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## Why do bigger countries have more problems with the Stability and Growth Pact?

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# *CeGE-Discussion Paper*

**40**

***Bodo Herzog***

***Why do bigger countries have more  
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Detailed information on past workshops and the planning for the 2006 workshop are available at <http://www.vwl.wiso.uni-goettingen.de/workshop>. Do not hesitate to contact Dr. Carsten Eckel, *CeGE* (carsten.eckel@wiwi.uni-goettingen.de) for further questions.

# Why do bigger countries have more problems with the Stability and Growth Pact?

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## Abstract

The European Fiscal Framework and the Stability and Growth Pact (SGP) have had great significance since the completion of the European Monetary Union (EMU) in 1999. The current enforcement and credibility problems, and discussion about reforming the SGP, as well as the failure to impose sanctions and early warnings against states in breach of the Pact, have introduced a new subject for economic research. One of the most surprising observations in recent years is that the larger countries in the EMU have more problems with the budget thresholds in the SGP than the smaller countries. To explain this ‘stylized fact’ we solve a model of ‘rational’ delay in consolidation and relate it to several economic and political variables. The model shows that larger governments tend to prefer slower consolidation because they are not concerned about the risk of breaching the SGP and face less output volatility. Moreover we solve in the theoretical model one unexplored phenomenon in empirical macroeconomics: why does larger government size imply less macroeconomic volatility? We demonstrate this approach and its results with current empirical data on the performance of the EMU and the SGP.

*Key words:* Monetary Union, Fiscal Policy, Stability and Growth Pact

*JEL classification:* E60, F30, F33

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## 1 Introduction

The Economic and Monetary Union in Europe has a common central bank that determines monetary policy, but each member country’s government re-

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tains simultaneously a large degree of fiscal autonomy. Since 1 January 1999, one of the most problematic issues in the European Monetary Union (EMU) has been the growing interaction between sovereign countries' fiscal policy and the European Central Bank's (ECB) monetary policy. Moreover, to ensure European price stability (art. 105 ECT) in the EMU the Maastricht Treaty was supplemented with the European Stability and Growth Pact (SGP) in Amsterdam in 1997. The implementation of the SGP (VO 1466/97 and 1467/97), which aims to be one of the mainstays in the European fiscal framework, introduced additional conflicts. However, since the ECOFIN Council failed in November 2003 both to send early warnings—so called Blue-letters—to Germany and France, and to impose sanctions against sinner states, the SGP has become the subject of lively academic and public debate. Different suggestions and proposals for modifying the current SGP are under discussion (Bayoumi and Masson, 1996; Buti et al., 2003). One of the most surprising and interesting questions about the SGP that has emerged in the last two years is: Why do the obviously bigger countries have more problems with the budget rules and thus with the SGP (Rodrik, 1998)? Or: why are countries in breach of the SGP more often larger countries such as Germany, France, and probably also Italy in 2004?

In this paper, we examine fiscal consolidation behavior within the EMU and find some new results and suggestions regarding the design of the European fiscal framework, especially the SGP. Moreover, we try to analyze the trade-offs between the de jure rigidity and de facto flexibility in the current reform discussion about the SGP. We consider a model where fiscal policy reputation, homogeneity, and output variance affect the speed of consolidation, and so explain the problem of huge differences in budget performance in Europe. Countries with good past fiscal reputations, such as Germany (von Hagen, 1992), consolidate their budget deficit more slowly because of a lower risk-premium on interest rates, higher free-riding incentives in a monetary union, and the well-known signaling effect caused by asymmetric information (Bohn, 1998). Delays in consolidation are particularly inefficient, as the longer a country waits the more costly the policy adjustment. The reason is that longer periods of instability imply higher inefficiencies and sanction fees payable under the SGP. This paper studies the economic determinants of delays in the consolidation of fiscal policy adjustment programs.

We present a simple model that describes some determinants of delayed consolidation due to a strategic-interaction game in a monetary union. Concerning the determinants of the speed of budget consolidation, we find that the values of output volatility and homogeneity within fiscal programs are the most relevant variables for explaining the differences in budget consolidation between the larger and the smaller countries (cf. Alesina and Drazen, 1991 and Alesina and Spolaore (1997)). We also explain one unsolved 'stylized fact' in empirical macroeconomics (Fatás and Mihov, 2001; Galí, 1994): why all the

empirical evidence points to the presence of a negative relationship between output variability and the size of government.

Moreover in models of monetary policy alone, precommitment leads to better outcomes, and avoids inflation bias (Kydland and Prescott, 1977). Unfortunately that simple relationship is not completely true for fiscal–monetary interaction in a monetary union (Dixit and Lambertini, 2003). In the European fiscal framework, particularly in the reform discussion about the SGP, the bias is rather towards more discretion than commitment (De Grauwe, 2003). This development has a strong impact on future consolidation behavior in the EMU. Therefore it is very interesting to understand fiscal policy consolidation behavior in a game-theoretic interaction framework.

The model results suggest that, when there is a difference in budget consolidation speeds in a monetary union, the limits set by the SGP may be useful, on the one hand to reduce the free-rider incentives, and on the other hand to close the gap between the bigger and the smaller countries. Nevertheless the current SGP has not achieved the second objective during the last three years. Moreover von Hagen et al. (2001) conclude in an initial empirical assessment about fiscal policy consolidation in the EMU: ‘The fiscal framework of Stage III of EMU will work more effectively in the small European states than in the larger states.’ Thus there are some systematic incentives to play the weak off against the strong. Understanding this phenomenon is an important issue for future reform of the SGP. In sum, the evidence indicates that the SGP needs a more transparent and credible enforcement mechanism.

