the aggregate share of discretionary measures in percentage of GDP and the average output gap in the corresponding year (these countries are Belgium, the Czech republic, Finland, France, Lithuania, Malta, Sweden and the UK). The result emphasizes that discretionary measures has been strongly pro-cyclical between 2001 and 2007 with discretionary measures increasing tax revenues during the early phase of this period while the output gap was low and declining and decreasing tax revenues once the output gap started to increase from 2003 on. The following section provide further econometric evidence on this issue.

## **6. Discretionary measures and the business cycle: econometric analysis.**

The descriptive evidence provided in the previous sections, although suggesting that discretionary measures affecting tax revenues might have a pro-cyclical nature, are limited given the short time span considered. An econometric analysis has also been carried out by

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<sup>12</sup> Consider for instance only two years where net elasticity is supposed to remain constant from  $t-1$  to  $t$ . In this situation despite their sign, discretionary measures (both pro-cyclical and counter-cyclical) would amplify gross tax elasticities changes, thus yielding larger variance for the gross serie without providing information on the cyclical nature of fiscal policy.

pooling data across countries and years in order to palliate the short time and low number of countries available. Only countries covering a sufficiently long time period for each tax category are used in order to capture potential cyclical pattern of discretionary measures. The period covered by the estimations is 2001-2007 and the countries are Belgium, the Czech republic, Finland, France, Lithuania, Malta, Sweden and the UK. The following equation has been tested for this sample of countries:

$$DM_{i,t} = \beta_0 + \beta_1 OG_{i,t-1} + \varepsilon_{it} \quad (1)$$

where  $DM_{i,t}$  indicates the variation in tax revenues as a result of discretionary measures in percentage of GDP in country  $i$  in year  $t$  and  $OG_{i,t-1}$  is the level of output gap in year  $t-1$  and represents the business cycle position.<sup>14</sup> The term  $\varepsilon_{it}$  is an error term which can be decomposed into two subcomponents:

$$\varepsilon_{i,t} = \alpha_i + \lambda_{i,t} \quad (2)$$

The coefficient  $\alpha_i$  represents an unobserved country specific-effect and  $\lambda_{i,t}$  is an error term which is assumed to have the *iid* properties. Equation (1) is therefore estimated using panel fixed (within) estimator in order to remove the unobserved country-specific components which could influence the relationship between discretionary measures and the business cycle (this could be the case if, for instance, for unobserved historical or institutional reasons certain countries would tend to follow more pro-cyclical policies)

Results of the estimation of Equation (1) are reported in Table 6 for discretionary measures concerning all taxes categories as well as for each tax category separately. Column (1) shows that the sign of the coefficient on the lagged output gap is negative and highly significant, indicating that discretionary measures tend to increase tax revenues when the output gap is lower and to decrease tax revenues when the output gap is higher, thus suggesting that discretionary measures affecting total taxes are pro-cyclical for the sample of countries and period covered. Column (2) includes additional control variables in the equation estimated, which are usually considered in the fiscal policy literature. These variables include two fiscal

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<sup>13</sup> The lagged output gap is used instead of the actual value in order to account for potential lag in fiscal policy setting and to avoid endogeneity issues. Section II provides a discussion and references on this point.

<sup>14</sup> As usual in the fiscal policy literature analysing the link between the fiscal stance and the business cycle, the output gap is observed in  $t-1$ , given that the fiscal stance measures the difference in budgetary position between year  $t$  and  $t-1$ . In addition, the use of lagged output gap allow to reduce potential endogeneity of discretionary measures affecting tax revenues, see in particular, European Commission (2006), Public Finance Report in EMU-2006, (Directorate General for Economic and Financial Affairs) for a review of the literature.



indicators represented by the level of debt and the budgetary position in year  $t-1$ , where the expected sign of the estimated coefficients is negative on the debt variable and positive on the net lending position (assuming that discretionary measures are taken for fiscal consolidation, i.e. to reduce deficit and debt levels). In addition to the fiscal variables, two other variables are used: a dummy variable indicating whether in year  $t-1$  general elections took place in country  $i$ , the expected sign being negative if tax reduction are used for electoral purposes; and an indicator measuring the quality of fiscal governance (where higher value indicates better fiscal governance) as this characteristic has been found to be relevant in the literature studying the pro-cyclical nature of fiscal policy.<sup>15</sup> Results of the estimation of the link between the output gap and discretionary measures, controlling for these other potential determinants are reported in Column (2) of Table 7 and show that the relationship between the lagged output gap and discretionary measures remains similar, i.e. negative and significant, while the value of the coefficient decreases slightly suggesting that the additional control variables capture a relatively small part of the link between discretionary measures affecting tax revenues and the business cycle. None of the other variables included in the equations are significant, however, excepting the net lending variable which displays a negative sign suggesting that countries with deteriorated budgetary balance in year  $t$  tend to adopt discretionary measures that tend to increase tax revenues thus pointing to fiscal consolidation.

Similar estimations are undertaken for each tax category separately in Column (3) to (8). Results indicate that only direct taxes display the same result as total direct taxes, i.e., indicating that discretionary measures are pro-cyclical. This result, together with the descriptive evidence presented earlier indicate that direct taxes are more frequently used in a pro-cyclical way compared to other tax categories, i.e. to lower the tax burden during good times and to increase it during bad time and that this in turn would explain while discretionary measures affecting total tax revenues tend to pro-cyclical. The short sample of countries and time period considered suggest however that these results should be interpreted with caution and further robustness checks should be conducted over longer time spans and for more countries with further updates of the data.

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<sup>15</sup> For a description on the database on fiscal governance, see also European Commission (2006). For evidence regarding the role played by fiscal institutions on the pro-cyclical nature of fiscal policy, see Debrun et al. (2008).

