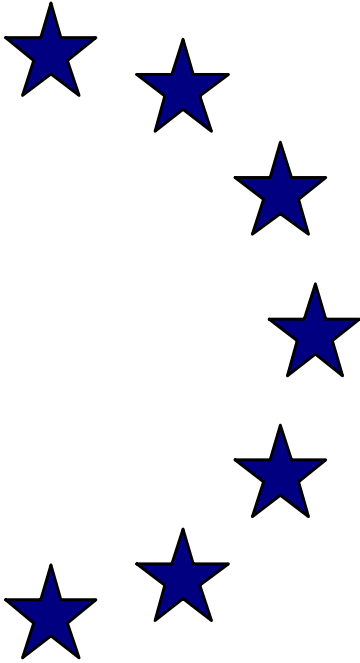


EUROPEAN ECONOMY

EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR ECONOMIC
AND FINANCIAL AFFAIRS

ECONOMIC PAPERS



ISSN 1725-3187

http://europa.eu.int/comm/economy_finance

Number 248

May 2006

**Proceedings from the ECFIN Workshop
"The budgetary implications of structural
reforms" - Brussels, 2 December 2005**

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(Directorate-General for Economic and Financial Affairs)

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Directorate-General for Economic and Financial Affairs
Publications
BU1 - -1/13
B - 1049 Brussels, Belgium

ECFIN/001324-EN

ISBN 92-79-01189-8

KC-AI-06-248-EN-C

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Preface

Most of the reforms discussed within the framework of the Lisbon strategy will benefit public finances in the long term. However, in the short-term, there could be a trade-off between some structural reforms and budgetary discipline. This possible tension between reforms and fiscal discipline was identified by academic economists as a possible drawback of the Stability and Growth Pact since its inception.

As a result of the 2005 reform of the Stability and Growth Pact, the EU fiscal framework now contains elements that allow better taking into account the budgetary impact of structural reform. These provisions permit to modulate the implementation of the Stability and Growth Pact in case of major structural reforms both in the preventive arm (the definition of medium-term budgetary objectives and the adjustment towards them) and in the corrective arm of the Pact (the Excessive Deficit Procedure). In the coming months and years, ensuring an implementation of the Stability and Growth Pact that takes appropriately into account structural reforms will be a major challenge. The Council Regulations codifying the reform of the Stability and Growth Pact define conditions under which structural reforms could be considered in the EU fiscal framework. However, there are aspects open to judgement by the Commission and the Council. Adequate knowledge about the interactions between structural reforms and public budgets will be crucial for an economically sound use of this judgement.

Unfortunately, to date there has been relatively little research on the relationship between structural reforms and government accounts. The workshop “Budgetary implications of structural reforms” organized on 2 December 2005 by DG ECFIN of the European Commission aimed at filling this gap. This issue of the DG ECFIN Economic Paper series collects the papers presented at the workshop.

Some of the papers (Andersen, Giorno, Hoeller and Van den Noord) focus on the budgetary impact of structural reforms over the long term and analyse the long-term implications for public finances of policies aimed at reforming social security or the functioning of markets via equilibrium modelling techniques. These papers highlight how the impact of structural reforms on the future path of government budget balances and debt is driven by the interaction between the specific design of the reform, the functioning of the tax system and the social security system, and the overall macroeconomic environment.

Other papers (Deroose and Turrini, Roeger) focus on the impact of structural reforms on budgets over the short and medium run. Reforms may hurt budget balances because implying a direct cost in terms of higher expenditures or lost revenues. The most relevant example is that of pension reforms shifting funded pillars outside the government sector. However, indirect costs could arise if political resistance to reforms is countered to some degree by a compensation of interest groups via tax cuts or targeted increased expenditure. These papers aimed at measuring the impact of different types of reforms on public budgets via modelling or econometric techniques.

Finally, there are papers (Duval, Heinemann) attempting to answer the question whether the pursuit of budgetary discipline could be a deterrent for structural reforms. The aim is to test the widely quoted argument that a tight fiscal stance reduces the “political capital” available to governments, thereby reducing the feasibility of policies that encounter opposition from interest groups. The analysis in this case is not on the impact of reforms on budgets but, the other way round, on the impact of the fiscal stance on the probability of reforms.

The analytical approaches differ across the papers, as well as the datasets employed. This poses an issue in deriving across-the-board conclusions. Nevertheless, a tentative summary of the main common findings can be made as follows. First, many reforms imply considerable potential long-term gains for public finances. However, the size of the impact depends crucially on the design of the reform and the overall economic environment. Second, although the existence of short-term costs of long-term beneficial reforms cannot be easily dismissed, the magnitude of the short-term budgetary impact varies considerably depending not only on which sector of the economy is reformed (e.g., labour market reforms versus pension reforms) but also on the specific design of the reform (e.g., parametric pension reforms versus systemic reforms introducing mandatory funded schemes recorded outside government). Third, the impact of the budgetary situation and the fiscal stance on the likelihood of structural reforms is not clear-cut. The evidence seems consistent with a possible trade-off between fiscal consolidation and labour market reforms, but such trade off is not visible for other type of reforms (product market reforms, financial market reforms, pension reforms).

THE BUDGETARY IMPLICATIONS OF STRUCTURAL REFORMS

A Workshop organised by the European Commission
Directorate General for Economic and Financial affairs

Brussels, 2 December 2005
Centre Borschette
36 rue Froissart, 1040 Brussels

Programme:

- **Chair:** E. Flores Gual

9.30-10.00 Registration and welcome coffee

10.00-10.15 Opening: Director General K. Regling (European Commission)

10.15-11.45 Session 1: The long-term budgetary impact of structural reforms

- T. M. Andersen (University of Aarhus, CEPR, CESifo and EPRU) and L. Haagen Pedersen (The Welfare Commission): "Assessing sustainability and the consequences of reforms"
- P. Hoeller, C. Giorno and P. van den Noord (OECD): "Nothing ventured, nothing gained: the long-run fiscal reward of structural reform"
 - Discussant: D. Costello (European Commission)

11.45–13.15 Session 2: The transitory impact of structural reforms on government budgets

- W. Roeger (European Commission): "Assessing the budgetary impact of systemic pension reforms"
- S. Deroose and A. Turrini (European Commission): "The short-term budgetary implications of structural reforms: evidence from a panel of EU countries"
 - Discussant: R. Beetsma (University of Amsterdam and CEPR)

13.15–14.15 Lunch

14.15–15.45 Session 3: Structural reforms and government budgets: is there a trade-off?

- F. Heinemann (ZEW): "How distant is Lisbon from Maastricht? The short-run link between structural reforms and budgetary performance"
- R. Duval (OECD): "Fiscal positions, fiscal adjustment, and structural reforms in labour and product markets"
 - Discussant: L. Jonung (European Commission)

15.45–16.00 Coffee break

16.00–17.00 Policy panel: Structural reforms in the implementation of the revised Stability and Growth Pact.

- J. Marin-Arcas (ECB), P. Mills (Ministry of Finance, France) and M. Buti (European Commission).

Assessing fiscal sustainability and the consequences of reforms*

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University of Aarhus
CEPR, CESifo and EPRU

Lars Haagen Pedersen
Welfare Commission

January 24th, 2006

Abstract

The paper evaluates fiscal sustainability by use of an explicit intertemporal (OLG) model. Sustainability problems are measured in terms of the needed tax changes which either on a period-by-period basis balance the budget or on a permanent basis ensure that the intertemporal budget constraint is fulfilled. The pros and cons of these approaches to assessing fiscal sustainability are discussed. In an application for Denmark the two metrics for the sustainability problem are calculated and the implications for the design and evaluation of policy reforms are discussed.

*Comments and suggestion by the discussant D. Costello and participants at the workshop "The Budgetary Implications of Structural Reforms" are gratefully acknowledged.

1 Introduction

The medium to long run developments of public finances is in focus in many countries due to changing demographics. Increasing dependency ratios imply that systematic fiscal deficits may develop, and this raises questions concerning both the sustainability of public finances and thus current policies as well as the timing and scaling of reforms.

For short run evaluations of the fiscal position it is important to have a forecast of medium to long run developments, since the former need not be a good indicator for the latter. For EMU countries the GSP stipulates norms for the fiscal position. Originally these were formulated in terms of the current budget and debt position (the 3% deficit-to-gdp and 60% debt-to-gdp norms) with an objective of ensuring that the structural deficit is in balance or surplus. In a recent reinterpretation (ECOFIN council (2005)) it is stressed that the evaluation of the budget position should take the medium to long run developments into account. In particular the influence of demographic changes should be considered. Moreover, it is stressed that the evaluation of the short run position should be seen in perspective of eventual structural reforms leading to more sustainable public finances.

Often fiscal policies are evaluated by considering the structural budget balance and questioning whether this is consistent with stabilization of a given debt level. Although readily applicable this approach has some shortcomings. First, in a forward looking perspective the primary balance may change significantly even for a given structural unemployment rate e.g. due to changing demographics. Second, the approach is not easy to apply in evaluating the effects of reforms. Finally, the issue of fiscal sustainability is more complex than just stabilization of debt levels.

While it is sensible to consider the medium to long run developments in public finances in order to evaluate the fiscal stance and the need for reforms, it also raises a number of questions. A key question is concerned with reliability and credibility. What is needed is a realistic projection of the development in public finances rather than desired paths. The latter are easy to formulate but do not provide very useful guidelines for an evaluation of the sustainability of current policies. This is in particular important since a main task is to provide indicators on the need and scale of structural reforms as an input to policy discussions.

Structural issues are involved in the discussion of possible policy reforms and to this end an explicitly formulated intertemporal general equilibrium model is a useful tool. The framework thus allows for indicators *of* the fiscal sustainability problem but also for assessment of reforms which may either be phased in over several years or have effects which unfold over a sequence of years. Clearly the specific results depend on the precise modelling assumption which needs to be carefully considered in each separate case. A forward looking approach is needed to take into account expected future developments affecting public finances.

In this paper we present a forward looking approach using an OLG model for assessing the sustainability of public finances and thus of current policies.

We present metrics by which to assess the sustainability of public finances. A straightforward indicator can be constructed by projecting the future path of public budgets and how it is affected by various reforms. This is useful in particular if the underlying budget profile has a trend, e.g. a systematic tendency towards deficits. However, it is not without problems to project a path with "unchanged policies" in an fully specified intertemporal general equilibrium model, and it is also often hard to interpret a given budget position in terms of the needed scale for reforms. Accordingly, it is useful to translate the sustainability problem into a readily interpretable indicator which can be directly controlled by politicians. This provides a better impression of the order of magnitudes of the needed policy reaction. Via sensitivity analysis it is possible to assess the uncertainty involved.

A simple indicator of the need for reforms can thus be calculated by finding the change in e.g. a tax instrument (defined on a broad tax base) needed to balance the budget period by period. Note that this metric has no normative implications as to whether the appropriate policy response is a tax increase. Evaluating how this indicator is affected by a given reform proposal provides a measure of the contribution of the reform to ensure sustainable public finances. Moreover, sensitivity analysis can be performed straightforwardly. The period-by-period indicator suffers from two shortcomings. First, it leaves a number of indicators – one for each year - and not a single and easily interpretable indicator. Second, by implicitly requiring budget balance on a period-by-period basis, it disregards the possibility that variations in the budget position may not necessarily pose a problem (smoothing), and in some cases be part of a reform package (e.g. if it is phased in over a transition period).

These problems are overcome by calculating an indicator of fiscal sustainability given by e.g. the permanent change in a tax instrument needed to ensure that the intertemporal budget constraint of the public sector is fulfilled - the sustainable tax rate. By evaluating how this indicator is affected by various reform proposals, a measure can be derived on the overall contribution to an improvement in public finances without concern for the particular timing of the budgetary consequences. A further advantage of this indicator is that it allows a smoothening of the effects over time, i.e. it allows for budget variation over time, but ensures sustainability of public finances (the intertemporal budget constraint is satisfied). The shortcoming is that it may suppress the underlying time profile, and this provides important insights into the process of designing reform proposals.

As we will argue below these two indicators are closely related, and the application will show that it is useful to apply both metrics since this provides more detailed information on the mechanisms affecting fiscal sustainability, and also the appropriate way of designing reforms.

To assess the robustness and risk profile of the evaluation of the sustainability of public finances it is important to perform sensitivity analysis. This can easily be done by either of the two indicators.

The paper presents both of these indicators and shows applications by use of an OLG-model for the Danish economy (the so-called DREAM-model, which is

a CGE-OLG model). We present an assessment of the sustainability of current policies and show that there is a substantial sustainability problem despite the fact that Denmark currently has a budget surplus. Since there is an underlying trend deteriorating public finances, this case brings forth the weaknesses and strengths of both indicators. We also present assessment of the implications of three types of reforms (retirement, tax and labour market reform) and discuss aspects to be taken into account in designing reforms.

The paper is organized as follows: Section 2 presents a short overview of different approaches to assess the sustainability of fiscal policies. The approach taken in this paper is presented in section 3, and section 4 provides information on the analysis performed for Denmark. The results on fiscal sustainability are presented in section 5. Section 6 discusses reform strategies and presents an evaluation of reform proposals, and section 7 provides a few concluding remarks.

2 Approaches in assessing fiscal sustainability

The concept of fiscal sustainability can be defined in different ways, but the most widespread interpretation is "the government's ability to indefinitely maintain the same set of policies while remaining solvent" (Burnside (2004, ch. 2 p1)). Various approaches and methods have been proposed in the literature to assess the sustainability of fiscal policy. They all depart from the identify linking changes in public debt to the primary balance and debt servicing (all measured relative to gdp),

$$d_{t+1} = (1 + r_t)d_t - b_t \quad (1)$$

where r is the interest rate (growth corrected rate of return), d denotes debt and b the budget balance (revenues less expenditures) relative to GDP.

Steady state conditions

For given interest rates, growth rates etc. this identity provides a relationship between the debt level (d^*) and the primary balance (b^*) which can be sustained in the long run (steady state). From this, one can from a targeted debt level infer a required level for the primary balance, or vice versa from a given primary balance infer the implied debt level (provided stability). This approach leads to the so-called primary gap indicator (see e.g. Blanchard(1990)) which gives the difference between the current primary balance and the level needed to sustain a given debt level. The fiscal norms of the GSP pact can also be interpreted from this perspective since a debt level of 60% of GDP can be maintained by a primary deficit of 3% of GDP provided that the growth corrected real rate of return is 5%.

Debt dynamics:

It is well-known that the stability properties of the debt level depends on the real rate of interest being less than the growth rate. Endogenizing interest determination allows for the possibility that the stability condition depends on the debt level. This implies that there may be threshold levels for public debt below which the system remains stable. Identifying the threshold and comparing

current debt levels to the threshold yield an indicator for the sustainability of fiscal policy (see e.g. Tobin and Buiter (1976), Zee (1988) and Bagnai (2004))¹.

Both of the approaches mentioned here share the property that they are relatively simple and therefore also easy to apply. However, they rely on rather mechanical assumptions concerning e.g. primary balances, and the forward looking elements in the approach are mainly captured by the dynamics implied by the debt accumulation equation allowing no role for future changes in conditions impinging on public revenues and expenditures. Furthermore, it is very difficult to assess the consequences of structural reforms especially if the reforms due to either implementation lags or effect lags only show their effects gradually over time.

Empirical methods

An approach to empirical test of fiscal sustainability was proposed by Hamilton and Flavin (1986) and has since been extended by various authors into a VAR framework (see e.g. Carriero, Favero and Giavazzi (2005), Polito and Wickens(2005)). The basic idea is to test for stationarity of primary balances and debt levels. If unit roots in the primary balance or debt levels can be rejected it is not possible to reject the hypothesis that the intertemporal budget constraint for the government will be fulfilled². Leaving aside econometric problems concerning the problems of unit root tests (sensitivity to alternatives close to a unit root) the main shortcoming of this approach is that it is backward looking and thereby completely disregards the forward looking aspects currently raising concerns of sustainability in many countries. These methods may be useful in characterizing historical periods but cannot be used to assess future consequences of say demographic changes and the consequences of proposed reforms.

Intertemporal approaches

Recently a number of analysis have taken explicit outset in the intertemporal budget constraint. Most well-known is generational accounting (see e.g. Auerbach et.al. (1999), Kotlikoff (1995)). The basic idea is to use the intertemporal budget constraint in combination with estimations of the contribution rates of currently living generations to calculate the tax burden resting on future generations. By comparing the latter to the burden on newborns the inter-generational profile can be evaluated.

Obviously this calculation is based on various assumptions, but it is straightforward to make sensitivity tests to variations in the underlying assumptions. An alternative closure is to consider the permanent decrease in government spending or the permanent increase in taxes to restore generational balance (see e.g. Cardarelli et.al. (2000)).

¹The IMF method of critical debt levels also falls into this category. The aim is to determine threshold levels for the debt level] (public or foreign) which would trigger a "crisis", see e.g. IMF(2003).

²An alternative method is to test for how primary surpluses respond to public debt, since a sufficient condition for sustainability is that an increase in debt leads to higher budget surpluses, cf Ballabriga and Martinez-Mongay (2005). See Turini(2005) for an evaluation of the short-term budgetary effects of structural reforms.

This is related to the so-called OECD approach which also relies on the intertemporal budget constraint but which for a finite horizon solves for the needed adjustment given an assumed level of debt at the end of the period (Blanchard(1990)). The latter property of the method introduces a large element of arbitrariness in the analysis since the results are very sensitive to the imposed time horizon and the stipulated debt level³.

From the abovementioned forward looking approaches it is possible to calculate the level at which e.g. taxes need to be to ensure that the intertemporal budget constraint is fulfilled⁴. The latter is often motivated by reference to tax smoothing arguments.

One shortcoming of these approaches is that they neglect general equilibrium effects of say changes in taxes. This is a serious shortcoming in evaluating both the order of magnitude of the needed changes to ensure fiscal sustainability and the implications of various types of reforms. The second generation approach⁵ to which the present paper belongs is thus based on an explicit intertemporal general equilibrium model (here: an OLG model for Denmark, cf below). The main attraction is that this approach is formulated in such a way that it can be used directly in the process of formulating and assessing policy proposals.

3 A forward looking method using an OLG model

The purpose is to develop indicators making it possible to assess the sustainability of current policies, and in the case of sustainability problems the order of magnitude of the required reforms. The following outlines the basic mechanisms. A simple model in the appendix illustrates the calculation of the indicators and their relation, while later sections present applications for Denmark.

Denote the primary budget deficit - revenues less expenditures - (relative to GDP) by

$$b(\mathbf{x}_t, \mathbf{y}_t, \mathbf{z}_t) \tag{2}$$

where \mathbf{x} denotes a vector of endogenous variables, \mathbf{y} a vector of policies, and \mathbf{z} a vector of exogenous variables (including foreign variables, demographics, shocks etc.). The endogenous variables are determined by some model left unspecified here for simplicity, but the endogenous response of various variables and how they impinge on the public budget is of course central to the whole approach, cf below.

Policies are given by

³However, for a sufficiently far-sighted horizon the sensitivity wrt. the debt level may be very limited.

⁴Frederiksen (2001) proposes a method to calculate the sustainable budget balance given the intertemporal budget constraint and assuming an exponential form for the deterioration in net tax receipts. A disadvantage of this approach is that the sustainable budget balance under a sustainable policy is not time invariant.

⁵Heide et.al. (2005) make an assessment of fiscal sustainability for Norway using a CGE-model and solving for the PAYG value of the pay-roll tax. See also Fehr, Jokisch and Kotlikoff (2004) and McMorrow and Roeger(2004).

$$\mathbf{y}_t = \mathbf{f}_t(\mathbf{x}_t, \mathbf{z}_t, \boldsymbol{\theta}_t) \quad (3)$$

which depend on the current state, the policy form (captured by the function f) and the policy parameters θ . This representation allows a treatment of both structural and parametric reforms.

Hence the public budget is for given policy functions defined by the implicit function

$$\beta_t(\mathbf{x}_t, \mathbf{z}_t, \boldsymbol{\theta}_t) \equiv b(\mathbf{x}_t, \mathbf{f}_t(\mathbf{x}_t, \mathbf{z}_t, \boldsymbol{\theta}_t), \mathbf{z}_t)$$

The public debt level relative to GDP evolves according to

$$d_{t+1} = (1 + r_t)d_t + b_t \quad (4)$$

where r is the growth corrected effective real rate of interest on public debt.

The intertemporal budget constraint for the public sector reads⁶

$$PV(b_t) - d_0 \geq 0 \quad (5)$$

where PV denotes the present value operator and d_0 the initial debt level.

Obviously the budget constraint - both the static and the intertemporal - are fulfilled for a infinity of policies, and it is therefore necessary to put more structure on the analysis to arrive at usable results. The issue is to clarify policies which are sustainable in the sense that they do not violate the intertemporal budget constraint.

Passive policies

A frequently asked question is what the consequences would be of maintaining unchanged policies. Specifically, how would the public sector budget balance(b) and public debt (d) evolve in the absence of any policy initiatives?

While it may be illustrative to show a divergent path for public debt, this approach has two major shortcomings. It is very difficult to determine critical levels for the public budget balance and debt level beyond which the situation is no longer tenable⁷. Theoretical work teaches us that the actual path followed by the economy depends critically on the expected future policy interventions used to correct a crisis situation. This is well-known from e.g. the literature on the contractionary effects of expansionary fiscal policy⁸ and the so-called "balance-of-payments-crises" literature⁹. Empirical work also leaves *it* unclear what the critical levels are. Moreover, the purpose of discussing sustainability is not to clarify for how long policies can be maintained without provoking a major crisis, but to aid in policy planning so as to avoid the possibility of such crises.

⁶ Assuming the usual no-Ponzi restriction.

⁷ cf the approach taken by e.g. IMF discussed in section 2.

⁸ See e.g. Bertola and Drazen (1989) and Sutherland(1993).

⁹ The "balance of payments crises" literature shows that the crises caused by unsustainable policies will depend on the nature of the policy intervention, which in turn critically would affect the timing of the crises.

The purpose of an evaluation of fiscal sustainability is to assess the need for policy reforms. Such an evaluation naturally takes its outset in current or unchanged policies, that is, the purpose is not to predict future developments, but to create an informed basis on which to discuss the need and nature of reforms. Leaving aside the practical problems of defining what is meant by unchanged policies, cf below, there is the fundamental problem that a fully specified intertemporal general equilibrium model necessarily builds on the premise that the intertemporal budget constraint of the public sector would have to be fulfilled. That is, an instrument for adjustment needs to be specified to close the model. This property should not be mixed up with Ricardian equivalence since it follows from a consistent modelling of all interrelationships - the attractive property and disciplining device of formulating an explicit intertemporal general equilibrium model. To illustrate this point note that in a standard OLG model Ricardian equivalence does not hold, however, this does not imply that there is no intertemporal budget constraint for the public sector.

A pragmatic way of solving this problem is to close the budget by assuming a lump sum transfer in the far future, cf below. This would allow debt to accumulate and make it possible to assess the consequences of "passive" policies. While a pragmatic solution, this approach is not without its problems. The expectations of agents would differ between a case where the budget constraint is fulfilled by an outside transfer and a case with a future lump sum tax increase. However, this problem may have less importance for the path in the initial periods

Pay-as-you go

A simple constraint to impose on the analysis is to require a balanced budget on a period-by-period basis. Requiring that the total balance is zero for all future periods, i.e.

$$b(x_t, y_t, z_t) - r_t d_t = 0 \quad \text{for all } t \quad (6)$$

This ensures an unchanged debt position, i.e.

$$d_t = d_{t+1} \quad \text{for all } t$$

Clearly this condition can still be fulfilled for an infinite of combinations of the policy instruments, and it is not immediately clear from (6) what order of magnitudes should be attained by policy changes aiming at ensuring that the condition holds. Clarity can be gained by choosing one instrument (say θ_1) and solve for the value of the instrument ensuring that (6) holds leaving the policy functions and all other policy parameters constant and thus time-invariant.

This approach yields a time dependent value of the policy parameter $\theta_1^{payg}(t)$ which ensures that (6) is fulfilled. The relation and path of $\theta_1^{payg}(t)$ relative to the current value of $\theta_1(0)$ yields a perspective on the need and order of magnitude of future policy changes as well as the underlying time profile. If there is a systematic difference between $\theta_1(0)$ and $\theta_1^{payg}(t)$, current policies are not sustainable if $\theta_1^{payg}(t)$ is systematically above (below) $\theta_1(0)$ and θ_1 is a tax (expenditure) instrument.

Note that the particular choice of instrument θ_1 has no implications for the optimal policy choice. It is obvious that it in general cannot be optimal to let one policy parameter to carry the burden of adjustment. The interpretation is thus that by focusing on one policy instrument one provides perspective on the direction and order of magnitude of the needed policy changes, and one policy instrument is singled out only for simplicity. For this to be useful the instrument θ_1 chosen needs to be a general policy instrument which is easily controllable. For instance a tax rate with a broad tax base. In practice a combination of policy instruments will be used, and the requirement is that the package achieves a total effect corresponding to the effect captured by the difference between $\theta_1^{pagg}(t)$ and $\theta_1(0)$.

