CAHIER D'ÉTUDES
WORKING PAPER

N° 40

PROS AND CONS OF VARIOUS FISCAL MEASURES TO STIMULATE THE ECONOMY

Carine Bouthevillain
Cristina Checherita
Esther Gordo
Geert Langenus
Bernhard Manzke
Pietro Tommasino
John Caruana
Jorge Cunha
Stephan Haroutunian
Amela Hubic
Javier J. Pérez

SEPTEMBER 2009

BANQUE CENTRALE DU LUXEMBOURG
EUROSYSTÈME

Pros and Cons of various fiscal measures to stimulate the economy

Carine Bouthevillain
Banque de France

John Caruana
Central Bank of Malta

Cristina Checherita
European Central Bank

Jorge Cunha
Banco de Portugal

Esther Gordo
Banco de España

Stephan Haroutunian
Central Bank of Cyprus

Geert Langenus
Bank of Belgium

Amela Hubic[†]
Banque centrale du Luxembourg

Bernhard Manzke
Deutsche Bundesbank

Javier J. Pérez
Banco de España

Pietro Tommasino
Banca d'Italia

Abstract

We review the theoretical and empirical literature on the effects of discretionary fiscal policies, against the background of renewed fiscal policy activism. In this sense, we analyze the main pros and cons of various fiscal tools to stimulate the economy. We show that it is extremely difficult to elaborate an unambiguous catalogue of measures defining an "optimal" fiscal package. Among the requirements that fiscal measures should be "timely, targeted and temporary" (TTT), the implementation of the first one – timeliness – is the least controversial criterion in the current situation. On the basis of the literature review, we provide some hints on the appropriate composition of a fiscal stimulus packages. The review of the pros and cons of short-term fiscal stimulus packages cannot be decoupled from the discussion of the "exit strategies", i.e. the means of financing fiscal expansions, and the intertemporal consistency of fiscal plans.

(*) **Acknowledgements**: The authors would like to thank the participants at the ESCB Working Group on Public Finance meeting of 3-4 March 2009, Frankfurt am Main, Germany. In particular, we would like to thank Karsten Wendorff, Ad van Riet and Richard Morris for their comments on previous drafts of this paper.

(**) The views expressed in the paper are those of the authors and do not necessarily represent the views of the ECB or the NCBs involved.

† e-mail: amela.hubic@bcl.lu

Résumé non-technique

Les responsables de la zone euro et du reste du monde sont intervenus avec promptitude ces derniers mois afin d'atténuer les répercussions économiques et sociales de la présente crise et pour mieux asseoir les perspectives de reprise. Ils ont pour ce faire fait appel à différents outils (conventionnels et non conventionnels) de politique monétaire et budgétaire.

L'article faisant l'objet du présent résumé passe en revue la littérature théorique et empirique relative aux effets des politiques budgétaires discrétionnaires, le principal objectif étant de distinguer les avantages et les inconvénients inhérents à une stimulation de l'économie par le biais de la politique budgétaire. Cet examen montre qu'il est difficile d'élaborer un catalogue complet et précis des éléments constitutifs d'un paquet fiscal "optimal".

Les mesures fiscales devraient en tout état de cause respecter les trois T: elles devraient en effet être "timely, targeted and temporary". En d'autres mots, les mesures devraient être "prise à temps, ciblées et temporaires". C'est l'implémentation du premier T (prises à temps) qui est la moins sujette à controverses. En ce qui concerne la durée de ces mesures, il existe de forts arguments en faveur de mesures temporaires ou, à l'inverse, de mesures plus persistantes. La pertinence respective de ces arguments antagonistes dépend: (i) de la proportion des agents économiques ayant des contraintes de liquidité; (ii) de la réaction des taux d'intérêt à long terme et (iii) de la durée estimée des chocs négatifs touchant l'économie. Par ailleurs, des mesures ciblant des agents bien spécifiques pourraient s'avérer difficiles à mettre en œuvre, en raison de l'incertitude élevée entourant les multiplicateurs fiscaux et à cause des multiples difficultés que comporte l'élaboration d'un paquet fiscal optimal.

Au-delà du débat sur les trois T, la littérature économique suggère que la structure d'un stimulus budgétaire devrait également prendre en considération des facteurs tels que: (i) un équilibre approprié entre les effets positifs de court terme (principalement du côté de la demande) et les coûts éventuellement générés par ces mesures (ces coûts se matérialisent principalement sur un horizon de long terme du côté de l'offre, mais également de court terme via les marchés financiers); (ii) la taille attendue des multiplicateurs fiscaux des différents outils disponibles; (iii) le degré d'ouverture de l'économie; (iv) la nécessité de réduire les distorsions affectant les mécanismes de marché.

De plus, les résultats des études empiriques montrent qu'à court terme, les multiplicateurs de dépenses (*spending multipliers*) sont plus élevés que les multiplicateurs de taxation (*tax multipliers*).

Mis à part les facteurs généraux, les caractéristiques propres de chaque pays sont d'une importance majeure pour estimer le degré d'efficacité des mesures de stimulus fiscal. Alors qu'un paquet fiscal donné pourrait être jugé approprié pour un pays touché par un sévère choc de demande, caractérisé par un ratio de dette peu élevé et par un excédent du budget structurel, ce même paquet pourrait facilement induire une hausse des primes de risque (taux de financement plus élevés) ainsi que d'autres effets macro-économiques néfastes dans le cas d'un pays présentant une position

de départ défavorable. À cet égard, la stratégie budgétaire de sortie de la crise est cruciale. Une stratégie encadrée par des règles budgétaires précises et qui ne compromet pas la viabilité à long terme des finances publiques – les mesures budgétaires expansionnistes étant intégrées dans un cadre de consolidation crédible à moyen terme - a moins de chances d'induire des effets secondaires défavorables qu'une stratégie impliquant un déficit permanent et non compensé, et ce en violation des règles budgétaires.

Dans une perspective européenne, le manque de respect par l'un des Etats membres du cadre multilatéral européen de surveillance budgétaire est de nature à induire des effets néfastes dans l'ensemble des autres Etats membres, car la crédibilité du cadre de surveillance précité est négativement affectée par le comportement de l'Etat "deviant".

Contents

1 Introduction

Policy makers in the euro area and worldwide have intervened substantially to mitigate the economic and social disruptions of the present crisis and to stimulate recovery through various (conventional or unconventional) tools of monetary and fiscal policy.

As regards fiscal policy, there is certainly a strong consensus that government **rescue plans for the banking sector** were needed to avoid a systemic crisis and restore confidence. A wealth of studies by the EC, IMF, OECD and also national bodies have supported this line of action, also in view of the experience of past banking crises, most notably in Japan, Korea and the Nordic countries.

At the same time, **fiscal measures to stimulate the economy in the short run have been advocated by** several voices within the economic profession, including international organizations and certain governments, **and implemented in many countries of the euro area** and worldwide. On this front, though, the whatever-it-takes approach that might be valid for financial rescue plans is usually not fully applicable for demand-oriented discretionary fiscal policy actions.[1]

First, the need for discretionary fiscal policy measures has to be assessed in conjunction with the counter-cyclical stimulus of fiscal policy built into tax and spending systems, i.e. automatic stabilization. **Automatic stabilizers** are those elements of fiscal policy that operate without any explicit government action, and thus are not affected by the implementation lags of discretionary policy. In this regard, a direct comparison of the "appropriate" discretionary stimulus in the EU and the US would be difficult, given the larger size of public sectors in the EU, with more progressive tax systems and more responsive social expenditure (in particular unemployment benefits).

Second, the affordability of a fiscal stimulus plan depends primarily on an economy's existing fiscal conditions or the degree of **fiscal stress**, either proxied by a high existing level of government debt, a rapid debt increase, or the extent of other long-term risks (such as aging costs). It is also likely to depend on the size of its external imbalances, particularly in the case of emerging economies. Hence, a country with a high level of foreign debt and/or confronting balance of payments problems is likely to have less room for fiscal expansion.

Third, even in the event that indeed **discretionary packages** were to be implemented, some questions remain open to debate: How should they be designed to maximize the impact on the economy (fiscal multipliers)? How should measures be tailored, communicated and implemented in order to bolster consumers' and firms' confidence and help reduce aggregate uncertainty in the economy? In the event of the crisis lasting longer than envisaged, some additional questions could be posed: Would fiscal measures increase the probability of ending a recession in addition to mitigating the slump? Would they instead delay the recovery?

[1] See European Central Bank (2009), Freedman et al. (2009), Barrell et al. (2009), OECD (2009), Elmendorf and Furman (2008), or Spilimbergo et al. (2008).

This paper reviews the main pros and cons of discretionary fiscal packages trying to unveil what we can learn from the existing theoretical and empirical literature on the effects of discretionary fiscal policies, while at the same time drawing lessons for the actual packages recently put forward in some EU countries. The paper shows that it is extremely difficult to elaborate an unambiguous catalogue of measures defining an "optimal" fiscal package, though much attention has been paid in the policy debate to the requirement that measures taken should be "**timely, targeted and temporary**" (TTT). As regards the duration of measures, both temporary and more persistent measures may be defended depending on the proportion of liquidity-constrained agents in the economy, the reaction of long-term interest rates, and the expected duration of the adverse shocks hitting the economy. Targeting measures to some specific agents may be difficult in practice, given the uncertainty surrounding fiscal multipliers and the difficulties of designing well-targeted fiscal stimulus packages. Timeliness is the least controversial criterion in the current situation.

