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ABSTRACT

Reconciling Stability and Growth: Smart Pacts and Structural Reforms*

This Paper analyses the decision of a government facing electoral uncertainty to implement structural reforms in the presence of fiscal restraints similar to the Stability and Growth Pact. We provide suggestive evidence that structural reforms – in particular labour market reforms – may lead to substantial outlays by the government, for example to buy political support. To the extent that the reform package entails up-front costs, the model shows that a pact may harm structural reforms, sacrificing future growth for present stability. Since electoral uncertainty creates an expansive fiscal bias, the welfare gains brought about by a pact depend on a trade-off between the reduction in the deficit bias and the induced reduction in the amount of structural reform. Imposing a pact becomes more attractive if it takes into account the up-front costs from structural reforms when evaluating the member states' fiscal stance. Therefore, the analysis lends support to a recent proposal by the European Commission for a more flexible implementation of the Stability and Growth Pact in this respect.

JEL Classification: E42, E61 and F33
Keywords: monetary union, Stability and Growth Pact and structural reforms

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1 Introduction

Since the Delors report set the blueprint for European monetary unification, the necessity to impose institutional constraints on national fiscal policies has been one of the most hotly debated issues regarding the European Monetary Union. Following the early quest for an economic rationale to the excessive deficit procedure and the Stability and Growth Pact (SGP),[1] the debate has now shifted to the implementation of those arrangements and, in particular, the apparent need for a "flexible" interpretation of SGP provisions. Although this is a highly politicized debate reflecting variable commitments by member states to deal with structural fiscal imbalances, economic arguments also suggest that the current arrangements could be improved. A first line of arguments call for making SGP numerical targets explicitly contingent on business cycle developments so as to eliminate the prospect of forcing member states to run pro-cyclical fiscal policies in bad times. Although the desirability of state-contingent rules is recognized in most existing theoretical analyses of the SGP, their implementation poses real challenges such as evaluating for each country the budgetary impact of automatic stabilizers. A second line of arguments supporting amendments to the Stability and Growth Pact concern the failure of the latter to account for the overall "quality" of fiscal policy (see Peletier et al., 1999, Blanchard and Giavazzi, 2003 and Buti et al., 2003). Currently, the SGP's provisions apply to deficit and debt figures irrespective of the underlying policies. For example, a country with a deficit of 3.5 percent of GDP and public investment amounting to 3 percent of GDP would normally be penalized while its neighbor, running a 2.9 percent deficit but spending only 2 percent of its GDP on public investment would not.

In the wake of the recent difficulties experienced by some countries to adhere to the SGP, the rigidity of the latter's numerical targets has naturally been invoked (perhaps opportunistically) by economists, policymakers and even the President of the European Commission to call for a more flexible arrangement. This has led the European Commission to propose a new strategy for the interpretation and implementation of the Stability and Growth Pact (see the European Commission's press release of November 27, 2002).[2] The Commission proposals constitute a clear attempt to address the two rigidities presented above. First, under the Commission's proposal, greater importance should be given to the structural nature of the fiscal imbalances. This means that temporary slippages clearly driven by business cycle factors might be waived while pro-cyclical loosening of fiscal policies in good times might trigger the excessive deficit procedure irrespective of the deficit (or surplus) figure. Also, the adjustment path of structural deficits would be mon-

[1] See, for instance, Artis and Winkler (1998), Beetsma and Uhlig (1999), Brunila et al. (2001) and Debrun (2000).

[2] "Commission calls for stronger budgetary policy coordination", press release IP/02/1742, available at http://europa.eu.int/rapid/start/cgi/guesten.ksh

itored more closely.[3] Second, the Commission's assessment of Member States' budget position would focus on long-term sustainability, implying in particular that highly-indebted countries would need to be more ambitious in their pursuit of fiscal probity whereas an assessment of contingent liabilities (for example future pension payments) would complement the existing debt cap (60 percent of GDP). Third, the Commission, recognizing that present fiscal imbalances might reflect policies aimed at boosting long-term growth (such as public investment in infrastructure or the budgetary impact of structural policies), would allow countries with sound budgetary positions to temporarily deviate from the "close-to-balance or in surplus" requirement so as to pursue their pro-gowth agenda of public investment and structural reforms. This would contribute to strike a better balance between the objectives of stability and growth proclaimed by the SGP. The Commission's new emphasis on pro-growth policies is already reflected in recent discussions of Member States Stability Programmes. For example, in its reaction (January 8, 2003) to Germany's updated Stability Programme, the Commission urged Germany to undertake more comprehensive reforms in several areas of public policy (labor markets, social security, benefits and regulation) with the aim of lifting the growth potential of the economy and at the same time easing the pressures stemming from growing health care and social security costs.

This paper proposes a simple theoretical framework allowing to investigate in detail the case for introducing fiscal restraints that would explicitly authorize deviations from deficit targets in case policies promoting growth in the longer run give rise to temporary fiscal expansions. This concerns a potentially wide array of structural policy measures such as tax reforms, welfare reforms, public investment projects, and even labor and good markets reforms. As the descriptive evidence discussed in Section 2 suggests, many key reforms advocated by the European Commission and other international organizations may indeed entail significant upfront costs and therefore conflict with the requirements included in the SGP.[4] In that context, we show that temporary relaxation of the deficit caps would help lessen the resulting conflicts between stability and growth.

The model focuses on the incentives of policymakers facing electoral uncertainty in a simple two-period economy. Since different political parties prefer different types of public goods, electoral uncertainty leads the current government to discount future economic outcomes at a greater rate than the public. As a result, fiscal policy tends to absorb too much current resources for the production of public goods preferred by the incumbent government. That bias impinges on all policy decisions affecting the intertemporal allocation of government resources, that is, in particular, debt accumulation and "investment".

[3] In particular, "[...] [C]ountries with underlying deficits exceeding the 'close to balance or in surplus' requirement [...] would be required to achieve an annual improvement in the underlying budget position of 0.5% of GDP each year until the 'close-to-balance or surplus' requirement of the SGP has been reached. This rate of improvement in the underlying budget position should be higher in countries with high deficits or debt."

[4] Similar concerns are expressed by Saint-Paul (2002).

Here, we talk of "investment" in the broad sense of fiscal outlays disbursed today with the aim of increasing revenues tomorrow. In that sense, "investment" also includes any outlay associated with effective structural reforms. In the remainder of the paper, we shall refer to structural reforms although it should be clear for the reader that the results are valid for a broader set of fiscal measures, including productive investment.

Our analysis shows that, for a given amount of structural reforms, deficits (debt accumulation) are excessive with respect to the social optimum, and that this lack of fiscal discipline is accompanied by insufficient structural reforms. In that context, a stability pact that only penalizes excessive deficits brings about greater fiscal discipline at the cost of a decline in a level of reform that is already too low. The reason is that the governments also want to save on the upfront costs of structural reforms so that the current production of public goods does not bear the full burden of fiscal adjustment. Hence, the design of a pact that ignores the nature of the policies underlying public expenditure[5] faces a trade-off between a reduced deficit bias and the exacerbation of the low reform problem. The overall effect of a such pact on welfare thus depends on the relative sensitivity of the deficit and structural reforms to the severity of the sanctions. Quite naturally, the design of the pact could be improved by taking explicit account of the fiscal consequences of structural reforms so that the induced incentive to fiscal discipline would not undermine the incentive to pursue reforms. Although such an arrangement raises a number of practical issues, that result lends some theoretical support to the Commission's proposal to interpret the SGP in a more flexible way for serious reformers.

The remainder of this paper is structured as follows. Section 2 presents some descriptive evidence on the generally low level of structural reforms in Europe. It also suggests a linkage between the particularly low amount of reforms in some areas (such as labor markets) and the magnitude of the direct and indirect fiscal effects of reforms in those areas. Section 3 presents the model, while Section 4 discusses its solution. In Section 5, we compare the solution under a government facing electoral uncertainty with the social planner's solution, after which we characterize the impact of a stability pact on the deficit and on structural reform. The design of welfare-improving pacts is analyzed in Section 6, while Section 7 discusses the results and derives the policy implications of the paper.

2 Budgets, reforms, and pacts

This section discusses the linkages between fiscal and structural policies, with a specific emphasis on the situation in the Euro area. That discussion establishes the concrete relevance of the key arguments elaborated in the formal analysis.

[5] As illustrated in Section 2, this consideration goes well beyond the mere composition of public spending (i.e. the usual split between current and capital expenditure). For instance, in our view, a temporary increase in the coverage of unemployment benefits to compensate the public for a drastic reduction in employment protection is qualitatively an "investment" in the broad sense defined above.

2.1 Fiscal implications of structural reforms

Structural reforms generally cover three broad areas: product markets, labor markets, and financial markets. Their ultimate objective is to stimulate potential output through a reduction in frictions known to disturb the allocation of resources, such as tax distortions and regulations leading to high transaction costs, decision lags and non-competitive market structures. As any other economic policy choice, structural measures result from a cost-benefit analysis that blends economic arguments and political considerations. However, unlike other policies, the diversity of instruments - from employment protection regulations to tax codes - and the complexity of the transmission channels to potential output make ex-ante appraisals difficult. As a result, estimates of the long-term economic gains from reforms are often plagued by considerable uncertainty whereas the immediate political and, possibly, financial costs are perceived with relatively greater precision by policymakers. Perhaps even more importantly, electoral uncertainty leads democratically accountable governments to further discount the future gains from reforms because of the possibility that a rival party might take advantage of the reforms' political dividends. The resulting asymmetry in the perception of costs and benefits arguably contributes to a suboptimally low activism on the front of structural reforms, especially for those measures characterized by high upfront costs and by gains spread over a long period of time.[6]

As indicated in the Introduction, this paper focuses on a key dimension of the cost-benefit analysis carried out by policymakers, namely the impact of structural policies on the government's budget. Direct linkages between structural policies and the budget are easy to identify. On the revenue side, reforms aimed at lifting future potential output could be expected to produce a permanent increase in tax revenues. Should the reform package include discretionary tax cuts, the long-term impact on the budget would eventually depend on the power of Laffer-curve effects and on "offsets" designed to ensure the long-run fiscal neutrality of the tax cut. Structural policies also directly affect expenditure. For instance, deregulation allows saving on monitoring and enforcement costs while reforms themselves may involve cuts in distortionary subsidies and transfers (e.g. overly generous unemployment benefits).

A more difficult task however is to evaluate the indirect fiscal implications of structural reforms. Two lines of arguments suggest that a fiscal expansion should accompany significant structural reforms. First, ensuring the political acceptability of necessary reforms may require compensation schemes aimed to smooth the costly reorganization of production processes and the temporary loss of revenue by individuals who might loose their job or specific benefits. This would incidentally help address one of the chief causes

[6] Rodrik (1996) provides a detailed survey of economic arguments pertaining to reforms in developing and transition economies. Many of his arguments naturally apply to industrial countries. However, the greater consideration given to redistribution issues in the latter (especially in Europe) suggests that short-term costs and the necessity to compensate those who are negatively affected by reforms may play a bigger role than in developing countries.

of Europe's structural sclerosis, that is the strong political constituencies formed by the main beneficiaries of the rents that the reforms would eliminate (e.g. Saint-Paul, 1996, on labor market reforms). Second, a deliberate fiscal (and monetary) expansion accompanying the implementation of reforms would help accommodate the induced increase in potential output, minimizing deflationary risks in an already low-inflation environment (Saint-Paul, 2002) and reducing the perceived unemployment risk by individual workers.

From the above discussion, the fiscal impact of structural policies appears as a critical consideration in the design of the reform package, and in particular, its "size" or ambition. The relative importance of fiscal matters in the reform process is likely to grow with the initial "stock" of structural inefficiencies, the magnitude of the distributive consequences to eliminate them, and the stringency of the government budget constraint. Against that backdrop, the fiscal dimension of structural reforms may arguably become pivotal in a number of Euro area member states. As some of them are in dire need of a structural overhaul, especially in the labor market, the large distributive impact of such reforms is likely to engender strong demands for compensation, putting serious pressure on the budget balance, especially in the short-term. The potential conflict with the member states' obligations under the Stability and Growth Pact is glaring, raising once again the necessity for discipline-enhancing fiscal rules to take account of the "qualitative" aspects of fiscal policy and, in particular, the underlying causes of a fiscal expansion. Aware of this, the European Commission recently proposed that, in the implementation of the SGP, a "*small temporary deterioration in the underlying budget position of a member state could be envisaged, if it derives from the introduction of large structural reforms, like for example tax reform or a long term public investment programme* [...]."[7] The rest of this section further elaborates on the practical importance of those linkages between structural reforms and the budget.

2.2 Are costly reforms delayed?

It has long been argued that many Euro area member states suffered from pervasive structural inefficiencies impairing their economy's resilience in the face of shocks, constraining their growth potential, and fueling high unemployment. Despite some progress achieved under the aegis of the European Union, labor and product markets remain insufficiently competitive, keeping labor costs too high despite high unemployment and maintaining firms' pricing power at levels that remain detrimental to consumers. Admittedly, assessing the ideal amount of reforms needed in those countries is difficult as the characteristics of ideal labor market regulations, perfect tax codes, etc. are hotly debated issues in the economic profession. However, it is useful to compare structural indicators in notoriously "rigid" countries with those in economies thought to be more flexible like the United

[7] European Commission, Press release IP/02/1742, November 2002. The Commission's proposals will soon be discussed by the European Council.

States or the United Kingdom.

Table 1 shows notable progress in product market reforms over the last 20 years although continental Europe still lags far behind the United States and the United Kingdom. The clear move towards greater product market flexibility sharply contrasts with the very mixed record in terms of labor market reforms, with some countries even increasing structural distortions - especially labor taxes. Since a significant fall in unemployment is much more visible[8] and, therefore, politically more rewarding than a reduction in price markups (whose visibility is hindered by inflation), such developments may seem puzzling, especially for countries where unemployment remains stubbornly high. We conjecture that the potentially important upfront fiscal costs associated with *politically-acceptable* labor market reforms – i.e. including the indirect costs discussed above – may help to explain that puzzle.[9] Such costs are indeed lower or even absent in the case of product and financial markets reforms as consumers benefit from lower prices and better financial services without direct fiscal intervention. A reform package that includes deregulation or privatization may even improve the budget balance because proceeds from privatization reduce future debt payments – admittedly at the cost of future discounted profits of privatized companies – and deregulation brings about savings on administrative costs (for example, no more enforcement of price controls) without obvious need to explicitly compensate anyone.