This approach is relatively simple to apply but it has two main disadvantages. First, it implies that the initial debt level is kept constant throughout time. This leaves aside whether this is optimal. Second, requiring a period-by-period balancing of the public budget is unnecessarily restrictive and implies that the capital market is not allowed to be used to smooth the adjustment.

Sustainable policies

An alternative procedure is to solve for the permanent level to which θ_1 would have to be adjusted for the intertemporal budget constraint (5) to be satisfied - allowing all policy functions and all other policy parameters to be unchanged and thus time invariant¹⁰. Denote this value by $\tilde{\theta}_1$. The interpretation is thus that by making an adjustment of the policy parameter θ_1 to $\tilde{\theta}_1$, the total policy package is sustainable in the sense that it is consistent with the intertemporal budget constraint. By implication future policy changes are only needed to deal with unanticipated changes. The case of sustainable policies can also be interpreted as smooth policies in the sense of time invariant policies. It is often a policy objective to avoid policy changes and having policies invariant over time and thus generations. There can also be efficiency arguments for choosing smooth tax policies (Barro(1979)).

By comparing the current value of the policy instrument θ_1 to the sustainable value $\tilde{\theta}_1$ one can assert both the sustainability of current policies and the needed order of adjustment to ensure sustainability. Specifically we have that current policies violate (14) and therefore are unsustainable, that is, the present value of revenues falls short of the present value of expenditures including initial debt if

$$\begin{aligned} \tilde{\theta}_1 &> \theta_1 && \text{for } \frac{\partial b}{\partial \theta_1} > 0 \\ \tilde{\theta}_1 &< \theta_1 && \text{for } \frac{\partial b}{\partial \theta_1} < 0 \end{aligned}$$

The interpretation is that if the instrument θ_1 chosen is a revenue instrument ($\frac{\partial b}{\partial \theta_1} > 0$) then there is a sustainability problem if the sustainable value exceeds

¹⁰ Presuming that a solution exists, cf also appendix.

the initial value, $\tilde{\theta}_1 > \theta_1(0)$, and vice versa for an expenditure instrument ($\frac{\partial b}{\partial \theta_1} < 0$).

If there is a sustainability problem a metric of the problem is given by $|\theta_1(0) - \tilde{\theta}_1|$.

An advantage of this approach is that it yields an answer to the question of fiscal sustainability in one metric taking into account the whole future profile of public finances and using capital markets to smooth effects across periods. Notice that this simplicity is attained at the cost of being unable to unravel the profile of the underlying problem from the indicator.

The sustainable value of the policy parameter can be interpreted as the present value of the path calculated under the PAYG solution, i.e.

$$\tilde{\theta}_1 = PV(\theta_1^{payg}(t))$$

which holds exactly if initial debt is zero, as shown in the appendix.

The sustainability indicator obtained by the approach outlined above can be interpreted as a market test of the sustainability of public finances. This is so since the indicator is based on the intertemporal budget constraint given market interest rates, and therefore provides an answer as to whether current policies (policy functions f and parameters θ) are consistent with the intertemporal budget constraint. If the answer is confirmative the conclusion is that it is feasible to maintain current policies. However, this does not answer the question whether it is desirable not least optimal to maintain current policies¹¹. It is obvious that optimal policies cannot be derived solely by considering the budget constraint. If it is found that current policies are unsustainable it can be concluded that an adjustment eventually would have to take place - current policies cannot be maintained, but the analysis does not say anything about how and when the change will take place.

The budget implications of the sustainable tax rate can be calculated by solving for

$$\beta_t \left(\mathbf{x}_t, \mathbf{z}_t, (\tilde{\theta}_1, \theta_2, \dots, \theta_N) \right)$$

which gives that the path the primary budget balance would have to follow in order for policies to be sustainable. Note that this path for the primary budget is both dependent on the particular instruments used in calculating sustainable taxes and time dependent. This points to the fact that it is not easy to use a budget metric as a guideline for formulating medium term objectives for fiscal policies. However, as shown in the application below it may be useful to consider the path for the budget balance when discussing the appropriate policy response, cf below.

In conclusion, by calculating both the PAYG-tax and the sustainable tax one arrives with the taxonomy that the former implies a constant level for the public debt (and public balance) and a time varying tax rate, while the latter has a constant tax rate and a time dependent level for public debt and the

¹¹Floden(2003) shows in a model with infinitely lived household how the optimal policy prescribes tax smoothing and a pre-funding due to demographic shifts.

public balance. In this way the two approaches span two orthogonal dimensions of possible reform directions.

4 An application for Denmark

The following provides an application of the approach outlined above for Denmark.

4.1 The DREAM model¹²

The analysis is conducted using a large scale dynamic CGE model, named DREAM, which has been developed with the purpose of evaluating medium-to-long term effects of fiscal policy in Denmark. This model is thus quite appropriate for assessing issues of fiscal sustainability and to evaluate the sensitivity to changes in key variables.

The model is based on an overlapping generation structure, and the focus is on demographic developments and the Danish public sector. DREAM represents a small open economy with a fixed exchange rate regime, perfect mobility of capital and residence based capital taxation, implying that the nominal interest rate is given by the international capital market. Danish and foreign products are considered imperfect substitutes in both production and consumption, and foreign trade is modeled using the Armington approach. Prices and wages are therefore influenced by internal Danish economic developments.

The core of DREAM is the household structure. The model uses the detailed projection of the Danish population presented in section 3.1. The adult population is divided into 85 generations, each consisting of cohorts in a 1-year interval, starting with people who are 17 years of age. For each generation a representative household is constructed. Children are distributed between the households according to the age-specific fertility rates of the demographic forecast.

Each representative household optimizes its labour supply, consumption, and savings decision in each period given perfect foresight. Savings take place in owner-occupied dwellings, financial assets (stocks and bonds) and labour market (second pillar) and private (third pillar) pension schemes. The labour market is characterized by unionized behavior giving rise to structural unemployment.

There are two private production sectors: a construction sector and a sector producing other goods and services. Firms optimize intertemporally and use labour, capital and materials in the production process. Investments are subject to convex costs of installation, giving rise to gradual capital adjustments. Like the labour market, product markets are characterized by imperfect competition. An exogenous Harrod-neutral, labour-augmenting productivity growth rate of 2 percent annually and an exogenous foreign inflation rate of 2 percent are assumed.

¹²The Danish Rational Economic Agents Model. For details see Knudsen, Pedersen, Petersen, Stephensen and Trier (1998,1999) and Pedersen, Stephensen and Trier (1999). More information can be found at www.dreammodel.dk.

The public sector produces goods that are mainly used for public consumption. In addition it levies taxes and pays transfers and subsidies to households and firms. These are modeled in great detail to capture actual systems and rules as closely as possible. The most important taxes in terms of revenue are local- and central-government income taxes, VAT, excise duties, corporate taxes, property taxes and a tax on yield of pension funds. Tax rates are assumed to remain constant in the forecast period. On the expenditure side 23 different transfers are distinguished and paid out to individuals of each respective age, gender and origin group following the actual distribution in 2001. In the same way expenditures for individual public consumption (mainly educational, health and social expenditures) are distributed to individuals. These individual (per age, gender and origin group) expenses are forecasted to increase with the rate of inflation and the exogenous productivity growth. The remaining collective public consumption is assumed to grow at the same rate as domestic GDP.

4.2 Unchanged policy

The starting point is to evaluate the sustainability of current policies, and this requires a precise clarification of what is understood by unchanged policies. This is complicated since it involves both current tax, transfer and welfare schemes. The key assumptions made here are the following(further details are given in Velfærdskommissionen (2004, 2005))

- * Transfer incomes are regulated annually by wage increases in the private sector¹³.
- * The frequency of the population receiving various income transfers is constant across gender, age and country of origin.
- * The frequency of the population using various forms of welfare services (individual collective consumption) is constant across gender, age and country of origin. The average cost per person is regulated annually by the sum of productivity increases and inflation equal to wage increases.
- * Collective public consumption is a constant fraction of GDP.
- * Public investments are determined such that the capital-labour ratio in public production is constant.
- * All tax rates (including excise taxes) are assumed constant. Taxes levied on a per quantum basis are regulated by inflation¹⁴.
- * Working hours and the fraction working part time are constant

Broadly interpreted the assumptions made here correspond to assuming un-

¹³According to Danish indexation rules "satsreguleringsloven" all transfers are indexed on private sector wages. However, 0.3 percentage points of the wage increase are transferred to a public fund "satspuljen" if wage increases exceed 2%. The funds accumulated in "satspuljen" are to be used for initiatives in the form of transfers or services benefitting recipients of transfer income. Note that since transfers are taxable income the distribution of part of the funds via "satspuljen" rather than by full indexation of transfers tends to deteriorate public finances.

¹⁴Currently there is a so-called tax-stop freezing all tax rates, also some at a nominal level (taxation of houses). In the projections the tax-freeze is assumed to be lifted in 2011.

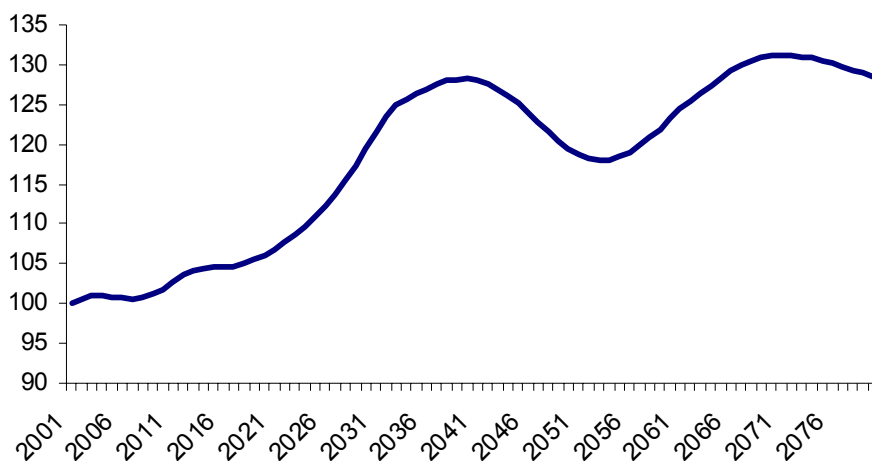
changed welfare arrangements and mode of financing via various forms of taxation. The basic question is thus whether these policies can be sustained, i.e. are they consistent with fiscal sustainability.

4.3 The demographic projection

Demographic projections depend on future fertility, mortality and migration. The uncertainty associated with the projection of each of these determinants is significant, and the evolution of the total population becomes highly uncertain in longer run projections. However, what really matters in relation to fiscal sustainability is the robustness of the demographic dependency ratio with respect to changes in the underlying population flows. The analysis is based on the demographic forecast of the Welfare Commission (2004).

Using the methods suggested by Lee and Carter (1992), Haldrup (2004) estimates age and gender specific mortality rates for Denmark using data from 1900-2002. These estimates imply that the average annual future growth rates in life expectancy are in the range from 0.08 to 0.09 years for both men and women. However, these estimates are cautious and imply that the growth rate in life expectancy remains approximately half of that projected for Western Europe over the next 50 years (United Nations, 2004). In any case, this suggests that uncertainty with respect to life expectancy may be significant.

Figure 1: Demographic dependency ratio
2001=100



Note: Persons age group below 15 and above 64 as a fraction of age group between age 15 and 64.

Source: Velfærdskommissionen (2004)

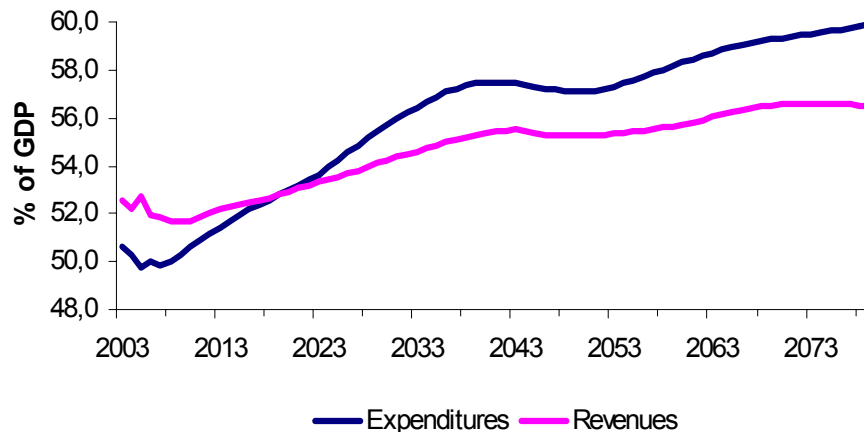
The projection shows a fall in the size of the population (from 5.4 million

today to 5.0 million in 2070), and the number of working-age persons (15-64) is reduced by 10 per cent from 2002 to 2040 and by 16 per cent from 2002 to 2080. Over the same two periods, the number of elderly citizens (65+) increases by 52 per cent and 47 per cent, respectively. Consequently, the demographic dependency ratio increases by 27 per cent from 2002 to 2040 and by 28 per cent from 2002 to 2080, cf figure 1. This indicates that the increase in the dependency ratio during the next 35 years is not a phenomenon that is isolated to the echo effects of the large post-war generations. Rather, it is a permanent shift to a higher level¹⁵.

5 Fiscal sustainability

We start by presenting the path for public expenditures and revenues under unchanged policies, cf figure 2. It is seen that expenditures gradually but steadily increase to a level systematically above revenues¹⁶.

Figure 2: Public expenditures and revenues



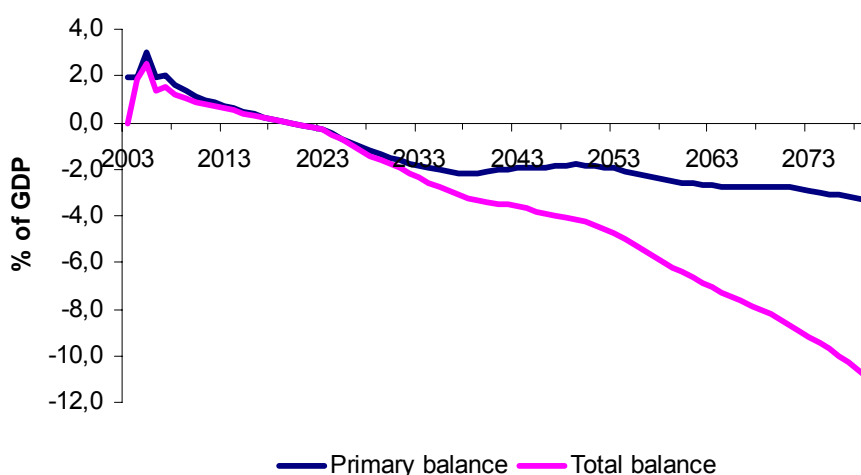
Source: Velfærdskommissionen (2005d)

¹⁵ Compared to previous yet very recent demographic forecasts, the shift in the dependency ratio is qualitatively different. In the 2001 forecast, the dependency ratio has a global peak around 2040, but the ratio is then reduced to a level which is in between the current level and the peak in 2040. This suggests that the demographic ageing problem has both a temporary and a permanent component. The current demographic projection implies that the ageing problem is almost entirely a permanent phenomenon, see e.g. Andersen et. al. (2005).

¹⁶ Note that deposits into private pension funds are deductible in taxable income, the return is taxed (at a low rate), but withdrawals are also taxable income. Since there has been a substantial build-up of pension funds since the late 1980s this implies that there is a substantial deferred tax payment in current pension funds. Therefore, the average tax share increases, despite unchanged tax rates.

The primary balance is initially in surplus but will gradually deteriorate, and systematic deficits will develop. The budget position changes by 4 percentage points of GDP between now and 2040. Since the change in the demographic dependency ratio is permanent, there is a persistent deficit.

Figure 3: Public finances - Primary and total balance



Source: Velfærdskommissionen (2005d)

The path shown in figure 3 raises the question of whether it is consistent with fiscal sustainability. Are current surpluses and reductions in public debt sufficient to cope with the projected deficits?

In the following the base tax rate is used as the instrument for evaluating the needed adjustments to ensure fiscal sustainability. This tax rate is chosen because it is a tax rate with a very broad base (90% of all taxable persons pay this tax, and the tax base is approximately 50% of GDP - the current rate is 5.5%) and easily interpretable. Note that in calculating the level of the base tax in accordance with the PAYG-criterion or for the sustainable tax rate, the consequences of tax changes are taken into account. For the base tax rate the marginal costs of public funds in the DREAM model are 1.67.

5.1 Pay-as-you go solution

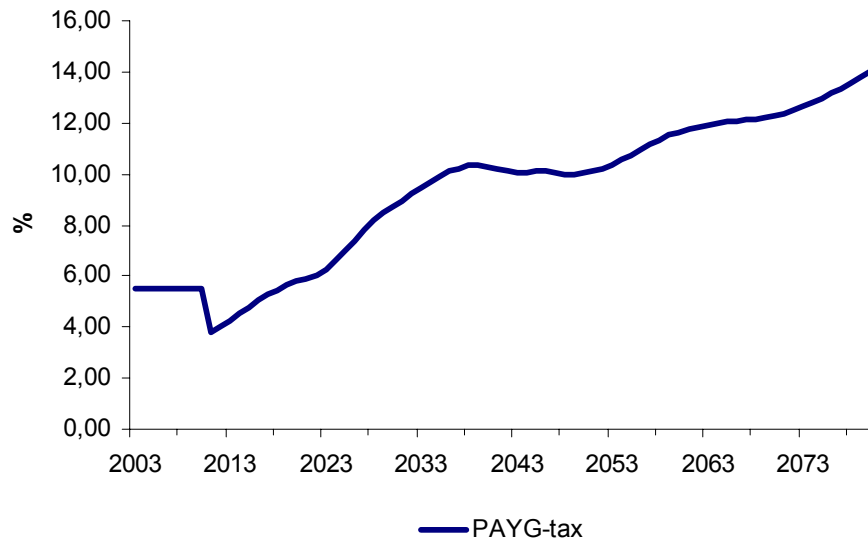
A natural starting point is to assume a pay-as-you-go financing where policy is continuously adapted to ensure a balance between revenue and expenses, cf (6). This ensures that the debt to GDP ratio remains constant (consolidated public debt at 5 % of GDP in 2003).

Under PAYG financing, the consequences of the demographic changes are financed on a period-by-period basis. This implies that capital markets are not

used to smooth the financial burden, cf above.

The upward trend in the dependency ratio causes an upward trend in the tax rate on labour income which in the medium to long run becomes more than twice the current level, cf. figure 4. Underlying the trend there are some variations. Initially there is scope for some tax reduction but eventually the demographic development requires an increasing tax rate.

Figure 4: PAYG-tax



Source: Velfærdskommissionen (2005d)

5.2 The sustainable tax rate

Consider alternatively the once and for all change in the tax rate that ensures fiscal sustainability, cf above. More specifically this gives the permanent change in the tax rate which ensures that the intertemporal budget constraint for the public sector is fulfilled.

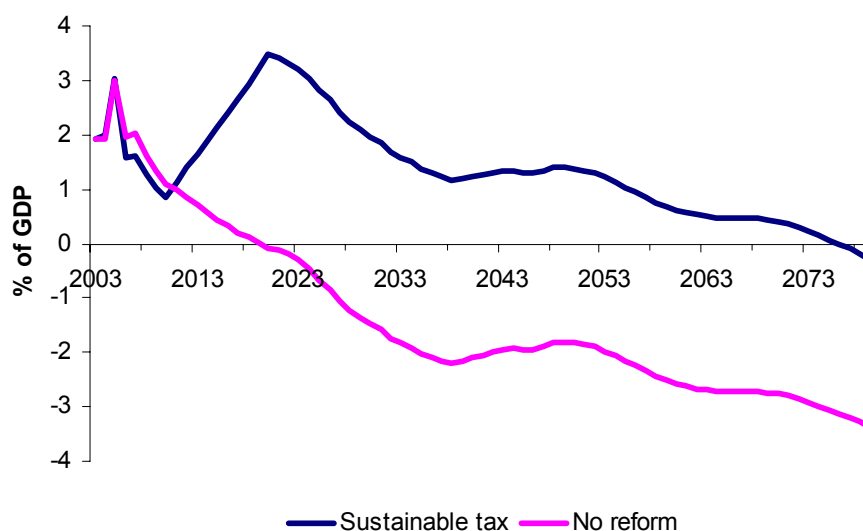
The sustainable tax rate is 7.9 percentage points above the current rate. This shows two things. First, current welfare arrangements are not fiscally sustainable despite current surpluses. Second, the needed reforms are substantial since they should have budgetary consequences equivalent to an increase in the base tax rate by 7.9 percentage points.

Since there is an underlying trend in the dependency ratio, it is an implication of the sustainable tax rate that it implies a substantial consolidation of public finances. That is, it implies a pre-funding strategy (for a further discussion see Andersen, Pedersen and Hougaard Jensen (2005))¹⁷ The primary

¹⁷McKissack and Comley (2005) consider pre-funding strategies adopted in some OECD

budget balance would thus remain positive for a long period of time (to 2076), cf figure 5, implying an accumulation of public wealth reaching more than 100% of GDP, which can be used to finance the upward expenditure drift in the future (cf also figure 7 below).

Figure 5: Primary balance - sustainable tax and no reform



Source: Velfærdskommissionen (2005d)

To underline that other modes of financing are available note that the permanent reduction in public expenditures ensuring fiscal sustainability is about 3.2% of GDP. The permanent increase in private employment is about 270.000 persons equivalent to an increase in employment by 10%. Note that this is a hypothetical number since it is not based on any explicit policy initiatives. Both of these measures also imply a consolidation and are therefore also prefunding or savings strategies.

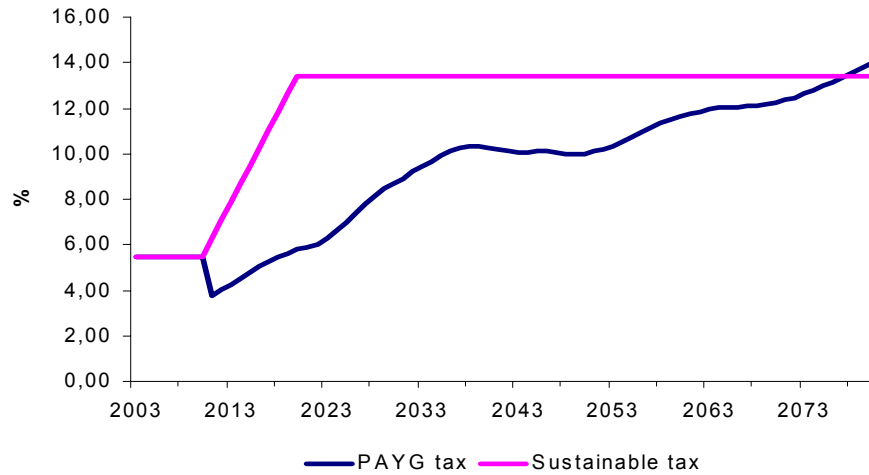
5.3 Comparison of PAYG-solution and sustainable taxes

PAYG-financing stabilizes the debt ratio but implies a time-varying tax rate with an upward trend, whereas the sustainable tax is constant, cf giure 6. Hence, there is a substantive consolidation of public finances under the sustainable tax. This reflectss the smoothing properties of the prefunding strategy. However, in the present context the smoothing is primarily of an underlying upward trend in the PAYG-tax rather than temporary variations around a more constant level.

countries.

As a consequence the sustainable tax implies a substantial pre-funding with a substantial wealth accumulation in the public sector.

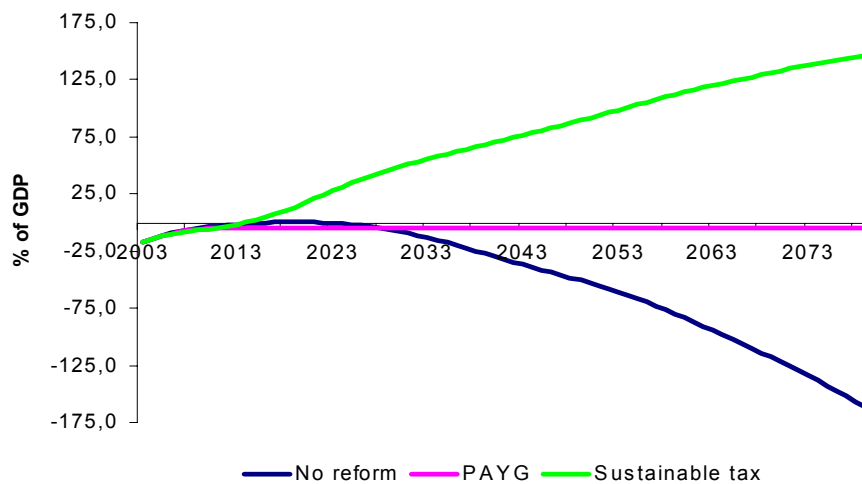
Figure 6: Sustainable tax vs. PAYG-tax



Source: Velfærdskommissionen (2005d)

The paths for public debt implied by the various strategies are seen from figure 7. The PAYG-tax keeps debt at the initial level, and the sustainable tax leads to an initial accumulation of substantial wealth in the public sector. This wealth is used to finance net-expenditures in the far future.