Beyond the discussion on TTT, the literature suggests that **the structure of a fiscal stimulus plan should take into account several factors**, such as: (i) a proper balance between the expected short-term positive effects (mainly demand-side) with the costs that might be expected from the measures (mainly linked to the longer-term, and the supply side, but also to the short term via financial markets); (ii) the expected size of fiscal multipliers of various tools available; (iii) the degree of openness of the economy; (iv) the need to minimise distortions in market mechanisms and, in the case of EU countries, the compliance with single market rules.

2 The effectiveness of fiscal packages: short-run benefits and potential costs

2.1 Short-run benefits on aggregate output

Discretionary fiscal policy measures are usually advocated based on the claim that there are short-run benefits in the event of a crisis/recession situation. Indeed, several recent studies seem to provide evidence that additional government spending and/or tax cuts have a **positive effect on aggregate output in the short-term in such a situation**. What remains to be determined is the size of the fiscal multipliers, and the sign and size of the disaggregated impact on private consumption and private investment.

Private consumption, the biggest component of aggregate demand, has received most of the attention. The current consensus holds that private consumption will increase after a positive government spending shock or after temporary tax cuts due to the increase in disposable income.[2]

The most popular argument usually advocated is that the consumption of ***liquidity-constrained*** or myopic agents reacts strongly to tax reductions or government spending increases. For example, Gali et al. (2007) find that, conditional on having a large enough fraction of rule-of-thumb consumers[3] (in their benchmark solutions 50% of the population), and a high degree of price stickiness (average duration of about four quarters), a government spending shock in the US generates an increase in aggregate consumption even if the latter is not very persistent. Otherwise, the negative wealth effect of the expected higher taxation would offset the expansionary impact, a standard result in models without liquidity constraints or price and wage stickiness.[4] Inverting the previous argument on the fraction of constrained/unconstrained agents in the economy, several studies that analyse the ***non-Keynesian effects*** of fiscal policies claim that fiscal consolidations might have expansionary effects on the economy if the fraction of unconstrained agents is high enough.[5, 6]

---

[2] See, for example, Gali et al. (2007), Blanchard and Perotti (2002), Fatas and Mihov (2001), Perotti (2005, 2007), Mountford and Uhlig (2002), Caldara and Kamps (2008) or Afonso and Sousa (2009). At the same time, some papers suggest the consumption response to temporary tax cuts may be modest. In this respect, see Shapiro and Slemrod (1995, 2001), Parker (1999) and Souleles (1999, 2002). Finally, the findings that government spending shocks cause private consumption to rise is not unchallenged, e.g. Ramey and Shapiro (1998), Edelberg et al. (1999), Burnside et al. (2004), or Ramey (2008). See Perotti (2007) for a critical discussion of this latter strand of the literature. Most of the papers referred to in this footnote analyze the US case.

[3] By rule-of-thumb (or liquidity constrained or hand-to-mouth) consumers the literature refers to individuals that do not have access to financial markets, and thus consume all of their current disposable income each period.

[4] Standard "neoclassical" models predict that an exogenous increase in government spending will decrease private lifetime wealth (given that agents anticipate that increases in spending today will have to be financed in the future), hence normal goods consumption and leisure declines (hours worked will increase to compensate for the negative wealth effect caused). The seminal paper most quoted in this respect is Barro (1974). See also Baxter and King (1993). For recent examples of simulation models that incorporate this theoretical structure in an otherwise standard "neo-Keynesian" framework see Coenen and Straub (2005) or Coenen et al. (2007).

[5] On the assumption of credit market imperfections and the link to constrained and unconstrained individuals, see Attanasio (1999), Perotti (1999), Giavazzi and Pagano (1990, 1996) or Giavazzi, Jappeli and Pagano (2000). Also on the issue of the "non-Keynesian" effects of fiscal policies see Schclarek (2007) and the references quoted therein.

[6] Monacelli and Perotti (2008) exploit an alternative channel. They set up a standard business cycle model, except for the presence of price rigidity, and find a positive response of private consumption to a government spending shock for preferences consistent with an arbitrarily small positive wealth effect on labour supply, that counterbalances the standard wealth effect. This effect is linked to the degree of complementarity between consumption and hours. See also Ravn, Schmitt-Grohé and Uríbe (2006).

Tagkalakis (2008) analyses the link between the fraction of constrained/unconstrained agents and the state of the economy. He develops a model to illustrate that the fraction of credit-constrained consumers is likely to increase in ***bad times***, and hence a fiscal expansion is more likely to have a positive and stronger effect on consumption in economic downturns. This hypothesis is validated in a panel data set of OECD countries for the period 1970-2002.[7]

An alternative argument in the literature that rationalizes why private consumption might react positively to an increase in government consumption is based on the assumption that public and private consumption are ***complements*** or, similarly, that they are imperfect substitutes with sufficiently low elasticity of substitution. In both cases the rise in government consumption increases the marginal utility of private consumption so that the negative wealth effect on consumption is counteracted.[8] Examples of public spending which substitutes private spending include defence, public order and justice, while public spending in education or health might be perceived as complements for private sector provided services.

Private investment, a much more cyclically volatile component of output, may also be influenced by tax and government spending. The incentive to invest is responsive to tax policy and is likely to be more responsive when tax measures are perceived to be temporary (in this respect see for example Auerbach and Hassett, 2002). The rationale is the following. Firms and investors are sensitive to changes over the coming period in the tax-adjusted price of new capital goods, and may be motivated to accelerate purchases into this year if a favourable tax environment is expected to become less favourable. This might be particularly the case in the presence of capital stock adjustment costs, as expectations of future changes in the incentive to use capital in production lead to immediate changes in investment so as to minimize the adjustment costs incurred in closing the gap between the current and future desired capital stocks. Thus, temporary tax credits may have more than proportional impact on the user cost of capital.

Most empirical studies on ***temporary investment incentives*** find that they tend to be only moderately effective (see, for example, CBO, 2008, and the literature cited there). This may be due to the fact that investment projects often require long planning phases and, consequently, only projects that have already been planned can be implemented in the short term.

Standard models without liquidity constraints or price and wage stickiness would predict a boost in investment after a government ***spending shock*** given that, to compensate for the negative wealth effect caused, agents might decide to work more, which in turn will raise the return to capital. Nevertheless, other arguments would signal that a positive government spending shock might lead to a situation in which private investment is ***crowded out*** by higher public debt issuance, if the latter raises the interest rate (this will depend on current and future

[7] This adds to the usual argument that expansionary fiscal policy is more efficient when the output gap is negative because otherwise it could only boost inflation (see Henry et al., 2004).

[8] See for example Fiorito and Kollintzas (2004) and Ganelli and Tervala (2009) for theoretical justifications and empirical evidence on the complementarities argument, and Linneman and Schabert (2004) for the imperfect substitution one. At the end of the day, the issue of whether private and public consumption are complements or substitutes is an empirical one.

monetary policy).[9] In addition, if the government spending shock is implemented through the ***public sector wage bill***, upward wage pressures may appear in the economy, leading to a reduction in profits and thus private investment (see Alesina et al. 2002, Lane and Perotti, 2003, and Ardagna, 2007, for theory and empirics supporting this claim).

2.2 Long-run costs, short-run costs and other considerations

The implementation of discretionary fiscal packages is not without risks. The main costs usually spelled out in the literature as regards short-term policies are **long-run costs**. These are usually framed against the dangers that strong discretionary actions may generate for the sustainability of public finances.[10]

In addition, if long-run costs are perceived by private agents to be relevant in a given historical episode, then precautionary savings may increase and investment may decrease or remain muted, provided that agents perceive that a fiscal consolidation might be needed once the economic crisis is over (or even before, if the slump turns out to be enduring). This perception is likely to depend on the existing degree of "**fiscal stress**", either proxied by high existing levels of government debt, a rapid debt increase, or the extent of the long-term risks perceived (such as aging costs or implicit liabilities related to government guarantees e.g. for financial institutions). These factors might severely limit the short-term impact of fiscal measures.

Discretionary fiscal actions can also have **short-run costs**. Bearing in mind default risk, increasing or perceived-as-unsustainable government debt can lead to a ***risk premium*** being charged on the interest on government debt, leading to a crowding-out of private investment. A credible one-off increase in government spending could – given a sufficient number of rule-of-thumb consumers in the economy – bring about positive fiscal multipliers. However, if economic agents do not believe that the fiscal stimulus is a one-off (or if it truly is a permanent stimulus), the risk premiums could increase accordingly because unconstrained Ricardian households want compensation for potential future income losses. This would generate a negative fiscal multiplier (see for example Giavazzi and Pagano, 1990, or Alesina and Perotti, 1997).

An additional short-run consideration pertains to the link between **fiscal policy and uncertainty**. Automatic stabilizers, to the extent that they operate properly, can lower volatility and uncertainty in the economy, without introducing new policy uncertainties (Auerbach and Hassett, 2002, Andrés et al., 2008). This is not necessarily the case as regards discretionary fiscal policy actions. In this respect, random fiscal policies could increase the overall economic uncertainty, and thus damage economic activity.[11] As the impact of different

[9] From an empirical point of view, Blanchard and Perotti (2002) find in a SVAR framework for the US a negative impact on private investment of a government spending shock.

[10] See for example Afonso et al. (2009). For the trade-off between automatic stabilisation and the long-run fiscal positions of governments see Hiebert et al. (2009).