2.3 Upfront costs vs. long-term benefits: some illustrations

Simply looking at aggregate figures such as the overall fiscal balance, it would be tempting to conclude to the absence of any compelling evidence about the fiscal effects of reforms. However, this by no means indicates that fiscal considerations play a negligible role in the design of reforms. A first reason lies in the fact that actual reforms may be biased towards measures that appear fiscally neutral in the short run (see above). Second, reforms that are most likely to have a significant impact on the budget may be implemented more gradually than others so that the incipient gains from initial measures start covering the short-term costs of new initiatives. Third, compensations may be hard to reverse and take a permanent character resulting in a failure of the long-run benefits from reforms to clearly materialize in the budget. Fourth, governments may be prone to spend the "reform dividends" on other programs or implement discretionary tax cuts. This subsection illustrates some of these aspects with a focus on the budgetary impact of labor market

[8] Numerous studies have shown that labor reforms would indeed result in lower unemployment; see for instance Nickell and Layard (1999), Belot and van Ours (2000), Blanchard and Wolfers (2000), Nickell et al. (2002), OECD (2002), European Commission (2002) and IMF (2003).

[9] This is reminiscent of Alesina and Drazen (1991) who show that desirable policy measures (in their case fiscal stabilization) are delayed because a "war of attrition" takes place among social groups about the sharing of the adjustment burden. In the model we propose later, the reluctance to implement structural reforms stems from the need to divert public resources away from the provision of public goods to finance transfers compensating the adjustment burden borne by citizens (see Section 2.3).

reforms, admittedly the most important item on the reform agenda in number of Euro area member states.

A first interesting illustration is provided by the recent episode of "job-rich" growth in France (1997-2000).[10] The accelerated pace of job creation during that period was the result of wage moderation combined with targeted cuts in social security contributions and increased flexibility in working time. On the revenue side, these developments led to a boost in fiscal revenues, lifting the elasticity of government revenues to GDP well above unity to reach 2.2 in 1999 and 1.9 in 2000. On the expenditure side, however, France did not experience any significant reduction in the transfers related to unemployment and poverty. While those transfers amounted to 4 percent of GDP in 1990 and 4.3 percent at the latest peak of unemployment in 1997, they fell only slightly to 4.1 percent of GDP in 2000, owing mainly to increased discretionary spending on programs linked to poverty and long-term unemployment. The fact that reform dividends on the spending side were almost entirely absorbed by discretionary measures benefiting the unemployed suggests the sort of indirect compensatory measures discussed above. Increased job creation was also the result of more direct public initiatives like targeted cuts in social security contributions for low-skilled workers provided that employers switched to the 35-hour workweek and committed to create new jobs. These measures resulted in additional spending equivalent to 0.8 percent of GDP in 2000. Other direct public programs aimed at boosting employment were reinforced (active labor market policies), presumably to magnify the perceived employment creation associated with structural measures, adding another 0.5 percentage point of GDP in public spending. Overall, spending on those programs increased by 0.2 percentage points of GDP between 1997 and 2000 while the rapid improvement of labor market conditions would have led one to expect a significant reduction. Again, this can be interpreted as evidence of significant compensatory measures designed to "buy" the acceptability of a - by the way relatively small - amount of structural reforms.

This brief review of recent labor market policies in France illustrates the significant and complex interactions between fiscal and structural policies. In particular, it suggests that compensatory measures presumably conceived to gather political support for reforms may be a critical dimension in the design of a reform package. As a consequence, constraints on fiscal discretion may unduly constrain the ambition of reform plans.

We can also adopt a more prospective approach and wonder what could be the fiscal costs and long-run gains of desirable labor market reforms in the Euro area. One measure advocated by experts is to reduce the tax wedge between the consumption wage and the real product wage. Given the relatively high taxation on labor in Europe, the direct fiscal costs of such a reform are potentially large. According to Daveri and Tabellini (2000), a reduction in the tax rate on labor by 5 percentage points would create an average budget gap of about 3 percentage points of GDP in the European Union. The impact of those

[10] Detailed background information on the fiscal impact of job-rich growth in France is provided by IMF (2002).

reforms on employment and output naturally depends on country-specific characteristics such as the degree of competition in the labor market. Existing empirical estimates suggest that a tax cut of that magnitude would produce a reduction in the unemployment rate of between 0.3 and 1.5 percentage points in the long run.[11] Correspondingly, output gains could be in the range of 0.5 to 2.25 percent.[12] Clearly, even with high elasticities of revenues to GDP (as observed recently in France), the budget gap could not be reduced without raising other taxes, especially on capital, or reducing expenditure. Given the likely objections to both measures (capital is mobile and reducing the size of the government is not necessarily what voters want), governments might want to smooth them over time. Clearly, strict balanced-budget requirements might prevent or impair the desired smoothing and ultimately discourage governments to undertake desirable tax reforms.

Other labor market reforms have a lesser or positive impact on the budget. For instance, tighter entitlement to unemployment insurance would actually reduce spending and free resources for alternative uses, for example to buy support (e.g. by reinforcing anti-poverty programs, as in France) for a presumably unpopular measure in a context of high unemployment risk. Among "fiscally neutral" reforms, a relaxation of employment protection legislation – for instance through flexible working time and the promotion of fixed-term contracts – has also often been advocated as a key pro-employment measure. As shown in Table 1, the strictness of employment protection is by far the greatest difference between the Euro area and the United States. Although the direct fiscal impact of such a measure would probably be positive, indirect costs might emerge from demands for more generous unemployment insurance. Indeed, a likely result of reduced employment protection would be temporarily greater short-term unemployment and a corresponding increase in the unemployment risk perceived by workers. As pointed out by Blanchard (2002), there is a strong empirical trade-off between employment protection and the generosity of unemployment insurance among industrial countries. Table 2 provides a rough quantification of that trade-off using an institutional data set for 20 OECD countries between 1960 and 1998 (see IMF, 2003). In a simple linear model explaining the benefit replacement ratio, the estimated coefficient for employment protection is negative and highly significant (see Table 2).

On the basis of these estimates, we find that a reduction in the index of employment protection by one standard deviation (calculated over the entire panel) would raise the ratio of unemployment benefits over past earnings by more than 11 percentage points. In the case of France, for instance, that would mean an average increase in unemployment transfers by 20 percent and a likely budgetary impact of about 0.25 percent of GDP.[13] Those figures would be doubled if France decided to converge to the same level of em-

[11] The low end of the range reflects estimates by IMF (2003), while the higher end comes from Daveri and Tabellini (2000).

[12] Figures based on recent estimates of Okun's law by Schnabel (2002).

[13] In 2000, French outlays for unemployment insurance amounted to 1.2 percent of GDP (IMF, 2002).

ployment protection as in the United States. As in the case of a labor tax cut, there is no consensus on the benefits such a measure could bring about in terms of lower unemployment. According to recent IMF estimates, if Euro area employment protection were to converge to U.S. levels, the average reduction in unemployment rates could reach 1.6 percentage points in the long term, with half of that reduction achieved after 3 years (IMF, 2003).

2.4 Reconciling stability and growth

The stylized facts analyzed above suggest strong, *direct and indirect* linkages between government budgets and structural reforms. It appears that limitations on fiscal discretion might unduly constrain the design of ambitious structural reforms needed to boost potential growth in the Euro area, especially in the labor market. In the present context of unsatisfactory growth, sluggish reforms and fiscal slippages, this is a powerful argument in favor of giving increased consideration to the overall "quality" of fiscal policy when assessing the budgetary position of a country. Due attention paid to the fiscal impact of well-designed structural reforms might therefore be an important ingredient in the implementation of the Stability and Growth Pact, as argued by the European Commission. In fact, this could be the key to reconcile the two stated objectives of the SGP, that is the simultaneous promotion of growth and stability. The next section proposes a theoretical model rationalizing that argument.

3 The model

The formal analysis is based on a simple two-period economy in which the budget constraints capture both the short-run and the long-run effects of structural reforms. The model aims at illustrating the potential tension between the imposition of fiscal restraints analogous to the Stability and Growth Pact and the incentives of the governments to carry out structural reforms characterized by significant upfront costs before they yield benefits in the future. The analysis presents the case of a country participating in a monetary union along with a large number of perfectly identical neighbors. A stability pact is designed and enforced by an unelected supranational authority. To avoid needless analytical complications, we ignore cross-border spill-overs from fiscal discipline, so that the stability pact only serves as an external device for tying the hands of national governments. There is substantial disagreement among economists about the importance of these spill-overs. In principle, they could be introduced in our model in the same fashion as Beetsma and Uhlig (1999).

It should be clear that we strictly focus on the relationship between the fiscal regime and the incentives to carry out reforms so that our assumption about the monetary regime (a monetary union) plays no role in the analysis. Other studies have emphasized strategic

linkages between structural reforms and the formation of a currency union. In particular, Sibert and Sutherland (2000) look at the impact of monetary unification on the participants' incentives to implement "labor market" reforms in a model à la Barro-Gordon with an inflation bias depending positively on the natural unemployment rate. They find that monetary unification lessens the incentives to reform labor markets because that regime partly alleviates the permanent inflationary costs of high structural unemployment.[14] Hughes Hallett and Jensen (2001) investigate the effect of reforms on the incentives to form a monetary union and warn that insufficient reforms in both existing member states and potential entrants reduce the mutual benefits from enlargement. In combination with our analysis, these papers underscore a strategic nexus between the implementation of structural reforms, the participation in a monetary union and the imposition to fiscal rules. Leaving this more general approach for future research, we now develop the structure of our model.

3.1 Private agents

Let 1 and 2 denote the two periods of the model. Each country is populated by identical individuals that together constitute a mass of unity. We therefore characterize private decisions by looking at a representative private agent whose utility depends on the consumption of both private and public goods and is separable over time and types of good. Private consumption in period 1 and 2 is denoted by c_1 and c_2 respectively. Further, there are two types of public goods, an F-good and a G-good, which are provided in quantities f_1 and f_2 (g_1 and g_2) in periods 1 and 2 respectively. Private agents consider these goods as perfect substitutes. Utility of the representative private agent is then given by:

$$\mathrm{E}_0 \left[u\left(c_1\right) + v(f_1 + g_1) + u\left(c_2\right) + v(f_2 + g_2) \right], \tag{1}$$

where, $\mathrm{E}_0\left[.\right]$ denotes the operator of mathematical expectation conditional on information available at the start of the game. For convenience, the discount factor is set equal to unity. Utility functions are twice continuously differentiable and have the following standard properties: $u\left(0\right) = 0$, $u' > 0$, and $u'' < 0$; $v\left(0\right) = 0$, $v' > 0$, and $v'' < 0$. Moreover, we assume that $v'\left(0\right) \to \infty$, while $v'\left(\infty\right) \to 0$. The agent maximizes utility under the following first- and second-period budget constraints, respectively:

$$\begin{aligned} c_1 &= \left(1-\tau\right) y_1 - I\gamma + h\gamma + b, \\ c_2 &= \left(1-\tau\right)\left[y_2 + \alpha\Gamma\left(\gamma\right)\right] - b, \ \alpha \geq 0. \end{aligned}$$

[14] Calmfors (2001) arrives at a similar conclusion. However, he shows that in the absence of an inflation bias, monetary unification may push governments to do more reforms because the induced price and wage flexibility would ease adjustment to country-specific disturbances.

In the first period, agents have a taxable private endowment denoted by y_1. The tax rate τ remains constant over time. Private consumers have free access to capital markets. They borrow an amount b (positive or negative) in the first period to be fully repaid in the second period. For convenience and with no harm to the results, the real interest rate is set equal to the discount rate: zero.[15] A structural reforms package is characterized by its "size" $\gamma \geq 0$. Private agents perceive a constant marginal cost of reforms equal to I. As argued in Section 2, the private costs of reforms may take various forms such as foregone rents, typically because the sector in which the individual is working is opened up to competition, leading to a fall in the sectoral wage premium; a reallocation of resources across sectors, leading to temporary unemployment; or a relaxation of firing restrictions which increases the risk of unemployment. The latter two imply direct job search costs. To soften the adverse consequences of the reforms (and implicitly boost voters' support or prevent social conflicts), we suppose that governments are willing to grant a partial compensation for those costs under the form of a transfer proportional to the size of the reform package (see the next-to-final term in the first-period private budget equation where h denotes a fixed proportionality parameter).[16] In practice (see Section 2), compensation may range from direct monetary transfers (like an extension in unemployment benefits) to more indirect forms such as active labor market policies designed to enhance the employability of the individual and ease the matching between unemployed individuals and available vacancies. More generally, the compensation scheme $h\gamma$ can be viewed as the political sunk cost of reforms. Indeed, even if everyone in the economy were to gain in the long run, a price has to be paid to prevent the sometimes powerful constituencies of those who stand to lose rents in the short run from derailing the reform process, for instance through disruptive protests. Thus, we assume that h is given and beyond the control of the government. In the second-period budget constraint, structural reforms pay off, boosting private income y_2 by an amount $\alpha\Gamma(\gamma)$, where $\Gamma(0) = 0$, $\Gamma'(\gamma) > 0$ and $\Gamma''(\gamma) \leq 0$. The properties of $\Gamma(\gamma)$ exclude counterproductive reform packages and, to ensure interior solutions, assume constant or decreasing returns to scale of reforms.[17]

3.2 The government

We introduce a very simple political structure *à la* Alesina and Tabellini (1990) with two political parties, F and G, and given electoral uncertainty. The electoral uncertainty

[15] The real interest rate is exogenous and can be assumed to be determined in the world market (which is large relative to the union), reflecting perfect capital mobility.

[16] Grüner (2002) analyzes the role of compensations in a political model of labor-market reforms. The same article provides additional references to the relevant literature.

[17] Beyond its technical appeal, decreasing returns to scale is an intuitively plausible assumption. For example, assume that employment is inefficiently low due to the market power of workers (e.g. because of strict employment protection or the institutional role of trade unions in wage bargaining). Initial labor market reforms will "easily" drive down wage premia, boosting job creation. However, it will become increasingly difficult to create new jobs through additional reforms as wages converge towards their competitive levels.

induces the government in power to discount the future at a higher rate than is socially desirable. Ceteris paribus, this leads to a deficit bias, which provides a possible rationale for the introduction of fiscal rules. More sophisticated political structures than the one presented here exhibit similar properties. However, in order to concentrate on the issues at stake, we keep the political structure as simple as possible. Finally, there are no information asymmetries.[18]

A policymaker of party F only cares about the provision of the F-good, whereas she derives no utility from the production of G-goods and vice versa for a policymaker of party G. Allowing both parties to care about both types of public goods, but with different relative intensities, would again produce the deficit bias described below, but leave the analysis qualitatively unaffected. Therefore, we abstract from this complication. Further, both parties have identical preferences regarding private consumption of the population and share the representative agent's preferences in that regard. Hence, the utility of party P $(P = F, G)$ is given by:

$$\mathrm{E}_0 \left[u\left(c_1\right) + u\left(c_2\right) + v(q_1) + v(q_2) \right], \tag{2}$$

where $q_t = f_t$ if $P = F$ and $q_t = g_t$ if $P = G$ $(t = 1, 2)$.[19] For convenience, but without loss of generality, we assume that in the first period party F is in power. This party is re-elected with a given probability $0 < p < 1$. Uncertainty about re-election may stem from several sources, such as uncertainty about the voter turnout that affects the two parties differently, uncertainty about the appeal of the party's leadership to the voters, the occurrence of scandals, and so on.