Figure 7: Public net-wealth: No reform, PAYG-tax and Sustainable tax

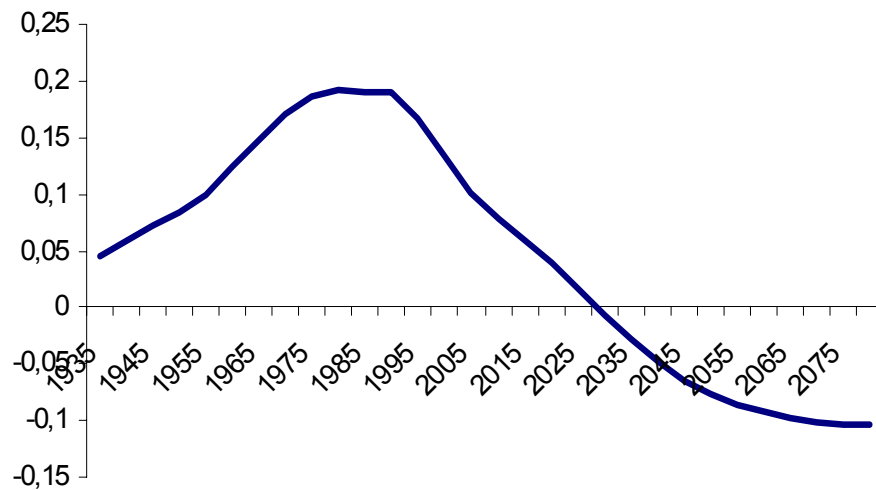


Source: Velfærdskommissionen (2005d)

Although the prefunding strategy smoothens taxes over time, it also implies a generational profile for the tax burden. This is so since the tax payments for a long period of time (before 2080) would be larger under the prefunding strategy compared to the PAYG-strategy. Considering the taxes paid by a given generation it follows that all generations born before 2030 will have to face a larger tax payment compared to PAYG-financing, and vice versa for generations born after 2030, cf figure 8¹⁸.

The choice of strategy has the largest implications for generations born between 1970 and 2000. For these generations the present value of the difference corresponds to 0.2 million Dkr per person over lifetime. The gain to generations born after 2060 under the prefunding strategy has a present value of about 0.1 million Dkr per person evaluated over life time.

Figure 8: Difference in net-payments across generations: Sustainable vs PAYG tax



Note: Present value of the difference in tax payments depending on the year of birth, million Dkr per person

Source: Velfærdskommissionen (2005d)

The distribution of gains and losses in net-contributions to the public sector can approximately be used to assess the relative change in utility for each generation. This is so since the effects on wages and prices of the two financing strategies are fairly similar compared to the differences in tax payments. Basically, the prefunding strategy implies that current generations are worse off

¹⁸This calculation is based on an earlier analysis, Velfærdskommissionen (2004). There is, however, no quality difference between the two.

compared to future generations¹⁹.

5.4 Sensitivity and risk

The calculations presented above apply to the base scenario, but various assumptions can of course be discussed. Moreover, it is important to identify the risk factors which may affect public finances the most. It is therefore important to perform a sensitivity analysis. The results of such sensitivity analyses are given in table 1 in terms of the changes in the sustainable tax rate. Similar analyses can easily be done for the PAYG-tax but are left out here to economize on space.

Table 1. Sensitivity – changes in the base tax rate under various alternative assumptions

	Change in base tax
Base scenario	7.9
Demographics	
UN growth in life expectancy	16.7
Increased fertility (from 1.7 to 1.8)	8.6
+5000 immigrants annually - more developed countries	7.9
+5000 immigrants annually - less developed countries	11.2
Welfare services and leisure	
0.10% reduction in work time per year	1.0
extra 0.15% real growth in welfare service per year	15.6
Labour market	
Higher labour force participation descendants from less developed countries	6.2
Interest rate and growth	
0.5 percentage points higher interest rate	4.8
0.5 percentage points higher growth in TFP	14.0
Health care	
"Year to death" and age dependency	7.3
"Year to death" and age dependency + increasing standards	14.5

Source: Velfærdskommissionen (2005d).

In the following we shall comment on two particular important aspects of the sensitivity analyses.

¹⁹See Jensen et.al.(2002) for a comparison of equivalent variation measures and generational accounts in the DREAM model. The analysis suggests a similarity in relative changes but differences between the two measures occur primarily due to differences in discount factors and the effects of bequest.

4.1 Demographics

It is seen that the sustainable tax rate is very sensitive to longevity. With no increases in expected life span, the sustainable tax is only marginally above the current rate (1.6 percentage points) while in the base case the difference is 7.5 percentage points. Under UN projections implying about the double growth in life expectancy the tax increase needed is about 16.7 percentage point. This shows how sensitive public finances are to changes in the balances between the number of years a person is net-contributor to the financing and the number of years as net-beneficiary. Note that the projections are made under an assumption of unchanged eligibility ages for early retirement and pensions. This shows that a major part of the financing problem arises from the need to deal with the fact that future generations would have higher longevity than current generations.

Table 1 also shows that changes in fertility would only have a minor effect on the sustainable tax rate, whereas it would obviously have some effect on taxes under PAYG-financing. Increased fertility worsens the sustainability problem because future generations are expected to live longer.

Permanent changes in immigration only have marginal long-term effects on the demographic composition of the population. Critical for the effects on the financing problem is the labour market attachment of immigrants and their descendants²⁰. This is so since universal welfare arrangements in Denmark provide entitlements to (almost) all individuals and compensate for lack of income, whereas financing goes via taxes levied on income generated in the market. Assessed from current experiences with the labour market performance of immigrants, it follows that increased immigration from highly developed countries would hardly affect the sustainable tax rate.

A permanent increase in immigration from less developed countries would worsen the sustainability problem due to the low employment frequency of this group. If their employment possibilities could be improved, it would clearly contribute to lowering the sustainability problem.

Finally, increased emigration could worsen the sustainability problem, in particular since the emigration propensity is larger for highly educated. Currently, return migration is at a high level, but to the extent this changes, the sustainability problem worsens. In short this is so since an investment is made in education, which is not paid back later in the form of tax payments arising from employment.

In sum, public finances are vulnerable if immigration is by groups with low employment rates and emigration is by the better educated. Continued globalization must be expected to lead to increases in migration flows, although immigration can be affected politically.

Growth

It is often hypothesized that growth will automatically create more leeway in public finances. Accordingly, proposals for structural reforms strengthen-

²⁰Labour force participation is 85% for males and 76% for females. For immigrants from more developed countries the corresponding figures are 69% and 57% and from less developed countries 59% and 41%.

ing growth are often also seen as measures to improve public finances, cf e.g. ECOFIN Council (2005). This type of reasoning is based on the fact that budget positions are very sensitive to the underlying business cycle situation. Despite this, the relationship between growth and public finance in the medium to long run may differ.

As seen from table 1, increasing the growth rate for productivity growth by 0.5 percentage points the sustainable tax increase is 12.8 percentage points rather than 8.7 percentage points in the base case, i.e. the sustainability problem is worse when the growth rate is higher.

This result may at first seem counterintuitive but it arises from some very basic mechanisms, cf also appendix. To see this start with the following basic effects of growth for public finances. If productivity increases in the private sector and wages and income increase, it will have a direct effect on public revenues. However, expenditures will also be affected. There are basically two types of public expenditures, namely wage expenditures and income transfers. The former will over the medium to long-run have to follow wage developments in the private sector²¹. The latter will also, under the political distributional constraint that all groups should share the gains in material well-being (or equivalently the distribution of income is not to change), follow wage developments in the private sector. Hence to a first approximation public expenditures will grow in parallel to the growth rate for given welfare arrangements.

Actually, there are mechanisms implying that increasing growth may deteriorate public finances. First, since some tax bases are defined on past income (say the taxation of withdrawals from pension funds) it follows that revenue is not following the growth rate²². Second, increasing growth may lead to increases in the demand for leisure (non taxed) but also increasing demand to standards in services provided by the public sector (expenditure increase) implying a further deterioration of public finances.

For the sustainable tax rate there is a further effect at stake. Even under assumptions ensuring that the PAYG-tax is independent of the growth rate. The reason is the trend increase in the dependency rate. The increasing dependency ratio implies a tendency towards systematic deterioration of public finances. The sustainable tax requires that all - current and future generations - pay the same tax rate, such that the intertemporal budget constraint holds. This implies that current generations with lower income than future generations are going to contribute to the financing of future expenditures. The larger the growth rate, the larger the tax rate would have to be to ensure that current generations contribute sufficiently to the financing of expenditure drifts caused by a trend increase in the dependency ratio.

The basic budget implications of changes in productivity growth under both PAYG-taxes and the sustainable tax rate are worked out in a simple two-period overlapping generations model presented in the appendix. The mechanisms through which growth affects either indicator are shown to demonstrate why

²¹Transfers are indexed to wages,cf the so-called "satsreguleringslov".

²²A similar effect is found for Norway in Heide et. al (2005).

increasing productivity growth under very general assumptions may worsen the sustainability problem.

6 Assessing the effects of reforms

The two alternative modes of assessing the fiscal sustainability problems also capture a fundamental dimension of reform strategy, namely a gradual adjustment vs a front-loading/pre-funding(savings) strategy. The sustainable tax corresponds to a pre-funding strategy since the underlying demographic developments have a clear upward trend. Therefore, this implies a considerable consolidation of public finance over several decades. There are several arguments against pursuing a strict pre-funding strategy. First, it implies that current generations come to contribute to the financing of a net-expenditure drift primarily caused by increased longevity of future generations. This is questionable on equity grounds. Second, the needed amount of pre-funding necessarily depends on the base projection. Substantial uncertainty is involved, and it is therefore difficult a priori to determine the needed pre-funding. Finally, on political economy grounds it is hardly advisable to pursue a policy path with substantial budget surpluses and accumulation of public wealth over a prolonged period which at the same time requires the policy discipline that standards in public provision (both services and transfers) should be kept unchanged relative to the base scenario.

For these reasons the following considers reform elements which have the property that they are timed so as to match the underlying trends, i.e. they can be considered as parts of a gradual adjustment strategy. The following focuses thus on ensuring a profile for public finances such that the primary budget balance in trend is close to zero. Although some smoothing is allowed, there is no substantial pre-funding or front-loading.

While the assessment of the sustainability problem in terms of needed tax changes has served the purpose of clarifying the need for reforms, this does not have any implications for the instrument choice. The reform proposals considered below aim at increasing labour supply and employment. The underlying demographic profile leads to an absolute decline in labour supply, and public finances in Denmark are as noted above very sensitive to the fraction of the population in employment. This is so since employment affects both public revenues (via tax payment) and expenditures (via transfer, since most non-employed have an entitlement to an income transfer in the Danish welfare system). By increasing the employment share of the population it is possible to ensure a financial basis for existing welfare arrangements without resorting to expenditure cuts or tax increases.

The following presents two specific reforms - retirement and labour market reform - as well as a complete reform package recently proposed by the Welfare Commission (Velfærdskommissionen (2005d)).

6.1 Retirement

A retirement reform can be seen as a natural response to increasing longevity since it directly aims at ensuring a balance between the number of "contributing" and "benefitting" years to the social contract. However, demographic shifts come gradually, and it is a further political concern that eligibility ages for early retirement and pensions are not changed significantly over short periods of time. To allow agents to adapt to the changes it is thus a premise that the changes should be phased in over a longer period of time. Given the long transition period it is interesting to analyse how such changes, which have marginal short run effects over time, will affect public finances and thus contribute to the solution of the fiscal sustainability problem via an increase in labour supply and employment.

In Denmark there is an early retirement scheme making retirement possible from the age of 60 (the scheme has incentives to postpone retirement to 62), and the official pension age is 65²³. The average retirement age is currently slightly above 61, and more than 60% have left the labour market before they reach the age of 65. Given the increasing longevity there has been much focus on measures to increase the retirement age.

In the following, we present an assessment of a retirement reform with the following two main elements

- * The early retirement scheme is phased out over the period 2009 to 2028, specifically the eligible age for entry into the scheme is increased by 4 months per year starting in 2009, and the scheme is closed when the early retirement period becomes 1 year.
- * The eligible age for public pension is linked to longevity, specifically by increasing the age limit by one month per year starting in 2013²⁴

Note that longevity according to the demographic projection underlying the calculations presented above approximately increasing by one month per year. Hence, the reform of the public pension is to index the eligible age to longevity²⁵.

In the assessment of this reform two issues are particularly important. The first is how large a fraction of persons currently on early retirement in the absence of this scheme would be entitled to a different transfer like disability pension. Various assessments of this issue have been made, and it is estimated that between 10% and 30% of those currently on early retirement would be entitled to a different transfer. In the assessment presented here the fraction is

²³Eligibility to the scheme requires that contributions have been paid for at least 25 years of the last 30 years. The contribution finances between 1/3 and 1/4 of the accumulated value of the early retirement benefit. The transfer is 91% of maximal unemployment benefits. By postponing early retirement from the age of 60 to 62 there is a higher transfer (100% of maximum unemployment benefits) and a more favourable treatment of some forms of pension savings. Moreover, there is a tax-free bonus to persons delaying early retirement.

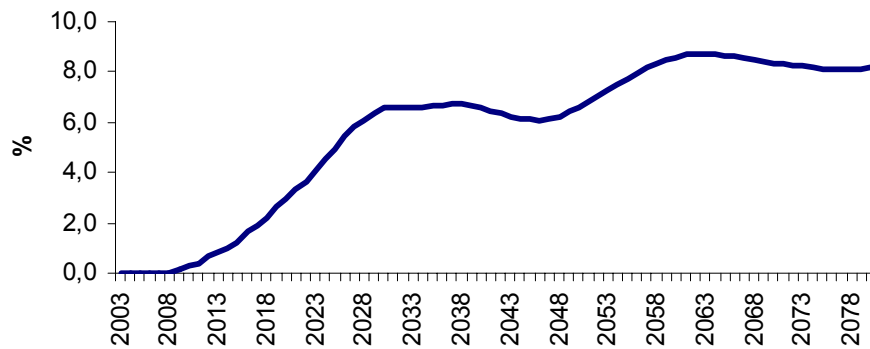
²⁴Observe that the indexing of the eligibility age for the public pension is started later than the out-phasing of the early retirement scheme since the opposite would imply a transition period in which the early retirement period would increase.

²⁵At regular intervals the indexation parameter should be adjusted to updates of demographic projections.

set at 20%. Second, increasing labour supply by changing retirement schemes is only of interest if it leads to more employment. It is a fact that there is somewhat higher unemployment for elderly in the labour markets. Analyses documented in Velfærdskommissionen (2005b,c) show that this is likely to be driven by mechanisms on both the demand and supply side arising up to the relevant horizon of labour market participation. Hence, by changing entitlement ages, it is to be expected that there somewhat higher unemployment will remain, but the age groups for which this prevails will be shifted upward along increases in the retirement age.

The effects of the reforms on labour supply and public finances (primary balance) are given in figure 9 and 10, respectively. The gradual introduction of the changes implies that the immediate effects are modest. For the indexation of the eligibility age for public pension the effect is moderate for a long period since it takes time for the indexing to accumulate to a significant increase in the "pension age". However, eventually both reform elements have substantial effects. It is thus an important implication that a reform which does not change the rules in the very short run and therefore fulfills the political criteria of a gradual change in the entitlements of individuals leads to substantial effects on the sustainability problem. Measured by the effect on labour supply and employment the effect in 2040 is about 160.000 (an increase of 8 %), and for the primary balance there is an improvement in 2040 of 2.1 percentage points of GDP, and the sustainability problem is reduced by some 80%.

Figure 9: Retirement reform - labour supply effect



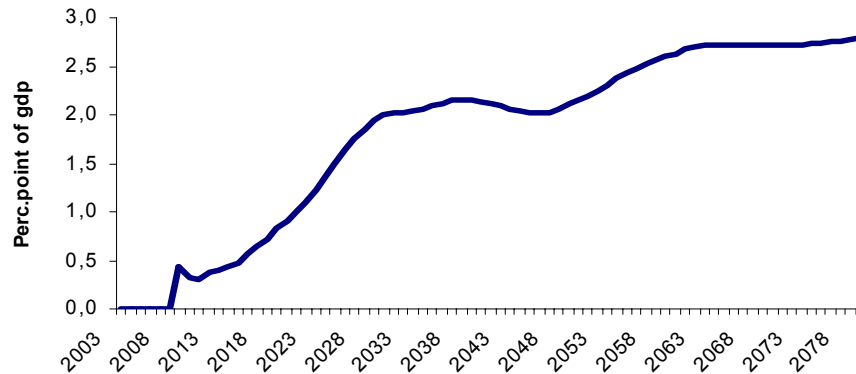
Note: Growth in labour force relative to base scenario

Source: Velfærdskommissionen (2005d)

The fact that the retirement reform only has marginal short run effects but substantial effects over the medium to long run points to implications for policy design. This is caused by the political constraint of avoiding sudden and abrupt changes in entitlements. The credibility of the future changes are thus important both from the perspective of individuals but also from a macroperspective.

It is therefore important that the changes are institutionalized by explicit indexation and an announced "tablitta" for changes in entitlement ages (early retirement and pension). An alternative procedure which plans to carry out the adjustment in steps by only undertaking one small step in the near future and leaving further steps for an unspecified future will not fulfill this requirement.

Figure 10: Retirement reform - budget effects



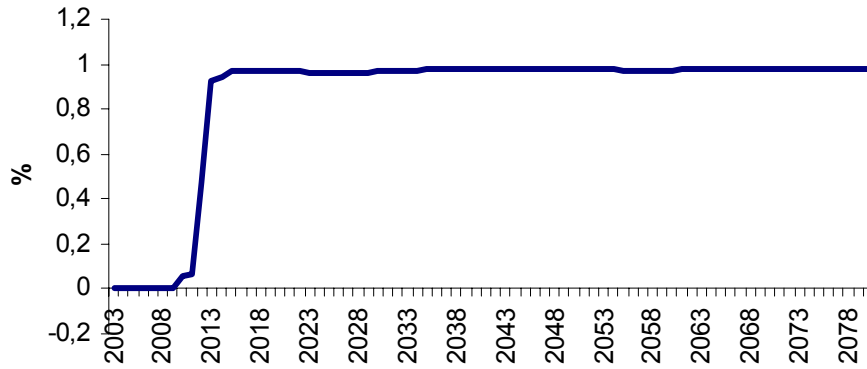
Note: The change in the primary balance (relative to GDP) relative to base case
Source: Velfærdskommissionen (2005d)

6.2 Labour market reform

Consider next a reform aiming at reducing structural unemployment. Specifically, the reform includes a shortening of the duration of unemployment benefits (from 4 to 2.5 years), an extended "youth package" implying a stronger focus on education and making it more difficult to enter the social security scheme and with more focus on activation. These ingredients will reduce the structural unemployment rate by 1 percentage point. By linking a change in the structural unemployment rate to explicit policy measures this also sheds light on the general question concerning the importance of unemployment for public finances.

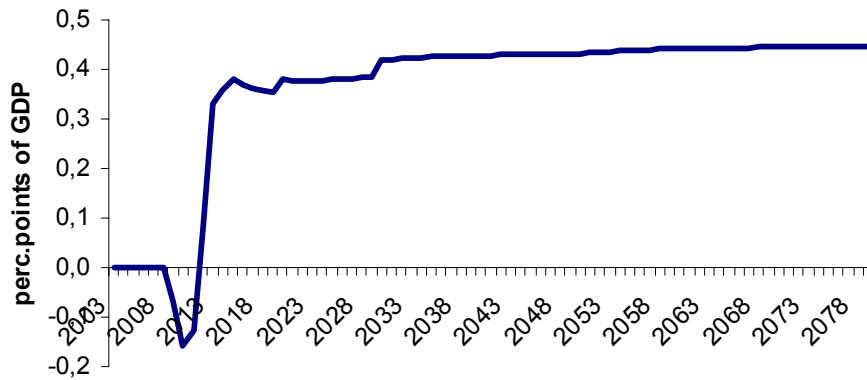
The effects on employment and the public budget balance can be read from figure 11 and 12.

Figure 11: Labour market reform - labour supply effect



Note: Growth rate of labour supply relative to base case
 Source: Velfærdskommissionen (2005d)

Figure 12: Labour market reform - budget effects



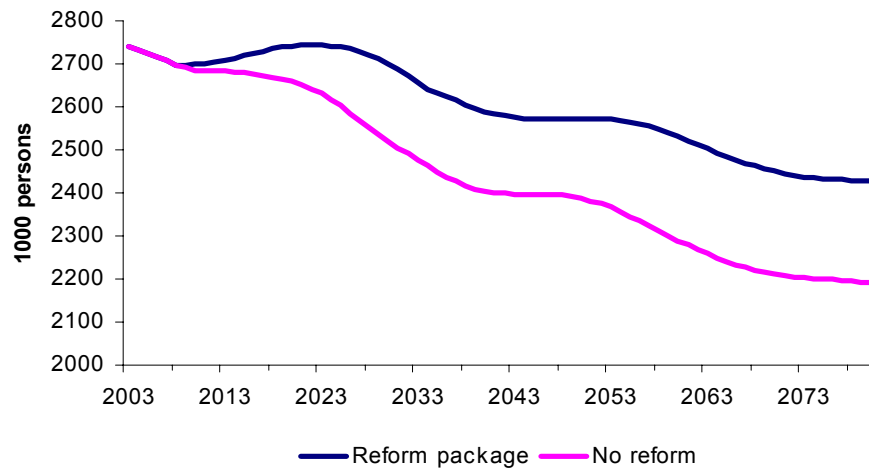
Note: Change in the primary balance (relative to GDP) relative to the base case
 Source: Velfærdskommissionen (2005d)

6.3 Reform package

The Welfare Commission (Velfærdskommissionen (2005d)) has recently proposed a reform package to solve the sustainability problem. The main thrust of the package is to increase labour supply and employment so as to provide a sound financial basis for welfare arrangements without resorting to tax increases or savings. The package has the following main ingredients; i) a retirement re-

form (cf above), ii) a labour market reform (cf above) iii) an education reform, iv) an integration reform and v) a tax reform. The main focus of all reform elements is to improve public finances by a strengthening of labour supply and employment, although the various reform elements have been chosen also with other concerns in mind. As noted this focus takes its outset in the fact that there will be a downward trend in labour supply..

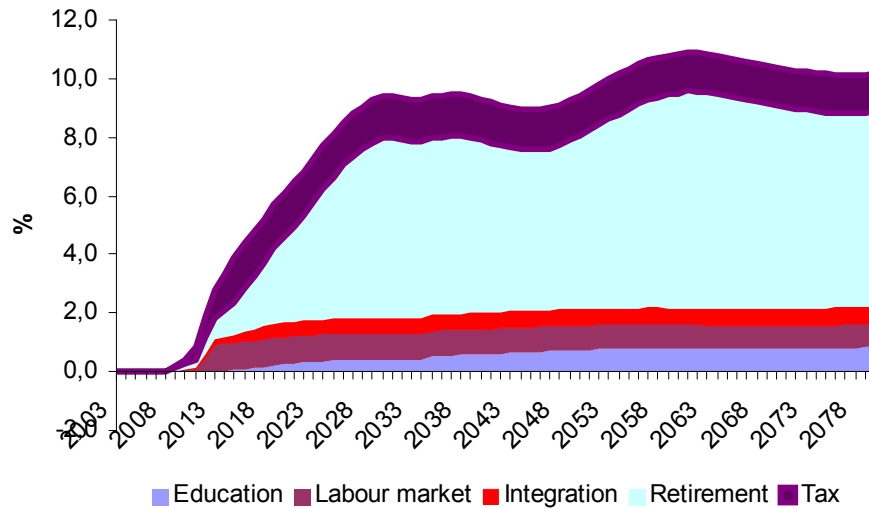
Figure 13: Labour supply - no reform



Source: Velfærdskommissionen (2005d)

The reform package has a substantial effect on labour supply and employment with an effect in 2040 of 252.000 equivalent to an increase by 10% in the labour force relative to the "no reform" path. The contribution of the various reform elements is shown in figure 14.