## **7. Summary and conclusion**

This paper provides a first analysis of data collected by the European Commission on countries' estimates of the impact of discretionary measures affecting tax revenues. This data shows that while estimates of the impact of discretionary measures affecting tax yields are made systematically in most EU countries, current practices and methods used to compile these data vary greatly across EU Member States, in part reflecting country-specific institutional settings, while this data is not systematically published or updated. In addition, the "no policy change scenario" definition used is often fairly general being defined in most cases as if no changes were undertaken in the tax system and in some cases including references to price indexation mechanisms. Furthermore the paper examines the impact of discretionary measures on tax revenues, tax elasticity and their link to the business cycle in the run-up to the global financial crisis. While discretionary measures are found to represent only a small share of total tax revenues on average, apparent tax elasticities are found to depart in many instances from their value in absence of such measures. Given that discretionary measures can significantly affect tax elasticities, they can also alter the relationship between tax revenues and the business cycle which plays a key role in the EU fiscal surveillance framework. In order to investigate this issue we test econometrically the link between the impact of discretionary measures on tax revenues and the output gap for a sample of countries for which comparable data was available. Our results suggest that discretionary measures affecting tax revenues were often pro-cyclical, whereby governments tend to implement tax cuts during expansionary phases while resorting to tax increases during periods of slowdown. We also find that such feature was predominantly relevant for direct taxes.

The results presented in this paper should be seen as preliminary to the extent that in most cases the time span covered is relatively short (7 to 8 years) and that definition and no-policy change scenarios are not homogenous across countries. Despite these caveat, such data and future analyses based on it would provide valuable complementary information for EU fiscal surveillance: (i) by providing elements for a backward assessment of fiscal plans vs. outcomes making use of information specific to the tax categories used in the EU fiscal surveillance framework and (ii) by promoting greater harmonisation and exchange of views

across EU countries regarding the no-policy change assumptions used in order to make medium-term projections on the impact of discretionary measures on tax revenues.

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**Table 1 Results from questionnaire sent to the Member States**

	Time periods covered			Accounting	
	Indirect taxes	Direct taxes	Social security contribution	Cash and/or accrual	Net and/or gross
<b>Austria</b>	2000-08	2000-08	2000-08	Cash and accrual	Gross and net
<b>Belgium</b>	2001-07	2001-07	2004-08	Cash and accrual	Gross
<b>Bulgaria</b>	2004-08	2004-08	2004-08	Cash	Gross
<b>Cyprus</b>	2002-04	2002-04	2002-04	Cash	Gross
<b>Czech Republic</b>	1995-08	1995-08	1995-08	Cash and accrual	Gross
<b>Denmark</b>	2001-07	2001-07	N/A	Cash	Gross and net
<b>Estonia</b>	2006-09	2006-09	06-09	Cash	Gross and net
<b>Spain</b>	1999-08	1999-08	N/A	Cash and accrual	Gross and net
<b>Finland</b>	2001-08	2001-08	01-08	Cash	Gross
<b>France</b>	2001-07	2001-07	2001-07	Accrual	Gross
<b>Germany</b>	N/A	N/A	N/A	Cash and accrual	Gross and net
<b>Italy</b>	2001-07	2001-07	N/A	Cash and accrual	Gross
<b>Lithuania</b>	2001-07	2001-07	2001-07	Cash and accrual	Gross and net
<b>Latvia</b>	2002-07	2002-07	2002-07	Cash	Gross and net
<b>Malta</b>	2001-07	2001-07	2001-07	Accrual	Gross
<b>Netherlands</b>	Since 1991	Since 1991	Since 1991	Cash and accrual	Gross and net
<b>Portugal</b>	2002-08	2002-08	2002-08	Cash and accrual	Gross
<b>Romania</b>	2005-07	2005-07	2005-07	Cash	Gross
<b>Sweden</b>	2000-09	2000-09	2000-09	Accrual	Gross and net
<b>Slovenia</b>	2003-07	2003-07	2003-07	N/A	Gross
<b>Slovakia</b>	2004-09	2004-09	2004-09	Accrual	Net
<b>UK</b>	2001-12	2001-12	2001-12	Accrual	Net

*Source: Commission services based on replies to the questionnaire on discretionary measures*

*Notes: While Germany and the Netherlands provided replies to the questionnaire, these countries referred to their respective national publication for the collection of the data and were thus not included in the analysis.*