The remainder of this paper is structured as follows. Section 2 presents a short literature review and discusses several aspects of the current reform literature about the SGP. Section 3 starts with the construction of the model and continues with the discussion of the results. Policy conclusions for the current reform discussion about the SGP are taken up in Section 4. The last, section 5, provides discussion and concluding remarks.

## **2 Literature review**

Our approach is related to the literature on dynamic games between a monetary and a fiscal authority, initiated by Kydland and Prescott (1977) and Barro and Gordon (1983). The paper relates to two analyses of delayed stabilization: (A) Tabellini (1986) considers a war of attrition that is played out between the fiscal and the monetary authorities—an unsustainable combination of monetary and fiscal policies is in place until one side concedes; and (B) Alesina and Drazen (1991) also build a war of attrition model; however, they shift the focus to a game between interest groups. They show why stabilizations are

delayed.

Our paper differs from Tabellini (1986,1987) and Alesina and Drazen (1991) in several ways. First, we concentrate on the consolidation of deficits and debts, and therefore abstract from pure political–economic determinants. Second, we try to analyze a strategic situation in a monetary union that fits the situation in the EMU with the current SGP since 1999. Finally, and most importantly, the model attempts to explain not only the fact that consolidation speeds are delayed and variable in the EMU, but also to show why consolidation is different between larger and smaller countries in the EMU.

The results illustrate that larger countries consolidate more slowly than smaller countries because of greater differences in the public sector and output variations. Indeed, the model focuses on a few details to explain the current empirical case in the EMU. Together with the paper by Alesina and Drazen (1991), it provides a reasonable explanation for the current phenomenon of breaching countries and refers to the discussion on the SGP (von Hagen et al., 2001).

There is also a substantial literature about the economic impact of and reasons for the European SGP and the new fiscal–monetary interaction relationships. An early attempt to model the SGP is provided by Beetsma and Uhlig (1999). They present in a two-period model of a monetary union where governments have incentives to issue more debt than a social planner would choose. They conclude therefore that the incentives to restrain debt accumulation are diminished in a monetary union, and hence the excessiveness of debt will be exacerbated. Thus the spillover effect arises through increasing public debt in a country, which leads to a looser common monetary policy and therefore affects all the union participants. Similar to Beetsma and Uhlig (1999) is the work by Chari and Kehoe (1998, 2003), who explore the need for debt restrictions in a two-country model of a monetary union. They conclude that restrictions on public debt are needed, because union members do not fully internalize the welfare effects of an increase in nominal debt on the common union-wide inflation rate.<sup>1</sup> Also Dixit and Lambertini (2001, 2003) and Beetsma and Jensen (2003) model a monetary union with fiscal–monetary interaction.<sup>2</sup> The main results of these models in relation to the SGP are: (A) fiscal discretion eliminates the gains of monetary commitment, but monetary discretion does not completely eliminate the gains of fiscal commitment within prescribed rules; and (B) shock-contingent budgetary targets (or sanctions) lead to increasing free-riding behavior and thus eliminate discipline.

The common point of all the papers mentioned so far is that the Union’s central bank is not only concerned with low inflation, but also with other objectives.

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<sup>1</sup> cf. Giovannetti, Marimon and Teles, who extend the paper of Chari and Kehoe into various directions.

<sup>2</sup> But without implementing fiscal restrictions like the SGP.

Debrun (2000), in contrast, provides a rationale for short-run (deficit-based) fiscal constraints, despite the assumption that the ECB is totally committed to its objective (Beetsma and Bovenberg, 2002). The important point here is that fiscal policies affect aggregated demand and supply, hence the price level in the monetary union. Through a lack of commitment in monetary and fiscal policy the public deficit is biased upwards: first, governments try to stimulate aggregate demand by expansive fiscal policy; and second, they use deficits to move the common inflation rate into the direction they individually prefer.<sup>3</sup> This model's prediction is perhaps an empirical rationale for the fact that France and Germany, which have very low 'national' inflation rates and growth rates, breach the SGP. Also Herzog (2004) found that the current SGP does not really work for securing price stability. He shows that if more than one country breaches the Pact, a deficit spiral (debt spiral) to more excessive government spending will be induced. Moreover Herzog (2004) shows that monetary policy in the EMU in combination with the current SGP is insufficient for punishing undisciplined fiscal policy. That implies under specific circumstances a higher optimal inflation rate than intended by the ECB. The theoretical analysis of that topic explains on the one hand the need for fiscal restrictions, and on the other hand the implementation problems of the current SGP. Despite this, Beetsma (2001) concludes that the theoretical literature has no clear verdict on the SGP: '*Therefore, the pros and cons of the SGP need to be assessed using qualitative arguments.*' However, we show here a further argument for the necessity of an efficient and strict SGP in the EMU.<sup>4</sup>

### 3 Model

The positive issue of how policymakers choose sustainable debt policy and consolidate the budget remains unexplored in the current literature. Using the simple stylized model below, we provide a formalization of signaling effects. Thus we build up a reputation game between two governments that differ both in their ability to perform sustainable debt consolidation (spending cuts) and in their size. In this model we examine separating equilibria and pooling equilibria.

The government's objective is to reach a sustainable debt level  $x^*$  that stabilizes the debt-to-GDP ratio. We use the following loss function similar to Drazen and Masson (1994)<sup>5</sup>

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<sup>3</sup> If the actual inflation rate target is to be too tight, they boost aggregate demand further, which increases inflation.

<sup>4</sup> Strengthening the SGP corresponds with the recent proposal by the EU Commission (2004).

<sup>5</sup> cf. Dornbusch, 1991.

$$L = p\Lambda + \frac{1}{2}(T)^2 \quad (1)$$

where  $p$  denotes the probability that the sustainable stabilization fails, and  $\Lambda$  is the fixed cost of failure. The costs of failure  $\Lambda$  include possible sanction fees  $\Gamma^S$  from the current SGP.<sup>6</sup> The government chooses first taxes  $T$  to achieve its consolidation target value. The cost of taxation is standard, while the cost of a failed consolidation reflects either the reputational and political costs of missing the announced budget target or the higher inflation and sanction fees within the SGP that may result if the stabilization fails.