Figure 14: Employment effect - decomposition on reform elements

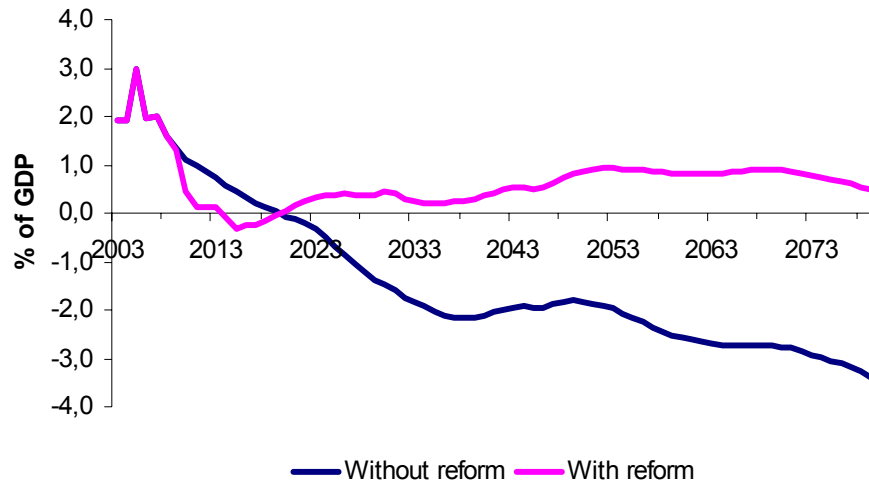


Source: Velfærdskommissionen (2005d).

The reform package implies that the deteriorating trend in public finances is eliminated and sustainability ensured. While the initial favourable position is used to further consolidate public finances, the package essentially implies that the primary balance is projected to vary very closely around zero reflecting that the net-effect of the overall reform package is timed so as to counteract the consequences of the demographic changes. The budget balance is projected to be very close to zero (maximum deficit in any year is 0.5% of GDP) and net-debt relative to GDP is in no year above 10% of GDP. The reform package is thus neither a pure PAYG-solution nor a pure consolidation/pre-funding strategy, although if anything it is closer to the former than the latter²⁶.

²⁶Note that in the long run there is a tendency towards budget surpluses leading to some consolidation coping with problems in the very long run. This has little current policy relevance since it applies to a very long horizon.

Figure 15: Primary balance with and without reform



Source: Velfærdskommissionen (2005d).

The contribution of the various reform elements to the improvement in public finances is shown in the table below.

Table 1: Decomposition of the contribution of the various reform elements to the change in the primary budget position

	2005	2020	2030	2040	2060
Base scenario	3.0	-0.1	-1.5	-2.1	-3.4
Education	0.0	0.1	0.2	0.3	0.5
Labour market	0.0	0.4	0.4	0.4	0.4
Integration	0.0	0.2	0.2	0.3	0.3
Retirement	0.0	0.9	2.0	2.1	2.8
Tax	0.0	-1.2	-0.7	-0.6	-0.6
Other reform elements	0.0	-0.3	-0.2	0.0	0.3
After reform	3.0	0.0	0.4	0.4	0.5

Velfærdskommissionen (2005d)

Assessed in terms of fiscal sustainability the reform package solves the problem²⁷The contribution of the various elements to the fiscal sustainability problem is: i) retirement 82.6% , ii) labour market 14%, iii) education 12.6%, iv) integration 10.4%, while iv) the tax reform worsens sustainability by -21% .

The reform package includes one element where the timing plays a very crucial role, namely the tax reform. The tax reform is motivated by both concerns for asymmetries in the existing tax structure as well as the need to make the system more robust to globalization. The particular tax reform considered involves

²⁷Exactly 99.6% of the sustainability problem identified in the base case is eliminated.

a shifting of taxes from labour income to real estate (i.e. shifting taxes in the direction of less mobile tax bases). However, increased taxation of real estate would be immediately capitalized in prices causing a capital loss for housing owners on top of the liquidity problem the tax increase may create (in particular for families which have recently entered the market)²⁸. By phasing in tax reductions on labour income quicker than the tax increase on real estate it is possible both to eliminate the immediate liquidity problem and to moderate the price effect²⁹. This reform element thus has the element of first deteriorating public finances, but eventually public finances will improve, and the reform can thus be seen as an "investment" in a better tax structure.

Note that the packages also includes increase public spending on research (to reach a target for public expenditures on research of 1 % of GDP) and pre-funding of pensions for groups not covered by mandatory labour market pension or similar pension scheme. This explains the short span of years for which the primary balance is in deficit, cf figure 15.

Since it is an implication of the package that it brings public finances to a situation very close to budget balance, it follows that exposure to various forms of risk is reduced. This applies to variation in the interest rate and the growth rate. For changes in longevity - where increase beyond the relative moderate projections made here may be expected - this only applies if the underlying indexation formula is maintained.

7 Concluding remarks

The issue of fiscal sustainability has been considered in an explicit intertemporal setting, and indicators based on either a period-by-period (gradual) approach or a once-and-for-all (permanent) approach have been considered and applied for Denmark. The framework here allows an explicit consideration of reforms aiming at eliminating the systematic trends towards making the situation fiscally unsustainable. Likewise it is possible to evaluate how reform proposals motivated by other concerns would affect fiscal sustainability.

It is an open question over how long horizons policies should be planned. However, it is important to consider the short term position of public finances in relation to medium to long run trends. The current situation for Denmark is a case in point - despite current budget surpluses and a trend decline in public debt, it is the case that current policies are not fiscally sustainable. There is a clear and systematic trend towards deterioration of public finances for unchanged welfare and taxation systems. Since this primarily is driven by demographic changes and a substantial lead time is needed to make changes in retirement and pensions systems it is necessary to consider public finance over a horizon of non-trivial length if sudden changes in policies should be prevented.

²⁸Note that since the taxation (ejendomsværdiskat) depends on the price development it follows that the liquidity problem is moderated the larger the price effect, and vice versa.

²⁹Evaluated in a partial model the effect is a price reduction of 11%. Taking into account the whole package and the general equilibrium effects, the effect is halved.

Concerns for inter-generational equity and risk both point in the direction of ensuring that the budget balance over the medium to long run is fairly close to zero. A policy aiming at substantial pre-funding would in a number of respects be a problematic strategy. By keeping public finances close to balance it follows that the risk exposure is smaller, and the room for accommodating short-run business fluctuations are larger. These points have been illustrated by consideration of a reform package recently proposed by the Welfare Commission (2005d).

Appendix A: The welfare state and the social contract - PAYG-financing and sustainable tax rates

A simplified version of the social contract can be represented in a standard two-period overlapping generations model with generations in the work force (the young) overlapping with retirees (the old). N_t is the number of persons in the generation being young in period t (and therefore old in period $t + 1$), a_{1t} denotes per capita services received from the public sector as young in period t , and a_{2t} per capita services received by the old in period t . Pensions paid to old in period t denoted p_t . The total income of those being active in period t is denoted y_{1t} , and it is taxed by a proportional tax rate τ .

The primary balance of the public sector in period t is

$$\begin{aligned} b_t &= N_t \tau_t y_{1t} - N_t a_{1t} - N_{t-1} (p_t + a_{2t}) \\ &= N_t [\tau_t y_{1t} - a_{1t} - (1 + \rho_t)(p_t + a_{2t})] \end{aligned}$$

where $1 + \rho$ is the demographic dependency ratio³⁰ in period t , i.e. $1 + \rho_t$. It follows that ρ is negative when the population is growing, and positive when it is decreasing. An increase in longevity prolongs the "retirement period" and increases the demographic dependency ratio and can thus be interpreted as a reason why ρ is positive.

In net terms the exchange of the young generation with the public sector is

$$\Gamma_{1t} = N_t a_{1t} - N_t \tau_t y_{1t}$$

and for the old it is

$$\Gamma_{2t} = N_{t-1} (p_t + a_{2t})$$

Given policy rules for welfare service, pensions and taxes - $p()$, $a_1()$, $a_2()$ and $\tau()$ - can be realized if and only if

$$PV(b) + D_0 \geq 0 \tag{7}$$

where D_0 is the initial public debt.

In the following we consider policy rules where

$$p_t = \gamma y_t \tag{8}$$

$$a_{1t} = \alpha_1 y_t \tag{9}$$

$$a_{2t} = \alpha_2 y_t \tag{10}$$

For pensions and welfare services it follows that they are proportional to current income. The first part of this assumption implies a fixed relation between

³⁰The fact that not all working people survive and reach the pensioner stage can easily be included. Denote by O_t the number of pensioners in period t out of generation N_t born in $t - 1$, where $O_t = (1 - \phi_{t-1})N_{t-1}$, and ϕ is the likelihood of dying young. The demographic dependency ratio is now $\frac{O_t}{N_t} = 1 + \tilde{\rho} \equiv (1 - \phi_{t-1})(1 + \rho_t) < (1 + \rho_t)$. Beyond this reinterpretation of the change in the demographic dependency ratio, the analysis remains unchanged.

pensions and income for those working, i.e. gains from growth are distributed equally among active and passive members of society. The second part implies that expenditures on welfare services are proportional to income developments. This reflects that welfare services are labour intensive and that public wages follow private wages very closely.³¹ Notice that all parameters are assumed to be time-independent, i.e. given rules for pensions and welfare services are considered.

The following focuses on the requirements to financing given the increase in the demographic dependency ratio. This is operationalized by considering the changes in the tax rate needed to finance the expenditures. We consider two financing strategies, namely, pay as you go with continuous adjustment of taxes to balance the budget and the sustainable tax rate, which over time is consistent with the government intertemporal budget constraint.

We consider a "small and open economy" for which the (real) rate of interest r is exogenous. To simplify, the interest rate is assumed constant over time. Similarly the growth rate g is exogenous and constant over time. It is assumed that $r > g$, i.e. corrected for growth the real rate of interest is positive.

Pay as you go financing

Under pay as you go financing it is a requirement that there is budget balance on a period-by-period basis, i.e.,³²

$$b_t = [\tau_t - \alpha_1 - (1 + \rho_t)(\gamma + \alpha_2)] y_{1t} = 0 \quad (11)$$

which immediately implies

$$\tau_t^{PAYG} = \alpha_1 + (1 + \rho_t)(\gamma + \alpha_2) \quad (12)$$

It follows straightforwardly that the optimal tax rate is increasing over time if the demographic dependency ratio is increasing ($\rho > 0$) and vice versa. The intuition is that it is necessary to tax the current work force more when a large fraction of the population has to be supported. It is also an immediate implication that

$$\begin{aligned} \Gamma_{1t} &= N_t a_{1t} - N_t \tau_t y_{1t} > 0 \\ \Gamma_{2t} &= N_{t-1} (p_t + a_{2t}) < 0 \end{aligned}$$

i.e. in net-terms the working population is net-contributors, and the retirees are net-beneficiaries from the welfare arrangements.

Note that the tax rate under PAYG-financing is independent of the income level and thus the underlying growth rate. The reason for this neutrality result

³¹At the same time, demand will pull in the same direction if the income elasticity in demand for welfare service is high.

³²Can more generally be translated as a requirement for unchanged debt (relative to GDP). For simplicity, the initial debt is assumed to be zero, and balance in the primary budget will maintain a zero debt.

is that all welfare arrangements (services and pensions) and the tax system are proportional to the current income level. Increased growth will thus lead to a proportional increase in revenues and expenditures for the public sector and therefore in net-terms not change anything. This neutrality result depends on the way welfare arrangements and taxation have been arranged, which can be seen by considering two special cases.

i) The tax system includes tax bases dependent on income in past period, e.g. via taxation of pensions or the return on savings. The budget restriction or the requirement to budget balance is in this case

$$b_t = [\tau_t - \alpha_1 - (1 + \rho_t)(\gamma + \alpha_2)] y_{1t} + \mu y_{1t-1} = 0$$

where μy_{1t-1} , is the revenue from taxation related to tax bases dependent on earlier periods' income (here income in the previous period). The balanced budget requirement can be rewritten

$$b_t = [\tau_t - \alpha_1 - (1 + \rho_t)(\gamma + \alpha_2) + \mu(1 + g)^{-1}] y_{1t} = 0$$

where g is the growth rate in income ($y_{1t} = (1 + g)y_{1t-1}$). The tax rate under PAYG-financing becomes

$$\tau_t^{PAYG} = \alpha_1 + (1 + \rho_t)(\gamma + \alpha_2) - \mu(1 + g)^{-1}$$

i.e. increased growth will increase the tax rate. The intuition is that while expenditures are increasing proportionally to income, this is not the case for the tax base since it also depends on previous periods' income. Therefore the needed tax rate to finance given welfare arrangements goes up.

ii) Pensions are proportional to earlier labour income, i.e.

$$p_t = \gamma y_{1t-1}$$

In this case pensions are seen relative to the income (and [this-?] consumption possibilities) while working and not relative to those currently working. In this case the budget restriction becomes

$$b_t = [\tau_t - \alpha_1 - (1 + \rho_t)(\gamma(1 + g)^{-1} + \alpha_2)] y_{1t} = 0$$

and the tax rate under PAYG-financing

$$\tau_t^{PAYG} = \alpha_1 + (1 + \rho_t)(\gamma(1 + g)^{-1} + \alpha_2)$$

i.e. increased growth will reduce the PAYG-tax. The intuition is that expenditures on pensions are not affected by growth since they depend on last period's income.

Sustainable tax rates

An alternative financing strategy is to keep tax rates constant over time to avoid varying tax rates and possibly minimizing tax distortions (Barro (1979)). The sustainable tax rate is defined as the tax rate $\hat{\tau}$, which it is possible to maintain

in all periods so as to finance welfare arrangements of the form (8), (9) and (10) and that the intertemporal budget constraint for the public sector is fulfilled, i.e.

$$\sum_{i=0}^{\infty} \left(\frac{1}{1+r} \right)^i b_{t+i} = 0 \quad (13)$$

Initial debt is assumed to be zero. By use of (11 and (13), it is found that the sustainable tax rate $\hat{\tau}$, satisfies

$$0 = [\hat{\tau} - \alpha_1 - (1 + \rho_t)(\gamma + \alpha_2)] y_{1t} + \frac{1}{1+r} [\hat{\tau} - \alpha_1 - (1 + \rho_{t+1})(\gamma + \alpha_2)] y_{1t+1} \\ + \left(\frac{1}{1+r} \right)^2 [\hat{\tau} - \alpha_1 - (1 + \rho_{t+2})(\gamma + \alpha_2)] y_{1t+2} \dots$$

or

$$0 = [\hat{\tau} - \alpha_1] \frac{1}{1 - \frac{1+g}{1+r}} - (\gamma + \alpha_2) \left[(1 + \rho_t) + \frac{1+g}{1+r} (1 + \rho_{t+1}) + \left(\frac{1+g}{1+r} \right)^2 (1 + \rho_{t+2}) \dots \right] \quad (14)$$

Consider the special case, where ρ is constant over time. In this case the sustainable tax rate is

$$\hat{\tau} = \alpha_1 + (\gamma + \alpha_2)(1 + \rho)$$

It is seen to coincide with the tax rate under PAYG-financing, cf (7). This indicates that differences between the two modes of financing arise when the demographic dependency ratio is not constant over time. It is an implication that the sustainable tax in this case is independent of the interest rate and the growth rate.

Trend changes in demographic dependency ratio

Consider a stylized situation with a trend change in the demographic dependency ratio given as $(1 + \rho_{t+i}) = (1 + \rho)^{i+1}$. This implies that the sustainable tax (14) becomes

$$\hat{\tau} = \alpha_1 + (\gamma + \alpha_2)(1 + \rho) \frac{(1+r) - (1+g)}{(1+r) - (1+g)(1+\rho)}$$

It follows that

$$\frac{\partial \hat{\tau}}{\partial \rho} = (\gamma + \alpha_2) \left[\frac{(1+r) - (1+g)}{(1+r) - (1+g)(1+\rho)} + (1+\rho)(1+g) \frac{(1+r) - (1+g)}{((1+r) - (1+g)(1+\rho))^2} \right] > 0$$

$$\frac{\partial \hat{\tau}}{\partial g} = (\gamma + \alpha_2)(1 + \rho) \left[\frac{(1+r)\rho}{[(1+r) - (1+g)(1+\rho)]^2} \right] > 0$$

$$\frac{\partial \hat{\tau}}{\partial r} = -(\gamma + \alpha_2)(1 + \rho) \left[\frac{(1+g)\rho}{[(1+r) - (1+g)(1+\rho)]^2} \right] < 0$$

where it is assumed that $(1+r) > (1+g)(1+\rho)$.

An increasing trend in the dependency ratio increases the sustainable tax rate. For the case where the dependency ratio is increasing ($\rho > 0$), it follows that an increase in the growth rate increases the sustainable tax rate, as does an increase in the interest rate. The intuition is that the sustainable tax distributes the financing requirements over time. Since increasing growth means increasing expenditures in the future, and since current generations are contributing to the financing it follows that the tax rate has to go up. Similar reasoning applies for the interest rate effect.

With a trend in the demographic dependency ratio, the initial budget balance is

$$\begin{aligned} b_0 &= [\hat{\tau} - \alpha_1 - (1 + \rho)(\gamma + \alpha_2)] y_{1t} \\ &= (\gamma + \alpha_2)(1 + \rho) \left[\frac{(1 + g)\rho}{(1 + r) - (1 + g)(1 + \rho)} \right] y_{1t} \end{aligned}$$

which implies that the sustainable tax rate implies an initial budget surplus if the demographic dependency ratio is increasing, and vice versa if it is decreasing, i.e. $b_0 > 0$ for $\rho > 0$, and $b_0 < 0$ for $\rho < 0$. With an underlying trend in the dependency ratio, it follows that the sustainable tax rate causes an initial consolidation to create a financial basis from which to finance future expenditure increases. With an underlying demographic trend, the sustainable tax rate thus induces savings to ensure a constant tax rate over time.

With an underlying upward trend in the dependency ratio, it is straightforward to compare the sustainable tax rate with the PAYG-tax rate, since

$$\begin{aligned} \tau_t^{PAYG} &= \alpha_1 + (1 + \rho)^{i+1}(\gamma + \alpha_2) \\ \hat{\tau} &= \alpha_1 + (\gamma + \alpha_2)(1 + \rho) \frac{(1 + r) - (1 + g)}{(1 + r) - (1 + g)(1 + \rho)} \end{aligned}$$

i.e.

$$\begin{aligned} \tau_t^{PAYG} - \hat{\tau} &= \alpha_1 + (1 + \rho)^i(\gamma + \alpha_2) - \left[\alpha_1 + (\gamma + \alpha_2)(1 + \rho) \frac{(1 + r) - (1 + g)}{(1 + r) - (1 + g)(1 + \rho)} \right] \\ &= (\gamma + \alpha_2)(1 + \rho) \left[(1 + \rho)^i - \frac{(1 + r) - (1 + g)}{(1 + r) - (1 + g)(1 + \rho)} \right] \end{aligned}$$

It follows that for $\rho > 0$: $\tau_0^{PAYG} - \hat{\tau} < 0$, and there exists a \tilde{t} , where $\tau_{\tilde{t}}^{PAYG} - \hat{\tau} > 0$. This shows that the sustainable tax rate smooths the financial burden caused by the trend increase in the demographic dependency ratio.

PAYG-taxes and the sustainable tax rate

It follows immediately by use of () defining the PAYG-tax that the sustainable tax from () can be written

$$\begin{aligned} 0 &= [\hat{\tau} - \alpha_1 - (1 + \rho_t)(\gamma + \alpha_2)] y_{1t} + \frac{1}{1 + r} [\hat{\tau} - \alpha_1 - (1 + \rho_{t+1})(\gamma + \alpha_2)] y_{1t+1} \\ &\quad + \left(\frac{1}{1 + r} \right)^2 [\hat{\tau} - \alpha_1 - (1 + \rho_{t+2})(\gamma + \alpha_2)] y_{1t+2} \dots \end{aligned}$$

or

$$\begin{aligned} 0 &= [\hat{\tau} - \tau_t^{PAYG}] y_{1t} + \frac{1}{1+r} [\hat{\tau} - \tau_{t+1}^{PAYG}] y_{1t+1} \\ &\quad + \left(\frac{1}{1+r}\right)^2 [\hat{\tau} - \tau_{t+2}^{PAYG}] y_{1t+2} \dots \end{aligned}$$

and therefore

$$\hat{\tau} = \sum_{i=0}^{\infty} \left(\frac{1+g}{1+r}\right)^i \tau_{t+i}^{PAYG}$$

i.e. the sustainable tax equals the present value of the PAYG-tax calculated by the growth corrected real rate of interest. Note that this presumes that the initial debt level is zero.

REFERENCES

- Andersen, T.M., (2005): Social Security and Longevity, CESifo Working paper
- Andersen, T.M., and R. Dogonowski (2002): Social Insurance and the Public Budget, *Economica*, 69, 415-432.
- Andersen, T. M., S. E. H. Jensen, & L. H. Pedersen (2004): The Welfare State and Strategies To-wards Fiscal Sustainability in Denmark, Arbejdsrapport 2004:4 Velfærdskommissionen
- Arbejderbevægelsens Erhvervsråd (2004a): "Størrelsen af de fremtidige udfordringer"
- Auerbach, A. J., and K. Hassett (2001): .Uncertainty and the Design of Long-Run Fiscal Policy, in A. J. Auerbach, and R. D. Lee (eds.) "Demographic Change and Fiscal Policy", Cambridge University Press, Cambridge, UK.
- Auerbach, A., and K. Hassett (2002a): .Fiscal Policy and Uncertainty, *International Finance*, 5(2), 229-242.
- Auerbach, A., and K. Hassett (2002b): .Optimal Long-Run Fiscal Policy: Constraints, Preferences and the Resolution of Uncertainty,.NBER Working Paper 7036, National Bureau of Economic Research, Boston, Mass.
- Bagnai, A., 2004, Keynesian and Neoclassical Sustainability indicators, with applications to emu member countries.
- Ballabriga, F.C. and C. Martinez-Mongay, 2005, Sustainability of EU public finances, European Commission, Economic Paper 225.
- Barro, R. (1974): Are Government Bonds Net Wealth?, *Journal of Political Economy*, vol 82, pp 1095-1117
- Barro, R (1979): On the Determination of Public Debt", *Journal of Political Economy*, vol 87, pp 940-971
- Benz, U. and S. Fetzner, 2004, Indicators for Measuring Fiscal Sustainability: A Comparative Application of the OECD-Method and Generational Accounting, University of Freiburg.
- Bohn, H. (2001): .Social Security and Demographic Uncertainty: The Risk-Sharing Properties of Alternative Policies, in Campbell, J. and M. Feldstein (eds.) "Risk Aspects of Investment Based Social Security Reform", University of Chicago Press, Chicago.
- Blanchard, O. & S. Fischer (1989): *Lectures on Macroeconomics*, MIT Press
- Burnside, C. (2004): Fiscal Sustainability in Theory and Practice, book manuscript, Duke University.
- Carriero, A., C. A. VFAvero and F. Giavazzi, 2005, Fiscal Sustainability: A New Framework for tests and indicators.
- Dardarelli, R., J. Sefton and L.J.Kotlikoff, 2000, Generational Accounting in the UK, *Economic Journal*, 110, F547-F574
- Det økonomiske Råd (2004): *Dansk Økonomi, forår 2004*, Copenhagen
- Diamond, P. (2003): "Taxation, Incomplete Markets and Social Security", *Munich Lectures in Economics*, MIT Press.
- Dimson, E., P. R. Marsh, & M. Staunton (2002): "Triumph of the Optimists: 101 Years of Global Investments Returns", Princeton University Press

- Dixit, A. K. & R. S. Pindyck (1994): *Investment under Uncertainty*, Princeton University Press.
- Fehr, H., S. Jokisch, and L.J. Kotlikoff, 2004, *Fertility, Mortality, and the Developed World's Demographic Transition*, CESifo Working Paper 1326.
- Flodén, M. (2003): *Public Saving and Policy Coordination in Aging Economies*, *Scandinavian Journal of Economics*, 105, 379-400.
- ECONFIN Council, 2005, *Improving the implementation of the Stability and Growth Pact*, Brussels.
- European Commission, *Public Finances in EMU*, various issues
- Finansministeriet (2004): *Finansredegørelse 2004*, Copenhagen
- Finansministeriet (2005): *Økonomisk Redegørelse, maj 2005*, Copenhagen
- Frederiksen, D., K. M. Heide, E. Holmøy og I. F. Solli, (2004): *Makroøkonomiske virkninger av Moderniseret folketrygd*, Statistisk Centralbyrå, Økonomiske Analyser 5, 60-70.
- Frederiksen, N.K., 2001, *Fiscal Sustainability in the OECD, A simple Method and some preliminary results*, Working Paper 2001, no 3, Finansministeriet, Danmark
- Gordon, R., and H. Varian (1988): *Intragenerational Risk Sharing*, *Journal of Public Economics*, 37, 185-202.
- Haldrup, N. (2004): *Estimation af middellevetider for mænd og kvinder i Danmark, 2002-2010, baseret på Lee-Carter metoden*, Arbejdsrapport 2004:3, Velfærdskommissionen.
- Hansen, N. P., S. E. H. Jensen, and M. Junge (1999): *Government Solvency, Social Security and Debt Reduction in Denmark*, in T. M. Andersen, S. E. H. Jensen, and O. Risager: "Macroeconomic Perspectives on the Danish Economy", chap. 7. Macmillan Press, London, UK.
- Heide, K.M., E.Holmøy, I.F.Solli and B. Strøm, 2005, *Fiscal sustainability problems i a wealthy welfare state: CGE assessments for Norway*.
- IMF, 2003, *Sustainability Assessments - Review of Application and Methodological Refinements*.
- Jensen, S. E. H., U. Nødgaard, and L. H. Pedersen (2001): *Fiscal Sustainability and Generational Burden Sharing in Denmark*, *Nordic Journal of Political Economy*, 28(1), 43-60.
- Knudsen, M., L. Pedersen, T. Petersen, P. Stephensen, and P. Trier (1998): *Danish Rational Economic Agents Model - DREAM Ver. 1.2*, Working paper, www.dreammodel.dk, DREAM, Copenhagen.
- Knudsen, M. B., L. H. Pedersen, T. W. Petersen, P. Stephensen, and P. Trier (1999): *Dynamic Calibration of a CGE-Model with a Demographic Application*, Working paper, www.dreammodel.dk, DREAM, Copenhagen.
- Lack, C. & Kugler, P. (2003): *Price Level Uncertainty and Real Interest Rates: An Empirical Investigation*, Working Paper
- Lee, R., and L. Carter (1992): *Modelling and Forecasting the Time Series of U.S. Mortality*, *Journal of the American Statistical Association*, 87, 659-671.
- Lee, R., and S. Tuljapurkar (2001): "Population Forecasting for Fiscal Planning: Issues and Innovations" in Auerbach, A. and R. Lee (eds.): "Demographic

Change and Fiscal Policy”, chap. 2. Cambridge University Press, Cambridge, UK.