[11] See Furceri (2008).

measures might depend on expectations about the future, fiscal stimulus packages announced clearly and credibly are likely to be more effective.[12] Without a credible strategy, the government may only increase the uncertainty in the system and induce firms and households to postpone their spending decisions (see Dixit and Pindyck, 1994). A related issue is the **anticipation of fiscal measures by private agents**. Hoon and Phelps (2008) show that under imperfect competition an unanticipated temporary labor tax cut to be effective on a given future date financed by future cuts in spending is neutral for output in a Ricardian world but contractionary in a non-Ricardian world. They also show that a sudden expectation of future labour tax cuts without a sunset provision, with spending gradually adjusting to ensure fiscal sustainability, is expansionary in a Ricardian world but (for small tax changes) contractionary in the time period before implementation in a non-Ricardian world.[13] Thus, even if ex-post multipliers were positive, the final impact of the labour tax cuts would have to be weighted against the ex-ante losses.

The effectiveness of fiscal packages is also likely to depend on the **openness of the economy** and external linkages. In a small and open economy, the share of additional consumption demand resulting from a short-term increase in transfers that is going into imports is conceivably high. Therefore, unless fiscal stimulus packages are perfectly coordinated internationally (everyone spends), more open economies may be inclined to prefer public investment programs, in which they are better able to direct the demand impact towards domestic goods and services and thus raise employment. IMF (2008) simulations show that, in general, fiscal multipliers tend to be lower in smaller and more open economies. However, in terms of the different fiscal tools, the multipliers for labour taxes fall by less (maybe not always be the case if also large openness of the labour market, see case of Luxembourg), followed by government investment, while the highest relative decline is found for transfers.

In addition, the impact of income tax changes on labour supply and output depends **on institutional factors** of the labour market, such as the degree of unionisation and other features of the wage-setting process. Other factors, such as corruption and preparedness of the government institutions (efficiency of spending line-ministries versus tax collection agencies; availability of resources for public institutions and capacity to implement large scale investment programs), could conceivably influence the effectiveness of spending versus tax measures, most notably in developing countries.

An argument that is sometimes absent from theoretical studies, and certainly from empirical ones, is that the effectiveness of fiscal packages depends crucially on the

[12] For example, if agents face a signal extraction problem as regards the prevailing and the expected fiscal regime. See Keen (2008), Eusepi and Preston (2008) or Davig (2004) in this respect.

[13] On different grounds, and from a purely empirical point of view, Ramey (2008) incorporates the timing of the news about future increases in government war spending, while Blanchard and Perotti (2002) incorporate future values of the fiscal shocks. Both empirical studies find a larger and longer positive response of output to the fiscal stimulus than found in studies using actual spending. Such controls can capture the behavioural change from the moment the fiscal stimulus has been credibly announced or approved to the moment of the actual implementation. The response of private consumption to fiscal shocks once the anticipation effects are taken into account is still controversial in the literature.

way they are financed. The literature signals that fiscal packages are not generally self-financing. For example, the impact of an increase in government spending depends on whether it is financed by a future tax rise (or a future spending cut) or by a more persistent increase in government debt (the latter being the case of most packages currently announced in the EU), as private agents respond differently. As an example, Leeper and Yang (2008) find that the expansionary effects of a tax cut (in the long-run, but also in the transition to a new steady-state) depend crucially on the choice of which fiscal instrument adjusts and on the magnitude of the adjustment in response to a deteriorating budget. The stronger is the response to the deteriorating budget, the less debt accumulates, and the more favourable are the expansionary effects of a tax cut.[14] Thus, especially in countries with high levels of public debt, this strand of the literature tends to suggest that a given package should be accompanied by a related set of reverting measures, also in view of sustainability issues.

Another consideration is the **consistency of fiscal packages with monetary policy**. Monetary policy ***reaction*** plays a key role in the effectiveness of a fiscal stimulus,[15] the output response being considerably higher and more persistent in the case of ***monetary accommodation***. Ideally, monetary and fiscal policies are consistent in the short run so that their impact on aggregate demand is cumulative and not offsetting. In the current situation of expansionary monetary and fiscal policies, risks may arise that the impact of one policy forces the other to adjust in the medium term, thus limiting its margin of manoeuvre and desirable design. For instance, if private debt remains high and public debt keeps on increasing due to stimulus and rescue plans, interest rates might be pushed up in the medium term.

Finally, expansionary policies might be difficult to **reverse**. An inadequate timing in the reversal of the policy mix could endanger growth and inflation developments in the medium term. For example, if expansionary policies are reversed too late European economies may have to face excess liquidity (maybe implying new bubbles in other asset prices), unsustainable public finances, and lack of confidence among private agents, which could endanger the recovery of consumption, investment and output in the medium term. The opposite might be also true: if expansionary policies are reversed too early, this could choke off an incipient recovery.

[14] For additional illustrations, in a different modelling framework, see Ardagna (2007).

[15] It is also a crucial assumption in simulation models and, if omitted, it may be an important source of bias in estimating the size of fiscal multipliers in regression analyses. By type of fiscal tools, recent IMF simulation work (IMF, 2008) shows that the output response to labour tax cuts is less affected by monetary accommodation in comparison with other tools (e.g. government investment, consumption taxes or transfers), due to the impact on labour supply.

3 The effectiveness of fiscal packages and their design

3.1 Targeted, timely and temporary?

The above review of the literature indicates that the design of fiscal measures may have a significant influence on their effectiveness. Taking this into account, policy institutions have called for stimulus measures to be timely (enacted rapidly), temporary and targeted (directed where the multipliers are larger). Example is the "European Economic Recovery Plan" (EERP). Meanwhile, in the United States, government officials have argued that a "speedy, substantial and sustained" fiscal stimulus should fit better, given the intensity and expected duration of the current crisis.

As regards **timeliness**, important lags can result between the diagnosis of the economic situation and the decision and implementation of fiscal policies (inside lags). Given these "inside lags" and the time needed for the measure to influence aggregate demand ("outside lags"), the impact of stimulus measures could come too late, when the cyclical position of the economy has already begun to improve[16]. This implies favouring simple measures instead of radical departures from current tax and expenditure structures, which may incur large lags associated with the process of political discussion and approval of new measures. In the particular case of public investment, the pressure to introduce timely measures may result in inefficient projects with little impact on short- and long-term output growth.

The effects of discretionary fiscal measures depend also on their **expected duration** (temporary vs permanent/sustained measures). As discussed above, the theoretical and empirical literature is controversial. Rule-of-thumb consumers would react to temporary measures, given that they spend all their current income. However, if the fraction of unconstrained agents is high enough then temporary increases in income will not lead to significant increases in consumption, as they only affect permanent income marginally. In this latter case, on the contrary, persistency measures may result in higher multipliers if agents optimize over a finite number of periods.[17]

The preference for temporary measures is designed to allay concerns about fiscal sustainability in the long term. A permanent or persistent stimulus could raise doubts about the long-run fiscal position, resulting in the crowding out of private investment through higher interest rates. Moreover, the literature on the quality of public finances, by stressing the negative relationship between government size and economic growth, at least beyond a certain minimal size, adds weight to the argument that spending increases should be temporary (EC, 2008). Finally, transitory measures can also work by affecting the relative prices of present and future consumption and investment. For example, a temporary reduction in VAT rates reduces the price of present consumption relative to future spending, boosting demand in the current period (but depressing it afterwards).

[16] Although, the diagnosis might be easier in the current crisis and therefore the inside lag shorter.

[17] But even in this case, private agents may adopt some consumption smoothing when there are fiscal rules that limit the government debt and deficit ratios. For example, if the fiscal deficit is close to the threshold established by the rule, private agents may adjust their saving behaviour anticipating the fiscal adjustment.

Focusing the stimulus on sectors with higher multipliers and towards agents with a higher propensity to spend current income, would raise its impact (**targeted**).[18] However, deciding which agents are eligible is controversial, especially when diverse sectors of the economy are affected, as in the current crisis. There is a risk that measures would be directed towards prominent sectors of the economy, on the basis of their visibility and political clout, rather than on the effective stimulus to demand. Moreover, national assistance to some specific sectors could distort competition rules and the functioning of the European single market. In addition, in a situation where fiscal multipliers are uncertain, it could be more prudent to rely on a **diversified** set of measures[19]. For example, against a background of uncertainty and tight credit conditions, firms might not undertake risky investments, even if corporate tax cuts reduce capital costs.

3.2 Coordination vs. country actions

Given that the current fiscal packages aim at counteracting an aggregate shock that affects most economies, a majority of institutions has also stressed that coordinated actions would be desirable to reinforce individual national actions by reducing concerns about leakages through imports that are not compensated by the induced demand of fiscal packages in trade partners. Trade spillovers and trade multipliers could potentially amplify the impact of fiscal stimulus. At the same time, large scale actions by a broad set of governments, especially in the euro area, might lead to competition in the bond market, and increased borrowing costs, especially for non-core EU countries.

3.3 The effectiveness of fiscal packages: what do we know about tax and spending multipliers?

Apart from theoretical arguments and the empirical evidence supporting alternative theories, it is important to be able to **quantify the multipliers associated with alternative fiscal measures** to assess the degree of effectiveness of fiscal activism[20]. The literature (mainly focused on the US case) suggests that fiscal multipliers are on average positive, but many studies find that they are quite low, and are typically estimated with a high uncertainty. This pertains to both expenditure and revenue stimulus measures.[21] In this respect, the size of the (short- and medium-term) multipliers attached to different types of measures remains an open empirical question.