In addition to its budget constraint, the government is subject to a binding fiscal arrangement ("a stability pact") reminiscent of the Stability and Growth Pact. In this stylized model, an "excessive deficit" arises if the deficit d in period 1 exceeds a certain threshold $\bar{d} > 0$. Any excessive deficit triggers pecuniary sanctions proportional to the overspending while surpluses or non-excessive deficits imply neither sanctions nor rewards. Specifically, a sanction of size $k\left(d - \bar{d}\right)$ is imposed if $d > \bar{d}$. We refer to $k \in [0; 1]$ as the "punishment parameter" so that our stability pact is characterized by $\left(k, \bar{d}\right)$.

Two practical observations need to be made at this stage. First, the actual operation of the SGP since the inception of EMU suggests a good deal of uncertainty regarding the imposition of pecuniary sanctions. One reason is that the procedure is long, leaving time

[18] In Rogoff (1990) for instance, temporary information asymmetries about the policymakers' competence suffice to bias equilibrium fiscal policy toward public consumption, producing a political cycle in the budget. By contrast to Rogoff, our model is purely "partisan".

[19] This means that public goods are only differentiated according to the political affiliation of the provider, a characteristic that admittedly matters only to the latter, and is consequently irrelevant for the private agent, for whom these goods are perfect substitutes. For instance, a consumer does not care about who provides public security but about the amount provided. Hence, our setup is formally identical to allowing for only one type of public good, while a party benefits from its provision only when it is in government.

for the country to adopt corrective measures. Another reason is that the procedure involves the ECOFIN (The Council of Ministers of Finance and Economic Affairs of the European Union) and is therefore subject to political manipulations.[20] To save space and simplify the notation, uncertainty about the sanctions will be ignored here. Earlier computations allowing for uncertainty about sanctions yield qualitatively identical results.[21] A second observation is that, beyond the uncertainty issue, the lag between the activation of the deficit procedure and the imposition of sanctions is also ignored in this model, that is, eventual fines have to be paid in period 1. Again, that assumption allows economizing on the number of cases we need to consider and is qualitatively unimportant.[22]

Accordingly, we write the first- and second-period government's budget constraints as:

$$\begin{aligned} f_1 + g_1 &= \tau y_1 - h\gamma + d + R, \text{ if } d \leq \bar{d}, \\ f_1 + g_1 &= \tau y_1 - h\gamma + d - k\left(d - \bar{d}\right) + R, \text{ if } d > \bar{d}, \\ \\ f_2 + g_2 &= \tau y_2 + (\tau\alpha + \beta)\,\Gamma(\gamma) - d, \ \beta \geq 0. \end{aligned}$$

The left-hand side of each equation represents spending allocated to the provision of public goods. On the right-hand side of period 1 budget constraint, we find the tax revenue τy_1 and the compensation paid to private agents $h\gamma$ (see above). The government has access to capital markets and may therefore finance a (first-period) deficit d. As no debt is inherited from the past, d also captures the public debt at the end of period 1. For convenience, we assume that the real interest rate paid on government debt is zero (same assumption as for the private sector). The direct proportionality between sanctions and the magnitude of the excessive deficit is reminiscent of the SGP, even though, for obvious tractability reasons, we ignore the cap on sanctions (0.5% of GDP). Our assumptions about the formal specification of the stability pact are similar to those adopted in Beetsma and Uhlig (1999) and Beetsma and Jensen (2003) except that those papers assume a symmetric arrangement where deficits below the threshold $\left(d < \bar{d}\right)$ give rise to rewards. The sanction mechanism is administered by an unelected, supranational utilitarian authority (e.g. the European Commission). Fines collected from countries with excessive deficits

[20] The procedure unfolds as follows. First, the European Commission prepares recommendations on the basis of countries' macroeconomic and budgetary data. Second, the ECOFIN decides whether to follow the recommendation or not. Third, sanctions may be decided if the country fails to comply with the injunction to correct its fiscal trajectory. However, the formal activation of the Excessive Deficit Procedure and the subsequent imposition of sanctions are subject to qualified majority voting by the ECOFIN and thereby exposed to political bargaining. Strauch and von Hagen (2001) provide a detailed analysis of the SGP in the light of effectiveness criteria of fiscal rules.

[21] Formally, a higher chance that sanctions will indeed be imposed when $d > \bar{d}$ is equivalent to an increase in the punishment parameter k introduced for a given excessive deficit level (see below). The computations are available upon request.

[22] Earlier computations allowing for second-period sanctions in response to a first-period excessive deficit are available upon request.

are redistributed equally among all Member States under the form of a rebate R. Since each country was assumed to be small with respect to the rest of the Union, individual governments view the size of the rebate as given. Finally, the first-period income (and thus tax revenue) is uncertain, giving rise to uncertainty about the fiscal deficit. To avoid complicated piecewise linear programming problems, we assume that $y_1 = y_L$ (adverse shock on first-period resources) with probability $\frac{1}{2}$ and $y_1 = y_H$ (positive shock) with probability $\frac{1}{2}$, and with $y_L < y_H$. Finally, we will carry out our analysis under the assumption that the variance of the first-period income is such that it is optimal for the government to set $d > \bar{d}$, when $y_1 = y_L$, and $d \leq \bar{d}$ when $y_1 = y_H$.[23]

The right-hand side of the period 2 budget constraint includes tax revenue τy_2, repayment of the public debt and the fiscal benefits of the structural reforms carried out in period 1. Those benefits materialize only in period 2 to reflect the potentially long lags with which structural measures affect the economy. In line with the discussion in Section 2, the direct fiscal impact of reforms (e.g. saving on administrative costs, unemployment benefits, social programs and active labor market policies) is captured by the term $\beta\Gamma(\gamma)$ while the indirect effect through higher tax revenue is represented by $\tau\alpha\Gamma(\gamma)$ so that the total budgetary gains from reforms amount to $(\tau\alpha + \beta)\Gamma(\gamma)$. Given the properties of $\Gamma(\gamma)$ (described above), the marginal budgetary impact of reforms decreases with γ, the size of the reform package. For the sake of tractability, we thus assume that both the direct and indirect budgetary impacts of the reform are governed by the same function $\Gamma(\gamma)$. Also, for tractability purposes, we assume that α, β and y_2 are constant, rather than stochastic. Again, relaxing those assumptions is straightforward, but does not add much additional insight to our analysis.

3.3 The timing

The timing of events is as follows:

1. The government of a representative country implements a structural reform of size γ.
2. The value for y_1 realizes.
3. d and b are selected by the government and the private individual, respectively. Sanctions are imposed when d exceeds $\bar{d}$.
4. Elections take place (beginning of period 2).
5. All debts are paid off.

[23] We assume that $\bar{d} < \tau y_2$, so that the model can indeed give rise to excessive deficits resulting in an amount of debt that can be paid off for any given level of structural reform.

4 Solution of the model

To keep algebraic expressions readable, all the solutions are derived under the assumption of perfectly correlated business cycles so that, either $y_1 = y_L$ for all countries, or $y_1 = y_H$ for all countries. This assumption, consistent with the case in which the monetary union would be an optimum currency area, implies that, in case of bad shocks, fines and rebates cancel out in equilibrium. This prevents second-order effects on the marginal utility of public goods – unlikely to be large in practice.

4.1 The private agent's debt choice

There are two decision points in the game, namely at Stage 1 and Stage 3 in the timing presented above. To ensure time consistency, we solve the model backwards. We start with the decision of the representative consumer at Stage 3. The optimal amount of private debt b maximizes $u(c_1) + u(c_2)$. The first-order condition is $u'(c_1) = u'(c_2)$, which under our assumptions about the discount rate and the interest rate, yields a flat consumption profile over time. Accordingly, $b = \frac{1}{2}(1-\tau)[y_2 - y_1 + \alpha\Gamma(\gamma)] + \frac{1}{2}(I-h)\gamma$ and

$$c_1 = c_2 = \tfrac{1}{2}\left[(1-\tau)(y_1 + y_2 + \alpha\Gamma(\gamma)) + (h-I)\gamma\right].$$

4.2 Optimal fiscal policy (Stage 3)

Define $V(y_1, k, p; d, \gamma)$ as the value function for the (first-period) government (conditional on the realization of y_1) at the *end* of Stage 3, taking d and γ as given. That value function is a function of the punishment parameter k which characterizes the stability pact and the probability p that the first-period government will be re-elected.

Since a government only values the provision of its own differentiated public good, it discounts future utility according to the probability of re-election. Hence, if $y_1 = y_L$, the government maximizes over $d > \bar{d}$ the function $V(y_L, k, p; d, \gamma)$, where:

$$V(y_L, k, p; d, \gamma) = v\left[\tau y_L - h\gamma + d - k\left(d - \bar{d}\right) + R\right] + pv\left[\tau y_2 + (\tau\alpha + \beta)\Gamma(\gamma) - d\right].$$

The first-order condition equalizes the marginal benefit of a fiscal expansion (additional public goods in period 1) with the perceived marginal cost in terms of foregone public goods in the future. It is given by:

$$v'\left[\tau y_L - h\gamma + d - k\left(d - \bar{d}\right) + R\right](1-k) = pv'\left[\tau y_2 + (\tau\alpha + \beta)\Gamma(\gamma) - d\right]. \tag{3}$$

Given the properties of $v(\cdot)$, an increase in the deficit d reduces the left-hand side (the marginal benefit), but raises the right-hand side (the marginal cost), indicating that there

exists at most one solution, which we denote by $d_L(\gamma)$. The second-order derivative of $V(y_L, k, p; d, \gamma)$ with respect to d is negative, ensuring that the solution maximizes utility (see the Appendix – available upon request). Further, notice that the optimal deficit $d_L(\gamma)$ increases with the magnitude of the negative shock (that is, the lower is y_L), so that $d_L(\gamma) > \bar{d}$ for a sufficiently large variance of the shock to period-1 resources.[24] Finally, for notational convenience, we denote $V(y_L, k, p; d_L(\gamma), \gamma)$, the value function at the *start* of Stage 3 when $y_1 = y_L$, by V_L.

In case of a positive shock to period-1 resources (that is, $y_1 = y_H$), the government chooses $d \leq \bar{d}$ such that $V(y_H, k, p; d, \gamma)$ is maximized. Since

$$V(y_H, k, p; d, \gamma) = v(\tau y_H - h\gamma + d + R) + pv[\tau y_2 + (\tau\alpha + \beta)\Gamma(\gamma) - d],$$

the first-order condition becomes

$$v'(\tau y_H - h\gamma + d + R) = pv'[\tau y_2 + (\tau\alpha + \beta)\Gamma(\gamma) - d], \tag{4}$$

where it can be checked ex-post that $d_H(\gamma) \leq \bar{d}$ for sufficiently large values of y_H. As above, we denote $V(y_H, k, p; d_H(\gamma), \gamma)$ by V_H.

These first-order conditions allow analyzing the reaction of the optimal fiscal policy to changes in the punishment parameter k and in the amount of structural reforms γ. As indicated above, the assumption of identical shocks hitting identical countries leads us to focus on a symmetric equilibrium in which fines and rebates cancel out when $y_1 = y_L$ and $R = 0$ when $y_1 = y_H$ (no country is subject to sanctions). Accordingly, we rewrite (3) and (4) as:

$$v'(\tau y_L - h\gamma + d)(1 - k) = pv'[\tau y_2 + (\tau\alpha + \beta)\Gamma(\gamma) - d], \tag{5}$$

$$v'(\tau y_H - h\gamma + d) = pv'[\tau y_2 + (\tau\alpha + \beta)\Gamma(\gamma) - d]. \tag{6}$$

These simplifications make it straightforward, by differentiating (5) and (6) – see also the Appendix (available upon request), to prove the following lemma, which will be of help for the analysis in the next section:

Lemma 1 *More ambitious structural reforms (that is, higher γ) increase deficits in good as well as in bad states of the economy; formally, $\frac{\partial d_L}{\partial \gamma} = h\lambda_L + (\tau\alpha + \beta)\Gamma'(\gamma)(1 - \lambda_L) > 0$ and $\frac{\partial d_H}{\partial \gamma} = h\lambda_H + (\tau\alpha + \beta)\Gamma'(\gamma)(1 - \lambda_H) > 0$. Here,*

[24] It is straightforward to check this numerically in the linear-quadratic version of the model presented in the Appendix (available upon request).

$$\lambda_L \equiv \frac{v''(f_{1L})(1-k)}{v''(f_{1L})(1-k)+pv''(f_{2L})},\ \lambda_H \equiv \frac{v''(f_{1H})}{v''(f_{1H})+pv''(f_{2H})}, \tag{7}$$

where

$$f_{1j} \equiv \tau y_j - h\gamma + d_j,\ f_{2j} \equiv \tau y_2 + (\tau\alpha+\beta)\Gamma(\gamma) - d_j,\ j = L, H. \tag{8}$$

In other words, ceteris paribus, more ambitious structural reforms raise the deficit to compensate for the fact that reforms reallocate resources away from the provision of public goods in the first period to the benefit of the second period.