Lippman, S., and J. McCall (1981): The Economics of Uncertainty: Selected Topics and Probabilistic Methods, in K. J. Arrow, and M. D. Intriligator (eds.) “Handbook of Mathematical Economics”, chap. 6. North-Holland, Amsterdam.

Markeprand, T. L. H. Pedersen, & P. Stephensen (2003): DREAMs disaggregerede befolkningsfremskrivning til år 2100. Resultater og Metode.

McKissack, and B. Comley, "005, Fiscal Sustainability and pre-funding strategies in OECD Countries, Working paper

Nielsen, S., and O. Risager (2001): Stock Returns and Bond Yields in Denmark 1922-1999, Scandinavian Economic History Review, 49(1), 63-82.

Nordhaus, W.D., 2003, Comment on A.J.Auerbach, Fiscal Policy, Past and Present, Brookings Papers on Economic Activity, 1, 130-134.

Oksanen, H., 2003, population gageing and public finance targets, European Commission, Economic Papers 196

Pedersen, L. H. (2002): Befolkningsudvikling, integration og økonomisk politik, DREAM, Rapport til Tænketanken om udfordringer for integrationsindsatsen i Danmark

Pedersen, L., P. Stephensen, and P. Trier (1999): A CGE Analysis of the Danish Ageing Problem,. Working paper, www.dreammodel.dk, DREAM, Copenhagen.

Polito, V. and M. Wickens, 2005, Measuring Fiscal Sustainability, Working Paper University of York

Regeringen (2000) Et bæredygtigt pensionssystem, Copenhagen, Denmark

Turini, A. 2005, The Short-term budgetary implications of structural reforms: Evidence from a panel of EU countries.

United Nations (2004): World Population in 2300. UN, New York.

Velfærdskommissionen (2004): Fremtidens velfærd kommer ikke af sig selv. Analyserapport. Velfærdskommissionen, Copenhagen, Denmark.

Velfærdskommissionen (2005a): Fremtidens velfærd og globaliseringen. Analyserapport. Velfærdskommissionen, Copenhagen, Denmark

Velfærdskommissionen (2005b): Fremtidens velfærd – sådan gør andre lande. Analyserapport. Velfærdskommissionen, Copenhagen, Denmark

Velfærdskommissionen (2005c): Befolkningsudvikling, velstandsdilemma og markoøkonomiske strategier, Teknisk Analyserapport. Velfærdskommissionen, Copenhagen, Denmark

Velfærdskommissionen (2005d): Fremtidens velfærd - Vores valg, Analyserapport, Copenhagen, Denmark.

Wadensjö, E. & C. Gerdes (2004): Immigrants and the Public Sector in Denmark and Germany. I Tranæs, T. & K. F. Zimmermann eds.: "Migrants, Work, and the Welfare State", University Press of Southern Denmark and the Rockwool Foundation Research Unit

NOTHING VENTURED, NOTHING GAINED: THE LONG-RUN FISCAL REWARD OF STRUCTURAL REFORM

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**Paper prepared for the European Commission Workshop:
The budgetary implications of structural reforms
Brussels, 2 December 2005**

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Introduction

1. We take it for granted that fiscal discipline is important: *i)* fiscal policy volatility can undermine growth; *ii)* a pro-cyclical policy can destabilise the economy; *iii)* large deficits and rising debt undermine the long-run sustainability of fiscal policy and *iv)* excessive deficits will be a burden on future generations (Fatas, 2005). Fiscal rules are one way to cope with such fiscal policy biases, but they need to be underpinned by institutional settings so that they can be enforced at the national, and in the case of the euro area, at the Community level.

2. The EU fiscal framework was set to underpin the single currency. It was designed to address one key concern, namely that once exchange rates within the single currency area ceased to exist, financial markets would no longer discipline fiscal policy. Fiscal profligacy in one country could affect area-wide interest rates and crowd out economic activity in other countries. As interest rate differentials across the euro area countries have become small despite a divergent fiscal performance, there is little evidence of spill-over effects, probably because there is little to crowd out due to persistent economic slack in the large euro area countries.

3. This may be one reason why the arguments in favour of rules-based fiscal co-ordination have shifted towards long-term issues, not least because ageing-related concerns oblige governments to recognise the implications of current budget decisions for public finances in the future. Also, greater weight has progressively been put on the incentives built into budgetary institutions that produce fiscal biases (higher deficits, expenditure and taxes). But, while these institutions have improved to some extent, they are still lagging best practice in many euro area countries.

4. At the same time, calls to make the Pact more flexible have mushroomed. Some were motivated by new member countries' need to boost infrastructure outlays, against the backdrop of relatively low public debt levels. Some observers have argued in favour of the "golden rule", along the lines of the one introduced in 1997 in the United Kingdom.

5. Another rationale for a rewrite of the rules, and the topic of this conference, is that structural reform may yield long-term economic gains but entail up-front costs. The estimated gains of structural reforms are usually uncertain, whereas any immediate political and budgetary costs, such as compensation schemes to offset redistributive effects, are felt immediately and more tangibly. Moreover, some reforms will involve J-curve effects; a cut in taxation will reduce budget receipts immediately while effects on incentives to work, save and invest may be slow to materialise. This asymmetry could discourage reforms, especially in a monetary union, where they cannot be supported via an easing of monetary policy. Similarly, a move towards privately funded pension schemes would lead to deficits in the public scheme but initial surpluses in the private schemes as contributors transfer to them.

6. According to the fiscal rules a waiver could be granted under the excessive deficit procedure to countries on the basis of "exceptional circumstances" (EC 2005a). While the Treaty had already stipulated that "other relevant factors" should be part of the "exceptional circumstances", these were not specified. The revamped Pact decided by the European Council in March 2005 specifies them and the conditions under which they are taken into account. These include a country's efforts to pursue the Lisbon agenda, to foster R&D or "a high level of financial contributions" to underpin the "unification of Europe" and "international solidarity" (development aid). Consideration would also be given to pension reforms. Concerning the Lisbon agenda, the new Council Regulation observes: "In order to enhance the growth-oriented nature of the Pact, major structural reforms which have direct long-term cost-saving effects, including through raising potential growth, and therefore a verifiable impact on the long-term sustainability of public finances, should be taken into account when defining the adjustment path to the medium-term budgetary objective for countries that have not yet reached this objective and in allowing a temporary deviation from this objective for countries that have already reached it" (EC, 2005b). All these provisions, however, only apply if "an excess over the reference value is temporary" and if the deficit ratio "remains close to the reference value", as stipulated in the Treaty.

7. There is not yet a proper framework for making decisions about such exemptions in place. In this paper, various aspects of the nexus between structural reforms and budgetary developments that should underpin such a framework will be highlighted. In the first part of the paper we look at the following issues: *i)* to what extent do budgets cost structural reforms? The United Kingdom, which has a very elaborate fiscal framework, is used as an example. *ii)* There may be budgetary cost from not reforming government programmes, such as disability or early retirement programmes, which should also be taken into account. *iii)* Large inventories of structural reforms exist. While they have been used to estimate the effects of reforms on growth, budgetary implications are seldom quantified. This is obviously difficult to establish. Two countries, New Zealand and Australia, which have implemented a radical reform agenda are used here to shed some light on these issues. The second part of the paper uses econometric tools to establish to what extent structural reform affects public expenditure, in the short as well as the long run. The data allow us to detect both upfront cost and long-run gains of structural reform, although both seem to be modest in comparison with other structural determinants. The third part uses simulations with the OECD's Interlink model to highlight the implications of reforms that affect technical progress, the participation rate and the natural rate of unemployment in different settings.

Linking reforms and the budget

The UK budget: a role model?

8. Assessing the budgetary implications of structural reforms in the short, medium and long run is shrouded with many difficulties. In many cases, governments do provide a costing of changes in tax and spending plans and often also beyond the current budget.¹ Obviously, changes in tax and spending plans are pursued for many other purposes than purely fiscal ones. UK Budgets (HMT, 2001, 2002, 2003 and 2004), for instance, provide an assessment of Budget policy decisions over a three-year horizon under the following headings: meeting the fiscal rules and funding public services; meeting the productivity challenge; increasing employment opportunity for all; building a fairer society; a modern and fair tax system; and protecting the environment.

9. Budget 2002 (Table A.I), for instance, lists 54 spending and tax measures and estimates their budgetary effect. The budgetary impact of 16 measures implemented since Budget 2001 are estimated as well. The biggest measure was a payroll tax increase and the second biggest an increase in the generosity of the Child Tax Credit and Working Tax Credit for families with children. All other measures were small, ranging from beer duty relief for small brewers to simplifying capital gains tax. While the list of measures is long, only those are included where the impact of the decisions and circumstances can be quantified with reasonable accuracy. Moreover, spending that is fixed by the spending reviews and embedded in Departmental Expenditure Limits is not included in the Budget costing of decisions. In 2002, the net fiscal impact of the identified spending and revenue measures was nearly 1% of GDP, but considerably lower in most other Budgets. In comparison, the forecasting error for the deficit was equivalent to 1% of GDP for the year-ahead projection in recent years and nearly 1½ per cent of GDP for the two-year ahead projection (Table 1). There is no strong hint in the Budget costings that reforms have generated large budgetary costs in the short term. However, this is so mainly, because the spending underpinning the ongoing reforms to health, education and infrastructure are built into (hence respect) the Departmental Spending Limits.

1. According to the 2003 Survey on Budget Practices and Procedures (available at <http://ocde.dyndns.org/>), 55% of the OECD countries provide multi-year cost estimates for all new spending items, and another 20% do it for some mandatory spending items. The survey does not cover revenue changes.

Table 1. The costing of Budget policy decisions in the UKBudgetary measures as a per cent of GDP¹

	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
Budget 2001	-0.2	+0.2	+0.3			
Measures since Budget 2000	-0.3	-0.4	-0.3			
Budget 2002		-0.1	+0.6	+0.7		
Measures since Budget 2001		-0.0	-0.2	-0.2		
Budget 2003			-0.1	-0.0	+0.0	
Measures since Budget 2002			+0.1	+0.0	+0.1	
Budget 2004				-0.1	+0.0	-0.0
Measures since Budget 2003				-0.1	-0.1	-0.1

1. A plus sign indicates an Exchequer yield.

Source : HM Treasury, Budget 2001, 2002, 2003, 2004.

10. What this spending has achieved is open to debate, as the new metrics to measure government outputs, following the Atkinson Review, are not yet fully in place. Assessments of feedbacks of tax and spending changes on economic activity are even rarer. HMT's effects of budget measures, for instance, do not include effects on overall levels of income and spending. This is not surprising, because there is often no consensus on effects. Depending on the underlying model and empirics, a rise in payroll taxes can have a negative short, medium or long-term impact on structural unemployment, or none at all. Effects of R&D tax credits or grants on R&D spending and ultimately growth are notoriously difficult to quantify. Or the effect of savings incentives on substitution between different savings vehicles versus aggregate savings is usually impossible to pin down. And sometimes, long lags imply that any discernible effects of reforms would only show up after many years. Still, in the United States, attempts are underway to include feedback effects in assessing tax and spending proposals (Box 1).

Box 1. Dynamic scoring

In the United States, legislative proposals are scrutinised by the Congressional Budget Office (CBO) and the Joint Committee on Taxation (JCT). They provide a baseline and forecasts of the changes in expenditure and revenues that would result from proposed legislation over the following ten years.¹ The forecasts provide a cost estimate or "score", for each piece of legislation that is reported by a Congressional committee (Page, 2005). In the past, the scoring was static, not taking into account macroeconomic feedback effects. Dynamic scoring, which is still in its infancy, takes into account induced changes on output, inflation, interest rates or other macroeconomic feedbacks. The scoring is important as it influences how favourably initiatives are viewed in Congress and the Senate. A tax cut, for instance, could raise output significantly, with a large cut in tax rates having little implication for net government revenues. If this feedback is not included, the tax cut will be viewed less favourably by Congress, which is usually constrained to keep the total revenue cost of a tax package within pre-set targets (Altshuler *et al.*, 2005)

The outcome of dynamic scoring depends on the models used and on assumptions about macroeconomic policy reactions. In assessing the 2004 budget, forward-looking, life-cycle growth models and more traditional macroeconomic forecasting models were used. For the latter, various monetary policy reactions to the fiscal stimulus were simulated, while the growth models differ in various respects. Given different models and assumptions, the outcomes differed widely. Concerning the JCT's analysis, incorporating dynamic effects reduced the net revenue cost of one proposal by 6 to 28% over the first five years and 3 to 23% over the second five years. Auerbach (2005) concludes from these first attempts, that "... it seems clear that dynamic scoring analysis has value, but also that adjustments to estimates are smaller than some might have expected. The process to date offers some support to those on both sides of the debate. On the one hand, the ability of CBO and JCT to produce dynamic analyses of complex, realistic proposals lends credence to the argument that dynamic analysis and, indeed, dynamic scoring may be feasible. On the other hand, the many models used and the many assumptions needed leave many with doubts about the quality of these estimates and how they would fit into the budget scoring process as currently structured."

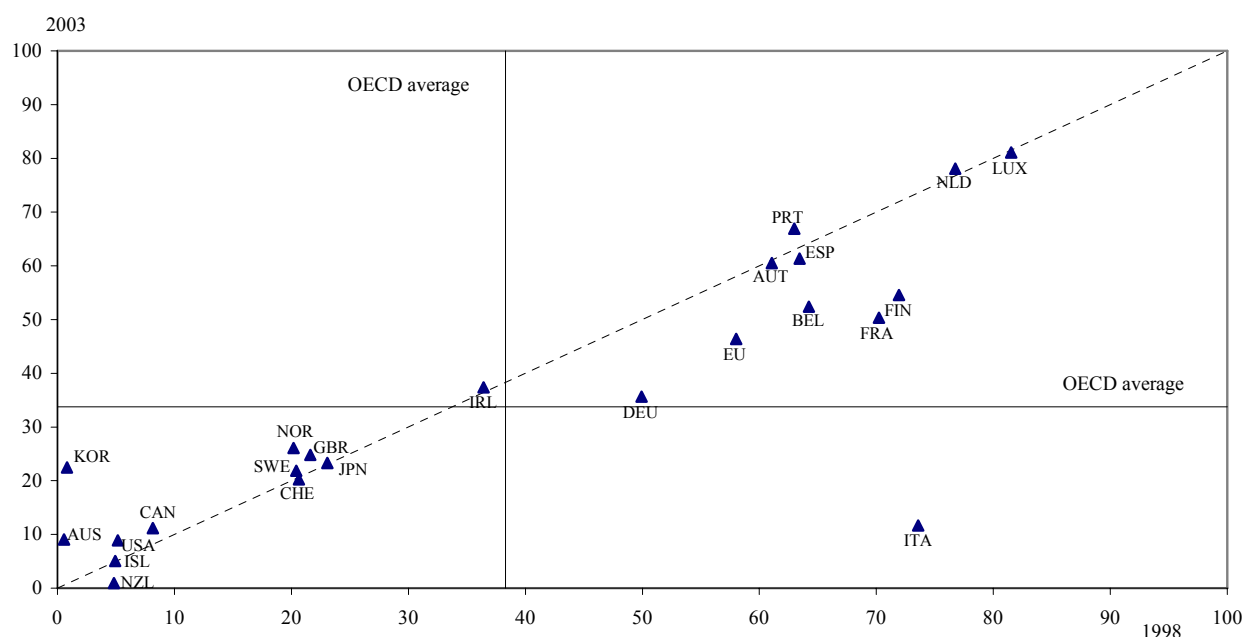
1. On the expenditure side, the CBO provides the baseline and the scoring, on the revenue side the CBO provides the baseline and the JCT the scoring.

Quantifying the cost of inaction

11. One could argue that, before allowing more leeway under the fiscal rules, unproductive spending should be pruned first, which would probably leave enough room to spend on priority areas, without running up against the deficit limit. Similar issues relate to reforms, or the lack thereof, of budgetary frameworks, which are far from being best practice in many EU countries (Joumard *et al.*, 2004). The design of reforms themselves may also be problematic: perhaps the scope for more cost-effective approaches is not being exploited. There are many examples of government spending programmes that tend to undermine growth, come at a high budgetary cost, sometimes grow considerably faster than GDP and are difficult to reform. They crowd out more productive government spending programmes. As such programmes tend to push countries towards the Maastricht deficit limit, the question arises whether policy inaction in such areas should not be taken into account, when granting greater flexibility on spending in priority areas.

12. The potential sources of fiscal stress built into government programmes are multiple. Fiscal pressures may mount because of biased incentives of government programmes, for example in the case of early retirement and disability schemes. The implicit tax on continued work, which gauges incentives to quit work before the retirement age, is very high in many European countries (Figure 1). There have been reforms, but most were minor, though Italy lowered the implicit tax a lot between 1998 and 2003. Early retirement lowers labour utilisation and has fiscal costs that can amount to several per cent of GDP. Similarly, the number of disability benefit recipients varies considerably across countries and only a few countries were successful in reducing the number of beneficiaries (Figure 2). In fact, in many countries, the number of beneficiaries keeps on rising rapidly.

Figure 1. Implicit tax on continued work: early retirement^{1,2}

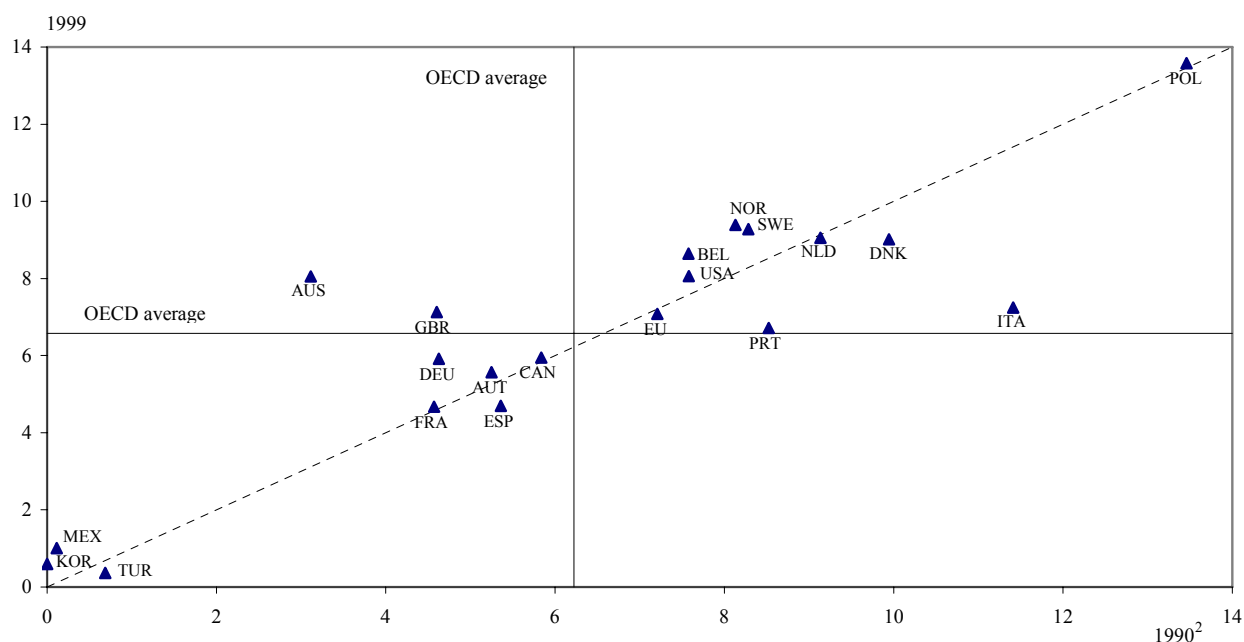


1. Average of implicit tax on continued work in early retirement route, for 55 and 60 year olds.

2. EU: 15 European countries excluding Denmark and Greece.

Source: OECD (2005), *Going for Growth*, Paris.

Figure 2. Income support for disability
Share of working age population non-employed and receiving disability benefits¹ (per cent)



1. EU: 15 European countries excluding Finland, Greece, Ireland and Luxembourg.

2. 1995 for Austria, Mexico and Poland.

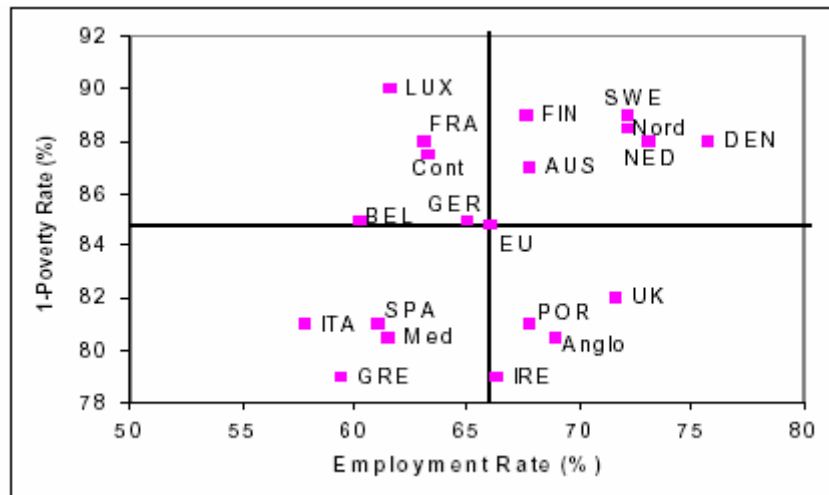
Source: OECD (2005), *Going for Growth*, Paris.

13. There are also cases, where reform efforts have been considerable, but reform outcomes tend to fall short of expectations. Majnoni d'Intignano (2001), for instance, argues that health reforms in France are recurrent, actually close to one every year between 1975 and 2000, but have barely dented spending growth, or have slowed growth in one year, but with a catch-up towards the underlying spending trend the next. The costing of changes in government programmes is not too difficult for programmes that are relatively simple and where at least some changes in policy parameters influence private decision making in a straightforward way: the implications of pension reforms, for instance, have been well researched by the Commission or the OECD. More complex issues, like the effects of health care reforms are much more difficult to quantify. There are many actors and incentive effects are difficult to model.

14. The cost of inaction can be illustrated by resorting to the now fashionable distinction between the Nordic, Anglo-Saxon, continental and Mediterranean social models. Boeri (2002), for instance, compares their performance in terms of meeting three objectives: reductions in income inequality and poverty; protection against uninsurable labour market risk; and the reward to labour market participation. And indeed, geography and economic characteristic tend to coincide. Sapir (2005) uses the same typology, but focuses on efficiency and equity aspects: Efficiency is measured by a high employment rate and equity by a low poverty rate.