The sequence of events is as follows. At the beginning of period 0 the government issues debt and decides the relative amounts of one- and two-period consolidation. At the end of period 1 the government chooses taxes to meet the announced budget target. However, whether the target will be met remains uncertain, as it depends on a shock,  $Z$ , which hits the budget after taxes have been set. The success of consolidation depends on the realization of  $Z$ . The probability that the consolidation fails is

$$p = \text{prob}[Z > T - G - X], \quad (2)$$

where  $G$  denotes government spending and  $X$  the consolidation effort, which depends on the revenue and output in each period. The distribution of the shock  $Z$  is triangular with mean zero,  $E_1 Z = 0$ , and a support ranging between  $-a$  and  $a$ . With this assumption we capture the fact that shocks of larger size are less likely to occur. Equation (2) shows on the right-hand side the distribution of  $Z$ , as we focus on a government that expects to succeed, in the sense that it chooses a level of taxes,  $T$ , for which the expected budget is larger than the announced target; i.e.,  $T - G - X > 0$ . The consolidation effort is equal to

$$X = (1 - \psi)Y + (\psi)[E_0[Y] + pE_0[\Gamma^S]] \quad (3)$$

where  $\psi$  is the share of consolidation in period 2,  $Y$  and  $E_0 Y$  are the output and the expected output, respectively (similar to budget growth revenue), and  $p$  is the probability of breaching the deficit threshold within the SGP  $\Gamma^S$  (sanction fees). Additionally we assume that output  $Y$  depends on fiscal policy stabilization. There are various different governments with respect to size and fiscal policy in the monetary union. The governments may be of two types—tough or weak—depending on the level of spending in period 1. A tough government has a level of spending,  $G^L$ , lower than the level of spending,  $G^H$ , of a weak government. Moreover the governments vary in size. This results in

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<sup>6</sup> Sanctions fees are between 0.2%–0.5% of GDP. We abstract from complex details and assume fixed fees because that does not change the model results.

$$Y = Y\left(\frac{G^i}{s_j}\right) + \mu \quad i = H, L \quad j = B, S \quad (4)$$

where  $Y(\mathbf{G}) \geq 0$ ,  $s_j$  is a scaling parameter reflecting the fact that the different members of the monetary union are of different size;  $s_B$  is for big countries and  $s_S$  is for small countries with  $s_B \geq s_S$ . Moreover  $\mu$  is an independent shock, distributed on the compact support  $[\mu^l; \mu^h]$ , with mean  $E_0\mu = 0$  and variance  $E_0\mu^2 = \sigma^2$ , which reflects some uncertainty. There is empirical evidence that smaller countries are more open to trade and that a positive relationship between trade openness and government size exists (Alesina and Wacziarg, 1998). We argue in line with Rodrik (1998) that small open countries are more often subject to external shocks, and therefore have positive incentives in a monetary union to consolidate faster.<sup>7</sup> Therefore the current SGP boosts consolidation incentives more effectively in smaller countries because of the higher degree of openness (Alesina and Wacziarg, 1998).

Substituting  $X + G - T$  into the value of  $p$ , and replacing  $p$  in equation (1), we obtain the loss that the government expects after observing  $X$ , but before knowing the realization of  $Z$ :

$$L = \frac{\Lambda}{2a^2}[a + G + X - T]^2 + \frac{1}{2}(T)^2. \quad (5)$$

Then, the optimal value of taxes is equal to  $T^* = \zeta[a + G + X]$  where  $\zeta = \Lambda/(a^2 + \Lambda)$ . All technicalities are relegated to Appendix A. Substituting  $T^*$  into equation (5), and taking expectations conditional on the information at time 0, yields the value of the expected loss after some transformations as

$$E_0L^* = E_0\left(\frac{\zeta}{2}\right)[a+G+X]^2 = E_0\left(\frac{\zeta}{2}\right)[a+G+((1-\psi)Y+(\psi)[E_0[Y]+pE_0[\Gamma^S]])]^2 \quad (6)$$

The loss function (6) is minimized by choosing  $\psi = 1$ , or respectively by setting  $x^* = -a - G$ . The last solution implies that sustainable debt policy is  $x^* < 0$  and depends on government spending and shocks ‘a’. Higher government spending also implies relatively higher sustainable budgetary targets. The explicit solution for  $\psi = 1$  implies that the government insulates the budget from budget shocks and thus eliminates all the uncertainty regarding the cost of consolidation. This policy is optimal because it rules out the possibility that the stabilization may fail as a result of a negative shock to the budget.

<sup>7</sup> Alesina and Wacziarg (1998) find some evidence of a direct relationship between openness and the size of government transfers.

Intuitively, a government that expects to succeed will not take the whole consolidation effort in period 1 because of budget risks in the meantime. Thus the government decides to consolidate optimally in period 2.

Consider now a class of separating equilibrium where beliefs have the following form: for consolidation levels less than  $\psi^S$ , the other governments expect to be tough (T). If the consolidation takes place first in period 2, the government is identified as weak (W) because their consolidation effort  $X$  is lower and thus slower than in the case of a tough (T) government. This implies the following two conditions.