**Table 2: Availability and production of estimates on impact of discretionary measures<sup>1</sup>**

Country	1.1 Is data available?	1.2 Institution in charge of elaborating estimates	1.3 Frequency of estimations	1.4 Availability and publication reference
Austria	Yes, since the 1980s*	Ministry of finance and Ministry of social affairs for SSC	Made systematically. Compulsory for any legal proposal of the government to the parliament	Published together with corresponding law or legal change.
Belgium	Yes, since the early or mid 1990s, depending on the category of taxes*	Federal Ministry of finances and regional/local authorities. Federal government, in collaboration with social security organisations for SSC	Made systematically	Published in the "Explanatory memorandum to the Budget" "Yearly inventory"
Bulgaria	Yes, but only for major measures*	Ministry of finance (all types of taxes), National Revenue Agency (direct taxes and SSC), National Social Security Institute (SSC)	Not made systematically	Reported in most cases in the reports accompanying the draft budget law and convergence programmes (www.munfinbg and www.aesf.munfinbg)
Cyprus	Yes, since 2002	Ministry of Finance	Made systematically	Reported in the Council of Minister's proposals and Explanatory memorandum accompanying the relevant Bill to the House of Representatives (when needed).
Czech republic	Yes, since 1995	Ministry of finance, Ministry of labour and social affairs and Ministry of Health for SSC	Made systematically before measures are submitted for the governmental or parliamentary approval. All drafts of new legislation must be accompanied by their impacts on public finances. Overall impact of all discretionary measures in place is usually summarised in April and in September when the medium-term fiscal outlook is being prepared.	Published as a part of the compulsory documentation of new legislation (www.psp.cz).  Estimates of the most important discretionary measures included in supporting documents to the state budget proposal and/or the Convergence Programme updates and/or the semi-annual publication Fiscal Outlook of the Czech Republic.
Estonia	Yes, since 2004	Ministry of finance	Made systematically in case of draft tax acts or amendments. All changes in the tax system are re-evaluated systematically during regular forecasting process (2-3 times in a year)	Made public in regular forecasts and strategic documents (State Budget Strategy, Convergence Program)
Hungary	Yes*	Ministry of Finance	Irregular	No regular publication
Spain	Yes*	Ministry of finance, in collaboration with Tax agency (AEAT)	Made for all legislative changes with impact on public revenues for e-ante data. Ex-post estimations made on annual basis and monitoring of effects on tax collections (cash terms) conducted with shorter periodicity	- Documents accompanying State budget - Annual Tax collection Reports ("Informes Anuales de Recaudación") - Monthly tax collection reports ("Informes Mensuales de Recaudación")
Germany	Yes*	Federal Ministry of finance and external research institutes	Made systematically	Annual financial report (Ministry of Finance).
Denmark	Yes, from 1993	Ministry of finance in cooperation with other ministries (often Ministry of Taxation)	Made systematically	Published three times a year in connection with Ministry of finances new economic forecasts Budget impact of specific discretionary measures published according to specific initiatives
Finland	Yes, since 2001	Ministry of finance	Made systematically for new legislative acts	Not reported in specific document. Always presented as part of government's bills
France	Yes, since 2001	Ministry of finance	Made systematically for all new discretionary measures (three times: $t-1$ , $t$ and $t+1$ for budget bills for year $t$ )	Appendix to the Budget bill ("Rapport sur les prélèvements obligatoires" for 2-year projections, "Débat d'orientation budgétaire" for 5-year projections and "Evaluation des voies et moyens" and Budget bill of National health insurance). Final estimates reported in National accounts report. (www.performance-publique.gouv.fr, www.securit-sociale.fr and www.insee.fr)
France	Yes, since 2001	Ministry of finance	Made systematically for all new discretionary measures (three times: $t-1$ , $t$ and $t+1$ for budget bills for year $t$ )	Appendix to the Budget bill ("Rapport sur les prélèvements obligatoires" for 2-year projections, "Débat d'orientation budgétaire" for 5-year projections and "Evaluation des voies et moyens" and Budget bill of National health insurance). Final estimates reported in National accounts report. (www.performance-publique.gouv.fr, www.securit-sociale.fr and www.insee.fr)
Italy	Yes*	Ministry of finance	Made systematically. The frequency of estimates is function of feature and size of each intervention. Estimates can be subject to revisions. Made for new tax measure	Estimates always published and data and description (the so-called "relazione tecnica") of each fiscal policy intervention is available on the web-site of the Ministry of Economy and Finance and the Parliament Information provided in the "Law on the State budget", (chapter "Revenue analysis").
Latvia	Yes, since 2002	Ministry of finance	Made for new tax measure	Generally available in the respective "Budget Speech" and Convergence and Stability Programmes.
Malta	Yes, since 2001	Ministry of finance	Made on a measure by measure basis, prior to the introduction of a measure	Published in the yearly bill with tax measures ("Belastingplan"). The effect (cash basis) of discretionary measures for year $t$ are published yearly ("Miljoennota").
Netherlands	Yes, since 1991	Ministry of finance	Made systematically for all new discretionary measures (three times: $t-1$ , $t$ , and $t+1$ for budget bills for year $t$ )	Not regularly published. Information partly included in Stability and convergence programmes, Annual report of Banco de Portugal and State Budget reports. Impact of measures related to tax measures publicly available on the State Budget and on the State General Account ("Conta do Estado").
Portugal	Yes, since 2002, but only partly made public	Ministry of finance and Ministry of employment for SSC	Made before implementation of measures	Currently not made public
Romania	Yes, since 2005	Ministry of finance	Made systematically	Currently not made public
Sweden	Yes, since 2000	Ministry of finance	Made systematically (twice a year)	Made publicly available in the Spring Fiscal Policy Bill in April and in the Budget Bill in September
Slovakia	Yes, since 2004	Ministry of finance, Ministry of labour in cooperation with Social insurance agency for SSC, Ministry of Health in cooperation with health insurance companies for health contributions	Made systematically	Ex-ante estimates published when a particular law is submitted to public consultation. The impacts of discretionary measures in the tax system are summarised in the three-year general government budget documentation
United Kingdom	Yes*	HM Treasury/HM Revenue and Customs	Estimates made for new measures introduced at Pre-Budget Report (PBR) and Budget, and estimates made for measures introduced at PBR are updated in the Budget	Estimates for implemented measures are published in the Pre-Budget report and Budget.

<sup>1</sup> Information based on replies by Member States to questionnaire sent in June 2008. No information was received for non-listed countries including Greece, Ireland Poland and Luxembourg. Lithuania and Slovenia provided data but no qualitative information as reported here. Luxembourg does not compile data.

\* Exact period not specified

**Table 3: Methodology and definition for the collection of estimates of the impact of discretionary measures on tax revenues.**