15. **Figure 3** shows that all Nordic and Anglo-Saxon countries are above average in terms of employment, whereas most continental countries (except Austria and the Netherlands) and Mediterranean countries (except Portugal) rank below average. On the other hand, poverty is relatively high in the Mediterranean and Anglo-Saxon countries and relatively low in the continental and Nordic countries. Sapir (2005) has analysed the reasons for these differences. What is important in the context of this paper is the fiscal sustainability of social models. Net public debt as a per cent of GDP is much lower in the "efficient" countries and much higher in the continental and Mediterranean countries (**Table 2**). Moreover, debt does not tend to come down much in the high-debt countries (except Belgium), while it has staid low or even come down further in most better-performing countries.

Figure 3. European social systems: employment rates and probability of escaping poverty



Source: Sapir (2005).

Table 2. Gross and net debt development

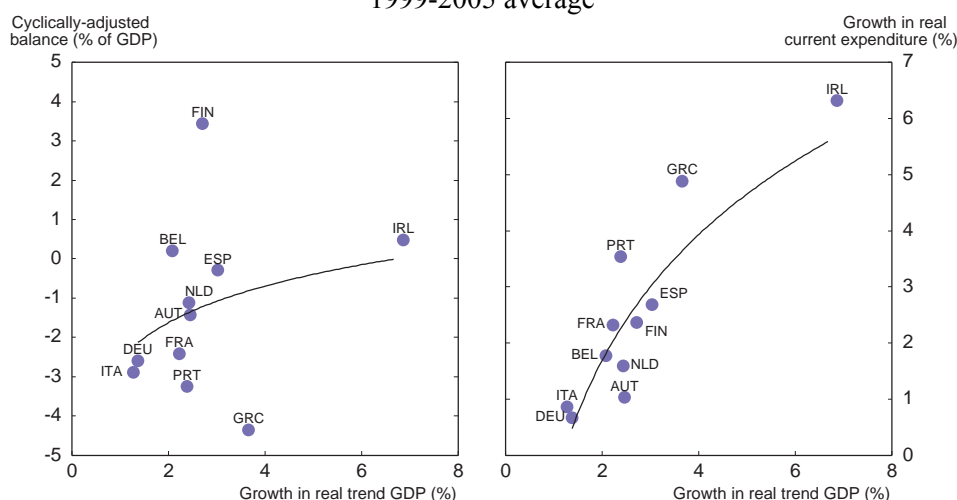
	Gross debt	Net debt	Change in	
	% of GDP	% of GDP	Gross debt	Net debt
	2005	2005	1993	2005
Nordic model				
Sweden	61	-6	-18	-16
Finland	48	-41	-4	-24
Denmark	48	2	-11	-23
Netherlands	66	-28	-32	-7
Austria	65	39	3	-2
Anglo-Saxon model				
United Kingdom	46	39	-3	6
Ireland	30	..	-65	..
Portugal	78	46	0 ¹	20 ¹
Continental model				
Germany	72	61	24	33
France	74	45	22	17
Belgium	100	90	-45	-38
Mediterranean model				
Italy	121	98	-5 ¹	-3 ¹
Spain	53	31	-14	-10
Greece	108	..	-2	..

1. 1995-2005

Source: OECD, *Economic Outlook* No. 77 database.

16. A similar pattern emerges when looking at growth performance and fiscal policy (**Figure 4**). In the period 1999-2005, trend growth was only 1½ per cent per year on average in the three major euro area countries, but ¾ per cent in the smaller countries. Faster growth coincides with a strong fiscal performance, while the contrary tends to be true for the slower-growing countries. Econometric work provides evidence that fiscal consolidations are more likely to be undertaken and successful if trend economic growth is high (von Hagen, 2002). At the same time, the smaller fast growing-economies were able to maintain fairly rapid growth in public spending while keeping their government deficits in check. Greece is of course an important exception with soaring spending and a whopping government deficit despite strong growth.

Figure 4. Trend growth and fiscal policy
1999-2005 average



Source: OECD, *Economic Outlook* No. 77 database.

Quantifying the impact of regulatory reform

17. Things become even more tricky when assessing the effects of changes in the regulatory stance on growth and government budgets. The OECD has developed a broad range of indicators concerning the stringency of labour and product market regulations, which are discussed in more detail in Duval (2005) and feed into the econometric exercise in the next section.² The OECD has also produced a lot of empirical work that traces the effects of the regulatory stance on employment and unemployment rates, R&D intensity and ultimately growth. This work has culminated in the OECD's Growth Project (OECD, 2001) and feeds into the ongoing structural surveillance work (OECD, 2005). Substantial methodological progress has been achieved in constructing structural policy indicators with an econometric link to economic performance.

18. Such inventories are potentially very useful, but there are also limitations, when assessing the budgetary implications of structural reforms:

- These inventories leave out a wide variety regulations, such as health and safety or environmental regulations, which could have a budgetary impact.
- There is in general no direct link between these inventories and budgetary effects and it would seem difficult to establish the link between reforms and side-payments to get reforms underway.

19. Moreover, while the body of empirical work on growth is enormous, there are still considerable disagreements about what reforms can achieve in the short and long term. In particular, the short-term adjustment costs associated with reforms are under-researched. In addition, results are data-quality, model and estimator dependent. While cross-country growth regressions have been an extremely popular means of testing ideas about the sources of growth, many of the variables claimed to be significant have not stood up to tests for statistical robustness (Ahn and Hemmings, 2000). Another problem is the lack of accepted formal theoretical models that can accommodate the wide range of variables that are often included as explanatory variables, despite advances in the theory of economic growth. A related issue is that causal links between aggregate economic variables and growth are bi-directional, hence most estimates are likely to suffer from endogeneity problems. We are tempted to quote Blanchard (2005) who, after reviewing the literature on whether enough is known about unemployment to give advice to policy makers about how to reduce it, concludes: "I believe we do – with the proper degree of humility".

"Big bangs" and gradualism: the experiences of New Zealand and Australia

20. Some OECD economies have undergone a radical transformation, with major fiscal implications. New Zealand is a prime example. It initiated quite radical and wide-ranging reforms in the mid-1980s. These reforms encompassed both macroeconomic stabilisation and structural change (Evans *et al.*, 1996). The reforms followed a decade of anaemic growth, which, at less than ½ per cent, was indeed considerably lower than it is currently in the euro area, while inflation was rampant and the government and current account deficits exceeded 6 and 8% of GDP, respectively.

21. Key reforms included financial market deregulation and the granting of operational independence to the Reserve Bank; deep labour market reforms, though they were only enacted from the early 1990s onwards; and telecommunication and electricity reforms. These reforms did not include any side-payments, but there were many reforms affecting the budget directly. Support to manufacturing industries and agriculture was withdrawn, which lowered spending, but also lowered revenues due to hefty tariff cuts on industrial products. Direct government assistance to industry and agriculture declined from 16% of primary government spending to just 4% in 1993/94. At the same time, tax policy put a sharp focus on the neutrality

2. The World Bank has also developed inventories of policy measures. Another example is the indicators developed by the Fondazione Rodolfo Debenedetti.

of the tax system: a comprehensive value added tax replaced a myriad of differing sales taxes, while the corporate and income tax base was broadened and tax rates reduced. Tax incentives concerning exports or retirement savings were abolished. On the spending side, focus was put on organisational and managerial devolution and improved accountability, for instance in health and education. Chief executives became responsible for managing departments, being directly accountable to their Ministers for hitting specific output targets. Moreover, the large number of trading departments was turned into state-owned enterprises, many of which were subsequently sold.

22. Stronger growth did not help fiscal consolidation early in the reform era. Partly reflecting heavy industrial and agricultural restructuring and job losses from rapid efficiency gains of former trading departments, GDP barely increased between 1984 and 1991. Also the exchange rate and real interest rate were high. Early in the reforms, consolidation was largely achieved by revenue increases and while some spending items were pruned severely, spending on health, education and social services increased as a per cent of GDP. But stronger growth followed and a fiscal surplus was achieved in the 1993/94 financial year. Fiscal performance has been strong since then, the government recording a deficit in only one year since 1994 and a net debt position of more than 40% of GDP has swung into a net asset position of 10% of GDP currently. This partly reflects a decent, though not outstanding, growth performance and partly the principled approach to fiscal management that was put in place in 1994. It is a blueprint for principles that underpin responsible fiscal management and transparency, which have been taken up in the UK's code of fiscal conduct and the OECD Best Practices for Budget Transparency. Macroeconomic policy was set to provide stable policies rather than stabilisation policy.

23. Reforms in New Zealand since the mid-1980s were broad ranging and quick, against the background of large macroeconomic imbalances. By tackling many areas quickly there was no stable coalition formed to oppose reforms: for instance, farmers who had their subsidies withdrawn,³ strongly supported tariff cuts; and farmers and other businesses then put pressure on the government to reduce spending to bring down the interest and exchange rate. But moving quickly also led to some backlashes, as the reform process stalled between 1988 and 1991, from when onward it resumed again. The experience highlights that fiscal consolidation and radical change can go hand in hand, even when the results of reforms on economic performance do not come quickly.

24. In contrast with New Zealand, the Australian reform process was gradual, but it was also principled and coherent (Banks, 2005). As in New Zealand, policy prior to the reforms was characterised by being highly regulated, anti-competitive and redistributive, even though the macroeconomic background, while not brilliant, was more benign. Productivity growth of just over 1% between 1973 and 1990 was relatively poor and, also affected by terms of trade losses, the international income-per-capita ranking slipped badly. Though reforms started in 1973 with a 25% across-the-board tariff cut, this precipitated a heavy backlash against reforms. It took until 1988, that tariff reductions were phased in and virtually all tariffs were below 5% by 1996. The early 1980s also saw financial market reforms. Increased competition led to pressure to reform labour markets and sheltered sectors. The reforms ultimately embraced all product markets, factor markets and the public sector, including as in New Zealand the commercialisation, corporatisation and privatisation of many government enterprises.

25. Contrary to New Zealand, Australia adopted an incrementalist approach to reforms, thus avoiding heavy initial adjustment costs. The programme evolved in a cumulative way to encompass reforms across much of the economy. Moreover, and again contrary to New Zealand, reforms were accompanied by retraining schemes and displaced workers could rely on the relatively generous welfare safety net. Adjustment costs were also eased by sector-specific restructuring and assistance schemes, which amounted to AUD 600 million annually under the Automotive Competitiveness and Investment Scheme. Similarly, when price support for the milk industry was abolished in 2000, farmers were provided with a substantial stream of payments, financed by a levy on milk consumers. Also regional policy schemes eased the

3. The largest farmer association, the Federated Farmers of New Zealand argue that the sudden and unexpected removal of subsidies have made the farming sector stronger and that farmers are determined never again to be dependent upon government handouts (Federated Farmers of New Zealand, 2002). Productivity gains, for instance, moved from 1% pre-reform to nearly 6% post-reform, while the initial impact of the reform, while sizeable, was much milder than officially projected.

adjustment blow in some cases. Policy has thus dealt with the front-loaded timing of the potential losses of reforms as well as the fact that costs of reform are often concentrated on particular groups. The reform process had a fiscal cost, but it was limited and easily outweighed by the overall gains: concomitant with the reforms, there was a sharp rise in the trade to GDP ratio and business R&D surged, boosting productivity growth to among the highest in the OECD and the income-per-capita ranking improved from the 15th place in the mid-1980s to the 8th currently. Not surprisingly, fiscal performance improved a lot as well: the general government balance swung from a deficit peak in the early 1990s of more than 6% of GDP into a surplus by 1998 and has staid in surplus since then, except in one year. Net debt will be eliminated in 2006 and a net asset position will build up.

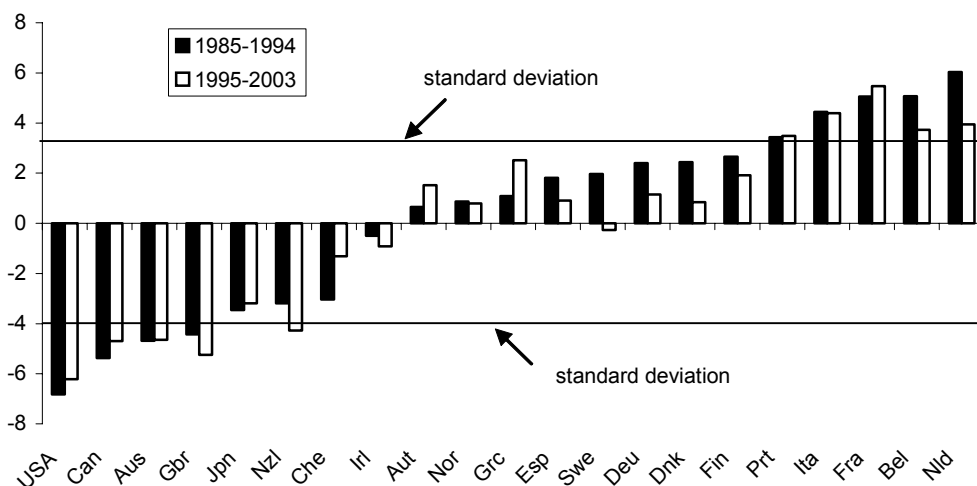
26. Clearly, for both countries the evidence is that the impact of major structural reforms was a major improvement in fiscal performance. Yet, how to apportion the success between a strengthening in budgetary institutions and better growth performance is unclear.

Structural reform in an empirical expenditure rule

27. Since the proof of the pudding is always in the eating, in this section we try to identify empirically the impact of the structural policy stance on public expenditure, using some basic econometrics. The assumption is that countries in which structural policy stances are geared towards greater market flexibility, the efficiency of welfare systems will generally be higher and government involvement in the economic process – be it through regulation or financial support - more effective. At the same time, potential output would be higher and as a result, everything else equal, public expenditure would decline relative to (potential) output. However, there may be short-run offsets in the form of upfront budgetary cost, such as compensation schemes for people losing their job or rents, which tends to raise public expenditure on a temporary basis.

28. The structural policy indicator capturing structural reform efforts referred to here is the one used by Duval (2005). It is calculated as the sum of normalised OECD indicators in five fields (employment benefits, tax wedges, employment protection legislation, retirement incentives and product market regulation). They are displayed in **Figure 5**; a higher value corresponds to a tighter stance (more rigidity) and *vice versa*, and a decline in the indicator suggests that “appropriate” structural reforms have been implemented. Countries that stand out by relatively “tight” stances (high value of the indicator) are all European countries. Some of these countries have also implemented major structural reforms in the past decade (notably Spain, Sweden, Denmark, Belgium and the Netherlands), suggesting that poor initial conditions are a good “predictor” of future structural reform (as confirmed by Duval, 2005). This is encouraging and suggests some tendency towards global convergence, perhaps helped by the Lisbon agenda.

Figure 5. Aggregate structural policy stance indicator



29. As in Duval (2005) we consider 21 countries for which we have annual observations for the period 1985-2003. Using this dataset, we estimated the following partial-adjustment relationship:

$$(1) \quad PRI_{it} = \lambda PRI_{it-1} + \alpha STR_{it} + \beta \Delta STR_{it} + \sum_k \gamma_k CON_{it-1}^k + \delta_i + \varepsilon_{it}$$

30. In this relationship PRI_{it} is the level of cyclically-adjusted primary expenditure as a per cent of GDP in country i in year t . STR_{it} is the overall structural policy stance. It is included to capture the long-run effect of the structural policy stance on public expenditure. The term ΔSTR_{it} is the change in the structural policy stance indicator which serves to capture any upfront budgetary cost of structural reform - its expected sign is negative as predicted by theoretical models such as that reported in Beetsma and Debrun (2005). CON_{it-1} is a vector of control variables, δ_i are country fixed effects and ε_{it} is the normally distributed residual. The method used is ordinary least squares.

31. Following Martinez-Mongay (2002), four control variables have been considered:

- *Per capita gross national income at 2000 purchasing power parities*. This captures “Wagner’s law”, which predicts that high-income countries will exhibit higher shares of public spending in GDP than low-income countries owing to a change in preferences in favour of public goods and services such as health care, education and social services. The expected sign is positive.
- *The dependency ratio*. Ageing puts pressure on notably health care and pension expenditure, hence a priori one expects public outlays to be higher in countries that portray a high dependency ratio (measured by the share of people older than 65 in the total population). The expected sign is again positive.
- *Trade openness (sum of exports and imports of goods and services as a per cent of GDP)*. A standard finding in the literature is that more open economies will have bigger governments in order to protect their citizens against cyclical volatility in economic activity. However, it could also be argued that in a globalising world small open economies, due to their greater exposure to international competition, will be under pressure to keep public expenditure low so as to secure competitive gains from a low tax burden. Accordingly, the net effect on government size is ambiguous.

- *Public debt ratio to GDP.* There is a large body of literature providing evidence that governments whose debt position threatens to become unsustainable will rein in public expenditure (rather than increase taxes which will at best only bring short-term relief). Hence in countries where public debt is high, government size will be negatively affected and vice versa.

32. The type of electoral system is another factor that emerges from the literature as relevant for the size of government (majoritarian voting rules yield smaller welfare systems), but it will not be considered here (or rather this will be picked up by the country fixed effects). Baumol's "cost disease", which predicts that as an economy grows the relative price of public services and hence the share of public expenditure in GDP will increase, will be considered as already being captured by the per capita income effect.

33. Before considering the impact of structural policy stances on government size, we look at the explanatory power of the controls (**Table 3**). European countries generally portray higher primary expenditure ratios, but also tend to score higher on debt, dependency, openness and lower on GDP *per capita* than for example the United States. This suggests that the control variables are unlikely to be able to explain the bulk of the cross-country variation in primary expenditure. Accordingly, country fixed effects should play an important role, as confirmed by the estimation results.

Table 3. Primary expenditure and its standard determinants

	Primary expenditure ratio (%)		Debt ratio (%)		Dependency ratio (%)		Openness (%)		GDP per capita (at 2000 prices and PPP, US\$)	
	1985-1994	1995-2003	1985-1994	1995-2003	1985-1994	1995-2003	1985-1994	1995-2003	1985-1994	1995-2003
Australia	31	33	29	30	17	19	35	42	34388	40831
Austria	47	47	58	69	22	23	70	84	33799	40647
Belgium	43	42	131	122	22	25	134	152	31551	38420
Canada	38	35	79	89	15	17	55	78	33499	38188
Denmark	49	52	74	63	23	23	69	80	34999	41837
Finland	47	48	30	58	12	13	52	69	30869	36492
France	46	48	42	67	21	24	43	50	34517	40164
Germany	41	43	39	60	22	25	50	59	37342	37164
Greece	31	35	74	110	22	27	46	50	16521	19717
Ireland	35	29	99	51	18	17	112	160	24755	42852
Italy	39	39	95	128	21	26	40	51	26902	31696
Japan	24	28	73	122	17	24	19	20	33239	37961
Netherlands	47	42	86	72	18	19	108	121	34166	42149
New Zealand	40	36	64	40	16	17	56	61	28474	32274
Norway	53	55	34	37	15	12	71	72	34502	46292
Portugal	30	37	65	64	20	23	64	66	19418	25232
Spain	33	32	53	67	20	24	37	54	24358	30583
Sweden	56	54	65	72	16	14	61	79	36600	40637
Switzerland	28	31	36	51	21	22	69	77	41653	43892
United Kingdom	38	37	43	48	24	24	51	56	32993	40808
United States	31	30	68	66	18	19	20	24	44591	52872
EU15 ¹	38	39	62	70	19	21	59	72	27473	33304
Average	39	40	64	71	19	21	60	72	31864	38129
Standard deviation	9	8	26	28	3	5	29	35	6670	7219

1. Unweighted average.

Source: OECD Economic Outlook 78 database.

34. The regression results for the controls, without and with country-fixed effects, are shown in the first two columns of **Table 4**. The inclusion of country-fixed effects indeed proves to be necessary; without them the significance levels are unsatisfactory except for the debt ratio and the lagged dependent variable. In the equation with country-fixed effects, the regression coefficients for the dependency ratio, per capita income and public indebtedness have the expected sign and are all significant. Trade-openness has a negative sign, and is also significant.

35. The long-run coefficients, which are the more interesting ones to look at, can be computed as $\gamma_k/(1-\lambda)$. Based on this calculation, the long-run semi-elasticity on the dependency ratio turns out to be about $\frac{1}{4}$, which suggests that if in any country old-age population growth outpaces total population growth by 1 percentage point the primary expenditure ratio will increase by $\frac{1}{4}$ percentage point. Similarly, an increase in per capita income by 10% would raise the primary expenditure ratio by $1\frac{1}{2}$ percentage point and if foreign trade (imports + exports) outpaces GDP by 10 percentage points for any given period or country, the primary expenditure ratio would fall by $\frac{1}{2}$ percentage point. Finally, an increase in the debt ratio to GDP by 10 percentage points would depress the primary expenditure ratio by approximately $1\frac{1}{4}$ percentage point. These findings are broadly in line with those reported by Martinez-Mongay (2002), except for the trade-openness indicator for which he finds the opposite sign. This may reflect the difference in estimation period (1960-99 in his case versus 1985-2003 in ours), since it may be that over time competitiveness considerations have gained importance as globalisation progressed. It is also in line with theoretical findings by Buti and van den Noord (2005) that there may be incentives for small open economies to aim for smaller governments as this would enhance the working of automatic stabilisers.

Table 4. Estimation results

Type of equation	Controls only			Controls, country fixed effects and structural policy	
	No country-fixed effects	With country-fixed effects		Long-term effect of structural policy	Long- and short-term effects of structural policy
		No EMU dummies	With EMU dummies		
Primary expenditure ratio (-1)	0.989 (150.0)***	0.878 (36.2)***	0.883 (36.7)***	0.874 (36.1)***	0.870 (35.7)***
Dependency ratio (-1) (log)	0.003 (1.2)	0.025 (3.3)***	0.023 (3.0)***	0.025 (3.3)***	0.024 (3.2)***
Per capita income (-1) (log)	-0.002 (-0.9)	0.015 (2.8)***	0.018 (3.1)***	0.015 (2.9)***	0.015 (2.8)***
Trade-openness (-1) (log)	-0.000 (-0.1)	-0.017 (-3.6)***	-0.020 (-4.0)***	-0.015 (-3.1)***	-0.015 (-3.0)***
Debt ratio (-1)	-0.005 (-2.5)**	-0.012 (-2.9)***	-0.008 (-1.8)*	-0.014 (-3.3)***	-0.015 (-3.4)***
Dummy Maastricht			-0.004 (-3.1)***		
Dummy SGP			-0.001 (-0.6)		
Structural policy stance				0.001 (2.1)**	0.002 (2.6)**
Change in structural policy stance					-0.002 (-1.7)*
Adjusted R ²	0.99	0.99	0.99	0.99	0.99
Observations	378	378	378	378	378

Note: *, ** and *** denote significance at 90, 95 and 99%, respectively.

36. Another issue is whether the enforcement of the Stability and Growth Pact and the run-up towards the adoption of the single currency subsequent to the Maastricht Treaty has had a significant additional impact on primary expenditure in Europe. To test this, the same regression was run including dummy

variables that are 1 in the run-up to the single currency (from 1992 to 1998) and after the coming into force of the Stability and Growth Pact (in 1999), respectively, and 0 otherwise (third column of Table 4). We find a significant Maastricht effect, but no significant SGP effect, suggesting that the former has provided a binding constraint whereas the latter has not. This is consistent with earlier findings that the Stability and Growth Pact failed to provide a binding fiscal constraint, as reported in Buti and van den Noord (2004) and Koen and van den Noord (2005). The Maastricht dummy clearly takes away explanatory power from the debt variable, suggesting that it essentially captures the same phenomenon, namely that high debt will eventually weigh on primary expenditure. We have not retained the EMU-related dummies in subsequent regressions.

37. The fourth column in **Table 4** reports the regression result including the impact of the structural stance indicator. The sign is as expected (positive, *i.e.* a tighter stance leads to higher primary expenditure). The long-run impact is not negligible: a structural reform equivalent to a cut in the stance indicator by 2 standard deviations (roughly corresponding to the difference between *e.g.* France and New Zealand, (Figure 5) reduces the primary expenditure ratio by around 1½ percentage points. Obviously structural reform is not primarily aimed at reducing public expenditure, but this result does provide some evidence that it might work out that way to a significant extent. One health warning is in place though, namely that a country with a good regulatory environment for goods and labour markets may typically also have a good fiscal framework in place, in which case we may be over-estimating the pure impact of structural policy stances on public expenditure. However, either way, the basic message would still be that good policies are associated with less rather than more public expenditure.

38. Finally, in order to capture possible upfront budgetary costs of structural reform, the regression was re-run with the change in the stance indicator included as an explanatory variable. The sign is indeed negative, as expected, but statistically significant only at the 10% level. This suggests that upfront cost may occur but are small and not very stable over time or across countries, at least on the expenditure side of the government account. Obviously, upfront cost may also take the form of tax cuts, which are not considered here, but we doubt these are more significant.