The weak government compares

$$E_0L^W(W, \psi = 1) \leq E_0L^W(T, \psi \leq \psi^S), \quad (7)$$

that inequality holds for

$$\psi \leq \psi^S = \frac{\sigma^2 + \lambda\alpha - \sqrt{\lambda^2\alpha^2 + \sigma^2\lambda(2\alpha - \lambda)}}{\sigma^2 + \alpha^2}, \quad (8)$$

where  $\alpha := a + G^H + Y\left(\frac{G^H}{s_j}\right)$  and  $\lambda := Y\left(\frac{G^H}{s_j}\right) - Y\left(\frac{G^L}{s_j}\right)$ , and it is the solution of the square equation of the expected loss of the weak government under full information. The intuition for this result is as follows. A short and thus fast consolidation carries no benefit for a weak government, except to allow it to distinguish itself as tough. As it is mimicking a tough government, consolidation payments are saved merely for the two-period consolidation. Such gain disappears if the weak consolidates faster. In contrast, the consolidation risk increases in the short term, because of shocks that can arise after the consolidation, which implies that the weak reveals itself by choosing  $0 < \psi^S < 1$ . It is also worth mentioning that the speed of consolidation increases with the variance of output shocks  $\sigma^2$ , and decreases with the difference,  $\lambda$ , between the efforts at fiscal policy stabilization.

A separating equilibrium of the tough government thus exists if and only if the tough government is willing to slow down the consolidation to  $\psi^S$ . This happens if

$$E_0L^T(T, \psi^S) \leq E_0L^T(W, \psi^S < \bar{\psi} \leq 1), \quad (9)$$

and the incentive compatibility constraint is satisfied if

$$(1 - \psi^S)^2\sigma^2 \leq (1 - \bar{\psi})^2\sigma^2 + \bar{\psi}^2\lambda^2 + 2\bar{\psi}\lambda\beta, \quad (10)$$

where  $\beta := a + G^L + Y \left( \frac{G^L}{s_j} \right)$ . The necessary condition for equation (10) also crucially depends on  $\sigma^2$  and  $\lambda$ . If the shock  $\sigma^2$  is too large then the tough government would prefer not to reveal its type. When such a separating equilibrium does not exist, a pooling equilibrium may exist, where both governments choose the same consolidation speed and amount.

In a pooling equilibrium, both governments choose the same Consolidation; i.e., the forward output rate is equal to

$$E_0 Y_1^P = E_0 [q Y_1^T + (1 - q) Y_1^W] = \left[ Y \left( \frac{G^L}{s_j} \right) + (1 - q) \lambda \right] \quad (11)$$

where  $q$ , which is the probability that the government is tough, depends on the beliefs of the other governments in the monetary union. Moreover,  $q$  depends on the economic and political impact in the monetary union. As the tough government chooses  $\psi^P$ , the consolidation speed that minimizes its expected loss, a pooling equilibrium exists if and only if  $\psi^P$  satisfies the incentive compatibility constraint of the weak government,  $E_0 L^W(\text{Pool}, \psi^S) \leq E_0 L^W(W, \psi = 1)$ . This requires

$$\psi^P = \frac{\sigma^2 - (1 - q) \lambda \beta}{\sigma^2 + (1 - q)^2 \lambda^2} \geq \psi^W := \frac{\sigma^2 + \lambda \alpha q - \sqrt{\lambda^2 q^2 \alpha^2 + \sigma^2 \lambda q (2\alpha - \lambda q)}}{\sigma^2 + \lambda^2 q^2}. \quad (12)$$

Condition (12) shows that for a pooling equilibrium to exist the initial reputation,  $q$ , must be sufficiently high. Intuitively, a better reputation in fiscal policy implies a lower risk of breaching the SGP and lower interest rate risk premium, and thus makes the tough government willing to choose a slower speed to consolidate the budget  $\psi^P$ , instead of a high speed consolidation.

In summary, the results are as follows. First, if a pooling equilibrium exists, the corresponding consolidation speed  $\psi^P$  is slower than the separating equilibrium speed  $\psi^S$ , which induces a weak government to reveal itself, because  $\psi^W > \psi^S$ . Second, the consolidation speed increases with the variance of output shocks in period 1,  $\sigma^2$ , and decreases with the difference,  $\lambda$ , between the fiscal stabilization efforts by the two governments. Thus the reputation game shows that if the variance  $\sigma^2$  is low relative to  $\lambda$ , the differences in fiscal stabilization (automatic stabilizers), a separating equilibrium is more likely. Instead, in a pooling equilibrium, debt consolidation is slower (longer) than in a separating equilibrium. In both constellations the consolidation speed  $\psi$  is faster with higher variances  $\sigma^2$  and smaller fiscal heterogeneity  $\lambda$ . We next summarize the results in the following propositions, but first consider the short

helpful Lemma 1.

**LEMMA 1:**  $\lambda \geq 0$ .

The proof of Lemma 1 follows from the model assumptions. We now want to find the adequate equilibrium condition in which the EMU is probably situated.

**PROPOSITION 1:** *A monetary union with decentralized fiscal policy implies high differences in fiscal stabilization  $\lambda$  and, because of the convergence criteria, a lower European variance  $\sigma^2$  than within single states.<sup>8</sup> Thus a monetary union with a decentralized fiscal framework more likely implies a separating equilibrium.*

(Proof of Prop. 1 follows directly from the model results.)

The intuition of this result suggests that speed of consolidation is different between the different governments in the monetary union. Moreover heterogeneity alone is not sufficient to delay consolidation. There must also be uncertainty about the variance of output. A comparison of the findings in the war of attrition model by Alesina and Drazen (1991) reveals that they show that stabilization is delayed. However the model here explains the delay and differences in consolidation around members in a monetary union. The following proposition can explain the consolidation behavior of the bigger countries like France, Germany and Italy. Moreover from Proposition 1 and Proposition 2 it is clear that the pooling equilibrium in the group of larger countries is more likely because of the higher probability  $q$  that implies slower budget consolidation.