4.3 The optimal reform package (Stage 1)

To determine the optimal reform package, the government solves the following program:

$$\underset{\gamma}{\text{Max}} \left\{2\text{E}_0\left[u(c_1)\right] + \tfrac{1}{2}\left[V_L + V_H\right]\right\}, \tag{9}$$

taking k as given and where we have made use of the result that $c_2 = c_1$. Thanks to the fact that $\frac{\partial V_L}{\partial d_L} = 0$ and $\frac{\partial V_H}{\partial d_H} = 0$ (see (3) and (4), respectively) the first-order condition for optimal reforms can be written as:

$$\text{E}_0\left\{u'(c_1)\left[h + (1-\tau)\alpha\Gamma'(\gamma) - I\right]\right\} + \tfrac{1}{2}\left[\tfrac{\partial V_L}{\partial \gamma} + \tfrac{\partial V_H}{\partial \gamma}\right] = 0, \tag{10}$$

where

$$\begin{aligned}
\tfrac{\partial V_L}{\partial \gamma} &= -hv'\left(\tau y_L - h\gamma + d_L - k\left(d_L - \bar{d}\right) + R\right) + p(\tau\alpha+\beta)\Gamma'(\gamma)v'(f_{2L}), \\
\tfrac{\partial V_H}{\partial \gamma} &= -hv'(\tau y_H - h\gamma + d_H) + p(\tau\alpha+\beta)\Gamma'(\gamma)v'(f_{2H}).
\end{aligned}$$

Using the cross-country symmetry of the equilibrium and after simplifying, we have:

$$\begin{aligned}
&\text{E}_0\left\{u'(c_1)\left[h + (1-\tau)\alpha\Gamma'(\gamma) - I\right]\right\} = \tfrac{1}{2}h\left[v'(f_{1L}) + v'(f_{1H})\right] \\
&-\tfrac{1}{2}p(\tau\alpha+\beta)\Gamma'(\gamma)\left[v'(f_{2L}) + v'(f_{2H})\right].
\end{aligned} \tag{11}$$

Finally, using (5) and (6), we rewrite (11) further as:

$$\begin{aligned}
&\text{E}_0\left\{u'(c_1)\left[h + (1-\tau)\alpha\Gamma'(\gamma) - I\right]\right\} \\
= \ &\tfrac{1}{2}\left[h - (\tau\alpha+\beta)\Gamma'(\gamma)(1-k)\right]v'(\tau y_L - h\gamma + d_L) + \\
&\tfrac{1}{2}\left[h - (\tau\alpha+\beta)\Gamma'(\gamma)\right]v'(\tau y_H - h\gamma + d_H).
\end{aligned} \tag{12}$$

We can show that for $k > 0$ not too large, this equation yields at most one solution for γ. For this solution, the second-order condition for a maximum is fulfilled (see the Appendix – available upon request). The existence of a solution requires that both sides of (12) are of the same sign. Suppose that $k = 0$. Then, a solution for γ requires that either (i) $(\tau\alpha + \beta)\,\Gamma'(\gamma) > h$ *and* $I > h + (1-\tau)\,\alpha\Gamma'(\gamma)$ or (ii) $(\tau\alpha + \beta)\,\Gamma'(\gamma) < h$ *and* $I < h + (1-\tau)\,\alpha\Gamma'(\gamma)$.[25] In case (i), we find the intuitively plausible condition that the total (budgetary) benefit of structural reforms must be sufficiently large. The second condition indicates that, to make the choice problem interesting, the individual costs of reforms must also be sufficiently large. Notice that an ambitious reform policy (that is, a higher γ when $\Gamma'' < 0$) makes the condition $(\tau\alpha + \beta)\,\Gamma'(\gamma) > h$ less likely to hold and the condition $I > h + (1-\tau)\,\alpha\Gamma'(\gamma)$ more likely to hold (and vice versa for a lower γ), indicating that if an optimal reform package exists, it will most probably reflect a middle-of-the-road approach. In other words, radical plans simply do not stand a chance in the quite general environment described in this model. The formal implication of this is that an appropriate choice of the function $\Gamma'(\gamma)$ allows to restrict the analysis to the intuitively plausible case (i), which we do henceforth. In the case where $\Gamma'(\gamma) \to \infty$ as $\gamma \to 0$ and $\Gamma'(\gamma) \to 0$ as $\gamma \to \infty$, there always exists a solution $\gamma > 0$. Further, the Appendix (available upon request) provides an explicit characterization of a solution $\gamma > 0$ under weak parameter restrictions and the assumption that $u(\cdot)$ and $v(\cdot)$ are quadratic and $\Gamma(\gamma)$ is linear.

5 Implications of a pact for deficits and reform

In this section, we explore the implications of a pact for deficits and structural reforms. However, before doing so, we compare the optimal policies chosen by a partisan government subject to a stability pact $(k, \bar{d})$ with the socially-optimal policies determined by a hypothetical social planner who shares the representative individual's preferences.

5.1 Comparison with a social planner

The planner does not care about the composition of public spending and she faces no electoral uncertainty. By definition, then, there is no justification for imposing a stability pact or any other institutional restriction on a social planner. Therefore, the solution to the social planner's problem (denoted by superscript "S") corresponds to that of a government that is certain to be re-elected (i.e., $p = 1$) and that is not exposed to any sanction (i.e., $k = 0$).

We first compare the optimal fiscal policies for a given level of structural reforms:

[25] By continuity of all the functions involved, if a solution $\gamma > 0$ exists for $k = 0$, there also exists one for $k > 0$, but not too large.

Lemma 2 *If k is not too large, then for a given level of structural reforms the deficit under a partisan government is larger than the socially-optimal level, that is $d_L^S(\gamma) < d_L(\gamma)$ and $d_H^S(\gamma) < d_H(\gamma)$.*

Proof. Differentiate (5) and (6) with respect to p holding γ fixed. We find that $\partial d_L/\partial p < 0$ and $\partial d_H/\partial p < 0$. As the case of the planner corresponds to $p = 1$ and $k = 0$, the result follows for $k = 0$. By continuity it follows also for k not too large. ■

Comparing the optimal structural policies, we have the following proposition:

Proposition 3 *If the punishment parameter k of the stability pact $(k, \bar{d})$ is not too large, then a partisan government provides a suboptimally low amount of structural reforms compared to the social optimum.*

Proof. Let $k = 0$ and consider (12) for both a partisan government and a social planner ($p = 1$, in which case d_L^S and d_H^S replace d_L and d_H, respectively). The left-hand side of (12) is decreasing in γ and in both cases equal for given γ. Taking account of the effect on the deficit, the right-hand side of (12) is increasing in γ, while, for given γ, it is larger under a partisan government than under a planner, because $d_L(\gamma) > d_L^S(\gamma)$ and $d_H(\gamma) > d_H^S(\gamma)$ by Lemma 2. Hence, the value of γ that solves (12) for the partisan government is larger than the one that solves it for the planner. By continuity of all functions involved, the result also holds for $k > 0$, but not too large. ■

Electoral uncertainty pushes a partisan government to discount the future state of the economy more than it should, resulting in policies that transfer resources away from the future to the benefit of current public consumption. Lemma 1 showed earlier that, for a given amount of structural reforms, such transfers can be organized directly through additional public debt accumulation. As Proposition 3 demonstrates, these intertemporal transfers also take place indirectly through reduced structural reforms. However, the underprovision of structural reforms makes the comparison of the final outcomes of the deficit potentially ambiguous. Indeed, Lemma 1 indicates that, ceteris paribus, the lower amount of reforms under a partisan government reduces equilibrium deficits so that it cannot be excluded that the latter are actually lower under a partisan government than under a social planner. The Appendix (available upon request) shows that, at least with quadratic specifications for utility and a linear specification for the budgetary effect of reform, the comparison of the final deficit outcomes can go in either direction, depending on the parameter values. However, if the concavity of the budgetary effect of reform is sufficiently strong, the levels of reform under a planner and a partisan government are close enough to ensure that that the deficit under the latter will be higher.

5.2 The impact of (more severe) sanctions

Having shown that electoral uncertainty leads a partisan government to create an excessive deficit (for a given level of reform), we now turn to the question how (harsher) sanctions

under a stability pact influence the deficit. This leads us to the following lemma, which is easy to prove by differentiating (5) and (6) – see also the Appendix (available upon request):

Lemma 4 *For a given amount of structural reforms (γ), an increase in the punishment parameter of the pact (k) lowers the optimal deficit after an adverse resource shock ($y_1 = y_L$), that is $\frac{\partial d_L}{\partial k} < 0$. Trivially, d_H is not affected by k.*

An increase in k discourages borrowing in the event of a bad shock, because it artificially raises the expected cost of borrowing.

While Lemma 4 establishes the "direct" implications of tighter sanctions on the deficit, there is also an indirect effect, as sanctions impact on structural reform, which in turn affects the deficit as Lemma 1 shows. By differentiating (11) with respect to k, we can assess the effect of a stability pact on optimal fiscal and reform policies.

Lemma 5 *If a stability pact $\left(k, \bar{d}\right)$ is effective at reducing the deficit (that is, if $\frac{\partial d_L}{\partial k} < 0$), then it also leads to less ambitious structural reforms as one can write $\frac{\partial \gamma}{\partial k} = C\frac{\partial d_L}{\partial k}$, where $C > 0$.*

The underlying intuition is straightforward. As shown in Lemma 1, more reforms optimally trigger a fiscal expansion, indicating that, in equilibrium, partisan governments face a trade off between reducing one distortion (e.g., too little reforms) at the cost of aggravating another (e.g., a greater excessive deficit). Therefore, any institutional arrangement constraining the optimal response of fiscal policy to structural policies will inevitably have repercussions on the optimal design of the latter. This is precisely what Lemma 5 shows, confirming that if our stability pact represents an effective tool of fiscal restraint, the bias towards insufficient reforms will worsen.

To conclude this section, we characterize the effect of a stability pact $\left(k, \bar{d}\right)$ on the equilibrium mix of fiscal and structural policies. Therefore, we differentiate (5) and obtain an expression of the format $\frac{\partial d_L}{\partial k} = A + B\frac{\partial \gamma}{\partial k}$, where $A, B > 0$. Combining this with the result of Lemma 5, gives the following proposition whose proof is in the Appendix (available upon request):

Proposition 6 *For $k \in [0, 1]$ not too large, a tightening of the pact $\left(k, \bar{d}\right)$ through an increase in the punishment parameter k leads to a lower deficit and less structural reforms.*

6 Welfare-improving fiscal rules

6.1 Does a stability pact paise welfare?

The existence of an expansionary fiscal bias and the costs of addressing it with a stability pact naturally raise the issue of the desirability of the latter in terms of welfare. To see

how the introduction of a stability pact affects welfare, we increase k, starting from $k = 0$, and track the effect on welfare. Differentiating (1) with respect to k, we find, after some manipulation reported in the Appendix (available upon request), the condition for a pact to be welfare-improving:

$$\begin{aligned}&\tfrac{1}{2}v'(f_{1L})\left[\left(\tfrac{p-1}{p}\right)\tfrac{\partial d_L}{\partial k}+\tfrac{1-p}{p}\left(\tau\alpha+\beta\right)\Gamma'\left(\gamma\right)\tfrac{\partial\gamma}{\partial k}\right]\\&+\tfrac{1}{2}v'(f_{1H})\left[\left(\tfrac{p-1}{p}\right)\tfrac{\partial d_H}{\partial k}+\tfrac{1-p}{p}\left(\tau\alpha+\beta\right)\Gamma'\left(\gamma\right)\tfrac{\partial\gamma}{\partial k}\right]>0.\end{aligned}\tag{13}$$

If $p < 1$, the introduction of a pact has a positive welfare effect by discouraging deficits, which for a given level of structural reforms are too high from a social perspective (Lemma 2), and a negative welfare effect through its negative impact on reform (see Proposition 6), which is already suboptimally low to start with (Proposition 3). Realizing that $\partial d_H/\partial k = 0$, we can rewrite (13) as:

$$\frac{1}{\left(\tau\alpha+\beta\right)\Gamma'\left(\gamma\right)}\left[\frac{v'(f_{1L})}{v'(f_{1L})+v'(f_{1H})}\right]\frac{\partial d_L}{\partial k}<\frac{\partial\gamma}{\partial k}<0.\tag{14}$$

The following proposition summarizes three lessons regarding the welfare effect of a stability pact:

Proposition 7 *(i) Electoral uncertainty is the only motivation for a stability pact. Indeed, if a government is sure to be re-elected ($p = 1$), the introduction of a pact has no first-order welfare effect. (ii) The net welfare effect resulting from a stability pact depends upon its relative effectiveness at reducing d_L compared to the induced adverse impact on structural reforms. (iii) As a result, given $\partial d_L/\partial k$, a stability pact is more likely to improve welfare when the marginal budgetary effect of reform, $(\tau\alpha+\beta)\Gamma'(\gamma)$, is smaller.*

Considering our previous results, the underlying intuitions should be clear. First, under electoral certainty ($p = 1$) and in the absence of a stability pact ($k = 0$), a partisan government behaves as a social planner, delivering socially-optimal structural reforms and deficit. Given that it is optimal from society's perspective to have $k = 0$ when $p = 1$, a marginal increase in k at this point can have no first-order welfare effect. Second, the optimal design of the stability pact faces the trade-off between the reduction in the excessive deficit bias and the increase in the under-reform bias. Hence, if the pact is highly effective at reducing the deficit bias, but leads to only a minor worsening of structural reform decisions, then its introduction will improve welfare. Third, for given $\frac{\partial\gamma}{\partial k}$ and $\frac{\partial d_L}{\partial k}$, a pact is more likely to reduce welfare if $(\tau\alpha+\beta)\Gamma'(\gamma)$ is larger, that is if the marginal budgetary benefit from reform in the second period is larger. The reason is that, through its adverse effect on structural reforms, the pact indirectly reduces the amount of resources available for public consumption in period 2.

In general, we cannot say whether (14) holds. By differentiating the first-order condition (11) for γ we obtain a relation between $\frac{\partial \gamma}{\partial k}$ and $\frac{\partial d_L}{\partial k}$. However, combining this relation with (14) does not provide us with an unambiguous answer as to whether the introduction of a pact is welfare enhancing. The Appendix (available upon request) shows that with quadratic specifications for utility and a linear specification for the budgetary effect of reform, the introduction of a pact may be welfare-improving or welfare-deteriorating, depending on the parameters.

6.2 A smarter pact?

As shown above, a stability pact $\left(k, \bar{d}\right)$ specifically targets the excessive deficit problem, but ignores the collateral damage on the front of structural reforms. In other words, the stability pact sacrifices future growth for present stability. Our analysis made clear that such a trade-off is a potentially serious obstacle to the social desirability of a stability pact. The task we now face is to refine our fiscal discipline device, with the aim of finding a "smart" pact that will still be effective at reducing excessive deficits but with only limited adverse repercussions on reforms. In addressing that issue, we stay (qualitatively) close to the plan of the European Commission to allow for a possible (temporary) relaxation of the SGP when a country implements large structural reforms (see Section 2). Accordingly, we now assume a stability pact $\left(k, \bar{d}\left(\gamma\right)\right)$ such that:

$$\bar{d} = \bar{d}^c + \delta\gamma, \ \ \delta > 0, \tag{15}$$

so that the deficit cap $\bar{d}$ is raised when structural reform is higher.[26] Hence, the first-order condition for the choice of γ is again given by (10), but now with:

$$\begin{aligned} \frac{\partial V_L}{\partial \gamma} &= -\left(h - \delta k\right) v'\left(f_{1L}\right) + p\left(\tau\alpha + \beta\right)\Gamma'\left(\gamma\right) v'\left(f_{2L}\right), \\ \frac{\partial V_H}{\partial \gamma} &= -h v'\left(f_{1H}\right) + p\left(\tau\alpha + \beta\right)\Gamma'\left(\gamma\right) v'\left(f_{2H}\right), \end{aligned}$$

so that

$$\begin{aligned} &\mathrm{E}_0\left\{u'\left(c_1\right)\left[h + \left(1-\tau\right)\alpha\Gamma'\left(\gamma\right) - I\right]\right\} = \tfrac{1}{2}h\left[v'\left(f_{1L}\right) + v'\left(f_{1H}\right)\right] \\ &-\tfrac{1}{2}p\left(\tau\alpha + \beta\right)\Gamma'\left(\gamma\right)\left[v'\left(f_{2L}\right) + v'\left(f_{2H}\right)\right] - \tfrac{1}{2}\delta k v'\left(f_{1L}\right). \end{aligned} \tag{16}$$

As before, the second-order condition holds and at most one solution for γ exists when $k > 0$ is not too large. In these conditions, the right-hand sides of (11) and (16) are both

[26] The arrangement analyzed here is based on relaxing the deficit threshold, rather than the "underlying budgetary position" (presumably the Commission's jargon to express budget figures corrected for cyclical influences). Nevertheless, both arrangements should have similar effects on the incentives for structural reforms, because they reduce the adverse consequences (such as public rebukes or financial penalties) of a resulting deterioration of the public budget in the short run.

increasing in γ. Then, because for given γ the right-hand side of (16) is smaller than that of (11), reform under a stability pact $\left(k, \bar{d}(\gamma)\right)$ is higher than under a pact $\left(k, \bar{d}\right)$ with a fixed reference deficit level (assuming a solution for $\gamma > 0$ exists in both cases, which is guaranteed by a suitable specification of $\Gamma(\gamma)$).