Linking structural reform and fiscal performance: what can a macro-model tell?

39. Even if reforms have measurable direct beneficial effects on primary spending, their overall budgetary impact also depends on economic feedback mechanisms that may be underestimated in a reduced-form approach as the one above. Moreover, the link between a more favourable supply side and a better macroeconomic and thus budgetary performance will vary across countries and the different mechanisms that pull up demand. Budgetary outcomes also relate to the effect of different types of reforms on endogenous variables that affect the public accounts, such as the monetary policy response – which is particularly relevant in the euro area where individual countries have given up monetary policy autonomy. Also the initial budgetary cost of reforms needs to be taken into account, associated with, for example, tax cuts or compensation of losers from reforms. To clarify the various mechanisms that link structural reforms and budgetary outcomes, several simulations were run with the OECD's Interlink model. They help to illustrate the effect of different types of reforms, including their macroeconomic effect as well as the difference between concerted reform efforts versus reforms in a single country.

Effects of coordinated reform in monetary union

40. Co-ordination of structural reform in the euro area between the countries and monetary authority could pay benefits, as will be illustrated below. To set a benchmark, we first construct scenarios in which such co-ordination with monetary policy is absent. Three scenarios are run: first, total factor productivity is raised; second, labour force participation increases; and third, structural unemployment is reduced. These changes affect the large euro area countries and thus the overall performance of the euro area, for which the level of potential output increases by 1¼ per cent over eight years. The reforms all imply lower inflation and are accompanied by lower interest rates in a way that keeps real interest rates unchanged. Exchange rates are assumed fixed, except in one simulation. Finally, tax rates are kept constant and also government consumption and investment are held fixed in real terms. The results are represented with respect to a

baseline scenario which goes to 2012, which is based on the premise that countries converge gradually to their potential production level.⁴

Effects of a rise in trend productivity

41. The first simulation illustrates the effect of a productivity gain on macroeconomic and budgetary performance. As many studies have shown there is considerable potential to raise productivity in the euro area, be it by product and labour market reforms or stronger innovative activity (OECD, 2003 and 2004). The simulation assumes that the level of trend labour productivity goes up by a cumulated increase of 2% over eight years. In the simulation, stronger productivity growth leads to a progressive rise in real wages, which is compatible with lower inflation (**Figure 6**). This raises internal demand and boosts net exports, which benefit from an improved competitiveness. Total demand rises somewhat faster than potential output and the output gap closes more quickly than in the baseline. The budget balance improves in actual and structural terms by about 1¼ per cent of GDP at the end of the simulation period. This is mainly due to the lower nominal interest rates and to a lesser extent to improved social accounts. The reduction of the deficit allows only a small decline in the debt/GDP ratio, because lower inflation lowers nominal GDP growth.⁵

Effects of a rise in participation

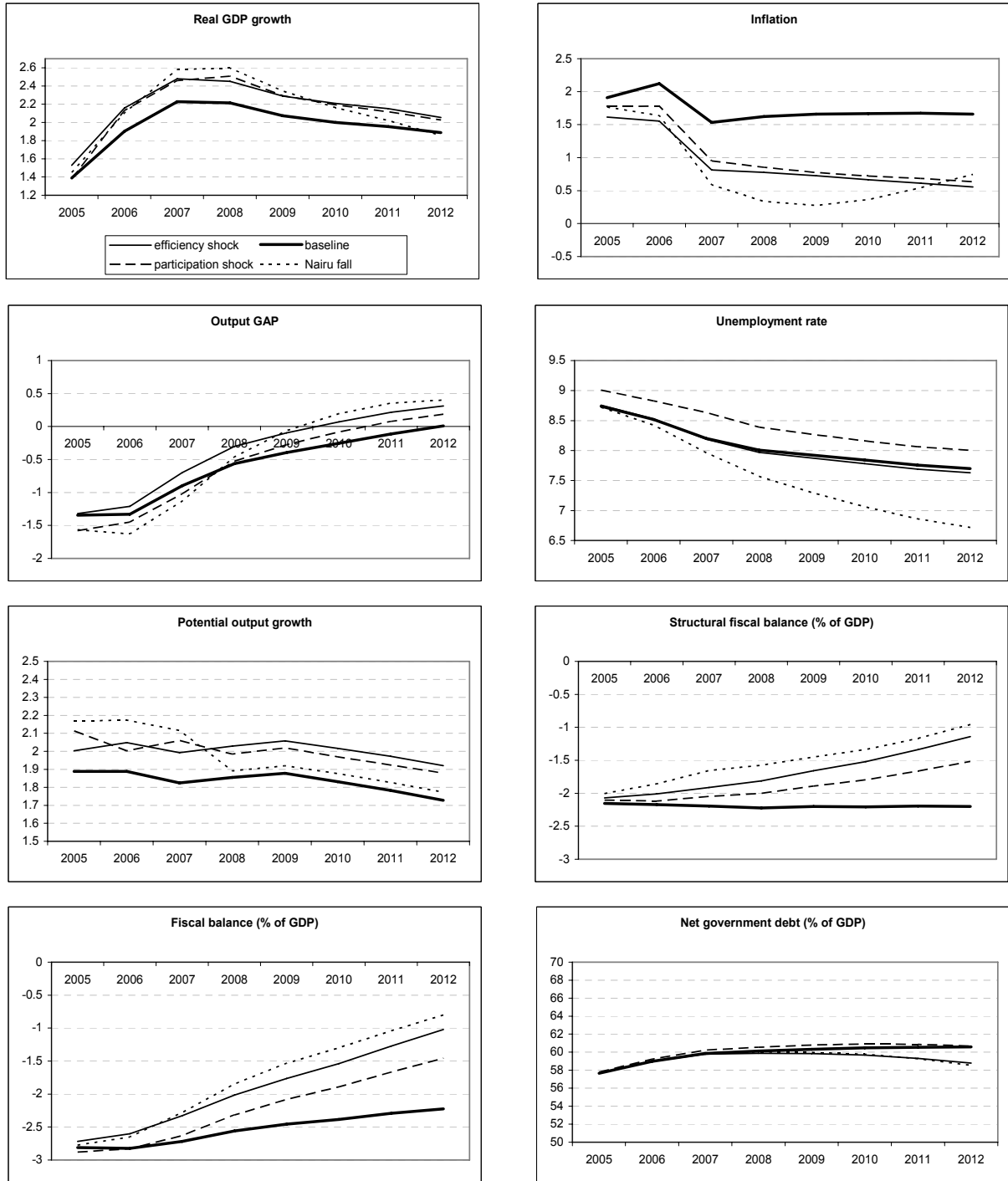
42. **Figure 6** allows a comparison of these first results with a simulation of an increase in labour force participation. Considerable room for increases also exist in this domain, especially by sharpening incentives for young and older workers to work and by removing obstacles to participation by females (Burniaux *et al.*, 2003). In this simulation it is assumed that changes in incentives push up trend participation by 1 percentage point gradually over eight years. As in the earlier case, domestic demand and net exports rise. The rise in participation leads, however, to some rise in unemployment, which leads to lower real wages and inflation, which stimulates competitiveness and employment and finally disposable income. Demand is, however, initially not rising as fast as supply, so that the output gap is higher for some years. The budgetary situation also improves in this simulation. But it is somewhat smaller than in the earlier simulation, because unemployment is somewhat higher. Moreover, the debt/GDP ratio remains close to the baseline. The improvement of the budgetary situation is likely however to be somewhat underestimated. Especially a rise in the participation of older workers would reduce spending on early retirement, while over the longer term, unemployment should return to the baseline level.

⁴. Medium-term scenarios that prolong the short-term projections are regularly up-dated by the OECD. They are based on the premise that the output gap will close over the scenario's horizon (by 2012), while unemployment converges to the structural unemployment rate. Commodity prices and exchange rates are held fixed in real terms, while the oil price declines from \$54 at the end of 2007 to \$44 per barrel by 2012. Monetary policy aims at price stability, while fiscal policy remains unchanged, with the primary budget balance virtually stable between 2007 and 2012 in most countries. Details can be found in the OECD Economic Outlook 78 (2005).

⁵. The debt profile is determined by the following equations:

$Debt(t) = \text{primary balance}(t) + debt(t-1) * (1 + r(t)) / (1 + g(t))$ with $r(t)$ being the nominal interest rate at t and $g(t)$ nominal growth of GDP. With no improvement in the primary budget, lower inflation tends to the growth of nominal GDP, which offsets the effect of lower interest rates. In this case public debt will change little with respect to the baseline. If, however, nominal growth declines more than interest rates, a snow-ball effect will raise indebtedness, even if there is no deterioration in the primary budget balance.

Figure 6. Simulated impact of various structured shocks in the euro area



Note: The nature of the shocks is specified in the main text. Nominal exchange rate and real interest rates are kept unchanged relative to baseline. Real government expenditure is also kept at baseline level.

Effects of a decline in structural unemployment

43. Also a decline in structural unemployment would raise the employment rate and potential output. This is illustrated by a third simulation which reduces the structural unemployment gradually by 1 percentage point over the first three years. The increase in potential output is thus concentrated in these years and the output gap widens initially by more than in the other simulations. This leads to a larger real wage and inflation deceleration than in the other two simulations (**Figure 6**). This stimulates employment,

profitability and competitiveness and leads to stronger internal and external demand. The budgetary improvement is somewhat stronger than in the preceding cases. This is because of lower unemployment. In conjunction with the effect of lower interest rates on the budget, also the debt/GDP ratio declines somewhat.

A stronger role for monetary policy

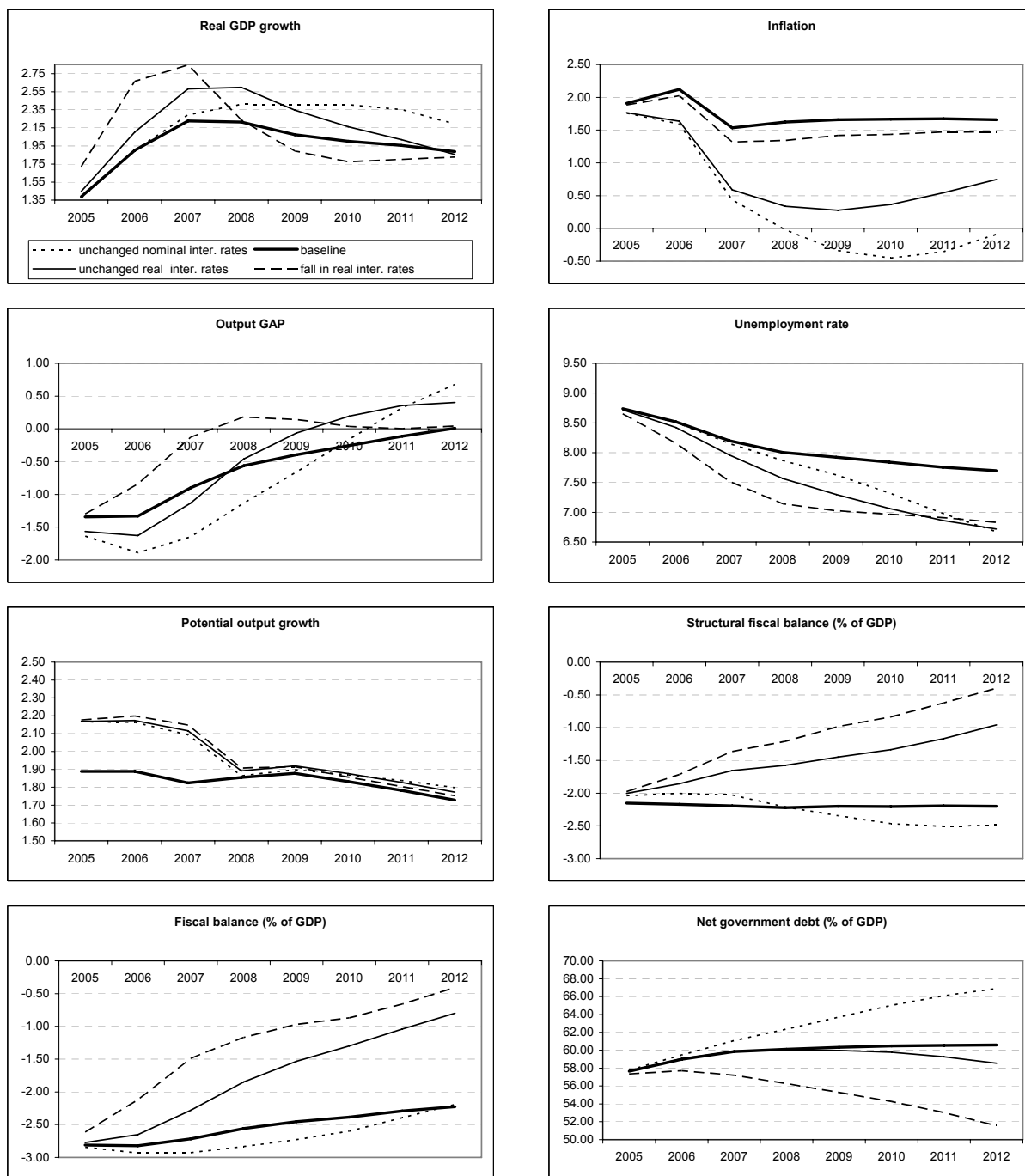
44. The simulations show the positive medium-term effects of the reforms on the government budget, with the gains being larger in the simulations that show a stronger improvement in the primary budget balance. However, the effects on indebtedness are minor, because of the deceleration in inflation induced by the reforms. A more accommodating monetary policy would contribute to improve the budgetary results further. The central role of monetary policy in accompanying the reforms is shown by simulations that again reduce the structural unemployment rate, but now under alternative monetary policy assumptions. The first assumes that real interest rates decline as well as the exchange rate, while the other assumes that nominal interest rates and exchange rates stay at the baseline level.

45. The simulation shown in **Figure 7** suggests that an easier monetary policy would stimulate demand considerably. It is assumed that real interest rates are about 100 basis points below the baseline level on average over the simulation period, while the euro is assumed to decline by 5% in real effective terms.⁶ The effects on external and internal demand would push the output gap above the baseline level, which would limit the deceleration of inflation. The budgetary improvement would be considerably stronger, in terms of deficits and of debt developments. Concerning the latter, the impact of the improvement in the primary deficit of lower interest rates is not offset by the disinflationary effect and the debt/GDP ratio would decline by 10 percentage points with respect to the deadline at the end of the simulation period.

46. If, on the other hand, nominal interest rates and exchange rates are kept at their baseline values, the higher real interest rates dampen demand considerably and the output gap remains larger than in the baseline scenario throughout the simulation period (**Figure 7**). With activity weaker and unemployment higher, the improvement in the primary deficit is much slower to come and offset by higher interest payments, while nominal GDP rises by less because of lower inflation. The debt/GDP ratio deteriorates considerably as the snow-ball effect is reinforced by lower inflation.

6. In this simulation the exchange rate adjustments are assumed to respond to both inflation and interest rates developments. On the one hand, exchange rate purchasing power parity rule is supposed to apply in the long term, implying stable real effective exchanges rates. On the other hand, the lower real interest rates in the euro area induce a weakening a real depreciation of the euro exchange rate at least in a transitory period.

Figure 7. Stimulated impact of a reduction of the NAITU in the euro area under alternative monetary assumptions



Note: The Nairu is assumed to fall progressively by 1 percentage point in the first three years of the stimulation. Nominal exchange rate are kept unchanged relative to baseline in the case of the simulations with fixed nominal or fixed real interest rates relative to baseline. A flexible exchange rate assumption is retained for the simulation with a fall in real interest rate. Real government expenditure is kept unchanged at baseline level.

Structural reform in a single country in monetary union

47. In the previous set of simulations it was assumed that all countries embark on structural reform simultaneously. However, this may not occur in reality, which raises the issue whether the incentives for (or reward of) structural reform is sufficiently strong for individual countries. There may also be a divide

between small and big countries in this regard, due to the difference in openness of their respective economies.

Effects of a decline in structural unemployment

48. The importance of monetary policy in facilitating the adjustment of demand to a rise in supply and for improving budget balances leads to questions about the reforms pursued by a single country in the euro area. This is shown by a gradual decline in the structural unemployment rate by 1½ percentage points over three years in the case a small (Belgium) and large (France) country. They are based on the same assumption as above: the nominal interest rate and the exchange rate are fixed at the baseline level. The results show a marked contrast between the two countries.

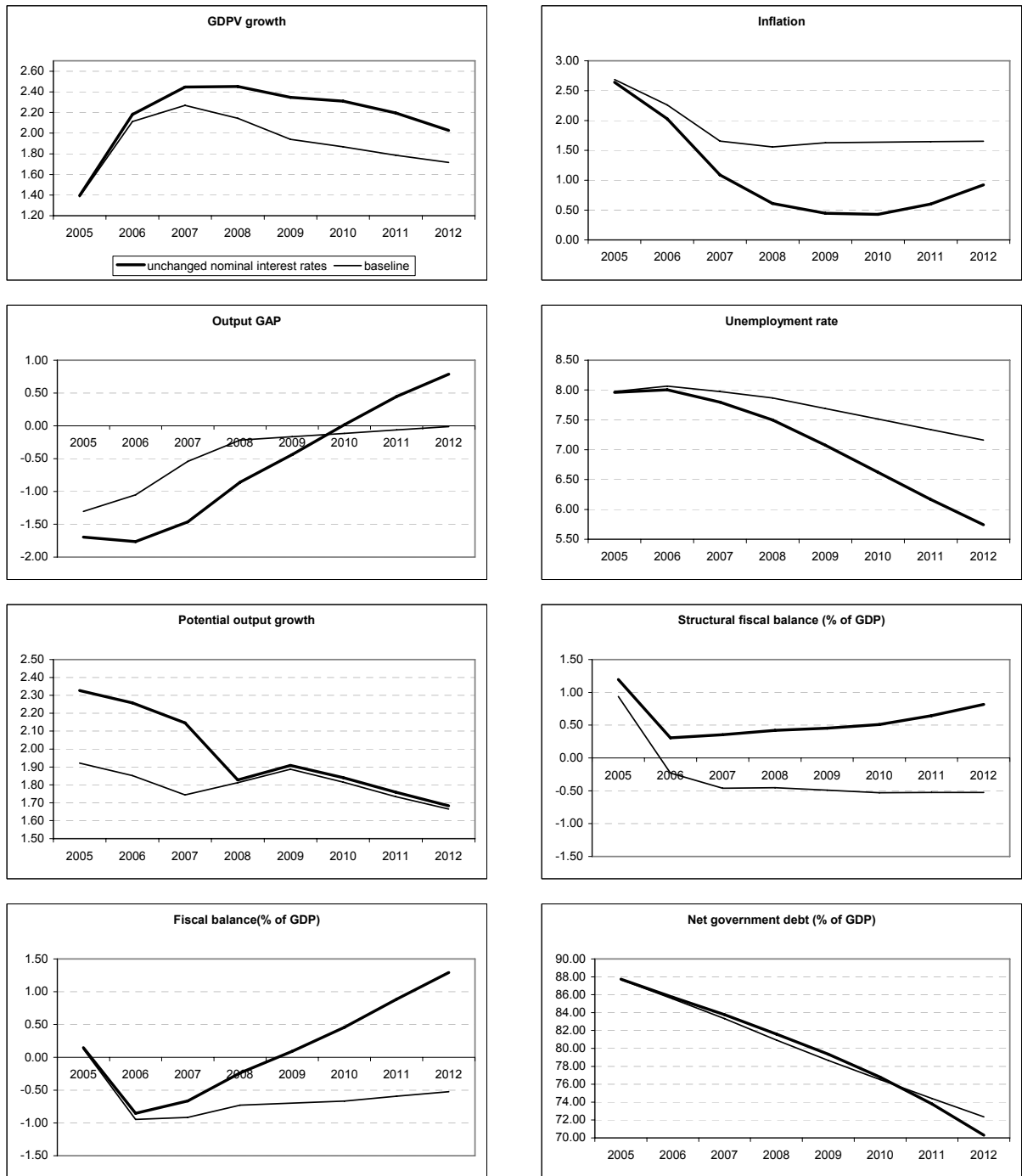
49. The small country, because of its much greater openness to trade, benefits much more from the competitiveness gains, which allows a more rapid adjustment of demand and limits the deceleration in inflation (**Figure 8**). The effect of the reform is positive for the budget balance, though the effect on indebtedness is minor.

50. In contrast, the adjustment path for the large country is much more drawn-out (**Figure 9**). The impact of higher real interest rates tends to neutralise the competitiveness gains due to lower inflation. Overall, the output gap remains below the baseline level over the whole simulation period. The budget balance hardly improves, while indebtedness is rising. However, significantly lower inflation in a large country will affect area-wide inflation, which could lead to some monetary easing. If the interest rate were to decline in line with overall inflation, the budget balance would improve by more.

51. These simulation results are, of course, model dependent. The weak endogenous adjustment forces in the case of reforms of a single large euro area economy could be exaggerated. It can not be excluded that a better macroeconomic performance, and especially lower unemployment, would lead to substantial confidence effects, which are not included in the model. These could lead to greater dynamism of consumption and investment. The reaction of the US economy to the productivity shock during the 1990s suggests that demand can outstrip supply, following a supply shock.⁷ On the other hand, one should not underestimate either the role played by the US monetary authorities, which recognized and accompanied the structural changes. Also the depth and flexibility of the American financial markets were crucial in allowing a rapid transmission of the associated wealth gains onto demand.

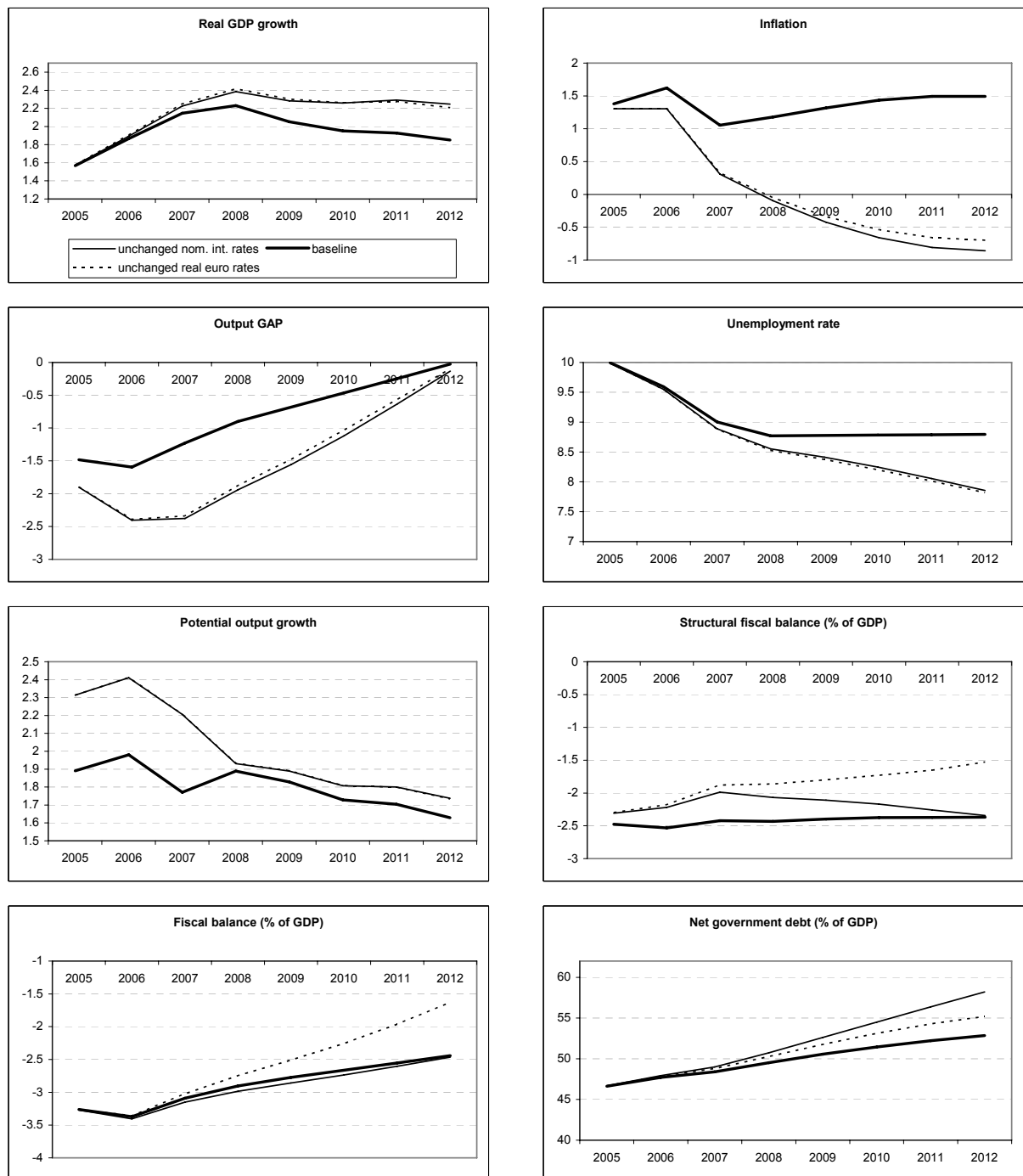
7. This would follow Say's law, which suggests that supply will create its demand. But the American situation even suggests what Val Koromzay dubbed Super-Say's law, whereby a more optimistic outlook on future income can lead to excess demand, when supply conditions improve.