**PROPOSITION 2:** *If  $\lambda > 0$ , fiscal consolidation differs; for  $\lambda = 0$  no difference occurs. The first condition implies different consolidation speeds among countries of different sizes.*

**PROOF OF PROPOSITION 2:** The first part follows directly from Lemma 1. That implies a relationship between government spending and government size:

$$\frac{G^H}{G^L} \geq \frac{s_B}{s_S} > \frac{s_B}{s_B} = \frac{s_S}{s_S} > \frac{s_S}{s_B}.$$

The inequalities prove the case that a higher discrepancy between government spending and size implies slower consolidation. The second part is immediately clear from equation (10).

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<sup>8</sup> Empirical findings confirm this constellation in the EMU. See De Grauwe (2003), Roeger and Wijkander (2002), von Hagen and Hallett and Strauch (2001), Fatás and Mihov (2001).

Proposition 2 states that countries' government expenditure, and thus partially deficit, is more than proportional to their size. It is obvious that small (weak) governments have a greater burden than the larger countries (de Haan et al., 2003). Fielding (2002) argues that marginal costs are inversely proportional to a country's size. Smaller countries therefore tend to have higher marginal costs of debt, and government debt consolidation is proportionally higher in smaller countries. This stylized finding is generally true in the West African Monetary Union, with Côte d'Ivoire and Sénégal. The empirical result by Fielding (2002) shows both these states representing the larger country case with extremely slow budget consolidation, and Burkina Faso, Niger, and Togo representing the small country case with fast consolidation. Several other empirical studies also demonstrate this phenomenon in the (pre-)European Monetary Union (von Hagen et al. 2001, von Hagen and Harden 1994, Perotti et al. 1998). A more intuitive argument for that empirical evidence uses the following facts: The EU's average debt ratio was 60% in 1992; it climbed to 73% in 1996. Not surprisingly, this increase was entirely driven by the debt expansion in five 'larger' states: Germany (44% to 61%), France (40% to 56%), Spain (48% to 70%), Italy (109% to 124%), and the UK (42% to 55%). In contrast, the debt ratios of the other, smaller countries were stabilized or fell after 1992 (von Hagen et al., 2002).

The empirical evidence in line with the theoretical model and particularly with Proposition 2 confirms the model framework and its relevance for the EMU, where we have observed such behavior over the last three years.

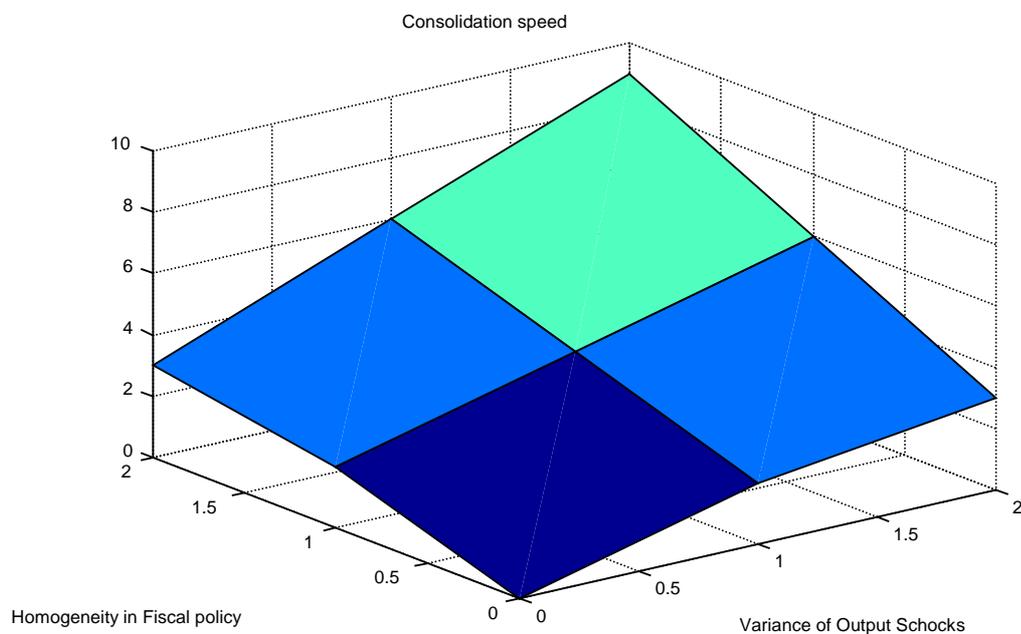
**PROPOSITION 3:** *Important determinants of consolidation speed are fiscal policy rules (homogeneity)  $\lambda$  and output variance  $\sigma^2$ .*

Proposition 3 explains that in the EMU there are many different consolidation amounts and speeds. The consolidation effort (speed) depends on output shocks and the differences in governments' spending. There is considerable empirical evidence that countries or regions with large governments display less volatile economies, as shown in Galí (1994) and Fatás and Mihov (2001). The intuition of the results lends support to the traditional Keynesian view of automatic stabilizers.<sup>9</sup> Fatás and Mihov (2001) explain: 'Our results also indicate that the size of the budget is key to understanding the stabilizing effects of fiscal policy.' This empirical 'stylized fact' implies in our model a slower consolidation speed for larger countries, exactly as we have observed empirically over the last three years in the EMU. Moreover von Hagen et al. (2004) emphasize in a recent empirical study: 'Since output volatility is generally higher in small and fast growing economies, this empirical finding can also be read as an indication that small countries are more able to engage in fiscal consolidation, or that governments there are more willing to do so.' The

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<sup>9</sup> Virén (2001) shows this empirically within a VAR model for the EU.

theoretical relationship between consolidation, the size of government, and the key variables is illustrated in Figure 1.