How does (15) affect the desirability of a pact?[27] Again, we differentiate (1) with respect to k, but now assuming (15), and evaluate the derivative at $k = 0$. We observe from (16) that, at $k = 0$, this condition reduces to (11) so that at this point the solution for γ coincides with the one obtained for a fixed $\bar{d}$. We can show that $\frac{\partial \gamma}{\partial k}_{|\delta>0} = \frac{\partial \gamma}{\partial k}_{|\delta=0} + D$, where $D > 0$ and linear in δ. Of course, the condition for a welfare-improving stability pact still depends on the relation between $\frac{\partial \gamma}{\partial k}$ and $\frac{\partial d_L}{\partial k}$, which is again given by (14). However, the condition is now more easily fulfilled because $\frac{\partial \gamma}{\partial k}_{|\delta>0} > \frac{\partial \gamma}{\partial k}_{|\delta=0}$. In fact, it is possible to pick δ large enough so that the condition is always fulfilled.[28] We can thus summarize the results of this subsection as follows:

Proposition 8 *(i) The introduction of a stability pact is more likely to be welfare enhancing (i.e., the set of parameter combinations for which a pact is welfare enhancing is larger) when sanctions are made contingent on the amount of structural reforms as prescribed by (15). (ii) There always exists a degree of contingency δ of the reference deficit level that makes the introduction of a pact beneficial.*

In connection with the second part of this proposition, one should observe that there are of course practical limitations to the degree of contingency of the deficit cap on the size of the reform package. In particular, if the size of reforms is only imperfectly observable, governments may have an incentive to overstate the amount of reform they conduct simply to justify increased government consumption unrelated to the reform policy. We leave for further research a detailed analysis of the optimally-contingent stability pact given such operational constraints.

Before concluding, it is worth emphasizing the specific contribution of this analysis with respect to the related literature, and especially the formal analyses of Peletier et al. (1999) and Blanchard and Giavazzi (2003) as well as other papers looking informally or empirically at the linkage between the design of fiscal rules and the overall "quality" of fiscal policy (such as von Hagen et al., 2002 and the references therein, and Buti et al., 2003). First, our paper provides an explicit model of the type of incentives produced by the Stability and Growth Pact in an environment where the quality of fiscal policy is critical and defined in general terms. This allows highlighting concrete amendments to the actual arrangement such as a flexible interpretation of the punishment threshold by

[27] All relevant calculations are in the Appendix – available upon request.

[28] If for $k = 0$, $d > \bar{d}$ when $y_1 = y_L$, then the introduction of a pact does not push the deficit into the range where sanctions are not applied, the reason being that we consider a marginal increase in k which, by continuity of all functions involved, has only a marginal impact on γ and, thus, on the threshold deficit level.

a politically independent institution. Second, our model provides a fairly general welfare analysis of fiscal institutions analogous to the SGP. Third, the analysis implicitly warns against a narrow definition of the quality of fiscal policy. Specifically, we argue that "good" fiscal policies may involve a wide range of expenditure categories (such as transfers) not necessarily related to the traditional distinction between "good" and "bad" expenditure categories. As a result, the reconciliation of stability and growth may well have to rely on non-politicized judgement based on the existing simple rules (as assumed in our formal analysis and proposed by the European Commission) rather than refined rules based on arbitrary accounting principles prone to politically-motivated creative accounting.

7 Concluding remarks

This paper has explored the incentives of a partisan government facing electoral uncertainty to undertake structural reforms when its fiscal decisions are constrained by a discipline-enhancing device similar to the Euro area's Stability and Growth pact. As discussed above, this is a critical issue in a region whose growth potential is arguably constrained by significant rigidities, especially in product and labor markets. The linkages between structural reforms and government budgets are numerous and diverse, ranging from the design of less distortionary tax codes to direct upfront costs and compensations for the temporary losses incurred by some categories of the population. The European Commission itself recognizes the existence of a potential short-run conflict between the pact's stated objectives, namely growth and stability, and has recently announced that the interpretation of the pact may be relaxed for countries that are actively pursuing structural reforms.

Our model features a partisan government uncertain to be re-elected and therefore eager to deliver its preferred public goods while in power. Because such a government discounts future states of the economy more heavily than what is socially desirable, the short-run political equilibrium is characterized by excessive deficits and unsatisfactory structural reforms. The deficit bias justifies the introduction of an institutional device which, like the Stability and Growth pact, provides governments with external incentives to maintain fiscal discipline. However, if reforms imply upfront fiscal costs, the pact further lessens the government's incentives to carry out structural reforms, sacrificing future growth for the sake of present stability. In particular, stronger punishments for fiscal profligacy induce a reduction in structural reforms as the governments also find it desirable to save on the upfront costs of reforms. The resulting trade-off between present stability and future growth has clear welfare implications, making an apparently desirable fiscal discipline device potentially counterproductive. A stability pact is more likely to be welfare-improving if its effect on reforms is relatively small compared to its effect on deficits. We have shown that the social desirability of a pact can be improved if its implementation can be made contingent on countries' efforts in terms of structural reforms.

In particular, we emphasized the positive welfare impact of a more flexible interpretation of the deficit threshold based on a broad judgement about the quality of fiscal policy by a politically independent institution. Although this arrangement does not exactly match the specific proposal made by the Commission in November 2002, our result underscores the general point that more flexibility may be needed in dealing with countries that are serious about structural reform. Implicitly, our result also warns against introducing complex refinements to the current set of rules. Indeed, the quality of fiscal policy goes beyond simple ratios between categories of expenditure.

The present analysis relies on a number of assumptions calling for extensions of great practical relevance. First, as in most existing analyses of the Stability and Growth pact, the excessive deficit procedure, including the imposition of pecuniary sanctions was assumed to be perfectly credible. Although our results remain broadly the same when we assume exogenously uncertain sanctions, it would be desirable to have a model that explicitly acknowledges the political dimension of the SGP's design and, above all, implementation. To put it simply, if politics matter for policy choices, it should also matter for the design and implementation of the SGP and that certainly needs to be modelled in view of recent history.

Second, we assumed away a series of operational difficulties in the implementation of the pact, especially if the latter is to be made contingent on structural policies. One of these difficulties is the objective observability of structural reforms, including the possibility to distinguish between truly effective measures and pure window dressing. Another practical difficulty is the precise identification of the upfront costs from reforms. In particular, we argued that "compensation" schemes (e.g. transfers) should be part of the calculation of those costs. But how do we "objectively" assess the compensation measures? That remains unsolved. More generally, a greater degree of contingency of the SGP might result in additional loopholes and manipulation opportunities which, as discussed in Strauch and von Hagen (2001), might harm the effectiveness of fiscal restraints. Also, these aspects are linked to our first remark about the role of politics in the pact's implementation. It seems clear that governments might be tempted to resort to superficial structural measures or rename spending on pork as "compensation" schemes, simply to obtain an exemption from the excessive deficit procedure. This is another reason why we believe the implementation of a socially desirable stability pact should rest in the hands of supranational institution, independent from short-term political pressure and with the expertise to judge the overall quality of fiscal policy (see also Buiter, 2003). At present, it seems that only the European Commission is able to play that role.

Third, further research might pursue more realistic modelling of the economic and budgetary effects of reforms. In particular, a growing empirical literature emphasizes complementarity between various types of reforms, calling for comprehensive and internally-balanced reform packages. In particular, this raises the possibility of intervals of increasing returns to scale in reforms (contrary to what we have assumed).

Fourth, distributive politics should obviously play a role in further analysis. We have assumed that each individual was affected in exactly the same way by structural measures and that the compensation individuals needed to support the reform was exogenous. In reality, reforms often raise important distributional issues affecting the probability of re-election. In that context, it would be interesting to study how opportunistic (instead of partisan) governments would behave. In particular, the presence of a pact may reduce the scope for compensations and weaken the incentive for reform if the government fears that it affects its re-election chances too adversely (see also Beetsma and Jensen, 2003).

Finally, from a normative perspective, it would be useful to investigate in greater detail the optimal design of fiscal rules. In principle, fiscal rules both prohibit governments to produce excessive deficits and may give them the incentives to pursue adequate structural reforms. Rules or restrictions on (certain categories of) public spending may be one example (for example, see Milesi-Ferretti, 2003). Such rules would allow governments to compensate specific groups that are particularly hurt by the reform, but would avoid overspending otherwise. Hence, despite many analytical and practical challenges, we believe fiscal rules can be made smarter and that the limitations of a presently unsatisfactory arrangement are no serious reason for scrapping it altogether.

References

[1] Alesina, A. and G. Tabellini, 1990, A Positive Theory of Fiscal Deficits and Government Debt, *Review of Economic Studies* 57, 403-14.

[2] Alesina, A. and A. Drazen, 1991, Why Are Stabilizations Delayed?, *American Economic Review* 81, 1170-1188.

[3] Artis, M. and B. Winkler, 1998, The Stability pact: Safeguarding the Credibility of the European Central Bank, *National Institute Economic Review* 163, 87-98.

[4] Beetsma, R. and H. Jensen, 2003, Contingent Deficit Sanctions and Moral Hazard with a Stability pact, *Journal of International Economics*, forthcoming.

[5] Beetsma, R. and H. Uhlig, 1999, An Analysis of the Stability and Growth Pact, *Economic Journal* 109, 546-71.

[6] Belot, M. and J. van Ours, 2000, Does the Recent Success of Some OECD Countries in Lowering their Unemployment Rates Lie in the Clever Design of their Labour Market Reforms?, *IZA Discussion Paper*, No 147, Bonn.

[7] Blanchard, O., 2002, Designing Labor Market Institutions, *mimeo*, MIT, available at: http://econ-www.mit.edu/faculty/blanchar/papers.htm.

[8] Blanchard, O. and F. Giavazzi, 2003, Improving the SGP Through a Proper Accounting of Public Investment, *mimeo*, MIT, available at: http://econ-www.mit.edu/faculty/blanchar/papers.htm.

[9] Blanchard, O. and J. Wolfers, 2000, The Role of Shocks and Institutions in the Rise of European Unemployment: The Aggregate Evidence, *Economic Journal* 110, C1–33.

[10] Brunila, A., Buti, M. and D. Franco, 2001, *The Stability and Growth Pact*, Palgrave, Basingstoke.

[11] Buiter, W.H., 2003, Ten Commandments for a Fiscal Rule in the E(M)U, *mimeo*, European Bank for Reconstruction and Development.

[12] Buti, M., S. Eijffinger and D. Franco, 2003, Revisiting the Stability and Growth Pact: Grand Design or Internal Adjustment?, *CEPR Discussion Paper*, No. 3692, London.

[13] Buti, M., von Hagen, J. and C. Martinez-Mongay (eds.), 2002, *The Behavior of Fiscal Authorities: Stabilization, Growth and Institutions*, New York: Palgrave.

[14] Calmfors, L., 2001, Unemployment, Labor Market Reform and Monetary Union, *Journal of Labor Economics* 19, 265-289.

[15] Daveri, F. and G. Tabellini, 2000, "Unemployment, Growth and Taxation in Industrial Countries," *Economic Policy* 30, 47–88.

[16] Debrun, X., 2000, Fiscal Rules in a Monetary Union: a Short Run Analysis, *Open Economies Review* 11, 323-58.

[17] European Commission, 2002, *The EU Economy: 2002 Review*, Brussels: European Commission.

[18] Grüner, H. P., 2002, Unemployment and Labour-market Reform: A Contract Theoretic Approach, *Scandinavian Journal of Economics* 104, 641-56.

[19] von Hagen, J., A. Hughes Hallett and R. Strauch, 2002, Quality and Success of Budgetary Consolidations, in Buti, M. et al. (eds.), *The Behavior of Fiscal Authorities: Stabilization, Growth and Institutions*, New york: Palgrave.

[20] International Monetary Fund, 2002, France: Selected Issues, *IMF Country Report*, No 02/249.

[21] International Monetary Fund, 2003, Unemployment and Labor Market Institutions: Why Reforms Pay Off, Chapter IV in *World Economic Outlook* - Growth and Institutions, April.

[22] Hughes-Hallett, A. and S.E. Hougaard Jensen, 2001, Currency Unions and the Incentive to Reform: Are Market Mechanisms Enough?, *North American Journal of Economics and Finance* 12, 139-155.

[23] Milesi-Ferretti, G. M., 2003, Good, Bad or Ugly? On the Effects of Fiscal Rules with Creative Accounting, *Journal of Public Economics*, forthcoming.

[24] Nickell, S., and R. Layard, 1999, Labor Market Institutions and Economic Performance, in Ashenfelter, O. and D. Card (eds.), *Handbook of Labor Economics*, Volume 3C, pp. 3029–84, New York: Elsevier Science.

[25] Nickell, S., and L. Nunziata, 2001, *Labour Market Institutions Database*, http://cep.lse.ac.uk/pubs/abstract.asp?ID=502.

[26] Nickell, S., Nunziata, L., Ochel, W. and G. Quintini, 2002, The Beveridge Curve, Unemployment and Wages in the OECD from the 1960s to the 1990s, *CEP Working Paper*, No. 502, London School of Economics.

[27] OECD, 2002, *Employment Outlook*, July, Paris.

[28] Peletier, B., Dur, R. and O. Swank, 1999, Voting on the Budget deficit: Comment, A*merican Economic Review* 89, 1377-81.

[29] Rodrik, D., 1996, Understanding Economic Policy Reform, *Journal of Economic Literature* 34, 9-41.

[30] Rogoff, K., 1990, Equilibrium Political Budget Cycles, *American Economic Review* 80, 21-36.