Nevertheless, some general conclusions could be drawn from the literature (presented in **Tables 1** and **2 in the Appendix**) and are summarized below.

---

[18] Notice that throughout this note we are ignoring measures aimed specifically at the financial system, which, in the current situation, could be a prominent example of well-targeted discretionary measures. Another usually quoted example is transfers to low-income households, that despite an expected short-term impact if they are well targeted (and if the target group is large enough), may have a negative impact on longer term growth by creating distortions in the allocation of resources (Obstfeld and Peri, 1998, Checherita, Nickel and Rother, 2009).

[19] Targeting might still be more appropriate in very specific cases (i.e. lower income households).

[20] It is important to mention at this stage that the authors have developed a much more detailed version of this paper with country specific files that describe impact of the largest recently adopted fiscal stimulus measures on different economic variables. Unfortunately, due to the confidentiality reasons these results cannot be presented in this paper. However, feel free to contact the country specific author for the country specific data.

[21] In some cases multipliers could turn out to be negative. Take the example of a small open economy with fiscal sustainability problems. In this case, fiscal activism could be damaging for short-term aggregate output, and hurt fiscal sustainability.

3.4 Government spending multipliers vs. tax multipliers

Many empirical studies find that **spending multipliers are higher than tax multipliers in the short term**. This result could be rationalized as being consistent with the theoretical prediction that part of the higher disposable income from a tax cut is saved, while government purchases of goods and services affect aggregate demand directly.[22]

The **cumulative effect of tax measures** usually grows with time, but the evidence that tax cuts are more effective than spending increases is mixed, especially when tax changes are temporary. Nevertheless, IMF (2008) shows evidence from a wide panel of fiscal policy responses to economic downturns suggesting that revenue-based policies, including temporary ones, were associated with higher subsequent growth and even faster recoveries, the latter particularly in emerging economies. On balance, it seems that there is more evidence, especially from recent narrative studies and simulation exercises that tax multipliers may be high - and higher than spending multipliers - in the longer run.

3.5 Beyond aggregate "government spending or tax shocks"

Increases in **government purchases** of goods and services are found to work faster than other spending components, particularly in times of recession and low capacity utilisation, as they induce an immediate positive impact on aggregate demand. However, in the longer term, the distortions induced in the economy are likely to result in a negative or, at best, insignificant impact (as shown by most simulation exercises).

Government **capital spending** is generally considered to have a smaller short-term impact due to the long lags associated with the approval and implementation of new projects, but a larger long-term impact by raising the capital stock and potential output (Roeger and in 't Veld, 2004). Capital spending on maintenance works has the potential for a fast impact on demand and a positive medium-term impact on the supply side. Despite the variety of results across countries, regions, sectors, or periods of time, the predominant view in the empirical literature is that public capital has a positive impact on long-term growth. However, this impact may be nonlinear (with lower returns after a certain threshold is reached), and thus it may have receded in recent years compared to earlier decades (Romp and DeHaan, 2005).

Coming to the impact of different measures aiming at affecting private sector income, **income tax cuts** are generally found to be more efficient in the long term by eliminating distortions in the labour market and raising labour supply. In simulations, Coenen, McAdam and Straub (2007) find that the short-term output impact is larger for a government spending shock than for a transfer shock, while the positive long-term impact of cuts in the tax wedge is sizably larger than the impact of both government consumption and transfers. Al-Eyd and Barrell (2005) conclude

[22] See, among others, Blanchard and Perotti (2002) for the US, Perotti (2002) who found this was the case during 1961-2000, but not for 1980-2000, Kuttner and Posen (2002) for Japan, IMF (2008) for advanced economies. Burriel et al. (2009) for the euro area aggregate, Dalsgaard, André and Richardson (2001) for the US, euro area, Germany and Japan, de Castro and Hernandez de Cos (2008) for Spain, Giordano et al. (2007) for Italy, and Heppke-Falk, Tenhofen and Wolf (2007) for Germany.

that personal income taxes have a larger impact than transfers in both the short and the medium term.

On the spending side, **investment tax credits** show high multipliers, as shown in, for example, Roeger and in 't Veld (2004) and Auerbach and Hassett (2002).

As regards the fiscal multipliers associated with **other tax instruments**, the comparable empirical literature is scarcer. Al-Eyd and Barrell (2005) find that personal income taxes have the largest short-term multiplier in Germany and France, corporate taxes in Italy, while indirect (consumption) taxes have a very large short-term multiplier in the UK. Corporate taxes have the largest medium-term multiplier across all countries under study. Similarly, in the long term, Arnold (2008) finds that corporate taxes have the largest impact on output per capita, followed by personal income tax and consumption tax.

3.6 Other issues: fiscal multipliers in high debt countries, and in good and bad times

Two final issues are worth mentioning. First, as signalled in IMF (2008), fiscal multipliers tend to be lower in countries with **high public debt** burdens and high indebtedness vis-à-vis the rest of the world, along the lines of the theoretical considerations discussed above.

Second, almost all empirical studies implicitly impose **symmetry**, in the sense that they are performed for complete samples that encompass both upturns (with fiscal tightening) and downturns (with fiscal stimulus) together. This implies that estimated multipliers are averages over episodes that could potentially be dramatically different (as the literature on "non-Keynesian" effects of fiscal policies shows). In addition, standard linear techniques might not capture accurately potential non-linearities arising for these reasons. Two remarkable exceptions point in different directions. On the one hand, the above-mentioned work by Tagkalakis (2008) models good and bad times explicitly, finding that a fiscal expansion is more likely to have a positive and stronger effect on consumption in economic downturns, with average "OECD spending multipliers" significantly above 1. On the other hand, IMF (2008) only look at downturns, and find that fiscal activism always makes them worse (and all the more so if public debt is high).

4 Evaluation of specific fiscal measures to stimulate the economy

4.1 Criteria for evaluating different fiscal policy measures

In the light of the discussion of previous sections, this section focuses on the evaluation of concrete fiscal measures that have been implemented or are under discussion in the context of the current recession in EU member states. As a yardstick against which these measures are assessed some of the criteria developed in previous sections (and widely acknowledged in the literature) are used. As mentioned before: (i) **timely**: Is the measure effective by the time a stimulus to the economy is needed most? In this respect the time lags involved in decision-making, implementation and impact on the economy are important; (ii) **temporary**: Does the measure create an expansive fiscal impulse only for as long as the production potential is underutilized?; (iii) **targeted**: Does the measure have a relatively strong multiplier effect?

In addition to these "TTT-criteria" it is also important that the respective measure does not conflict with other economic policy objectives (e.g. fiscal sustainability, long-term economic growth, functioning of the market mechanism, desired income and wealth redistribution). This should also be taken into account when assessing the stimulus measures.

4.2 Evaluation of main fiscal measures implemented in the current context

As discussed above, the suitability of a specific fiscal measure to stimulate economic activity in a severe recession depends on its precise form and on a number of other specific factors. For example, a measure that usually has a high multiplier effect can have a low or even negative impact on economic activity if fiscal sustainability is already severely impaired to begin with. Other country-specific circumstances like institutional factors and the capacity utilisation in different sectors of the economy also play an important role. Here instead the focus is only on general characteristics of some more important fiscal measures.

Since not all specific measures taken by EU countries can be covered here – the EU identified more than 350 government actions by the end of January 2009 – **only those measures that have a large size and/or have been adopted by a number of member states are considered**. On the revenue side, this is mainly the case for permanent reductions of the personal income tax and frontloading of VAT refunds, while main expenditure measures include increases in government investment, subsidies for purchases of consumer durables, per-capita transfers/tax rebates and higher benefits connected to temporary working time reductions.

1) ***Permanent reductions of the personal income tax***[23] have been taken or announced by a number of countries recently, namely Germany, Spain, Denmark, Sweden, Finland or Malta. They may be implemented in a timely manner although adjusting withholding tax payments might take some time on the side of employers and some time might elapse before private households increase consumption (outside lag). However, this measure is not temporary and thus the expansionary effect would not be limited to the period of the downturn. A permanent reduction is especially costly from a fiscal perspective and implies a large deterioration of the long-term sustainability of public finances. The multiplier effect of this measure is low in general, because a large part of personal income tax is paid by households with a relatively low marginal propensity to consume. It could, however, be increased somewhat by targeting the cut to households with lower incomes (e.g. by increasing individual tax allowances or cutting rates only for lower tax brackets).

2) ***Frontloading of VAT refunds***: The effectiveness of this measure depends crucially on the capability of tax authorities to advance the payment of VAT returns. If payment lags can indeed be shortened, additional liquidity would be provided to firms. The multiplier effect therefore hinges on the share of credit-constrained firms in the economy, likely to be high in the current circumstances. If this share is small the expansionary impact on the economy may be rather limited as the gains from interest savings will be marginal in most cases. In countries facing a severe credit crunch, however, some expansionary impact seems likely. Public finances will deteriorate only temporarily. In fact, the deficit would not be affected at all in case of a strict accrual recording. However, a permanent detrimental effect on the government balance could arise if there is an increase in the number of firms that receive refunds but become insolvent before final tax settlements are paid. Measures of this type have been adopted in a number of countries, in particular France, Italy and Spain.