The stylized fact that government size has a negative effect on the volatility of output fluctuations was until now unexplored in economic theory, because in the standard RBC model there is no clear connection between these variables (Galí, 1994). This unexplored phenomenon can be partially explained in our model. Larger countries have stronger economic and political influence; i.e., higher automatic stabilizers, which can affect a country's reputation and thus its consolidation behavior. That relationship implies a slower consolidation in connection with Proposition 3 and a decline in output volatility for countries with greater government size. The correlation between size of government and volatility has also been refined by several other recent studies in the European context. For example, Martínez-Mongay (2002) and Martínez-Mongay and Sekkat (2003) have looked at which measure of government size captures this correlation better (e.g., personal versus indirect taxes). The empirical evidence and the economic theory in this paper imply a higher consolidation speed in the smaller countries concerning the variable output variance, as illustrated in Figure 1.

The same is true for the other dimension: homogeneity in fiscal policy rules (Fatás et al., 2003; von Hagen and Harden, 1994).

**PROPOSITION 4:** *The consolidation speed differs between countries in fiscal policy homogeneity  $\lambda$  as follows:*

- (a) *Weak/Tough government is big; i.e.,  $\lambda^{W,B} / \lambda^{T,B}$*
- (b) *Weak/Tough government is small; i.e.,  $\lambda^{W,S} / \lambda^{T,S}$*
- (c) *Weak and Tough government are both small or big; i.e.,  $\lambda$ .*

*Thus it is:  $\lambda^{W,S} > \lambda > \lambda^{W,B}$  and/or  $\lambda^{T,B} > \lambda > \lambda^{T,S}$ .*

The proof of Proposition 4 follows directly from Lemma 1 in connection with Proposition 2. The intuition is: If the weak government is also small ( $\lambda^{W,S}$ ) then fiscal policy is totally different (heterogenous). This constellation implies a slower consolidation for the large government because of free-riding on the small weak state (Bandt and Mongelli, 2002). In the other case, if the weak government is big ( $\lambda^{W,B}$ ), fiscal policy is more homogenous. This implies that the small governments speed up their consolidation because of real benefits through spillovers from the big country (cf. Heise, 2001). In summary, the fiscal policy homogeneity parameter implies faster consolidation for a tough and small government. For smaller countries, gains from free-riding and spillover effects are more important than high domestic fiscal policy expenditures. This implies costs in favor of the larger countries. The intrinsic motivation in smaller countries thus implies a faster consolidation in the EMU particularly because of the decision weights in the current SGP. This finding is also consistent with the theoretical argument by Buti and van den Noord (2004): ‘Most importantly, the political ownership of the fiscal rules seems to be shifting towards smaller countries with sound public finances which, although numerous, have a relatively small weight in the euro area. It is fair to recognize that this shift has weakened the enforceability of the rules, especially vis à vis larger countries.’ Moreover von Hagen et al. (2001) show that most of the smaller countries follow a contract approach, which worked more effectively in fiscal consolidations. Countries such as Germany, which was identified as tough in the preliminary phase of the EMU, consolidate more slowly if the amount of fiscal stabilization varies more in the other European countries (free-riding), and thus affects the national decision through spillover. This fact is still empirically correct in Europe (von Hagen et al. 2003). Another past event that confirms our findings was the violation by the Irish government of the Broad Economic Policy Guidelines in February 2001 (Hallerberg, 2001).

The puzzling question of why some of the EMU member countries do not consolidate immediately, once it becomes apparent that current policies are unsustainable, could partially be explained using the above model. Large deficits imply an explosive path of government debt, and it is apparent that such

deficits would have to be eliminated at some stage because of the SGP excessive deficit procedure. The spirit of our analysis is similar to recent attempts to explain other stylized facts of fiscal policy. Starting from these results we discuss in the following section some policy conclusions for the reform discussion about the SGP.

#### 4 Reforming the SGP

There is a general consensus that monetary stability is a primary aim of the European Economic and Monetary Union, and requires sustainable public finances of the member states. The idea that excessive fiscal laxity would undermine the ECB's commitment runs through all important documents and decisions, from fiscal convergence criteria defined by the Maastricht Treaty, to the SGP adopted in Amsterdam in 1997 (Buti et al., 1998).<sup>10</sup>

The monitoring of fiscal discipline in the EMU is now based on four elements: the two criteria from the SGP and Maastricht Treaty, which restrict deficits to 3% of GDP and debt to 60% of GDP; fiscal surveillance such as the stability programs in the SGP; and, fourth, the 'Broad Economic Policy Guidelines'. According to article 104 of the ECT, 'Member States shall avoid excessive government deficits', with excessive deficits being defined as greater than 3% of GDP. The SGP concretizes the deficit procedure and implements a sanction mechanism. If a country breaches the threshold it may pay fines of between 0.2 and 0.5% of its GDP. However, a country will not be fined in the case of 'exceptional circumstances'; i.e., if the deficit is generated by an unusual event out of the control of the national authorities, or if output has fallen by more than 2%; it may avoid any sanction, if partner countries agree, in the event of a fall in GDP of between 0.75 and 2%. The Treaty and the SGP maintain also that the debt to GDP ratios should be below a reference value of 60%. This criterion is relevant for assessing fiscal sustainability (Buti, 2003).

Additionally the SGP sets out a medium-term objective, which is to reach budgetary positions 'close-to-balance or in surplus' and to implement yearly stability programs. The Commission and the EFC then evaluate these programs. After a detailed evaluation the Commission addresses a recommendation to the ECOFIN Council. The procedure of the SGP attempts to discipline the national fiscal policy in favor of the common price stability. On the one hand the SGP functions at times as a corset for fiscal policy. On the other hand the SGP is needed to discipline fiscal policy. The question therefore is: what are the costs and benefits in each situation? To make the EMU and the Euro currency successful projects, all participating countries must reach the

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<sup>10</sup>Theoretically proofed by Dixit and Lambertini (2003).

consensus that price stability is critical. In conclusion, the EMU needs a disciplining mechanism like the SGP but must also protect national freedom as much as possible (cf. ‘subsidiarity principle’, art. 5 ECT) to react, for example, to idiosyncratic and asymmetric shocks.