[31] Saint-Paul, G., 1996, The Political Economy of Employment Protection, *Journal of Political Economy* 110, 672-704.

[32] Saint-Paul, G., 2002, Some Thoughts on Macroeconomic Fluctuations and the Timing of Labor Market Reform, *IZA Discussion Paper*, No.611, Bonn.

[33] Schnabel, G., 2002, Output Trends and Okun's Law, *BIS Working Papers*, No. 111, Basle: Bank for International Settlements.

[34] Sibert, A. and A. Sutherland, 2000, Monetary Union and Labor Market Reform, *Journal of International Economics* 51, 421-435.

[35] Strauch, R. and J. von Hagen, 2001, Formal Fiscal Restraints as Solutions to a Deficit and Spending Bias in Public Finances - U.S. Experience and Possible Lessons for EMU, *ZEI Working Paper*, No B 14, Bonn.

Appendices

A Proofs and derivations

A.1 Proof that second-order derivative of $V(y_L, k, p; d, \gamma)$ with respect to d is negative

The first-order derivative is $v'(f_{1L})(1-k) - pv'(f_{2L})$. Hence, the second-order derivative is:

$$v''(f_{1L})(1-k)^2 + pv''(f_{2L}) < 0.$$

A.2 Proof that, if $d_L > \bar{d}$, then d_L maximizes $V(y_L, k, p; d, \gamma)$

Denote by d_L^* the solution to (3) if $k = 0$. Then, by Lemma 4, $d_L^* > d_L > \bar{d}$. Combining this with strict concavity, we have that for all $d < \bar{d}$, $V(y_L, 0, p; d, \gamma) < V\left(y_L, 0, p; \bar{d}, \gamma\right)$. Hence, the only remaining candidate solution to the maximization problem would be $d = \bar{d}$. Finally, from (3), $V\left(y_L, 0, p; \bar{d}, \gamma\right) = V\left(y_L, k, p; \bar{d}, \gamma\right)$, while, again, by strict concavity and the assumption that $d_L > \bar{d}$, $V\left(y_L, k, p; \bar{d}, \gamma\right) < V(y_L, k, p; d_L, \gamma)$. Hence, $V\left(y_L, 0, p; \bar{d}, \gamma\right) < V(y_L, k, p; d_L, \gamma)$ and, hence, $V(y_L, k, p; d, \gamma)$ is maximized at $d = d_L$.

A.3 Proof of Lemmata 1 and 4

A.3.1 Effect of γ

Differentiate (5) with respect to γ, to give:

$$v''(f_{1L})(1-k)\left(\frac{\partial d_L}{\partial \gamma} - h\right) = pv''(f_{2L})\left[(\tau\alpha + \beta)\Gamma'(\gamma) - \frac{\partial d_L}{\partial \gamma}\right].$$

Hence, $\frac{\partial d_L}{\partial \gamma}$ can be written in the format stated in Lemma 1. Similarly, differentiate (4) with respect to γ, to give:

$$v''(f_{1H})\left(\tfrac{\partial d_H}{\partial \gamma} - h\right) = pv''(f_{2H})\left[(\tau\alpha + \beta)\Gamma'(\gamma) - \tfrac{\partial d_H}{\partial \gamma}\right].$$

Hence, $\frac{\partial d_H}{\partial \gamma}$ can be written in the format stated in Lemma 1.

A.3.2 Effect of k

Differentiate (5) with respect to k, to give:

$$v''(f_{1L})(1-k)\frac{\partial d_L}{\partial k} - v'(f_{1L}) = -pv''(f_{2L})\frac{\partial d_L}{\partial k}.$$

Hence,

$$\frac{\partial d_L}{\partial k} = \frac{v'(f_{1L})}{v''(f_{1L})(1-k) + pv''(f_{2L})} < 0.$$

A.4 Properties of (11)

The derivative of the left-hand side of (11) with respect to γ is:

$$\mathrm{E}_0 \left\{ \tfrac{1}{2} u''(c_1) \left[h + (1-\tau)\alpha\Gamma'(\gamma) - I \right]^2 + u'(c_1)(1-\tau)\alpha\Gamma''(\gamma) \right\} < 0.$$

Hence, an increase in γ reduces the left-hand side of (11). The derivative of the right-hand side of (11) with respect to γ is:

$$\begin{aligned}
&\tfrac{1}{2} h \left[v''(f_{1L}) \left(\tfrac{\partial d_L}{\partial \gamma} - h \right) + v''(f_{1H}) \left(\tfrac{\partial d_H}{\partial \gamma} - h \right) \right] \\
&-\tfrac{1}{2} p (\tau\alpha + \beta) \Gamma'(\gamma) \left\{ \begin{array}{c} v''(f_{2L}) \left[(\tau\alpha+\beta)\Gamma'(\gamma) - \frac{\partial d_L}{\partial \gamma} \right] + \\ v''(f_{2H}) \left[(\tau\alpha+\beta)\Gamma'(\gamma) - \frac{\partial d_H}{\partial \gamma} \right] \end{array} \right\} \\
&-\tfrac{1}{2} p (\tau\alpha + \beta) \Gamma''(\gamma) \left[v'(f_{2L}) + v'(f_{2H}) \right].
\end{aligned}$$

Using (7), this is written as:

$$\begin{aligned}
&\tfrac{1}{2} h \left\{ v''(f_{1L})(1-\lambda_L) \left[(\tau\alpha+\beta)\Gamma'(\gamma) - h \right] + v''(f_{1H})(1-\lambda_H) \left[(\tau\alpha+\beta)\Gamma'(\gamma) - h \right] \right\} \\
&-\tfrac{1}{2} p (\tau\alpha + \beta) \Gamma'(\gamma) \left\{ \begin{array}{c} v''(f_{2L}) \lambda_L \left[(\tau\alpha+\beta)\Gamma'(\gamma) - h \right] \\ +v''(f_{2H}) \lambda_H \left[(\tau\alpha+\beta)\Gamma'(\gamma) - h \right] \end{array} \right\} \\
&-\tfrac{1}{2} p (\tau\alpha + \beta) \Gamma''(\gamma) \left[v'(f_{2L}) + v'(f_{2H}) \right] \\
= \; & \tfrac{1}{2} \left[(\tau\alpha+\beta)\Gamma'(\gamma) - h \right] \left[\begin{array}{c} h \left[v''(f_{1L})(1-\lambda_L) + v''(f_{1H})(1-\lambda_H) \right] \\ -p(\tau\alpha+\beta)\Gamma'(\gamma) \left[v''(f_{2L})\lambda_L + v''(f_{2H})\lambda_H \right] \end{array} \right] \\
&-\tfrac{1}{2} p (\tau\alpha + \beta) \Gamma''(\gamma) \left[v'(f_{2L}) + v'(f_{2H}) \right].
\end{aligned}$$

We can further write this as:

$$\begin{aligned}
&\tfrac{1}{2} \left[(\tau\alpha+\beta)\Gamma'(\gamma) - h \right] \left[\begin{array}{c} ph \left[\frac{v''(f_{1L})v''(f_{2L})}{v''(f_{1L})(1-k)+pv''(f_{2L})} + \frac{v''(f_{1H})v''(f_{2H})}{v''(f_{1H})+pv''(f_{2H})} \right] \\ -p(\tau\alpha+\beta)\Gamma'(\gamma) \left[\frac{v''(f_{1L})v''(f_{2L})(1-k)}{v''(f_{1L})(1-k)+pv''(f_{2L})} + \frac{v''(f_{1H})v''(f_{2H})}{v''(f_{1H})+pv''(f_{2H})} \right] \end{array} \right] \\
&-\tfrac{1}{2} p (\tau\alpha + \beta) \Gamma''(\gamma) \left[v'(f_{2L}) + v'(f_{2H}) \right].
\end{aligned}$$

If $k = 0$, this reduces to:

$$
\begin{aligned}
& -\tfrac{1}{2}p\left[(\tau\alpha+\beta)\Gamma'(\gamma)-h\right]^2\left[\frac{v''(f_{1L})\,v''(f_{2L})}{v''(f_{1L})+pv''(f_{2L})}+\frac{v''(f_{1H})\,v''(f_{2H})}{v''(f_{1H})+pv''(f_{2H})}\right] \\
& -\tfrac{1}{2}p(\tau\alpha+\beta)\Gamma''(\gamma)\left[v'(f_{2L})+v'(f_{2H})\right] \\
> \; & 0,
\end{aligned}
$$

because $(\tau\alpha+\beta)\Gamma'(\gamma) > h$. By continuity, the derivative of the right-hand side of (11) with respect to γ should be positive also when k is positive, but not too large. Hence, the right-hand side of (11) is increasing γ when k is zero or positive, but not too large.

Hence, (11) has at most one solution, say γ^*. For $\gamma > \gamma^*$, (9) is increasing in γ, while for $\gamma < \gamma^*$, (9) is decreasing in γ. Hence, the second-order condition is satisfied.

A.5 Proof of Lemma 5 and Proposition 6

A.5.1 Proof of Lemma 5

Differentiate (11) with respect to k, to give:

$$
\begin{aligned}
& \mathrm{E}_0\left\{\tfrac{1}{2}u''(c_1)\left[h+(1-\tau)\alpha\Gamma'(\gamma)-I\right]^2+u'(c_1)(1-\tau)\alpha\Gamma''(\gamma)\right\}\tfrac{\partial\gamma}{\partial k} \\
& -\tfrac{1}{2}hv''(f_{1L})\left[-h\tfrac{\partial\gamma}{\partial k}+\tfrac{\partial d_L}{\partial k}\right]-\tfrac{1}{2}hv''(f_{1H})\left[-h\tfrac{\partial\gamma}{\partial k}+\tfrac{\partial d_H}{\partial k}\right] \\
& +\tfrac{1}{2}p(\tau\alpha+\beta)\Gamma'(\gamma)v''(f_{2L})\left[(\tau\alpha+\beta)\Gamma'(\gamma)\tfrac{\partial\gamma}{\partial k}-\tfrac{\partial d_L}{\partial k}\right] \\
& +\tfrac{1}{2}p(\tau\alpha+\beta)\Gamma'(\gamma)v''(f_{2H})\left[(\tau\alpha+\beta)\Gamma'(\gamma)\tfrac{\partial\gamma}{\partial k}-\tfrac{\partial d_H}{\partial k}\right] \\
& +\tfrac{1}{2}p(\tau\alpha+\beta)\left[v'(f_{2L})+v'(f_{2H})\right]\Gamma''(\gamma)\tfrac{\partial\gamma}{\partial k} \\
= \; & 0,
\end{aligned}
$$

which is equivalent to

$$
\begin{aligned}
& \begin{bmatrix} \mathrm{E}_0\left\{\tfrac{1}{2}u''(c_1)\left[h+(1-\tau)\alpha\Gamma'(\gamma)-I\right]^2+u'(c_1)(1-\tau)\alpha\Gamma''(\gamma)\right\}+ \\ \tfrac{1}{2}p(\tau\alpha+\beta)^2(\Gamma'(\gamma))^2\left[v''(f_{2L})+v''(f_{2H})\right]+\tfrac{1}{2}h^2\left[v''(f_{1L})+v''(f_{1H})\right] \\ +\tfrac{1}{2}p(\tau\alpha+\beta)\left[v'(f_{2L})+v'(f_{2H})\right]\Gamma''(\gamma) \end{bmatrix}\tfrac{\partial\gamma}{\partial k} \\
= \; & \tfrac{1}{2}\left[p(\tau\alpha+\beta)\Gamma'(\gamma)v''(f_{2L})+hv''(f_{1L})\right]\tfrac{\partial d_L}{\partial k},
\end{aligned}
\tag{17}
$$

where we have used that $\frac{\partial d_H}{\partial k}=0$. Hence, $\frac{\partial\gamma}{\partial k}<0$.

A.5.2 Proof of Proposition 6

Lemma 5 allows us to write:

$$
\frac{\partial\gamma}{\partial k}=C\frac{\partial d_L}{\partial k}, \tag{18}
$$

where

$$C = \frac{p(\tau\alpha+\beta)\Gamma'(\gamma)v''(f_{2L}) + hv''(f_{1L})}{p(\tau\alpha+\beta)^2(\Gamma'(\gamma))^2[v''(f_{2L})+v''(f_{2H})] + h^2[v''(f_{1L})+v''(f_{1H})] + F},$$

and where

$$\begin{aligned} F &= \mathrm{E}_0\left\{u''(c_1)[h+(1-\tau)\alpha\Gamma'(\gamma)-I]^2 + 2u'(c_1)(1-\tau)\alpha\Gamma''(\gamma)\right\} \\ &\quad +p(\tau\alpha+\beta)[v'(f_{2L})+v'(f_{2H})]\Gamma''(\gamma) < 0. \end{aligned}$$

Further, by differentiating (5) we have that

$$\frac{\partial d_L}{\partial k} = A + B\frac{\partial\gamma}{\partial k}, \tag{19}$$

where

$$\begin{aligned} A &= \frac{v'(f_{1L})}{v''(f_{1L})(1-k)+pv''(f_{2L})} < 0, \\ B &= \frac{hv''(f_{1L})(1-k)+p(\tau\alpha+\beta)\Gamma'(\gamma)v''(f_{2L})}{v''(f_{1L})(1-k)+pv''(f_{2L})} > 0. \end{aligned}$$

Combine (18) and (19) and solve to give:

$$\frac{\partial\gamma}{\partial k} = \frac{CA}{1-CB}, \quad \frac{\partial d_L}{\partial k} = \frac{A}{1-CB},$$

where both expressions are negative if $CB < 1$.