Country	2.1 Data collected on cash or accrual (following ESA95) basis? Are estimates concerning change in tax payment considered?	2.2 Are estimates made ex-post and/or ex-ante? Are the estimates revised and made public?	2.3 Is the estimate made in gross or net (taking into account consequent change in tax base) term?	2.4 What is the definition of the “no-policy change scenario”? Is the effect of price indexation (when relevant) taken into account?
Austria	Cash and accrual basis. Only estimates on cash basis are published	Estimates are made ex ante. Most estimates are not revised.	Estimates are generally in gross terms but in certain cases (depending on expected reactions from tax payers) are estimates also made in net terms	The 'no policy change' scenario is based on the assumption of no change in the tax laws against the version existing before the measure is implemented
Belgium	Cash basis for federal taxes Accrual basis for SSC	Both ex-post and ex-ante estimates are made. Estimates are made twice: during year $t-1$ and $t$ for discretionary measures concerning year $t$ . Revisions are not published.	Impact is usually in gross terms. Net estimates are made in specific circumstances.	The impact of indexation is reported as discretionary measure. Spillovers and other technical factors are also considered for correcting revenues.
Bulgaria	Cash basis. Measures changing tax payment are not considered	Estimates are made ex ante and are not revised.	Estimates are in gross terms	N/A
Cyprus	Cash basis. Measures changing tax payment are not considered	Estimates are made ex ante, and are not revised.	Estimates are in gross terms	The 'no policy change' scenario is based on the assumption that the tax framework in place continues to apply. Indexation of tax brackets is made at irregular intervals.
Czech republic	Cash and accrual basis. Most important measures are made both on cash and accrual basis following ESA95 definition.	Estimates are made ex ante. They are exceptionally revised for analytical purpose only.	Estimates are in gross terms. Ex-post analysis can reflect changes in behaviour.	The 'no policy change' scenario is based on the assumption that there is no change in the legislation affecting tax receipts and no other measures affecting tax receipts are taken. Any regular or irregular updates are considered as discretionary measures.
Estonia	Cash basis	Most of the estimates are done ex-ante and revised during the forecasting process.	Estimates are in gross terms and net terms when possible (e.g. in case of changes in excise duties, price elasticities are used).	Current situation is compared to legal situation on the 31st of December in previous year.
Hungary	N/A	Estimates are made ex ante. Estimates are not made on a regular basis.	N/A	N/A
Spain	Estimations are carried out both in cash and in accruals terms. Estimations in accrual terms do not necessarily correspond with National accounts estimations. Impacts due to legal changes that imply time shifts in tax collection are also estimated.	Estimations are made both ex-ante and ex-post. Revisions are made periodically but not on regular or systematic basis.	The estimations are generally made in gross terms. Only in few cases they are made on net terms.	Price indexation is irregular.
Germany	Cash and accrual basis. Discretionary measures changing the timing of the tax payments are taken into account for estimations on a cash basis.	Estimates are only made ex-ante and are not revised.	Estimates are in gross terms but important behavioural aspects are also taken into account. Assessment is being made in connection with official economic forecasts.	Strict “no indexation” policy is followed.
Denmark	Accrual basis. Possible effects of changed timing of tax payments due to discretionary decisions are not included.	Estimates are only made ex-ante and are not revised. Estimates of the impact of the annual regulation of tax brackets and fiscal drag are revised three times a year in connection with new economic forecasts.	Estimates are usually in gross terms except for large tax reforms, excepting for large reforms.	The 'no policy change' scenario is generally determined as unchanged tax rates and tax rules. For the annual regulation of tax brackets a regulation corresponding to the increase in potential nominal GDP is considered to be neutral. Revenues from excise duties are considered to be neutral, if the increase corresponds to the consumer price inflation net of indirect taxes.

**Table3(follow)**

Denmark	Accrual basis. Possible effects of changed timing of tax payments due to discretionary decisions are not included.	Estimates are only made ex-ante and are not revised. Estimates of the impact of the annual regulation of tax brackets and fiscal drag are revised three times a year in connection with new economic forecasts.	Estimates are usually in gross terms except for large tax reforms, excepting for large reforms.	The 'no policy change' scenario is generally determined as unchanged tax rates and tax rules. For the annual regulation of tax brackets a regulation corresponding to the increase in potential nominal GDP is considered to be neutral. Revenues from excise duties are considered to be neutral, if the increase corresponds to the consumer price inflation net of indirect taxes.
Finland	Cash basis. Changes of the timing of the tax payments are taken into account when preparing yearly budgets.	Estimates are made ex ante and are not revised.	The estimations are generally made in gross terms.	Indexation is based on the forecast for price development of the following year. In practice baseline scenarios are formulated assuming that there will be indexation based on developments of the consumer price index.
France	Estimates of the impact of discretionary measures are consistent with ESA recording. Discretionary measures changing the timing of the tax payments are taken into account.	Estimates of discretionary measures are made both ex-post and ex-ante. They are done ex-ante for the Budget Bill and ex-post for the National Accounts report.	Estimates are in gross terms	Changes that are systematically done every year, such as the indexation of the tax brackets of the personal income tax, are considered as "no policy change" measure. Thus, they are not included in the set of discretionary measures.
Italy	Estimated are considered on accrual basis and only afterwards the relative cash flows are also measured. All payments involved are fully synchronised.	Estimates are made ex ante. An ex-post assessment is performed (whenever possible), only to test and improve the reliability and robustness of the forecast models. Usually the estimates of the discretionary measures are not subjected to revisions, except when the law including them is modified by the institutions.	Estimates are in gross terms	No systematic rule applied.
Latvia	Cash basis	Estimates are made ex ante. Ex-post estimations concerning CIT and excise tax are also available.	Ex-post impact is estimated in gross terms. Ex-ante impact is estimated taking into account expected changes in tax base.	"No policy change" is considered as a situation in which tax revenues are affected only by macroeconomic variables.
Malta	Accrual basis		Estimates are in gross terms	Discretionary measures relate to those measures that involve a deliberate decision to implement a change in the tax regime involving a change in the tax base or a change in the rate of tax. The effect of price indexation, when relevant, is not considered as discretionary measure.
Netherlands	Estimates of discretionary measures are made on both accrual and cash basis. Discretionary measures changing the timing of the tax payments are also taken into account for cash basis estimates.	Estimates are made ex ante and are not revised.	Estimates are in gross terms. Only totally new measures or measures expected to have a large impact are estimated in net terms.	There is an automatic indexation rule for tax brackets enshrined in legislation. This automatic indexation rule is not considered as a discretionary measure.
Portugal	Generally, the estimates are made on a cash basis. Because the fiscal targets are set in accrual basis, those estimates are then adapted to fit that definition. Discretionary measures changing the timing of the tax payments are also taken into account.	Estimates of discretionary measures are made ex-ante. Multi-year estimates and forecasts of discretionary measures are revised according to changes in the macroeconomic scenario and tax bases.	Estimates are in gross terms	"No policy change scenario" is defined differently depending on the tax category:  Personal income tax: tax brackets and threshold of tax benefits are updated according to expected inflation rate. Excise taxes are updated according to expected inflation rate No updates for corporate income tax and VA.
Romania	Cash basis	Estimates are made ex ante	Estimates are generally in gross terms	There is no automatic indexation rule, usually tax brackets are indexed yearly (in each annual budget law) but also on a multi-year basis depending on the type of the tax.
Sweden	Accrual basis	Estimates are made ex ante and can occasionally be revised. Both ex ante and revised series are published.	The impact is measured both in gross and net terms.	The tax brackets of the personal income tax are indexed. The same is valid for some excise duties. These indexations are not considered as discretionary measures.
Slovakia	Accrual basis	Estimates are ex-ante. Ex-post estimation made on ad-hoc basis depending on the nature of the measure and the availability of necessary data.	Estimates are in net terms	The 'no-policy change' scenario is as a scenario under the existing legislative status. Automatic indexation rules enshrined in legislation are perceived as a 'no-policy change' scenario. In particular, these are automatic indexation rules in case of PIT (basic and spousal tax allowances and child credit are automatically indexed) and of social and health contributions (the minimum and maximum assessment bases are automatically indexed). Other situations are considered as discretionary measures.
United Kingdom	Accrual basis	Estimates are made ex-ante. However, estimates of Pre-Budget Report measures are revised where necessary in the Budget.	Estimates are in net terms	Costings are made against an indexed baseline that assumes allowances, thresholds and rates of duty will be increased in line with the appropriate price index, or any other pre-commitments e.g. duty escalators.