3) Many governments have decided to ***increase government capital spending***, among which Germany, Spain, France, Portugal, Luxembourg and Italy. Government investment spending, particularly on maintenance works, has the potential for a relatively high short-term multiplier as the state directly creates demand and there are therefore no leakages in the form of saving, at least initially. Moreover, the import ratio for construction projects is likely to be comparatively low. In addition, this instrument is appealing because there appears to be no conflict with long-run growth objectives as potential growth might even be increased.[24] However, a major drawback is that such measures involve long lags associated with deciding, planning and implementing additional investment projects (especially infrastructure), so that the multiplier is usually higher in the medium to longer term jeopardising

[23] Note that permanent reduction of the personal income tax is not necessarily a crisis measure but has been used by some countries as it was already planned before the crisis.

[24] However, it can be argued that in the absence of distortions introduced by the political decision-making process the optimal amount of public investment was already planned before the downturn and that therefore any additional investment is likely to be welfare decreasing. According to this reasoning in the long run the level of public investment should not be increased and only the timing of this investment should be adapted to cyclical conditions (advance expenditure to period of recession).

the timeliness of the effects. Even for projects that have already been planned and approved, the construction phase often lasts several quarters. Therefore, there is a danger of partially procyclical effects unless the additional investment is restricted to moveable capital goods and small construction projects (maintenance investment) which can be completed in the short run and the downturn is expected to be protracted. In addition, there is a risk of price increases if sizeable government demand leads to capacity constraints in the respective sector. Finally, an efficient public administration is needed to avoid investment in projects that are wasteful from a welfare perspective. In federal countries in particular, an effective coordination between different layers of government is necessary.

4) Temporary subsidies for consumer durables might bring forward private demand during a recession and therefore can have a particularly high multiplier. The time limit on the subsidy strengthens the effect as it lowers the price of current as opposed to future consumption. While free-rider effects – payments to consumers who would have purchased the product at the time anyway – are inevitable, they still have some effect as disposable income is increased in these cases as well.[25] However, consumer durables (e.g. cars) tend to have a relatively high import ratio. Moreover, unwanted price reactions instead of the desired volume effects become more likely with narrower subsidised product groups, higher subsidy and higher capacity utilisation in the industry concerned. While the measure is timely and temporary it leads to relative price distortions and associated welfare losses. Moreover, subsidies for a specific industry might prevent necessary structural adjustments, and lead to increased pressures from lobbying groups to introduce additional distortions affecting the playing field for international competition. Measures to support certain industry, like the car industry, have been adopted in a number of countries, among which Germany, France, Spain, Luxembourg and Italy.

5) Per-capita transfers/tax rebates: Depending on the specific form that this instrument takes it can have quite different effects. For example, whereas in Spain all labour income recipients will receive a transfer for an unspecified number of years, in Germany the transfer is of a one-off nature and limited to households with children. In Italy it is limited to low-income families with children. In general, the effectiveness of the transfers increases with the degree of concentration on credit-constrained households with a low savings ratio. Evidence for the US (Agarwal, Liu, Souleles 2007 and Johnson, Parker and Souleles 2006) suggests a limited size of the multiplier of tax rebates. The timeliness of the implementation of the transfer depends on administrative issues. In the US in 2001 it took around ten weeks for tax rebates to be distributed. In case of a one-off transfer the impact of the measure is strictly temporary.

[25] While we are not aware of any studies on how car subsidies (eg scrapping subsidies) affect the savings ratio and GDP growth with regard to the automobile sector, there is some evidence that the sector is stimulated in the short run but then experiences a downturn (Licandro and Sampayo, 2005, and Adla and Cooper 1997).

*6) **Higher benefits connected to temporary working time reductions***, like the ones taken in Germany or the Netherlands, can be implemented in a timely manner but outside lags – as with all measures aiming to support purchasing power of households – can delay the impact on the economy. Given that temporary working time reductions are highly cyclical, the impact is likely to be concentrated on the period of the economic downturn. Moreover, the multiplier could be rather high as employees eligible for this transfer could have a high marginal propensity to consume. However, if the benefits accrue mainly to firms then any short-term impact on economic activity is likely to be smaller. The measure might reduce firing and (re-)hiring costs of firms and prevent a loss of firm-specific human capital but also help to avoid or alleviate the hysteresis phenomenon (structural unemployment). However, in the absence of market failure it remains unclear why an additional incentive by the government is needed since a profit-maximising firm can be expected to take these costs into account anyhow. Moreover, subsidised temporary working-time reductions imply the risk that necessary structural adjustments are postponed as employees are locked into industries with structural overcapacity.

5 Conclusions

This paper has reviewed the theoretical and empirical literature on the effects of discretionary fiscal policies in order to distinguish pros and cons of fiscal policy in stimulating the economy. It shows that it is extremely difficult to elaborate an unambiguous catalogue of measures defining an "optimal" fiscal package.

Discretionary fiscal policy measures are usually advocated based on the claim that they have short-run benefits in the event of a crisis. Indeed, several recent studies seem to provide evidence that additional government spending and/or tax cuts have a positive effect on aggregate output in the short term. The most popular argument relies on the presence of liquidity-constrained agents, whose consumption reacts strongly to tax reductions or government spending increases and whose share in total households may rise in times of financial turmoil. Another explanation relates to the complementarity between public and private goods.

Short-term costs of discretionary fiscal measures stem, first and foremost, from increasing sovereign risk premia: bearing in mind default risk, increasing or perceived-as-unsustainable government debt can lead to a risk premium being charged on the interest on government debt to compensate for higher default risk crowding out private investment. An additional short-run consideration pertains to the link between fiscal policy and uncertainty. Automatic stabilizers, to the extent that they operate properly, can lower volatility and uncertainty in the economy, without introducing new policy uncertainties. This may not be the case for discretionary fiscal policy. In this respect, random fiscal policies could increase economic uncertainty, and thus damage economic activity. As the impact of different measures might depend on expectations about the future, fiscal stimulus packages announced clearly and credibly are likely to be more effective.

Among the requirements that fiscal measures should be "timely, targeted and temporary" (TTT), the implementation of the first one – timeliness – is the least controversial criterion in the current situation. As regards the duration of measures, both temporary and more persistent measures may be defended depending on the proportion of liquidity-constrained agents in the economy, the reaction of long-term interest rates, and the expected duration of the adverse shocks hitting the economy. Targeting measures to some specific agents may be difficult in practice, given the uncertainty surrounding fiscal multipliers and the challenge of designing well-targeted fiscal stimulus packages.

The structure of a fiscal stimulus plan should take into account several factors, such as: (i) a proper balance between the expected short-term positive effects (mainly demand-side) with anticipated costs (mainly longer-term supply side); (ii) the expected size of fiscal multipliers of various tools available; (iii) the degree of openness of the economy; (iv) the need to minimise distortions in the market mechanisms and, in the case of EU countries, the compliance with the EU single market rules.

On balance, empirical studies find that spending multipliers are higher than tax multipliers in the short term. This result could be rationalized as being consistent with the theoretical prediction that part of the higher disposable income from a tax cut is saved, while government purchases of goods and services affect aggregate demand directly in the longer term. The cumulative effect of tax measures usually grows with time, but the evidence that tax cuts are more effective than spending increases is mixed, especially when tax changes are temporary. Increases in government purchases of goods and services are found to work faster than other spending components, particularly in times of recession and low capacity utilisation, as they induce an immediate positive impact on aggregate demand. However, in the longer term, the distortions induced by these measures may result in a negative or, at best, insignificant impact.

In addition to general factors, country specific features are also of major importance in assessing the suitability of fiscal packages. While a given fiscal package may be deemed appropriate for a country with a low debt ratio and a structural budget surplus, the same package could easily lead to rising risk premia on interest rates and other detrimental effects in a country with an unfavourable starting fiscal position. The openness of the economy should be considered as well. A crucial aspect in this regard is the exit strategy of the adopted fiscal policy line. A strategy that preserves long-term fiscal sustainability by embedding expansionary fiscal measures in a credible medium-term consolidation framework is less likely to invoke adverse expectation effects than a strategy based on permanent and uncompensated deficit increasing measures which violates fiscal rules.

From a European perspective, the neglect of the European fiscal framework could even lead to negative spill-over effects on other EU member states if the credibility of the framework is damaged by individual member state's actions.

References

Adla, J. and R. Cooper (1997), "*Balladurette and Juppette: a discrete analysis of scrapping subsidies*", NBER Working Paper 6048.

Afonso, A., L. Agnello, D. Furceri and R. M. Sousa (2009), "*Assessing long-term fiscal developments, a new approach*", ECB Working Paper 1032, March.

Afonso, A. and R. Sousa (2009), "*The macroeconomic effects of fiscal policy*", ECB Working Paper 991, January.

Agarwal, S., C. Liu and N. Souleles (2007), "*The Reaction of Consumer Spending and Debt to Tax Rebates: Evidence from Consumer Credit Data*", NBER Working Paper 13694,

Al-Eyd, A. and R. Barrell (2005), "*Estimating tax and benefit multipliers in Europe*", Economic Modelling 22, pp. 759-776.

Alessina, A. and R. Perotti (1997), "*Fiscal adjustments in OECD countries: composition and macroeconomic effects*", IMF Working Paper 96/70.

Alesina, A., R. Perotti and F. Schiantarelli (2002), "*Fiscal policy, profits and investment*", American Economic Review 92, pp. 571-589.

Andrés, J., R. Domenech and A. Fatas, (2008), "*The stabilizing role of government size*", Journal of Economic Dynamics and Control 32, pp. 571-593.