The need to reform the SGP became increasingly obvious during 2002. A number of economists made different and sometimes contradictory proposals. The radical reform proposals are connected with fundamental changes of the fiscal policy framework in Europe, for example ‘Tradable Deficit Permits’ (Cassela, 1999), ‘Rating Agencies to evaluate national Debt’ (Eichengreen, 2003), and all proposals of a closer fiscal policy coordination or centralization at the European level (Heise, 2002). The suggestions from Casella (2001) and Eichengreen (2003) lean towards a market solution that works efficiently and solves the interaction problem. The other direction for solving the problem efficiently points towards a European economic government. However, the knowledge that these radical reforms need a majority among the European countries and/or a closer political union probably makes both directions unlikely in the near future. On the other hand, there is a modified proposal for change only in the current framework of fiscal policy in Europe. The reform alternatives in that field are the first to define a new target structure that transforms the sole focus today (deficit) to a more multidimensional view, combining this with a longer time horizon. The second group of reforms works on the current SGP. Common to all suggestions for reform is the plea for establishment of a nonpartisan or independent agency or committee. We will now summarize recent academic ideas for reforming the SGP.

*Fiscal-fiscal coordination:* A new level of commitment: Pisani-Ferry (2002) argues that Eurogroup should agree on a set of broad nonbinding policy principles outlining the operation of fiscal policy to complement the fiscal–monetary interaction. *Fiscal policy committees:* Wyplosz (2002) and Ohr (2003) propose the creation of new independent fiscal policy committees in each member state and on the EU level. These would have authority over the deficit in each country, but no say on the size and composition of expenditures or taxes. They would be given the long-term mandate of maintaining debt at a certain target, but would be able to vary the deficit in the short term to stabilize the economy. *New monitoring institutions:* Several authors suggest that independent bodies would be more credible in assessing whether discretionary fiscal policy compromised sustainability. Begg et al. (2002) argues that the EU should also delegate monitoring to an independent body. Fatás et al. (2003) propose the creation of an independent European fiscal sustainability council to monitor the sustainability of member states’ finances. *Allowance for public investments:* Blanchard and Giavazzi (2003) argue that investment spending should be excluded from deficit calculations under the SGP. They argue this would increase transparency, permit quality public investment, and prevent procyclical tightening of fiscal policy in the short run. *A permanent balance*

*rule:* Buiter and Grafe (2003) favor a permanent balance rule, whereby the net present value of total future government revenues should be at least equal to the net present value of total future expenditures, including debt repayments. Although both sides of this equation would be hard to calculate accurately, the authors see the benefits of allowing for countercyclical policy and public investment outweighing any implementation costs (Corsetti and Roubini, 1996). *More clarity of monetary reaction function:* Allsopp (2002) proposes that a key requirement for effective fiscal coordination is an ‘appropriate and transparent monetary policy reaction function’. The higher transparency in that topic increases the understanding of the national fiscal authorities and helps to find the correct responses to economic fluctuations. *Tradable deficit permits:* Casella (2001) proposes the introduction of tradable permits to run deficits. Countries that wanted to run higher deficits would have to buy such permits from others before they could do so. A similar mechanism is proposed by Eichengreen (2003) with a ‘rating agency’ to evaluate the sustainability of national public finance. *A more pragmatic Pact:* Buti et al. (2003) propose a collection of measures designed to deliver a more pragmatic interpretation of the SGP, including: modifying the interpretation of the ‘close-to-balance or in surplus’ rule on a country-by-country basis; taking better account of public sustainability; improving transparency by distinguishing between long-lasting measures; better monitoring of cash flows; devising sanctions for MS not undertaking sufficient consolidation during economic up-turns; making the implementation mechanism less partisan by strengthening the role of the Commission in assessing compliance with the rules and application of sanctions; and imposing no monetary sanctions but instead encouraging more ‘mutual-supervision’ (De Grauwe 2003). *More coordination between fiscal–monetary policy:* Heise (2002) and Pinzler and von Heusinger (2004) suggest a closer cooperation between the ECB and the member countries’ fiscal policy. The so-called ‘move to the middle’ seems the only successful solution in the EMU (Theurl and Schweinsberg, 2003).

The common point of all the reform proposals mentioned so far is that most of them are not based on a detailed economic analysis, and moreover that none of them perceived the different economic incentive problems between big and small countries within the current SGP. Although monetary theory is analyzed in economic literature, over the past 10 years we have not learned to transfer it to other topics. We should now transfer such results also to fiscal policy (Wyplosz, 2003) in Europe. Besides, all reform proposals that deal with the trade-off between flexibility and discipline do not recognize the problems of distinguishing between big and small countries. The results analyzed above confirm that there are economic determinants that have different impacts on governments of different size. We have therefore discovered an important relationship that has not been considered in the current reform discussion. In line with the empirical findings, von Hagen et al. (2001) suggest: ‘The EMU needs a framework for preventing fiscal policies from backsliding.’

## 5 Conclusions

This paper has explained delayed consolidation in the EMU under the SGP using a model of strategic interaction between ‘weak’ and ‘tough’ member states. We conclude the paper by discussing some generalizations and by touching on some issues that the model did not address but that are important in explaining consolidation speed.