**Table 4: Annual shares of discretionary measures in tax revenue levels: average 2001-2007**

country	Direct taxes			Indirect taxes			SSC			all taxes*		
	average*	minimum	maximum	average*	minimum	maximum	average*	minimum	maximum	average*	minimum	maximum
AT	3,0	-4,8	7,7	0,6	-0,4	2,7	0,1	-0,5	0,2	1,4	-2,3	2,9
BE	2,4	-4,3	0,3	0,9	0,9	1,7	0,4	-1,2	0,1	0,7	-1,2	0,1
CZ	3,7	-12,6	0,0	3,0	0,0	12,4	1,1	-0,4	1,7	1,5	-1,8	3,7
DK	0,7	-2,4	0,7	-0,7	0,8	0,6	N/A	N/A	N/A	N/A	N/A	N/A
FI	2,9	-4,1	-2,5	0,4	-1,6	0,5	0,9	-2,5	1,3	1,5	1,2	2,4
FR	2,6	-5,9	2,2	0,2	-0,2	0,6	0,7	-1,1	1,0	0,8	0,8	1,7
IT	2,1	-6,4	2,0	0,5	-1,4	0,4	N/A	N/A	N/A	N/A	N/A	N/A
LT	5,6	-12,4	2,9	1,5	-4,7	0,9	0,0	0,0	0,0	1,8	-4,1	0,4
LV	2,4	-3,3	-1,2	2,3	0,3	6,5	0,9	0,0	2,0	0,6	-0,8	0,9
MT	1,6	-3,9	1,9	1,7	-0,8	3,5	0,1	0,0	0,6	1,3	-1,0	0,7
PT	2,1	-3,2	5,4	1,5	0,0	4,4	0,5	0,0	2,2	1,3	-0,2	3,8
SE	2,6	-7,2	1,2	0,3	-0,2	0,8	0,3	-0,8	0,2	1,2	-2,8	0,7
SK	4,5	-19,4	3,7	3,1	-4,5	2,3	0,7	-4,9	2,2	1,9	-4,7	2,9
UK	0,1	-0,5	0,3	0,3	-0,8	0,0	1,3	0,0	8,9	0,3	-0,5	2,0
<b>Average</b>	<b>2,6</b>	<b>-6,4</b>	<b>1,8</b>	<b>1,1</b>	<b>-0,9</b>	<b>2,7</b>	<b>0,6</b>	<b>-1,0</b>	<b>1,7</b>	<b>1,2</b>	<b>-1,5</b>	<b>1,9</b>

\* absolut values average

\*\* sample average

**Table 5: Descriptive statistics on tax elasticities and discretionary measures.**

Countries	Direct taxes			Indirect taxes			SSc			Total Taxes		
	Variance gross elasticity	Variance net elasticity	Correlation DM/Output Gap	Variance gross elasticity	Variance net elasticity	Correlation DM/Output Gap	Variance gross elasticity	Variance net elasticity	Correlation DM/Output Gap	Variance gross elasticity	Variance net elasticity	Correlation DM/Output Gap
Austria	6,5	1,2	0,7	0,1	0,2	-0,3	0,1	0,1	-0,1	0,7	0,2	0,6
Belgium	0,3	0,3	-0,4	0,3	0,3	-0,4	0,3	0,2	0,8	0,0	0,1	-0,3
Czech Rep	0,9	2,0	-0,1	0,3	0,5	0,3	0,2	0,2	-0,4	1,3	1,3	0,1
Denmark	0,6	0,8	0,5	0,1	0,0	0,6	-	-	-	0,4	0,6	0,6
Finland	1,9	1,3	0,3	1,7	3,0	0,6	0,3	0,2	-0,3	0,3	0,2	0,2
France	1,1	0,7	-0,7	0,2	0,2	-0,3	0,2	0,2	-0,8	0,1	0,0	-0,8
Italy	1,8	1,4	0,2	0,5	0,4	-0,2	-	-	-	0,4	0,2	0,2
Lithuania	0,6	0,7	-0,8	0,2	0,2	-0,1	-	-	-	0,0	0,1	-0,9
Latvia	0,1	0,1	-0,6	0,2	0,3	0,2	0,1	3,8	0,7	0,2	0,1	0,4
Malta	19,3	15,6	0,1	9,4	5,8	-0,1	-	-	-	5,5	3,7	-0,3
Portugal	3,3	6,5	0,6	1,8	0,9	-0,2	-	-	-	0,2	0,5	-0,6
Slovakia	0,4	0,1	0,3	0,3	0,2	-0,7	0,2	0,1	0,6	0,3	0,2	0,2
Sweden	3,4	2,5	-0,4	1,5	1,5	-0,1	2,0	1,9	-0,1	2,0	1,7	-0,4
U.K	0,9	0,9	0,1	0,2	0,3	0,9	0,3	0,4	-0,2	2,8	2,7	0,3

Notes: Results based on replies to the questionnaires submitted to the Member States and Commission services' calculations