Ardagna, S. (2007), "*Fiscal policy in unionized labor markets*", Journal of Economic Dynamics and Control 31, pp. 1498-1534.

Arnold J. (2008), "*Do tax structures affect aggregate economic growth? Empirical evidence from a panel of OECD countries*", OECD Economics department working paper no. 643.

Attanasio, O. (1999), "*Humps and Bumps in Lifetime Consumption*", Journal of Business and Economic Statistics 17, pp. 22-35.

Auerbach A. J. and K. A. Hassett (2002), "*Fiscal policy and uncertainty*", International Finance 5, pp. 229-249.

Barrell, R., T. Fic and D. Holland (2009), "*Evaluating policy reactions to the financial crisis*", National Institute Economic Review 207, pp. 39-42.

Barro, R. (1974), "*Are government bonds net wealth?*", Journal of Political Economy 82, pp. 1095-1117.

Baxter, M. and R. King (1993), "*Fiscal policy and general equilibrium*", American Economic Review 83, pp. 315-334.

Biau, O. and E. Girard (2005), "*Politique budgétaire et dynamique économique en France: l'approche VAR structurel*", Économie et Prévision 169–171, pp. 1–24.

Blanchard, O. and R. Perotti (2002), "*An empirical characterization of the dynamic effects of changes in government spending and taxes on output*", Quarterly Journal of Economics 117, pp. 1329-1368.

Burnside, C., M. Eichenbaum and J. Fisher (2004), "*Fiscal shocks and their consequences*", Journal of Economic Theory 115, pp. 89-117.

Caldara, D. and C. Kamps (2008), "*What are the effects of fiscal policy shocks? A VAR-based comparative analysis*", ECB Working Paper Series 877.

Congressional Budget Office (2008), "*Options for Responding to Short-Term Economic Weakness*", Washington.

Checherita C., C. Nickel and P. Rother (2009), "*The role of fiscal transfers for regional economic convergence in Europe*", ECB Working Paper, forthcoming.

Christoffel, K., Coenen, G. and Warne, A. (2008), "*The New Area-Wide Model of the Euro Area: a Micro-Founded Open-Economy Model for Forecasting and Policy Analysis*", ECB Working Paper 944.

Coenen, G., P. McAdam and R. Straub (2007), "*Tax reform and labour-market performance in the euro area. A simulation-based analysis using the New Area-Wide Model*", ECB Working paper 747.

Coenen, G. and R. Straub (2005), "*Does government spending crowd in private consumption? Theory and empirical evidence for the euro area*", ECB Working Paper 513.

Dalsgaard, T., C. Andre and P. Richardson (2001), "*Standard Shocks in the OECD Interlink Model*", OECD Working paper 306.

Davig, T. (2004), "*Regime-switching debt and taxation*", Journal of Monetary Economics 51, pp. 837-859.

De Castro, F. and P. Hernandez de Cos (2008), "*The economic effects of fiscal policy: the case of Spain*", Journal of Macroeconomics 30, pp. 1005-1028.

Dixit, A. and R. Pindyck (1994), "*Investment under uncertainty*", Princeton University Press.

Edelberg, W., M. Eichenbaum and J. Fischer (1999), "*Understanding the effects of a shock to government purchases*", Review of Economic Dynamics 1, pp. 166-206.

Elmendorf, D. W. and J. Furman (2008), "*If, when, how: a primer on fiscal stimulus*", Brookings Institution, January.

European Central Bank (2009), "*The effectiveness of various fiscal measures to stimulate the economy*", Box 7 in Monthly Bulletin, March.

Eusepi, S. and B. Preston (2008), "*Stabilizing expectations under monetary and fiscal policy coordination*", NBER Working Paper 14391.

Fagan, G. and Morgan, J. (2005), "*Econometric Models of the Euro-area Central Banks*", Edward Elgar Publishing – Northampton.

Fatas, A. and Mihov, I. (2001), "*The effects of fiscal policy on consumption and employment: theory and evidence*", CEPR Discussion Paper 2760.

Fatas, A. and Mihov, I. (2009), "*The Euro and Fiscal Policy*", NBER Working Paper 14722.

Fiorito, R. and T. Kollintzas (2004), "*Public goods, merit goods, and the relation between private and government consumption*", European Economic Review 48, pp. 1367-1398.

Freedman, Ch., M. Kumhof, D. Laxton and J. Lee (2009), "*The case for global fiscal stimulus*", IMF Staff Position Note SPN/09/03.

Furceri, D. (2007), "*Is Government Expenditure Volatility Harmful for Growth? A Cross-Country Analysis*", Fiscal Studies 28, pp. 103-120

Gali, J., D. López Salido, and J. Vallés (2007), "*Understanding the effects of government spending on consumption*", Journal of the European Economic Association 5(1), pp. 227-270.

Ganelli, G. and J. Tervala (2009), "*Can government spending increase private consumption?*", Economics Letters, forthcoming.

Giavazzi, F. and M. Pagano (1990), "*Can severe fiscal contractions be expansionary? Tales of two small European countries*", NBER Macroeconomics Annual 5, pp. 75-110.

Giavazzi, F. and M. Pagano (1996), "*Non-Keynesian effects of fiscal policy changes: international evidence and the Swedish experience*", Swedish Economic Policy Review 3, pp. 67-103.

Giavazzi, F., T. Jappeli and M. Pagano (2000), "*Searching for non-linear effects of fiscal policy: evidence from industrial and developing countries*", European Economic Review 44, pp. 1259-1289.

Giordano, R. S. Momigliano, S. Neri and R. Perotti (2007), "*The effects of fiscal policy in Italy: evidence from a VAR model*", European Journal of Political Economy 23, pp. 707-733.

Hemming R., M. Kell and S. Mahfouz (2002), "*The effectiveness of fiscal policy in stimulating the economic activity - A review of the literature*", IMF Working Paper WP/02/2008.

Hemming R., S. Mahfouz and A. Schimmelpfennig (2002), "*Fiscal policy and economic activity during recessions in advanced economies*", IMF Working Paper WP/02/87.

Henry, J., P. Hernandez de Cos and S. Momigliano (2008), "*The impact of government budgets on prices: Evidence from macroeconometric models,*" Journal of Policy Modeling 30, pp. 123-143.

Heppke-Falk, K.H., J. Tenhofen and G.B. Wolff (2006). "*The macroeconomic effects of exogenous fiscal policy shocks in Germany: a disaggregated SVAR analysis*", Discussion Paper Series 1: Economic Studies No. 41/2006.

Hiebert, P., J. J. Pérez and M. Rostagno (2009), "*The trade-off between public debt reduction and automatic stabilisation*", Economic Modeling 26, pp. 464-472.

Hoon, T. H. and E. S. Phelps (2008), "*Future fiscal and budgetary shocks*", Journal of Economic Theory 143, pp. 499-518.

Hunt B. and D. Laxton (2003), "*Some Simulation Properties of the Major Euro Area Economies in MULTIMOD*", IMF Working Papers 03/31.

International Monetary Fund, (2008), "*World Economic Outlook*", Chapter 5 "Fiscal policy as a countercyclical tool", October.

Johansson A. et al. (2008) "*Tax and economic growth*" OECD Economics Department Working Paper number 620.

Johnson, D., J. Parker, and N. Souleles (2006), "*Household Expenditure and the Income Tax Rebates of 2001*", American Economic Review, 96 (5), S. 1589-1610.

Keen, B. D. (2008), "*The signal extraction problem revisited: its impact on a model of monetary policy*", mimeo University of Oklahoma, August.

Kuttner, K.N. and A.S. Posen, (2004) "*Fiscal Policy Effectiveness in Japan*", Journal of the Japanese and International Economies 16, pp. 536-558.

Kuttner, K. and A. Posen (2002), "*Passive savers and fiscal policy effectiveness in Japan*", paper presented at the CEPR-CIRJE-NBER conference "Issues in fiscal adjustments", Tokyo.

Lane, P. and R. Perotti (2003), "*The importance of composition of fiscal policy: evidence from different exchange rate regimes*", Journal of Public Economics 87, pp. 2253–2279.

Leeper, E., and S. S. Yang (2008), "*Dynamic scoring: alternative financing schemes*", Journal of Public Economics 92, pp. 159-182.

Licandro, O., and A. Sampayo (2005), "*The Effects of Replacement Schemes on Car Sales: The Spanish Case*", EUI Working Paper ECO No. 2005/20.

Linneman, L. and A. Schabert (2004), "*Can fiscal spending stimulate private consumption?*", Economics Letters 82, pp. 173-179.

Marcellino, M. (2006). "*Some Stylized Facts on Non-Systematic Fiscal Policy in the Euro Area*". Journal of Macroeconomics, 28(3), 461-479.

Monacelli, T. and R. Perotti (2008), "*Fiscal policy, wealth effects, and mark-ups*", NBER Working Paper 14518.

Mountford, A. and H. Uhlig (2009), "*What are the effects of fiscal policy shocks?*", forthcoming Journal of Applied Econometrics.

Neri, S., (2001), "*Assessing the effects of monetary and fiscal policy*", Banca d'Italia Discussion Papers No. 425.

Obstfeld, M. and G. Peri (1998), "*Regional Non-Adjustment and Fiscal Policy*", Economic Policy 13, pp. 207-259.

OECD (2009), "*The effectiveness and scope of fiscal stimulus*", Chapter 3 in OECD Economic Outlook Interim Report, March.