First, our argument is much more general than initially considered. The results are thus very similar to the model of Alesina and Drazen (1991) but show that within a monetary union the determinants for consolidation and stabilization are more complex and general than in a pure national framework. The model shows that credibility, the missing parameter in Alesina and Drazen (1991), plays a very important role in the case of fiscal policy stabilization in a monetary union. Furthermore, explaining the unsolved ‘stylized fact’ in line with empirical macroeconomics—negative relation of government size and output volatility—affirmed the robustness of the theoretical model. Second, the model fits the empirical observations in the AFC Monetary Union and in the European Monetary Union, and is consistent with several other theoretical and empirical findings in that literature. A third generalization in that model is the explicit modelling of sanction fees within the SGP, the different size and behavior of governments, and the interaction of fiscal policy consolidation in a monetary union. Finally, we note some issues not discussed earlier in the paper. The major omission is a closer endogenous political-economic description of the model, considering for instance important political events such as elections, veto power, and decisions about distribution policy. Moreover, we do not focus on the fact that smaller countries typically pay more attention to international and European organizations than larger countries do, and that the more they do so, the more they receive transfers from these organizations (Katzenstein, 1991). These determinants, which are not modelled explicitly, all play a very important part in creating a better understanding of why bigger countries consolidate more slowly.

Our model suggests that successful consolidation within the restriction of the SGP needs an efficient and credible enforcement mechanism. A major message is that necessary harmonization or coordination in fiscal policy as well as some discretionary policy are needed to close the gap between the larger and the smaller countries to consolidate public finance.

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## A Model derivations

### A.1 Derivation of the loss function

Substituting  $X + G - T$  into the value of  $p$ , and replacing  $p$  in equation (F.1), we obtain the loss function:

$$L = \frac{\Lambda}{2a^2}[a + G + X - T]^2 + \frac{1}{2}(T)^2. \quad (\text{A.1})$$

Then, the optimal value of taxes is equal to  $T^* = \zeta[a + G + X]$  where  $\zeta = \Lambda/(a^2 + \Lambda)$ . Substituting  $T^*$  into equation (39) yields

$$L = \frac{\Lambda^2}{2a^2} \left( (1 - \zeta)(a + G + X) \right)^2 + \frac{1}{2}(\zeta[a + G + X])^2 \quad (\text{A.2})$$

$$L = \left[ \underbrace{\frac{\Lambda}{a^2 + \Lambda}}_{=: \zeta} * \left( \frac{a^2}{a^2 + \Lambda} \right) + \zeta^2 \right] \frac{1}{2}(a + G + X)^2 \quad (\text{A.3})$$

this is now

$$E_0 L^* = E_0 \left( \frac{\zeta}{2} \right) [a + G + X]^2 = E_0 \left( \frac{\zeta}{2} \right) [a + G + ((1 - \psi)Y + (\psi)[E_0[Y] + p\Gamma^S])]^2 \quad (\text{A.4})$$

### A.2 Derivation of the separating equilibrium

Consider a class of *separating equilibrium*. The weak government compares

$$E_0L^W(W, \psi = 1) \leq E_0L^W(T, \psi \leq \psi^S); \quad (\text{A.5})$$

that inequality is equivalent to

$$E_0[X - Y(G^H) + Y(G^H)]^2 \leq E_0[X - \psi Y(G^H) + (1 - \psi)\mu + \psi Y(G^L)]^2 \quad (\text{A.6})$$

$$0 \leq \psi^2(\lambda^2 + \sigma^2) - 2(\alpha\lambda + \sigma^2)\psi + \sigma^2. \quad (\text{A.7})$$

The ‘only’ solution is now:

$$\psi \leq \psi^S = \frac{\sigma^2 + \lambda\alpha - \sqrt{\lambda^2\alpha^2 + \sigma^2\lambda(2\alpha - \lambda)}}{\sigma^2 + \alpha^2} \quad (\text{A.8})$$

where  $\alpha := a + G^H + Y(G^H)$ ,  $\lambda := Y(G^H) - Y(G^L)$ . A separating equilibrium of the tough government thus exists if and only if the *tough* government is willing to slow the consolidation down to  $\psi^S$ . This happens if

$$E_0L^T(T, \psi^S) \leq E_0L^T(W, \psi^S < \bar{\psi} \leq 1), \quad (\text{A.9})$$

$$E_0[a + G^L + (1 - \psi^S)Y + \psi^S E_0Y]^2 \leq E_0[z + \bar{\psi}\lambda + (1 - \bar{\psi})u]^2 \quad (\text{A.10})$$

$$E_0[z + (1 - \psi^S)u]^2 \leq E_0[z + \bar{\psi}\lambda + (1 - \bar{\psi})u]^2, \quad (\text{A.11})$$

and thus the incentive compatibility constraint is satisfied if

$$(1 - \lambda^S)^2\sigma^2 \leq (1 - \bar{\psi})^2\sigma^2 + \bar{\psi}^2\lambda^2 + 2\bar{\psi}\beta\lambda, \quad (\text{A.12})$$

where  $\beta := a + G^L + Y(G^L)$ . The necessary condition for equation (44) also crucially depends on  $\sigma^2$  and  $\lambda$ .

### A.3 Derivation of the pooling equilibrium

In a *pooling equilibrium* both governments choose the same Consolidation; i.e., the forward output rate is equal to

$$E_0Y = [Y(G^L) + (1 - q)\lambda]. \quad (\text{A.13})$$

A pooling equilibrium exists if and only if  $\psi^P$  satisfies the incentive compatibility constraint of the weak government,  $E_0L^W(Pool, \psi^S) \leq E_0L^W(W, \psi = 1)$ . This requires

$$\psi^P = \frac{\sigma^2 - (1 - q)\lambda\beta}{\sigma^2 + (1 - q)^2\lambda^2} \geq \psi^W := \frac{\sigma^2 + \lambda\alpha q - \sqrt{\lambda^2 q^2 \alpha^2 + \sigma^2 \lambda q (2\alpha - \lambda q)}}{\sigma^2 + \lambda^2 q^2}. \quad (\text{A.14})$$

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