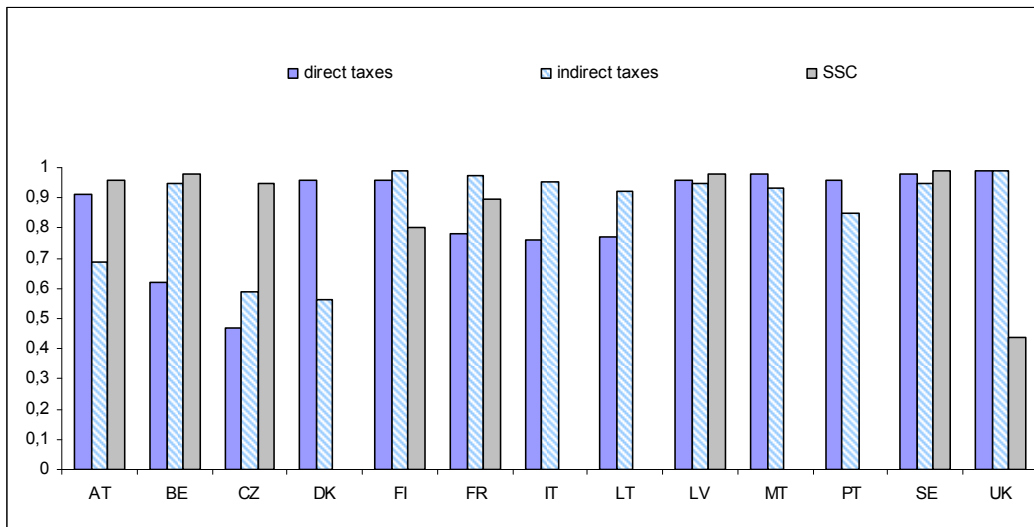
**Table 6: Econometric estimation of the link between the output gap and discretionary measures. Panel (fixed-effect) estimations**

	<i>Total taxes</i>		<i>Direct taxes</i>		<i>Indirect taxes</i>		<i>Social security contributions</i>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Output gap	-0.046*** (0.009)	-0.034*** (0.010)	-0.034*** (0.007)	-0.031*** (0.008)	-0.007 (0.004)	-0.004 (0.005)	-0.001 (0.002)	0.000 (0.003)
Debt		-0.001 (0.006)		-0.004 (0.005)		0.001 (0.003)		0.001 (0.002)
Net lending		-0.047*** (0.015)		-0.014 (0.013)		-0.009 (0.008)		-0.008* (0.004)
General elections		-0.056 (0.044)		-0.037 (0.038)		-0.022 (0.025)		0.002 (0.013)
Fiscal rules		0.045 (0.066)		-0.017 (0.056)		0.025 (0.037)		0.028 (0.019)
Constant	-0.054** (0.022)	-0.092 (0.294)	-0.101*** (0.017)	0.105 (0.253)	0.026** (0.011)	-0.045 (0.164)	0.004 (0.006)	-0.055 (0.085)
Observations	55	55	55	55	55	55	55	55
Number of countries	8	8	8	8	8	8	8	8
R-squared	0.38	0.54	0.36	0.41	0.06	0.12	0.01	0.13
F test for fixed effects	4.66***	2.27**	2.57**	1.53	3.43***	2.43**	2.16*	0.86

Notes: Standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

The period covered by the estimations is 2001-2007 and the countries are Belgium, the Czech republic, Finland, France, Lithuania, Malta, Sweden and the UK.

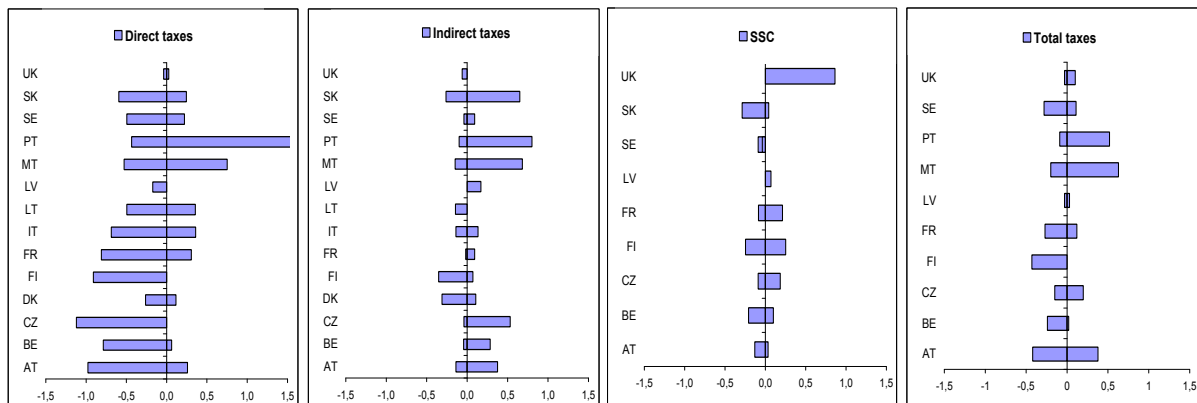
**Graph 1: Correlation between gross and net apparent tax elasticities**



*Note: Correlation calculated across periods indicated in Table 1. Countries with less than four years of observations are not reported*