Parker, J. (1999), "*The response of household consumption to predictable changes in social security taxes*", American Economic Review 89, pp. 959-973.

Perotti, R. (1999), "*Fiscal Policy when things are going badly*", Quarterly Journal of Economics 114, pp. 1399-1436.

Perotti, R. (2002), "*Estimating the effects of fiscal policy in OECD countries*", ECB Working Paper no. 168.

Perotti, R. (2004), "*Public Investment: Another (Different) Look*", IGIER Working Paper n°. 277.

Perotti, R. (2005), "*Estimating the effects of fiscal policy in OECD countries*", Proceedings, Federal Reserve Bank of San Francisco.

Perotti R. (2007), "*In search of the transmission mechanism of fiscal policy*", NBER Working Papers 13143.

Ramey, V. (2008), "*Identifying Government Spending Shocks: It's All in the Timing*", mimeo, University of California, San Diego.

Ramey, V. and M. D. Shapiro. (1998). "*Costly Capital Reallocation and the Effects of Government Spending*", Carnegie-Rochester Conference Series on Public Policy 48 (June): 145-194.

Ravn, M., S. Schmitt-Grohé and M. Uribe (2006), "*Deep habits*", Review of Economic Studies 73, pp. 195-218.

Roeger, W. and in't Veld (2004), "*Some selected simulation experiments with the European Commission's QUEST model*", Economic Modelling 21(5), pp. 785-832.

Romer C. and J. Bernstein (2009), "*The job impact of the American Recovery and Reinvestment Plan*".

Romer C. and D. Romer (2007), "*The macroeconomic effects of tax changes: estimates based on a new measure of fiscal shocks*", mimeo, University of California, Berkeley.

Romp, W. and J. DeHaan (2005), "*Public Capital and Economic Growth: a Critical Survey*", EIB Papers 10(1).

Schclarek, A. (2007), "*Fiscal policy and private consumption in industrial and developing countries*", Journal of Macroeconomics 29, pp. 912-939.

Shapiro, M. and J. Slemrod (2001), "*Consumer response to tax rebates*", NBER Working paper 8672.

Shapiro, M. and J. Slemrod (1995), "*Consumer response to the timing of income: evidence from a change in tax withholding*", American Economic Review pp. 274-283.

Spilimbergo A., S. Symansky, O. Blanchard and C. Cottarelli (2008), "*Fiscal Policy for the Crisis*", IMF Staff Position Note, SPN/08/01.

Souleles, N. S. (2002), "*Consumer response to the Reagan tax cuts*", Journal of Public Economics 89, pp. 99-120.

Souleles, N. S. (1999), "*The response of household consumption to income tax refunds*", American Economic Review 89, pp. 947-958.

Spilimbergo A., S. Symansky, O. Blanchard and C. Cottarelli (2008), "*Fiscal Policy for the Crisis*", IMF Staff Position Note, SPN/08/01.

Straub, R. and Tchakarov, I. (2007), "*Assessing the Impact of a Change in the Composition of Public Spending: A DSGE Approach*", IMF Working Paper WT/07/168.

Tagkalakis, A. (2008), "*The effects of fiscal policy on consumption in recessions and expansions*", Journal of Public Economics 92, pp. 1486-1508.

Wallis, K. F. (2004), "*Comparing empirical models of the euro economy*", Economic Modelling 1(5), pp. 735-758.

Appendix: Effects of fiscal policy shocks in selected VAR and simulation models

Table 1: Effects of fiscal policy shocks in selected VAR studies[a]

	GDP				Multiplier	
Quarters	1st	4th	12th	20th	Short Term	Medium Term
Expenditure shock						
United States						
Blanchard and Perotti (2002) 1947-1997	+*	+	+*	+*	0.84-0.9	0.66-0.97
Perotti (2002) 1961-2000	+*	+	+*	+*	0.43	0.96
Perotti (2002) 1980-2000	+	+	_	_*	0.07	-1.26
Neri (2001) 1965-1996	+*	+*	_	_		
Mountford and Uhlig (2009) 1955-2000	+	+	+	+	0.44	-0.08
Fatás and Mihov (2001) 1960-1996	+*	+*	+*	+*		
Edelberg et al. (1998) 1948-1996	+*	+*	+*			
Ramey (2008) 1947-2003	+*	+*	+	-		
Romer and Bernstein (2009) 2009-2014					1.05/1.44	1.55
Germany						
Perotti (2002) 1961-2000	+*	+*	_	+*	1.3	0.94
Perotti (2002) 1980-2000	+	_*	_	_	0.8	-0.71
Marcellino (2002) 1981-2001	+*	+*				
France						
Marcellino (2002) 1981-2001	-	-				
Italy						
Marcellino (2002) 1981-2001	+	+				
Spain						
Marcellino (2002) 1981-2001	-	-				
de Castro and Hernández de Cos (2008)	+*	+*	+	_*		
United Kingdom						
Perotti (2002) 1960-2000	+*	-	+	+	0.3	0.06
Japan						
Kuttner and Posen (2002)	+*	+*	+		0.84/1.05	3.53
Pool of countrries						
WEO (2008) 1970-2007[b]					0.06	-0.06
Advanced economies					0.15	0.52
Emerging economies					0.08	-0.23
Revenue shock						
United States						
Blanchard and Perotti (2002) 1947-1997	+*	+*	+*	+	0.69-0.70	0.22-1.29
Perotti (2002) 1960-2000	+*	+*	+*	+*	0.26-0.47	0.53
Perotti (2002) 1980-2000	+*	_*	_*	+	0.17-0.49	0.11
Neri (2001) 1965-1996	+*	+*	+*	+*		
Mountford and Uhlig (2009) 1995-2000	+*	+*	+*	+	0.19	1.32
Romer and Romer (2007) 1947-2005	+	+*	+*		0.16	3
Romer and Bernstein (2009) 2009-2014					0.00/0.66	0.98
Germany						
Perotti (2002) 1961-2000	+*	+*	+*	+	0.17	0.22
Perotti (2002) 1980-2000	-	+*	+	+*	-0.01	0.39
Marcellino (2002) 1981-2001	+*	+*				
France						
Marcellino (2002) 1981-2001	-	-				
Italy						
Marcellino (2002) 1981-2001	_*	_*				
Spain						
Marcellino (2002) 1981-2001	-	-				
de Castro and Hernández de Cos (2008)	-	-	-	+*		
United Kingdom						
Perotti (2002) 1960-2000	_*	-	_*	_*	-0.06	-0.24
Japan						
Kuttner and Posen (2002)	+	+*	+*		0.16/1.58	4.84
Pool of countries						
WEO (2008) 1947-2007[b]					0.10	0.14
Advanced economies					0.01	0.4
Emerging economies					0.13	0.17

[a] Source: prepared by the authors, also with input from Henry et al. (2004) and de Castro and Hernández de Cos (2008).
[b] WEO (2008) refers to a group of 21 advanced economics and 20 emerging economies.
* The value 0 is outside the region between the two one-standard error bands.

Table 2: Effects of fiscal policy shocks in selected simulation models: government expenditure shock[a]