We now show that $CB < 1$ for $k \geq 0$ sufficiently close to zero. The numerator of the term CB is given by:

$$\begin{aligned} & [p(\tau\alpha+\beta)\Gamma'(\gamma)v''(f_{2L}) + hv''(f_{1L})][hv''(f_{1L})(1-k) + p(\tau\alpha+\beta)\Gamma'(\gamma)v''(f_{2L})] \\ = \; & h^2(1-k)[v''(f_{1L})]^2 + p^2(\tau\alpha+\beta)^2[\Gamma'(\gamma)]^2[v''(f_{2L})]^2 \\ & +hp(\tau\alpha+\beta)\Gamma'(\gamma)(2-k)v''(f_{1L})v''(f_{2L}). \end{aligned}$$

The denominator equals:

$$
\begin{aligned}
& [v''(f_{1L})(1-k)+pv''(f_{2L})] \\
& *\left\{p(\tau\alpha+\beta)^2(\Gamma'(\gamma))^2[v''(f_{2L})+v''(f_{2H})]+h^2[v''(f_{1L})+v''(f_{1H})]+F\right\} \\
= \; & h^2(1-k)[v''(f_{1L})]^2+h^2(1-k)v''(f_{1L})v''(f_{1H})+ \\
& h^2pv''(f_{1L})v''(f_{2L})+h^2pv''(f_{1H})v''(f_{2L})+ \\
& p(\tau\alpha+\beta)^2(\Gamma'(\gamma))^2(1-k)[v''(f_{1L})v''(f_{2L})+v''(f_{1L})v''(f_{2H})]+ \\
& p^2(\tau\alpha+\beta)^2(\Gamma'(\gamma))^2\left[(v''(f_{2L}))^2+v''(f_{2L})v''(f_{2H})\right]+ \\
& [v''(f_{1L})(1-k)+pv''(f_{2L})]F.
\end{aligned}
$$

Both numerator and denominator are positive. We need to show that the numerator is smaller than the denominator. Hence, cancelling some terms, we need to show that:

$$
\begin{aligned}
& h^2(1-k)v''(f_{1L})v''(f_{1H})+h^2p[v''(f_{1L})v''(f_{2L})+v''(f_{1H})v''(f_{2L})]+ \\
& p(\tau\alpha+\beta)^2[\Gamma'(\gamma)]^2(1-k)[v''(f_{1L})v''(f_{2L})+v''(f_{1L})v''(f_{2H})]+ \\
& p^2(\tau\alpha+\beta)^2[\Gamma'(\gamma)]^2v''(f_{2L})v''(f_{2H})+[v''(f_{1L})(1-k)+pv''(f_{2L})]F \\
> \; & hp(\tau\alpha+\beta)\Gamma'(\gamma)(2-k)v''(f_{1L})v''(f_{2L}).
\end{aligned}
$$

or

$$
p\left[h^2+(\tau\alpha+\beta)^2(\Gamma'(\gamma))^2(1-k)-h(\tau\alpha+\beta)\Gamma'(\gamma)(2-k)\right]v''(f_{1L})v''(f_{2L})+K>0,
$$

where

$$
\begin{aligned}
& K\equiv h^2(1-k)v''(f_{1L})v''(f_{1H})+h^2pv''(f_{1H})v''(f_{2L})+ \\
& p(\tau\alpha+\beta)^2[\Gamma'(\gamma)]^2(1-k)v''(f_{1L})v''(f_{2H})+ \\
& p^2(\tau\alpha+\beta)^2[\Gamma'(\gamma)]^2v''(f_{2L})v''(f_{2H})+[v''(f_{1L})(1-k)+pv''(f_{2L})]F>0.
\end{aligned}
$$

Hence, we need to show that

$$
\begin{aligned}
& p[h-(\tau\alpha+\beta)\Gamma'(\gamma)]^2v''(f_{1L})v''(f_{2L})+ \\
& pk(\tau\alpha+\beta)\Gamma'(\gamma)[h-(\tau\alpha+\beta)\Gamma'(\gamma)]v''(f_{1L})v''(f_{2L})+K>0,
\end{aligned}
$$

or

$$
p[(\tau\alpha+\beta)\Gamma'(\gamma)-h][(\tau\alpha+\beta)\Gamma'(\gamma)(1-k)-h]v''(f_{1L})v''(f_{2L})+K>0.
$$

This holds if k is sufficiently close to zero.

A.6 Derivation of (14)

The derivative of (1) with respect to k is:

$$\begin{aligned}
&\mathrm{E}_0\left\{u'\left(c_1\right)\left[h+(1-\tau)\,\alpha\Gamma'\left(\gamma\right)-I\right]\right\}\tfrac{\partial\gamma}{\partial k}\\
&+\tfrac{1}{2}v'(f_{1L})\left[\tfrac{\partial d_L}{\partial k}-h\tfrac{\partial\gamma}{\partial k}\right]+\tfrac{1}{2}v'(f_{1H})\left[\tfrac{\partial d_H}{\partial k}-h\tfrac{\partial\gamma}{\partial k}\right]\\
&+\tfrac{1}{2}v'(f_{2L})\left[(\tau\alpha+\beta)\,\Gamma'\left(\gamma\right)\tfrac{\partial\gamma}{\partial k}-\tfrac{\partial d_L}{\partial k}\right]+\tfrac{1}{2}v'(f_{2H})\left[(\tau\alpha+\beta)\,\Gamma'\left(\gamma\right)\tfrac{\partial\gamma}{\partial k}-\tfrac{\partial d_H}{\partial k}\right],
\end{aligned}$$

which, by (3) and (4), equals:

$$\begin{aligned}
&\mathrm{E}_0\left\{u'\left(c_1\right)\left[h+(1-\tau)\,\alpha\Gamma'\left(\gamma\right)-I\right]\right\}\tfrac{\partial\gamma}{\partial k}\\
&+\tfrac{1}{2}v'(f_{1L})\left[\left(\tfrac{p-1}{p}\right)\tfrac{\partial d_L}{\partial k}+\left[\tfrac{1}{p}\left(\tau\alpha+\beta\right)\Gamma'\left(\gamma\right)-h\right]\tfrac{\partial\gamma}{\partial k}\right]\\
&+\tfrac{1}{2}v'(f_{1H})\left[\left(\tfrac{p-1}{p}\right)\tfrac{\partial d_H}{\partial k}+\left[\tfrac{1}{p}\left(\tau\alpha+\beta\right)\Gamma'\left(\gamma\right)-h\right]\tfrac{\partial\gamma}{\partial k}\right].
\end{aligned}$$

Furthermore, by (12) evaluated at $k=0$, we have that

$$\begin{aligned}
&\mathrm{E}_0\left\{u'\left(c_1\right)\left[h+(1-\tau)\,\alpha\Gamma'\left(\gamma\right)-I\right]\right\}\tfrac{\partial\gamma}{\partial k}\\
=\;&\tfrac{1}{2}\left[h-(\tau\alpha+\beta)\,\Gamma'\left(\gamma\right)\right]\left[v'\left(f_{1L}\right)+v'\left(f_{1H}\right)\right]\tfrac{\partial\gamma}{\partial k}.
\end{aligned}$$

Substituting this into the previous expression, we arrive at:

$$\begin{aligned}
&\tfrac{1}{2}\left[h-(\tau\alpha+\beta)\,\Gamma'\left(\gamma\right)\right]\left[v'\left(f_{1L}\right)+v'\left(f_{1H}\right)\right]\tfrac{\partial\gamma}{\partial k}\\
&+\tfrac{1}{2}v'(f_{1L})\left[\left(\tfrac{p-1}{p}\right)\tfrac{\partial d_L}{\partial k}+\left[\tfrac{1}{p}\left(\tau\alpha+\beta\right)\Gamma'\left(\gamma\right)-h\right]\tfrac{\partial\gamma}{\partial k}\right]\\
&+\tfrac{1}{2}v'(f_{1H})\left[\left(\tfrac{p-1}{p}\right)\tfrac{\partial d_H}{\partial k}+\left[\tfrac{1}{p}\left(\tau\alpha+\beta\right)\Gamma'\left(\gamma\right)-h\right]\tfrac{\partial\gamma}{\partial k}\right],
\end{aligned}$$

which equals (13).

A.7 Computations for case of (15)

A.7.1 Effect of k on γ

Differentiate (16) with respect to k, to give:

$$\begin{aligned}
&\mathrm{E}_0\left\{\tfrac{1}{2}u''\left(c_1\right)\left[h+(1-\tau)\,\alpha\Gamma'\left(\gamma\right)-I\right]^2+u'\left(c_1\right)(1-\tau)\,\alpha\Gamma''\left(\gamma\right)\right\}\tfrac{\partial\gamma}{\partial k}\\
&-\tfrac{1}{2}hv''\left(f_{1L}\right)\left[-h\tfrac{\partial\gamma}{\partial k}+\tfrac{\partial d_L}{\partial k}\right]-\tfrac{1}{2}hv''\left(f_{1H}\right)\left[-h\tfrac{\partial\gamma}{\partial k}+\tfrac{\partial d_H}{\partial k}\right]\\
&+\tfrac{1}{2}p\left(\tau\alpha+\beta\right)\Gamma'\left(\gamma\right)v''\left(f_{2L}\right)\left[(\tau\alpha+\beta)\,\Gamma'\left(\gamma\right)\tfrac{\partial\gamma}{\partial k}-\tfrac{\partial d_L}{\partial k}\right]\\
&+\tfrac{1}{2}p\left(\tau\alpha+\beta\right)\Gamma'\left(\gamma\right)v''\left(f_{2H}\right)\left[(\tau\alpha+\beta)\,\Gamma'\left(\gamma\right)\tfrac{\partial\gamma}{\partial k}-\tfrac{\partial d_H}{\partial k}\right]\\
&+\tfrac{1}{2}p\left(\tau\alpha+\beta\right)\left[v'\left(f_{2L}\right)+v'\left(f_{2H}\right)\right]\Gamma''\left(\gamma\right)\tfrac{\partial\gamma}{\partial k}\\
&+\delta\pi v'\left(f_{1L}\right)+\delta\pi kv''\left(f_{1L}\right)\left[-h\tfrac{\partial\gamma}{\partial k}+\tfrac{\partial d_L}{\partial k}\right]=0.
\end{aligned}$$

When evaluated at $k = 0$, this is equivalent to

$$\begin{aligned} & \left[\begin{array}{c} \mathrm{E}_0 \left\{ \frac{1}{2} u''(c_1) \left[h + (1-\tau)\alpha\Gamma'(\gamma) - I \right]^2 + u'(c_1)(1-\tau)\alpha\Gamma''(\gamma) \right\} + \\ \frac{1}{2} p (\tau\alpha+\beta)^2 (\Gamma'(\gamma))^2 \left[v''(f_{2L}) + v''(f_{2H}) \right] + \frac{1}{2} h^2 \left[v''(f_{1L}) + v''(f_{1H}) \right] \\ + \frac{1}{2} p (\tau\alpha+\beta) \left[v'(f_{2L}) + v'(f_{2H}) \right] \Gamma''(\gamma) \end{array} \right] \frac{\partial\gamma}{\partial k} \\ = \; & \frac{1}{2} \left[p(\tau\alpha+\beta)\Gamma'(\gamma) v''(f_{2L}) + h v''(f_{1L}) \right] \frac{\partial d_L}{\partial k} - \delta v'(f_{1L}), \end{aligned}$$

where we have used that $\frac{\partial d_H}{\partial k} = 0$. We can write $\frac{\partial\gamma}{\partial k} = C \frac{\partial d_L}{\partial k} + D$, where $C > 0$ and $D > 0$. Hence, the presence of the final term $-\delta v'(f_{1L})$ implies an increase in $\frac{\partial\gamma}{\partial k}$.

A.7.2 The welfare effect of introducing a stability pact

Because the equilibrium is symmetric across countries (both in choices of γ and d), we again arrive at (13), which is simplified further as:

$$\frac{1}{2} \frac{1-p}{p} \left[(v'(f_{1L}) + v'(f_{1H}))(\tau\alpha+\beta)\Gamma'(\gamma) \frac{\partial\gamma}{\partial k} - v'(f_{1L}) \frac{\partial d_L}{\partial k} \right].$$

Hence, the introduction of a pact is welfare enhancing when

$$C \frac{\partial d_L}{\partial k} + D > \frac{1}{(\tau\alpha+\beta)\Gamma'(\gamma)} \left[\frac{v'(f_{1L})}{v'(f_{1L}) + v'(f_{1H})} \right] \frac{\partial d_L}{\partial k}.$$

B A linear-quadratic example

In this section we provide a numerical example to show that well-defined solutions exist and that a stability pact may actually be welfare enhancing, despite the fact that it may harm the incentives for structural reform. The example is based on the following functional forms:

$$\begin{aligned} u(x) &= v(x) = -(\xi-1)x^2/2 + \xi x, \; \xi > 1, \\ \Gamma(\gamma) &= \gamma. \end{aligned}$$

Given that the first-order derivative is $-(\xi-1)x + \xi$, this requires that $x < \xi/(\xi-1)$, so that marginal utilities are always positive. Hence, equations (5) and (6) require that

$$-(\xi-1)(\tau y_1 - h\gamma + d) + \xi > 0, \quad y_1 = y_L, y_H, \tag{20}$$

$$-(\xi-1)\left[\tau y_2 + (\tau\alpha+\beta)\gamma - d\right] + \xi > 0. \tag{21}$$

The government's first-order condition (5) in **Stage 3**, when $y_1 = y_L$, is now written as:

$$[\xi-(\xi-1)(\tau y_L-h\gamma+d)](1-k)=p[\xi-(\xi-1)(\tau y_2+\tau\alpha\gamma+\beta\gamma-d)]\Leftrightarrow$$

$$d_L=\left(\tfrac{\xi}{\xi-1}\right)\tfrac{1-p-k}{1+p-k}+\tfrac{\tau[py_2-(1-k)y_1]+[p(\tau\alpha+\beta)+(1-k)h]\gamma}{1+p-k}. \tag{22}$$

From (6) we find:

$$d_H=\left(\tfrac{\xi}{\xi-1}\right)\tfrac{1-p}{1+p}+\tfrac{\tau(py_2-y_1)+[p(\tau\alpha+\beta)+h]\gamma}{1+p}. \tag{23}$$

In the following, we denote by $\tilde{d}$ the expected deficit level, $\tilde{d}\equiv(d_L+d_H)/2$, and by $\tilde{y}_1$ the expected first-period income.