*Source: Commission services based on data provided by Member States*

**Graph 2: Difference in level between gross and net tax elasticities**



*Note: Average across period 2001-2007.*

*Source: Commission services based on data provided by Member States*

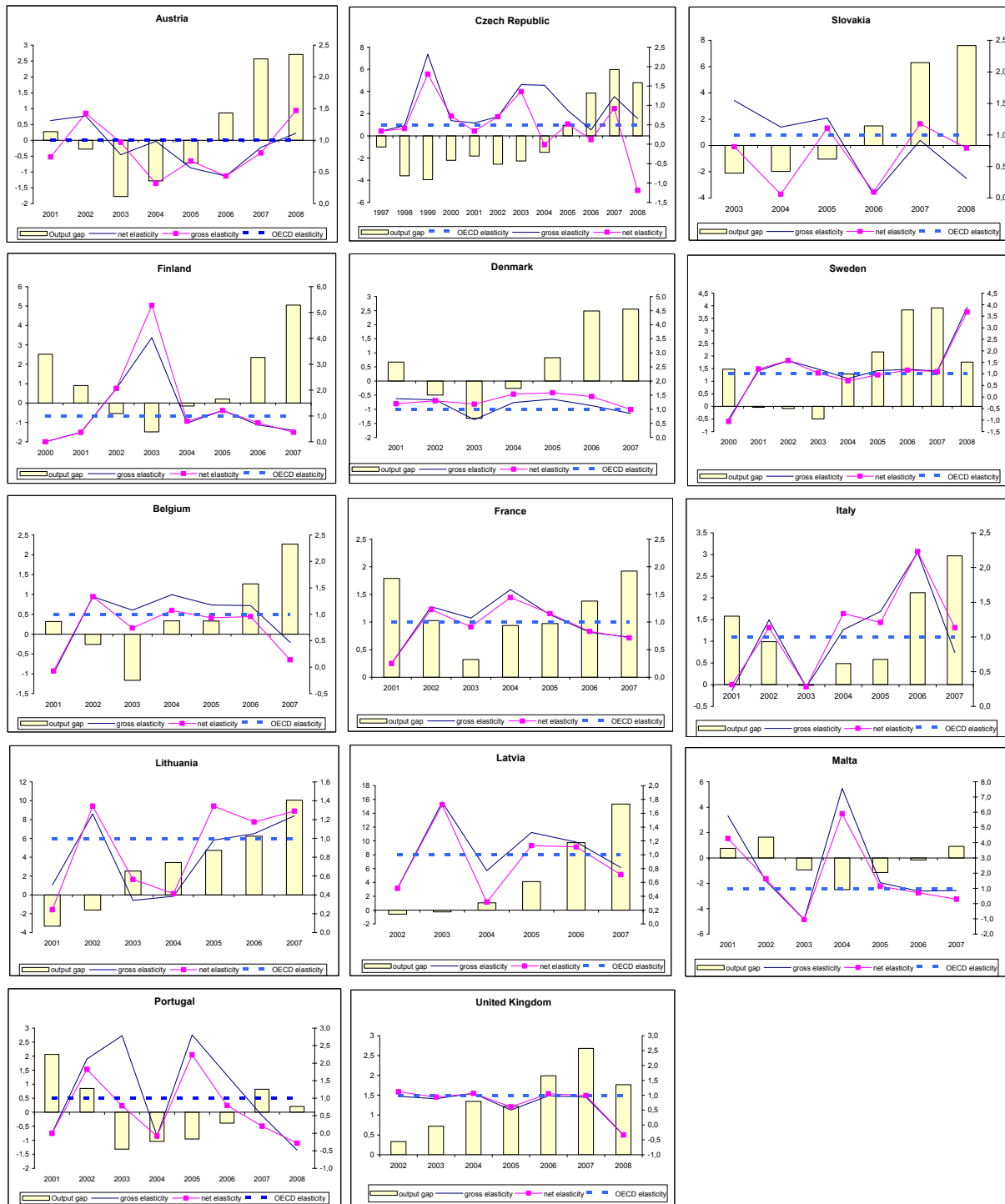
### Graph 3 : Gross and net (for the impact of discretionary measures) tax elasticities to GDP and output gap: Direct taxes

Output Gap (left axis) Elasticity (right axis)

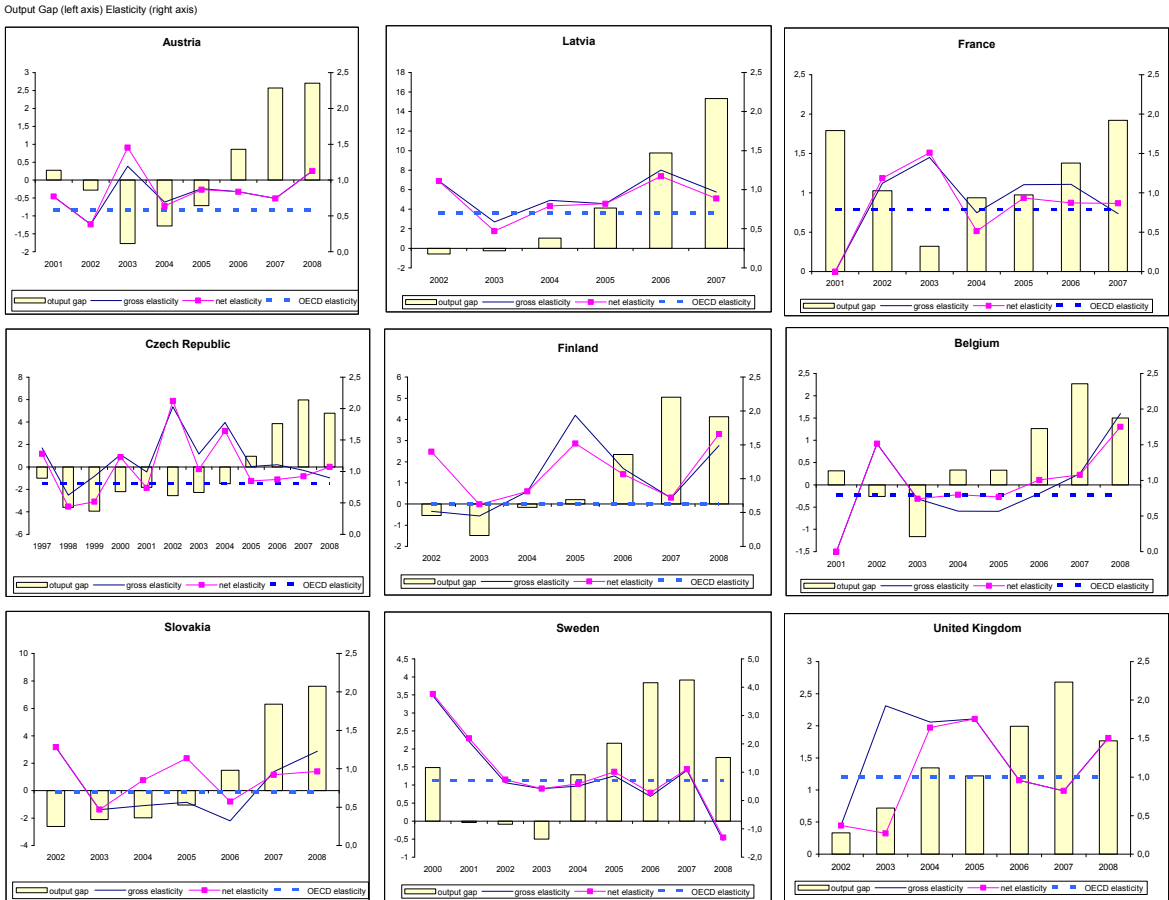


**Graph 4: Gross and net (for the impact of discretionary measures) tax elasticities to GDP and output gap: Indirect Taxes**

Output Gap (left axes) Elasticity (right axes)