	Simulation	Multiplier Short Term	Multiplier Medium Term
Expenditure shock			
United States			
Dalsgaard et al (2001)[b]	*Increase in Gov. Cons.*	1.1	0.1
OECD (2009)[h]	*Increase in Gov. Cons.*	0.7	0.8
	Increase in Gov. Invest.	0.9	1.1
	Increase in transfers to household	0.5	0.8
Euro Area			
Dalsgaard et al (2001)[b]	*Increase in Gov. Cons.*	1.2	0.1
Hunt and Laxton (2003)[c]	*Increase in Gov. Cons.*	1.5	0.0
Fagan and Morgan (2005)[f]	*Increase in Gov. Cons.*	1.3	1.6
Straub and Tchakarov (2007)	*Increase in Gov. Cons.*	1.1	1.0
	Increase in Gov. Invest.	1.2	1.1
Germany			
Dalsgaard et al (2001)[b]	*Increase in Gov. Cons.*	1.1	-0.2
Roeger and in't Veld (2004)[d]	*Increase in Gov. Cons.*	0.9	0.0
Hunt and Laxton (2003)[c]	*Increase in Gov. Cons.*	1.3	0.0
Al-Eyd and Barrell (2005)[e]	*Transfers to individuals*	0.5	0.1
Fagan and Morgan (2005)[f]	*Increase in Gov. Cons.*	1.2	0.7
Perotti (2004)[h]	*Increase in Gov. Cons.*	0.8	1.2
	Increase in Gov. Invest.	3.7	3.7
OECD (2009)[h]	*Increase in Gov. Cons.*	0.4	0.5
	Increase in Gov. Invest.	0.8	1.0
	Increase in transfers to household	0.3	0.5
France			
Dalsgaard et al (2001)[b]	*Increase in Gov. Cons.*	0.6	0.2
Roeger and in't Veld (2004)[d]	*Increase in Gov. Cons.*	0.9	0.0
Hunt and Laxton (2003)[c]	*Increase in Gov. Cons.*	1.3	0.0
Al-Eyd and Barrell (2005)[e]	*Transfers to individuals*	0.2	0.1
Fagan and Morgan (2005)[f]	*Increase in Gov. Cons.*	1.1	0.8
OECD (2009)[h]	*Increase in Gov. Cons.*	0.6	0.7
	Increase in Gov. Invest.	0.8	1.0
	Increase in transfers to household	0.4	0.7
Italy			
Dalsgaard et al (2001)[b]	*Increase in Gov. Cons.*	0.9	0.0
Roeger and in't Veld (2004)[d]	*Increase in Gov. Cons.*	0.9	0.0
Hunt and Laxton (2003)[c]	*Increase in Gov. Cons.*	1.3	0.0
Al-Eyd and Barrell (2005)[e]	*Transfers to individuals*	0.1	0.1
Fagan and Morgan (2005)[f]	*Increase in Gov. Cons.*	1.2	1.2
OECD (2009)[h]	*Increase in Gov. Cons.*	0.6	0.7
	Increase in Gov. Invest.	0.8	1.0
	Increase in transfers to household	0.4	0.7
Spain			
Al-Eyd and Barrell (2005)[e]	*Transfers to individuals*	0.1	0.1
Fagan and Morgan (2005)[f]	*Increase in Gov. Cons.*	1.2	0.9
OECD (2009)[h]	*Increase in Gov. Cons.*	0.5	0.6
	Increase in Gov. Invest.	0.8	1.0
	Increase in transfers to household	0.4	0.6
UK			
Dalsgaard et al (2001)[b]	*Increase in Gov. Cons.*	0.2	-0.1
Roeger and in't Veld (2004)[d]	*Increase in Gov. Cons.*	1.0	0.0
Al-Eyd and Barrell (2005)[e]	*Transfers to individuals*	0.1	0.2
Perotti (2004)[h]	*Increase in Gov. Cons.*	0.7	0.7
	Increase in Gov. Invest.	0.0	-0.4
OECD (2009)[h]	*Increase in Gov. Cons.*	0.5	0.6
	Increase in Gov. Invest.	0.8	1.0
	Increase in transfers to household	0.4	0.6
Japan			
Dalsgaard et al (2001)[b]	*Increase in Gov. Cons.*	1.7	0.5
OECD (2009)[h]	*Increase in Gov. Cons.*	0.7	0.8
	Increase in Gov. Invest.	0.9	1.1
	Increase in transfers to household	0.5	0.8
Belgium			
Fagan and Morgan (2005)[f]	*Increase in Gov. Cons.*	1.0	0.9
OECD (2009)[h]	*Increase in Gov. Cons.*	0.3	0.4
	Increase in Gov. Invest.	0.7	0.9
	Increase in transfers to household	0.2	0.4
Luxembourg			
Fagan and Morgan (2005)[f]	*Increase in Gov. Cons.*	0.6	0.3
OECD (2009)[h]	*Increase in Gov. Cons.*	0.3	0.4
	Increase in Gov. Invest.	0.7	0.9
	Increase in transfers to household	0.2	0.4
Austria			
Fagan and Morgan (2005)[f]	*Increase in Gov. Cons.*	1.3	1.3
OECD (2009)[h]	*Increase in Gov. Cons.*	0.3	0.4
	Increase in Gov. Invest.	0.7	0.9
	Increase in transfers to household	0.2	0.4
Portugal			
Fagan and Morgan (2005)[f]	*Increase in Gov. Cons.*	1.2	1.0
OECD (2009)[h]	*Increase in Gov. Cons.*	0.4	0.5
	Increase in Gov. Invest.	0.8	1.0
	Increase in transfers to household	0.3	0.5
Finland			
Fagan and Morgan (2005)[f]	*Increase in Gov. Cons.*	1.2	0.0
OECD (2009)[h]	*Increase in Gov. Cons.*	0.4	0.5
	Increase in Gov. Invest.	0.8	1.0
	Increase in transfers to household	0.3	0.5
Netherlands			
Fagan and Morgan (2005)[f]	*Increase in Gov. Cons.*	1.1	0.8
OECD (2009)[h]	*Increase in Gov. Cons.*	0.3	0.4
	Increase in Gov. Invest.	0.7	0.9
	Increase in transfers to household	0.2	0.4
Greece			
Fagan and Morgan (2005)[f]	*Increase in Gov. Cons.*	0.7	1.4
OECD (2009)[h]	*Increase in Gov. Cons.*	0.5	0.6
	Increase in Gov. Invest.	0.8	1.0
	Increase in transfers to household	0.4	0.6
Ireland			
Fagan and Morgan (2005)[f]	*Increase in Gov. Cons.*	1.1	0.9
OECD (2009)[h]	*Increase in Gov. Cons.*	0.3	0.4
	Increase in Gov. Invest.	0.7	0.9
	Increase in transfers to household	0.2	0.4

[a] Source: prepared by the authors.
[b] OECD INTERLINK model. Nominal exchange rates and real interest rates are assumed fixed.
[c] MULTIMOD model (IMF).
[d] QUEST model (European Commission).
[e] NIGEM model (NIESR).
[f] ESCB National Central Banks' Models.
[g] NAWM (ECB's New Area-Wide Model)
[h] DSGE Model. Luxembourgish figures provided by the OECD INTERLINK model are not presented in a very transparent way and therefore one should be very cautious when interpreting these. According to the latest available information, Luxembourg and Belgium were modelled as a single country.

Table 3: Effects of fiscal policy shocks in selected simulation models: government revenue shock[a]

	Simulation	Multiplier	
		Short Term	Medium Term
Revenue shock			
United States			
Dalsgaard et al (2001)[b]	*Sustained cut in PIT (Personal Income Tax)*	0.6	0.3
OECD (2009)[h]	*Cut in PIT*	0.3	0.5
	Cut in Indirect Tax	0.2	0.3
Euro Area			
Dalsgaard et al (2001)[b]	*Sustained cut in PIT*	0.5	0.2
	Cut in Indirect Tax	0.1	0.2
Germany			
Dalsgaard et al (2001)[b]	*Sustained cut in PIT*	0.5	0.3
Al-Eyd and Barrell (2005)[e]	*Indirect taxes*	0.5	0.2
	Corporate tax	0.3	1.3
	Direct personal taxes	0.7	0.2
OECD (2009)[h]	*Cut in PIT*	0.2	0.3
	Cut in Indirect Tax	0.1	0.2
France			
Al-Eyd and Barrell (2005)[e]	*Indirect taxes*	0.3	0.2
	Corporate tax	0.2	0.5
	Direct personal taxes	0.3	0.2
OECD (2009)[h]	*Cut in PIT*	0.2	0.4
	Cut in Indirect Tax	0.2	0.2
Italy			
Al-Eyd and Barrell (2005)[e]	*Indirect taxes*	0.2	0.2
	Corporate tax	0.2	0.6
	Direct personal taxes	0.1	0.2
OECD (2009)[h]	*Cut in PIT*	0.2	0.4
	Cut in Indirect Tax	0.2	0.2
Spain			
Al-Eyd and Barrell (2005)[e]	*Indirect taxes*	0.2	0.1
	Corporate tax	0.2	0.3
	Direct personal taxes	0.2	0.1
OECD (2009)[h]	*Cut in PIT*	0.2	0.4
	Cut in Indirect Tax	0.1	0.2
UK			
Al-Eyd and Barrell (2005)[e]	*Indirect taxes*	0.3	0.2
	Corporate tax	0.1	0.6
	Direct personal taxes	0.2	0.2
OECD (2009)[h]	*Cut in PIT*	0.2	0.4
	Cut in Indirect Tax	0.2	0.2
Japan			
Dalsgaard et al (2001)[b]	*Sustained cut in PIT*	0.4	0.4
OECD (2009)[h]	*Cut in PIT*	0.3	0.5
	Cut in Indirect Tax	0.2	0.3
Belgium			
OECD (2009)[h]	*Cut in PIT*	0.1	0.2
	Cut in Indirect Tax	0.1	0.1
Luxembourg			
OECD (2009)[h]	*Cut in PIT*	0.1	0.2
	Cut in Indirect Tax	0.1	0.1
Austria			
OECD (2009)[h]	*Cut in PIT*	0.1	0.3
	Cut in Indirect Tax	0.1	0.2
Portugal			
OECD (2009)[h]	*Cut in PIT*	0.2	0.3
	Cut in Indirect Tax	0.1	0.2
Finland			
OECD (2009)[h]	*Cut in PIT*	0.2	0.3
	Cut in Indirect Tax	0.1	0.2
Netherlands			
OECD (2009)[h]	*Cut in PIT*	0.1	0.2
	Cut in Indirect Tax	0.1	0.1
Greece			
OECD (2009)[h]	*Cut in PIT*	0.2	0.4
	Cut in Indirect Tax	0.1	0.2
Ireland			
OECD (2009)[h]	*Cut in PIT*	0.1	0.2
	Cut in Indirect Tax	0.1	0.1

[a] Source: prepared by the authors.
[b] OECD INTERLINK model. Nominal exchange rates and real interest rates are assumed fixed.
[c] MULTIMOD model (IMF).
[d] QUEST model (European Commission).
[e] NIGEM model (NIESR).
[f] ESCB National Central Banks' Models.
[g] NAWM (ECB's New Area-Wide Model)
[h] DSGE Model. Luxembourgish figures provided by the OECD INTERLINK model are not presented in a very transparent way and therefore one should be very cautious when interpreting these. According to the latest available information, Luxembourg and Belgium were modelled as a single country.

BANQUE CENTRALE DU LUXEMBOURG

EUROSYSTÈME

2, boulevard Royal
L-2983 Luxembourg

Tél.: +352 4774-1
Fax: +352 4774 910

www.bcl.lu • info@bcl.lu