The government's first-order condition (11) in **Stage 1** is rewritten as:

$$\begin{aligned}&\left[\xi-\tfrac{1}{2}(\xi-1)[(1-\tau)(\tilde{y}_1+y_2+\alpha\gamma)+(h-I)\gamma]\right][(h-I)+(1-\tau)\alpha]\\ =\;& h\left[\xi-(\xi-1)\left(\tau\tilde{y}_1-h\gamma+\tilde{d}\right)\right]-p(\tau\alpha+\beta)\left[\xi-(\xi-1)\left(\tau y_2+\tau\alpha\gamma+\beta\gamma-\tilde{d}\right)\right]\Leftrightarrow\end{aligned}$$

$$\begin{aligned}&\xi[(1-\tau)\alpha+p(\tau\alpha+\beta)-I]-\\ &\tfrac{1}{2}(\xi-1)\left\{[(h-I)+(1-\tau)\alpha](1-\tau)(\tilde{y}_1+y_2)+[(h-I)+(1-\tau)\alpha]^2\gamma\right\}\\ =\;&(\xi-1)\left[p(\tau\alpha+\beta)\left(\tau y_2+\tau\alpha\gamma+\beta\gamma-\tilde{d}\right)-h\left(\tau\tilde{y}_1-h\gamma+\tilde{d}\right)\right]\Leftrightarrow\end{aligned}$$

$$\begin{aligned}&\xi[(1-\tau)\alpha+p(\tau\alpha+\beta)-I]-\\ &\tfrac{1}{2}(\xi-1)\left\{[(h-I)+(1-\tau)\alpha](1-\tau)(\tilde{y}_1+y_2)+2p(\tau\alpha+\beta)\tau y_2-2h\tau\tilde{y}_1\right\}\\ =\;&(\xi-1)\left[\begin{array}{c}\tfrac{1}{2}\left[((h-I)+(1-\tau)\alpha)^2+2p(\tau\alpha+\beta)^2+2h^2\right]\gamma\\ -[h+p(\tau\alpha+\beta)]\tilde{d}\end{array}\right]\Leftrightarrow\end{aligned}$$

$$\begin{aligned}&\xi[p(\tau\alpha+\beta)-h-\varepsilon]-\\ &\tfrac{1}{2}(\xi-1)\left\{-\varepsilon(1-\tau)(\tilde{y}_1+y_2)+2p(\tau\alpha+\beta)\tau y_2-2h\tau\tilde{y}_1\right\}\\ =\;&(\xi-1)\left[\begin{array}{c}\tfrac{1}{2}\left[\varepsilon^2+2p(\tau\alpha+\beta)^2+2h^2\right]\gamma\\ -[h+p(\tau\alpha+\beta)]\tilde{d}\end{array}\right]\Leftrightarrow\end{aligned}$$

We compute the solution for γ when we evaluate $\tilde{d}$ at $k=0$. If a proper solution exists, then, by continuity, there should also exist a proper solution for γ when k is sufficiently small. When $k=0$, then

$$\tilde{d} = \left(\frac{\xi}{\xi-1}\right)\frac{1-p}{1+p} + \frac{\tau(py_2-\tilde{y}_1)+[p(\tau\alpha+\beta)+h]\gamma}{1+p}.$$

Substitute this into the next-to-last equation, which then becomes:

$$\begin{aligned}
& \xi\left[p\left(\tau\alpha+\beta\right)-h-\varepsilon\right]- \\
& \tfrac{1}{2}\left(\xi-1\right)\left\{-\varepsilon\left(1-\tau\right)\left(\tilde{y}_1+y_2\right)+2p\left(\tau\alpha+\beta\right)\tau y_2-2h\tau\tilde{y}_1\right\} \\
= \; & \left(\xi-1\right)\left[\begin{array}{c} \frac{1}{2}\left[\varepsilon^2+2p\left(\tau\alpha+\beta\right)^2+2h^2\right]\gamma \\ -\left[h+p\left(\tau\alpha+\beta\right)\right]\left[\left(\frac{\xi}{\xi-1}\right)\left(\frac{1-p}{1+p}\right)+\frac{\tau(py_2-\tilde{y}_1)+[p(\tau\alpha+\beta)+h]\gamma}{1+p}\right] \end{array}\right] \Leftrightarrow
\end{aligned}$$

$$\begin{aligned}
& \xi\left[p\left(\tau\alpha+\beta\right)-h+\left(h+p\left(\tau\alpha+\beta\right)\right)\left(\tfrac{1-p}{1+p}\right)-\varepsilon\right]+ \\
& \tfrac{1}{2}\left(\xi-1\right)\left\{2\tfrac{[h+p(\tau\alpha+\beta)]\tau(py_2-\tilde{y}_1)}{1+p}+\varepsilon\left(1-\tau\right)\left(\tilde{y}_1+y_2\right)-2p\left(\tau\alpha+\beta\right)\tau y_2+2h\tau\tilde{y}_1\right\} \\
= \; & \tfrac{1}{2}\left(\xi-1\right)\left[\varepsilon^2+2p\left(\tau\alpha+\beta\right)^2+2h^2-2\tfrac{[p(\tau\alpha+\beta)+h]^2}{1+p}\right]\gamma \Leftrightarrow
\end{aligned}$$

$$\begin{aligned}
& \xi\left[\tfrac{2p}{1+p}\left(\tau\alpha+\beta-h\right)-\varepsilon\right]+ \\
& \tfrac{1}{2}\left(\xi-1\right)\left\{2\tfrac{[h+p(\tau\alpha+\beta)]\tau(py_2-\tilde{y}_1)}{1+p}+\varepsilon\left(1-\tau\right)\left(\tilde{y}_1+y_2\right)-2p\left(\tau\alpha+\beta\right)\tau y_2+2h\tau\tilde{y}_1\right\} \\
= \; & \tfrac{1}{2}\left(\xi-1\right)\left[\varepsilon^2+\tfrac{2p}{1+p}\left(\tau\alpha+\beta-h\right)^2\right]\gamma.
\end{aligned}$$

Some rewriting yields the following solution:

$$\gamma = 2\frac{2p\left(\tau\alpha+\beta-h\right)\left[\xi-\frac{1}{2}\left(\xi-1\right)\tau\left(\tilde{y}_1+y_2\right)\right]-\varepsilon\left(1+p\right)\left[\xi-\frac{1}{2}\left(\xi-1\right)\left(1-\tau\right)\left(\tilde{y}_1+y_2\right)\right]}{\left(\xi-1\right)\left[\left(1+p\right)\varepsilon^2+2p\left(\tau\alpha+\beta-h\right)^2\right]},$$

which is positive if ε is not too large and $\frac{1}{2}\tau\left(\tilde{y}_1+y_2\right) < \xi/\left(\xi-1\right)$. This assumption seems reasonable, given that the marginal utilities of consumption and public spending become zero when they equal $\xi/\left(\xi-1\right)$.

Differentiating the solution for γ with respect to p, we obtain:

$$\begin{aligned}
& \frac{\partial\gamma}{\partial p} \propto \left\{2\left(\tau\alpha+\beta-h\right)\left[\xi-\left(\xi-1\right)\tau\tfrac{\tilde{y}_1+y_2}{2}\right]-\varepsilon\left[\xi-\left(\xi-1\right)\left(1-\tau\right)\tfrac{\tilde{y}_1+y_2}{2}\right]\right\}* \\
& \left[\left(1+p\right)\varepsilon^2+2p\left(\tau\alpha+\beta-h\right)^2\right]-\left[\varepsilon^2+2\left(\tau\alpha+\beta-h\right)^2\right]* \\
& \left\{2p\left(\tau\alpha+\beta-h\right)\left[\xi-\left(\xi-1\right)\tau\tfrac{\tilde{y}_1+y_2}{2}\right]-\varepsilon\left(1+p\right)\left[\xi-\left(\xi-1\right)\left(1-\tau\right)\tfrac{\tilde{y}_1+y_2}{2}\right]\right\} \\
= \; & \left(1+p\right)\varepsilon^2* \\
& \left\{2\left(\tau\alpha+\beta-h\right)\left[\xi-\left(\xi-1\right)\tau\tfrac{\tilde{y}_1+y_2}{2}\right]-\varepsilon\left[\xi-\left(\xi-1\right)\left(1-\tau\right)\tfrac{\tilde{y}_1+y_2}{2}\right]\right\} \\
& -2p\left(\tau\alpha+\beta-h\right)\left[\xi-\left(\xi-1\right)\tau\tfrac{\tilde{y}_1+y_2}{2}\right]\varepsilon^2+\varepsilon^3\left(1+p\right)\left[\xi-\left(\xi-1\right)\left(1-\tau\right)\tfrac{\tilde{y}_1+y_2}{2}\right] \\
& +2\varepsilon\left(1+p\right)\left(\tau\alpha+\beta-h\right)^2\left[\xi-\left(\xi-1\right)\left(1-\tau\right)\tfrac{\tilde{y}_1+y_2}{2}\right],
\end{aligned}$$

where we use the symbol " $\propto$ " to indicate that both sides are of the same sign. The last expression can be simplified to:

$$\begin{aligned}
& (1-p)\,\varepsilon^2 * 2\,(\tau\alpha+\beta-h)\left[\xi-(\xi-1)\,\tau\tfrac{\tilde{y}_1+y_2}{2}\right]+ \\
& 2\varepsilon\,(1+p)\,(\tau\alpha+\beta-h)^2\left[\xi-(\xi-1)\,(1-\tau)\,\tfrac{\tilde{y}_1+y_2}{2}\right] \\
= \; & 2\varepsilon\,(\tau\alpha+\beta-h)\left\{\begin{array}{c}\varepsilon\,(1-p)\left[\xi-(\xi-1)\,\tau\tfrac{\tilde{y}_1+y_2}{2}\right]+ \\ (1+p)\,(\tau\alpha+\beta-h)\left[\xi-(\xi-1)\,(1-\tau)\,\tfrac{\tilde{y}_1+y_2}{2}\right]\end{array}\right\} \\
> \; & 0,
\end{aligned}$$

which confirms Proposition 3 that structural reforms under a planner (case of $p=1$ and $k=0$) are larger than under a partisan government, when we evaluate at $k=0$.

To obtain the final solution for the deficit under low and high first-period income, we substitute the solution for γ into (22) and (23). Differentiating the resulting outcomes for the deficit, we have:

$$\frac{\partial d}{\partial p}=-\left(\frac{\xi}{\xi-1}\right)\frac{2}{(1+p)^2}+\frac{\tau\,(y_1+y_2)+(\tau\alpha+\beta-h)\,\gamma}{(1+p)^2}+\frac{[p\,(\tau\alpha+\beta)+h]}{1+p}\frac{\partial\gamma}{\partial p},$$

for $y_1=\{y_L,y_H\}$. The sum of the first two terms on the right-hand side of this expression is negative, because the sum of (20) and (21) can be rewritten as

$$\tau\,(y_1+y_2)+(\tau\alpha+\beta-h)\,\gamma<2\xi/\,(\xi-1)\,,\quad y_1=y_L,y_H.$$

Further, $\partial\gamma/\partial p\to 0$ as $\varepsilon\downarrow 0$. Hence, the deficit under a partisan government is higher than under a social planner if ε is not too large.

B.1 A welfare enhancing SGP

Let us now check whether the introduction of an SGP is welfare enhancing. That is, we check whether the welfare effect of a marginal increase in k, evaluated at $k=0$, is positive. For the utility specification under consideration, (17) becomes:

$$\left[\begin{array}{c}\frac{1}{2}\left[h+(1-\tau)\,\alpha-I\right]^2+ \\ p\,(\tau\alpha+\beta)^2+h^2\end{array}\right]\frac{\partial\gamma}{\partial k}=\frac{1}{2}\left[p\,(\tau\alpha+\beta)+h\right]\frac{\partial d_L}{\partial k}\Leftrightarrow$$

$$\left[\tfrac{1}{2}\varepsilon^2+p\,(\tau\alpha+\beta)^2+h^2\right]\frac{\partial\gamma}{\partial k}=\frac{1}{2}\left[p\,(\tau\alpha+\beta)+h\right]\frac{\partial d_L}{\partial k},$$

where $I=h+(1-\tau)\,\alpha+\varepsilon$. Hence,

$$\frac{\partial\gamma}{\partial k}=\frac{p(\tau\alpha+\beta)+h}{\varepsilon^2+2p(\tau\alpha+\beta)^2+2h^2}\frac{\partial d_L}{\partial k}.$$

Substitute this into condition (14), which then becomes:

$$\frac{p(\tau\alpha+\beta)^2+h(\tau\alpha+\beta)}{\varepsilon^2+2p(\tau\alpha+\beta)^2+2h^2} < \frac{1}{2}\frac{\xi-(\xi-1)(\tau y_L-h\gamma+d_L)}{\xi-(\xi-1)(\tau\tilde{y}_1-h\gamma+\tilde{d})}. \tag{24}$$

As an example, take the parameter combination $y_L = 0.75$, $y_H = 1.25$, $y_2 = 1$, $p = \alpha = \tau = h = \frac{1}{2}$, $\beta = 0.75$, $\xi = 3$, and $\varepsilon = 0.02$. This example fulfills all formal conditions on the model (positive marginal utilities, positive outcomes for structural reforms and $\tau\alpha + \beta > h$) and delivers a positive marginal welfare effect from the introduction of a pact. This marginal welfare effect was computed numerically, using a Gauss program that computes all the outcomes. Setting $\varepsilon = 0.04$, while holding the other parameters constant, preserves the fulfillment of all formal conditions and gives a negative marginal welfare effect from the introduction of a pact.

Tables

Table 1. Euro area: Structural indicators (1978, 1998)

	Product market regulation		Employment protection		Benefit replacement ratio		Labor tax wedge	
	1978	1998	1978	1998	1978	1998	1978	1998
Austria	5.2	3.2	0.95	1.30	0.35	0.38	0.56	0.62
Belgium	5.5	3.1	1.55	1.19	0.54	0.47	0.45	0.51
France	6.0	3.9	1.30	1.50	0.55	0.56	0.61	0.68
Germany	5.2	2.4	1.65	1.41	0.40	0.40	0.48	0.57
Ireland	5.7	4.0	0.50	0.54	0.52	0.36	0.26	0.39
Italy	5.8	4.3	2.00	1.41	0.03	0.43	0.54	0.72
Netherlands	5.3	3.0	1.35	1.23	0.65	0.78	0.57	0.39
Portugal	5.9	4.1	1.79	1.91	0.22	0.77	0.26	0.38
Spain	4.7	3.2	1.98	1.62	0.64	0.64	0.31	0.45
United Kingdom	4.3	1.0	0.35	0.35	0.34	0.21	0.47	0.47
United States	4.0	1.4	0.10	0.10	0.25	0.32	0.43	0.47

Sources: The product market regulation index is taken from OECD (2002), has a scale from 0 to 6 and is increasing with the restrictiveness of the regulations. All labor market indicators are taken from Nickell and Nunziata (2001), with the 1998 values extrapolated using OECD data. The employment protection index spans between 0 (no protection) and 2 (maximum protection). The benefit replacement ratio is the average first-year unemployment benefit as a percentage of average earning before tax, while the tax wedge is the sum of the employment tax rate, the direct tax rate and the indirect tax rate as calculated by Nickell and Nunziata (2001).

Table 2. Trade-off employment protection vs. unemployment benefit ratios

Dependent variable: unemployment benefit replacement ratio		
Explanatory variables	Coefficients	t-statistics
Employment protection (EP)	-18.76	-5.19
Union density (UD)	-1.25	-16.34
Index of bargaining coordination (BC)	30.96	16.91
BC squared	-8.51	-13.14
Tax wedge (TW)	-0.40	-5.94
Adjusted R-squared (unweighted)	0.74	
Number of observations	745	

Sources: (1)Unbalanced panel estimates using Generalized Least Squares. The model allows for fixed effects and interaction variables (not reported here) to capture as much as possible the heterogeneity among the various institutional frameworks.

(2) Standard errors have been corrected for heteroskedasticity.

(3) For a description of the tax wedge and the employment protection index, see Table 1. Union density is measured as the ratio between total union members and wage and salaried employees, while the index of bargaining coordination, constructed on the basis of OECD data, increases in the degree of coordination both on the side of employers and unions. These two indices were compiled by Nickell and Nunziata (2001) until 1995 and extrapolated from recent OECD data.