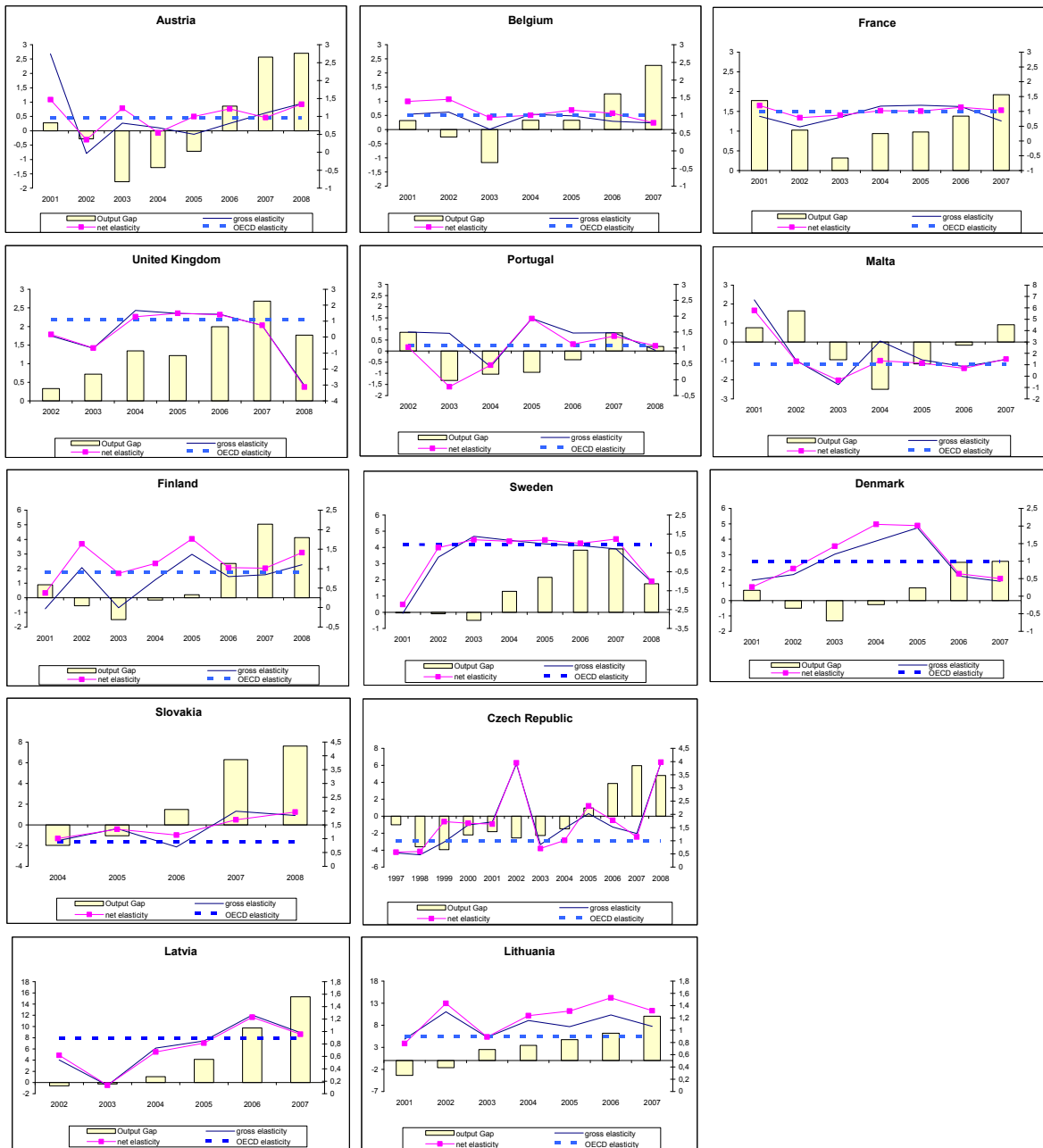


**Graph 5: Gross and net (for the impact of discretionary measures) tax elasticities to GDP and output gap: Social security contributions**

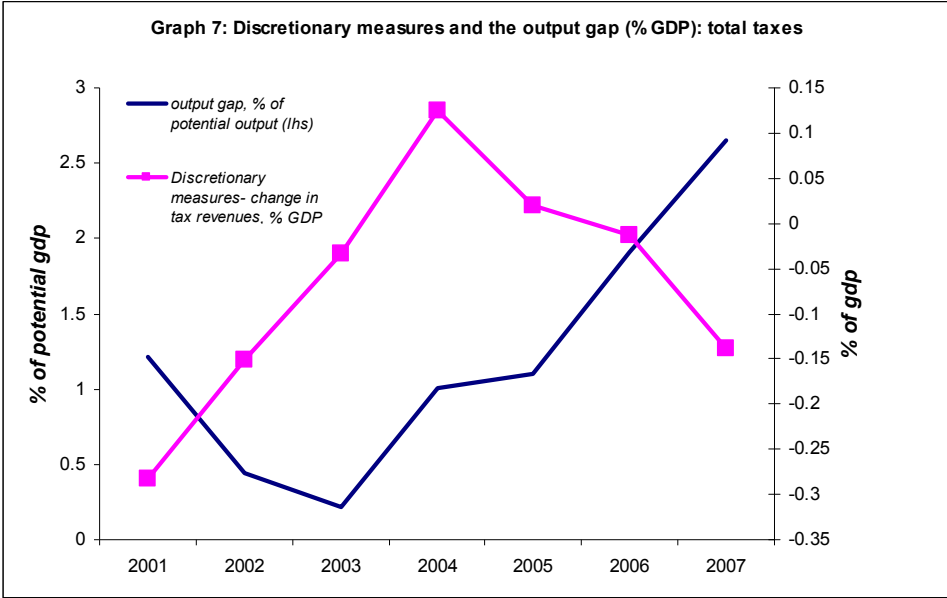


# Graph 6: Gross and net tax elasticities to GDP and output gap: Overall tax revenues

Output Gap (Left Axis) Elasticities (right axis)



**Graph 7: Aggregate share of discretionary measure in percent of GDP and the output gap.**



Notes: Output Gap series is built as weighted average of the sample of countries for whose data were available in the years considered. The countries concerned are Belgium, the Czech republic, Finland, France, Lithuania, Malta, Sweden and the UK.