Figure 8. Simulated impact of a reduction of the NAIRU in a small euro country (Belgium)



Note: The Nairu is assumed to fall progressively by 1.5 percentage points in the first three years of the simulation. Nominal exchange rate and interest rates are kept unchanged relative to baseline. Real government expenditure is also kept unchanged at baseline level.

Figure 9. Simulated impact of a reduction of the NAIRU in a large euro area country (France) under alternative monetary assumptions



Note: The Nairu is assumed to fall progressively by 1.5 percentage points in the first three years of the simulation. Nominal exchange rate kept unchanged relative to baseline. Real government expenditure is also kept unchanged at baseline level.

Effects of a decline in structural unemployment with a more active fiscal policy

52. Our final set of simulations is designed to examine the role of upfront cost, and more generally to look at the possibility that countries use a more activist fiscal policy to accompany their structural reform programme. A rise in potential output due to a decline in structural unemployment improves the structural budget balance. In the absence of monetary policy, euro area member countries may be tempted to use the room for fiscal manoeuvre to accompany reforms to speed up the adjustment of demand to the improved supply conditions. Moreover, the reforms could have a budgetary cost, for instance, making a cut in social security contributions necessary.

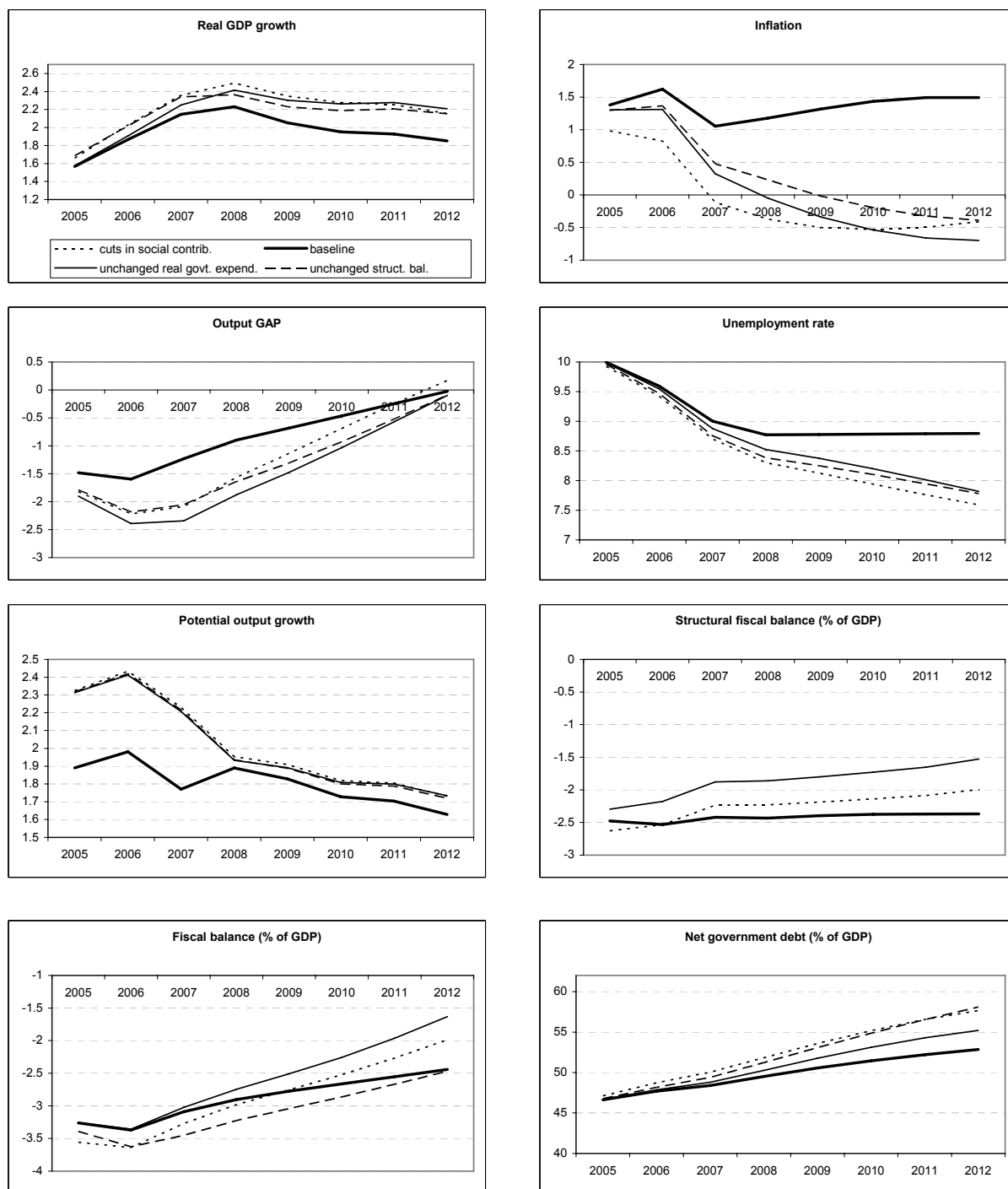
53. To illustrate the joint effect of a decline in structural unemployment and of a more active fiscal policy to scenarios were run for France. The first assumes that the structural budget balance is kept at the baseline level. The second assumes that the decline in unemployment is accompanied by a permanent reduction in employers' social security contributions by ½ per cent of GDP. The results are presented in **Figure 10**. They clearly show the limits of an expansionary fiscal policy accompanying structural reforms. The macroeconomic gains are very limited, while the budget deteriorates significantly.

Some policy implications

54. The recent reform of the Stability and Growth Pact provides more leeway for EU governments to temporarily breach the 3% and close to balance or surplus rule if this can be shown to facilitate the implementation of effective, but initially expensive, structural reform. While this principle is underpinned by a clear economic rationale, its implementation is less obvious. Indeed, for it to be properly implemented a number of conditions will need to be met:

- Budgets would need to clearly identify the structural policy measures that are being taken and specify their immediate and multi-annual budgetary cost and benefit profile. So far, there is very little evidence of this happening, with probably the United Kingdom being at the frontier (and even there the picture is not always clear). Indeed, given the absence of an explicit structural reform programme and its costing, the SGP revision seems rather premature.
- Budgets would also need to be explicit about the fiscal cost of inaction, *i.e.*, report the budgetary developments in the absence of structural reform. This is a form transparency that is necessary for the European authorities to call a balanced judgment on countries' trade-offs between the various options available, like reform health care but not pensions, or any other combination of reform programmes. However, it is very rare to find such costing in budgets.
- Budgets would, finally, need to give some indication of the broader economic effects of action or inaction, in order to be able to call a judgment on the *ex ante* effectiveness and efficiency of the proposed measures. However *ex ante* cost-benefit analysis is rare – not to mention *ex post* cost-benefit analysis. The experience in countries like New Zealand and Australia has shown that the longer-term benefits both in terms of the budget and overall economic performance may be significant. Even so, it is not easy to disentangle the various forces at play. Fundamentally, structural reform and the implementation of smart fiscal frameworks tend to go hand in hand – indeed may be two sides of the same coin.

Figure 10. Simulated impact of a reduction of the NAIU in a large euro country (France) under alternative fiscal assumptions



Note: The Nairu is assumed to fall progressively by 1.5 percentage points in the first three years of the simulation. Nominal exchange rate kept unchanged relative to baseline. Real interest rates at the euro level are maintained unchanged relative to baseline.

55. The econometric exercise in this paper provides additional evidence that the budgetary cost of structural reform has been rather limited, whereas the longer-term benefits are significant. Probably nobody would contest this general finding, but it is useful to be able to put some numbers on it. They broadly concur with similar findings by Deroose and Turrini (2005), although they focus on the fiscal position rather than on public expenditure. Obviously these findings are *ex post* and they may not apply to the

future. They are also partial in the sense that they do not take explicit account of macroeconomic feedback mechanisms.

56. The simulation exercises highlight the positive budgetary effects of coordinated structural reforms in the euro area. But they have to be accompanied by an adequate monetary policy response to guarantee a rapid adjustment of demand to the improved supply conditions. The budgetary gains would still depend on the type of reform and their impact on employment and productivity. Efforts to improve supply conditions are surely easier to co-ordinate or coordinated in any case, when it comes to single market initiatives, such as the current drive to liberalise services across the European Union. Co-ordination is more difficult to achieve for labour market reforms. In this domain, national policy initiatives by a single country could have only a limited impact, especially in the short term and in the case of a large country. Indeed, in monetary union, the strength of endogenous adjustment mechanism appear to be weaker the larger the country. Moreover, if reforms were to be accompanied by an easing of fiscal policy, additional macroeconomic gains would also appear very limited.

Bibliography

- Ahn, S. and P. Hemmings (2000), "Policy Influences on Economic Growth in OECD Countries: An Evaluation of the Evidence", OECD Economics Department Working Papers, No. 246.
- Altshuler, A. *et al.* (2005), "The Role of Dynamic Scoring in the Federal Budget Process: Closing the Gap between Theory and Practice", *American Economic Review Papers and Proceedings*, Vol. 95, No. 2.
- Auerbach, A.J. (2005), "Dynamic Scoring: An Introduction to the Issues", *American Economic Review Papers and Proceedings*, Vol. 95, No. 2.
- Banks, G. (2005), "Structural Reform Australian-Style: Lessons for Others?" Paper presented at the OECD on 31 May 2005.
- Beetsma, R. and X. Debrun (2005), "Implementing the Stability and Growth Pact: Enforcement and Procedural Flexibility", *IMF Working Papers*, No. WP/05/59.
- Blanchard, O. (2005), "European Unemployment: the Evolution of Facts and Ideas", *MIT Department of Economics Working Paper Series*, Working Paper 05-2004.
- Boeri, T. (2002), "Let Social Policy Models Compete and Europe Will Win", paper presented at a Conference hosted by the Kennedy School of Government, Harvard University, 11-12 April.
- Burniaux J.M., R. Duval and F. Jaumotte (2003), "Coping with Ageing: A Dynamic Approach to Quantify the Impact of Alternative Policy Options on Future Labour Supply in OECD Countries", OECD Economics Department Working Papers, No. 371.
- Buti, M. and P. van den Noord (2004), "Fiscal Discretion and Elections in the Early Years of EMU", *Journal of Common Market Studies*, Vol. 42, No. 4.
- Buti, M. and P. van den Noord (2005), "What is the Impact of Tax and Welfare Reforms on Fiscal Stabilizers?", in W. Semmler (ed.), *Monetary Policy and Unemployment*, Routledge.
- Deroose, S. and A. Turrini (2005), "The Short-term Budgetary Impact of Structural Reforms. Evidence from a Panel of EU Countries", mimeo.
- Majnoni d'Intignano, B. (2001), *Economie et santé*, Presses Universitaires de France, Paris.
- Duval, R. (2005), *Fiscal Positions, Fiscal Adjustment and Structural Reforms in Labour and Product Markets*, Paper prepared for this conference, Paris.
- EC (2005a), *Public Finances in EMU 2005*, European Economy, No.3/2005.
- EC (2005b), Council Regulation (EC) No. 1055/2005, 27 June 2005.
- Evans, L., A. Grimes, B. Wilkinson and D. Teece (1996), "Economic Reform in New Zealand 1984-95: the Pursuit of Efficiency", *Journal of Economic Literature*, Vol. 34, No. 4.
- Fatas, A. (2005), "Is there a Case for Sophisticated Balanced-Budget Rules?", *OECD Economics Department Working Papers*, forthcoming.
- Federated Farmers of New Zealand (2002), "Life after Subsidies", August, Wellington.
- von Hagen, J., A. Hughes Hallett and R. Strauch (2002), "Quality and Success of Budgetary Consolidations", in Buti, M., J. von Hagen and C. Martinez-Mongay (eds.), *The Behaviour of Fiscal Authorities: Stabilisation, Growth and Institutions*, Basingstoke: Palgrave.

HM Treasury, *Budget 2001, 2002, 2003, 2004*.

Koen, V. and P. van den Noord (2005), "Fiscal Gimmickry in Europe: One-off Measures and Creative Accounting", *OECD Economics Department Working Papers*, No. 417, Paris.

Martinez-Mongay, C. (2002), "Fiscal Policy and the Size of Government", in Buti, M., J. Von Hagen and C. Martinez-Mongay (eds.), *The Behaviour of Fiscal Authorities: Stabilisation, Growth and Institutions*, Palgrave.

OECD (2001), *The New Economy: Beyond the Hype. The OECD Growth Project*, Paris.

OECD (2003), *OECD Economic Surveys: Euro area*, Paris.

OECD (2004), *OECD Economic Surveys: Euro area*, Paris.

OECD (2005), *Going for Growth*, Paris.

Page, B.R. (2005), "CBO's Analysis of the Macroeconomic Effects of the President's Budget", *American Economic Review Papers and Proceedings*, Vol. 95, No.2.

Sapir, A. (2005), "Globalisation and the Reform of European Social Models", Background document for the presentation at ECOFIN Informal Meeting in Manchester, 9 September.

Assessing the Budgetary Impact of Systemic Pension Reforms

by

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Abstract:

This paper projects the macroeconomic and budgetary effects until 2050 of retaining the current PAYG system in the EU and analyses two alternative strategies of avoiding an increase in non wage labour costs. Special emphasis is laid on the question whether a partial move to a funded system could be a feasible option. At least for the transition, the budgetary costs appear to be rather large. In an alternative scenario, the paper highlights the debt explosion associated with a move to debt financing of additional pension expenditures.

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The views expressed in this paper are those of the author and not necessarily those of the European Commission.

Introduction

Demographic pressure in the EU is putting the long run sustainability of government budgets on the fiscal policy agenda. The PAYG pension system which currently is the dominant source of intergenerational income transfer will increasingly come under stress. Currently ten workers finance two and a half retirees, in 2050, ten workers will have to finance five retirees with their pension contributions. This has serious consequences for the government budget in coming decades if no reforms are undertaken. As shown previously, leaving the generosity of the PAYG system unaffected would require an increase in pension contribution rates from currently about 16% to about 27%⁸ in 2050, taken as given the demographic trends currently projected for the EU. Given the still high levels of unemployment in the EU and the fact that non wage labour costs are partly blamed for low employment rates in Europe, letting the current pension system in place does not seem to be an attractive policy option. There are two radically alternative fiscal strategies of financing additional pension expenditures if one wants to avoid ever increasing pension contributions. A first alternative could be seen in a switch to debt financing of additional ageing related pension expenditure requirements and freezing the replacement rate at current levels. An alternative strategy would be to partially move to a funded system, with a government guarantee of accrued pension rights for current pensioners and certain well defined age cohorts within the pool of current workers. It will be assumed that the transition costs are financed via an increase in government debt.

Obviously, the first option is not a true long run solution but rather a strategy of postponing reforms, since it will eventually lead to exploding debt levels. Nevertheless it is interesting to show the debt dynamics implied by that strategy. The second option would certainly be preferable from a debt sustainability point of view, however, the short to medium term budgetary costs, in terms of deficits, are likely to be larger, because of immediate and large transition costs due to a fraction of accrued pension rights guaranteed by the government. However, unlike with the first option, the transition costs would be temporary. The duration would be limited by the age cohorts who are chosen to be eligible for government transfers. Nevertheless, given the voting power of age cohorts older than 40 years in Europe, it is likely that any transition to a funded system in Europe would be accompanied by a fairly generous compensation of current retirees and older workers.

This paper compares these two stylised strategies to each other and to a baseline PAYG scenario where the current generosity of the pension system is retained, financed by increasing pension contributions. In particular it asks the following questions. What are the macroeconomic and fiscal consequences of retaining the generosity of the present PAYG system? What would be the macroeconomic impact of the two strategies for stabilising social security contributions? And what would be the level of debt the EU would end up in 2050 under the two alternative strategies?

The quantitative analysis is conducted with a five region version of the 'QUEST model', where we distinguish between EU15, US, Japan and the rest of the World divided into fast and slow ageing regions (FA, SA). We regard the international dimension as useful since ageing and pension reforms are generally associated with changes in national savings and have implications for international capital flows. This model is an extension of DG ECFINs macro model, allowing for a disaggregated household sector, split into worker and pensioner households along the lines suggested by Gertler (1999). The paper is structured as follows. Section 1 presents the model,

⁸ See, The EU Economy Review 2001 Review, Reforms of Pension Systems in the EU – An Analysis of the Policy Options, pp.171-222.

followed by a section discussing the calibration of the most crucial structural parameters. Section 3 presents standard simulations on debt and pension reforms in order to show the basic magnitudes of crucial multipliers in the model. Section 4 compares the alternative scenarios to each other and the paper ends with some concluding remarks.

1. The Model

An identical good is produced in each region with a constant returns to scale production function. The technology in each region is identical up to the level of TFP. We allow for capital mobility across regions but restrict international migration to zero. In order to allow for demographic effects on savings within a life cycle framework and at the same time keep the model tractable we distinguish three age groups in each region and adopt the Gertler (1999) specification of consumer preferences and make similar assumptions concerning population dynamics, insurance arrangements and preferences.

Individuals go through three distinct stages of life: youth (0 - 14 years), work (15years - retirement age), and retirement (retirement age+1 - expected end of life). The number of children in period t is given by N^y . Each period bN^y children are born and average duration in childhood is $1/\lambda^y$ where λ^y is the fraction of young people turning age 15. Child population dynamics is given by

$$N_{t+1}^y = bN_t^y + \lambda_t^y N_t^y. \quad (1)$$

The working age population in period t is given by N^w . Each period $\lambda^y N^y$ children enter the working age population cohort. The mean duration of staying in this cohort is $1/\lambda^w$ where λ^w is the fraction of the population in working age which goes into retirement in the current period. Thus the population of working age evolves over time as follows

$$N_{t+1}^w = \lambda_t^y N_t^y + (1 - \lambda_t^w) N_t^w. \quad (2)$$

There are N^r pensioners at date t . they are joined by $\lambda^w N^w$ new retirees, while a fraction $(1 - \lambda^r)$ incumbent retirees survive to the next period. This gives the following law of motion for the retiree population

$$N_{t+1}^r = \lambda_t^w N_t^w + (1 - \lambda_t^r) N_t^r. \quad (3)$$

Population dynamics imply that individuals face certain probabilities of switching into different stages of their lives. Each child faces a probability λ^y of becoming a worker, each worker has a probability λ^w of becoming a retiree and each retiree faces an uncertain time of death. Following Yaari (1965) and Blanchard (1985) a perfect annuities market is introduced which provides life insurance for retirees. Each worker faces an idiosyncratic income risk each period of losing wage income and receiving pension income for the rest of his life. This type of uncertainty is dealt with analytically by restricting preferences, i. e. by employing a special class of nonexpected utility functions proposed by Farmer (1990). The so called risk neutral constant elasticity of substitution (RINCE) preferences separate a household's attitude toward income risk from its intertemporal elasticity of substitution. In particular they restrict individuals to be risk neutral with respect to income risk but allow for an arbitrary intertemporal elasticity of substitution. Notice, income risk is introduced artificially because it allows to simplify the analysis and not because there is a real

income risk. Therefore it seems reasonable to mitigate the impact of the stochastic income variation of individuals between work and retirement by assuming risk neutrality. Children are assumed not to make any economic decisions. Extending population dynamics to include children is nevertheless useful since it allows to take care of different birthrates and initial youth dependency ratios.

The decision problem of retiree and workers can now be formulated by postulating value functions V^r and V^w over consumption for retirees (r) and workers (w) respectively as follows

$$V_t^z = \left\{ C_t^\rho + \beta^z E_t (V_{t+1}^z | z)^\rho \right\}^{1/\rho} \quad (3)$$

with $z=(r, w)$. The value function is non-linear in the two arguments. However, instead of complicating the analysis it is exactly this type of non-linearity of the value function which generates risk neutrality with respect to stochastic income and which allows the derivation of closed form decision rules which are functions of first moments of income only.

Consumption of retirees:

Each retiree j consumes out of pension income (w_t^r) and financial wealth A_t^{rj} . Because of the life insurance contract pensioners receive a premium on top of the interest rate which is equal to the probability of death. Thus the budget constraint is given by

$$A_t^{rj} = (1 + r_t + \lambda_t^r) A_{t-1}^{rj} + w_t^r - C_t^{rj} \quad (4)$$

Maximising (10) subject to (20) yields the consumption Euler equation

$$C_{t+1}^{rj} = (1 + r_t) \beta C_t^{rj}. \quad (5)$$

From this first order condition together with the intertemporal budget constraint the following decision rule for retiree consumption can be derived

$$C_t^{rj} = \varepsilon_t \pi_t [A_t^{rj} + S_t] \quad (6)$$

where the marginal propensity to consume out of wealth is given by the following difference equation

$$\varepsilon_t \pi_t = 1 - \left((1 + r_t)^{\sigma-1} \beta^\sigma (1 - \lambda_t^r) \right) \frac{\varepsilon_t \pi_t}{\varepsilon_{t+1} \pi_{t+1}} \quad (7)$$

and the present value of retirement income is given by

$$S_t^j = \frac{1 - \lambda_t^r}{(1 + r_t)} S_{t+1}^j + w_t^r. \quad (8)$$

Consumption of the population of working age:

Each member of the labour force j can either be employed or unemployed. Employed workers receive net income $w_t^e = (1 - t_t - ssc_t) w_t$, the unemployed receive unemployment benefits w_t^u . An

unemployed worker finds a new job with probability p_t^u while a currently employed worker loses his job and becomes unemployed with probability p_t^e . Both employed and unemployed workers can expect the same pension. The budget constraint of both types is given by

$$A_t^{wj} = (1 + r_t)A_{t-1}^{wj} + w_t^w - C_t^{wj} \quad (9)$$

where the superscript $w = \{e, u\}$ indicates the employment status of worker j . The FOC of worker ej is given by

$$(1 - \lambda_t^w) \left((1 - p_t^e) C_{t+1}^{ej} + p_t^e C_{t+1}^{uj} \right) + \lambda_t^w \Lambda_{t+1} C_{t+1}^{rj} = ((1 + r_t) \Omega_t \beta)^\sigma C_t^{ej} \quad (10)$$

The FOC of unemployed worker uj is given by

$$(1 - \lambda_t^w) \left((1 - p_t^u) C_{t+1}^{uj} + p_t^u C_{t+1}^{ej} \right) + \lambda_t^w \Lambda_{t+1} C_{t+1}^{rj} = ((1 + r_t) \Omega_t \beta)^\sigma C_t^{uj} \quad (11)$$

Where $\Lambda_t = \varepsilon_t^{\frac{\sigma}{1-\sigma}}$ is the marginal rate of substitution of consumption across work and retirement and Ω_t is a factor that adjusts the rate of time preference for the fact that the worker can be in a different state next period. It is given by

$$\Omega_t = (1 - \lambda_t^w) + \lambda_t^w \varepsilon_t^{\frac{1}{1-\sigma}} \quad (12)$$

The worker determines the level of consumption in period t such that the ratio of the marginal utility of consumption tomorrow vs. today is equal to the difference between the real interest rate and the rate of time preference. The expected marginal utility of consumption in the next period is a weighted average of consumption in the two possible states. Notice, because of risk neutrality only the mean of consumption in the two states matters. A closed form decision rule for workers consumption can be derived and is given by

$$C_t^{wj} = \pi_t \left[A_t^{wj} + H_t^{wj} + S_t^{wj} \right] \quad (13)$$

where the marginal propensity to consume out of wealth is given by

$$\pi_t = 1 - \left(((1 + r_t) \Omega_t)^\sigma \beta^\sigma \right) \frac{\pi_t}{\pi_{t+1}}. \quad (14)$$

The term H^w is the present discounted income of an employed or unemployed worker. Because workers can switch employment status randomly in the next period, H^e and H^u are best represented by the following arbitrage conditions

$$H_t^{ej} = \frac{(1 - \lambda_t^w)}{(1 + r_t) \Omega_t} \left((1 - p_t^e) H_{t+1}^{ej} + p_t^e H_{t+1}^{uj} \right) + w_t^e \quad (15)$$

$$H_t^{wj} = \frac{(1 - \lambda_t^w)}{(1 + r_t)\Omega_t} \left((1 - p_t^u)H_{t+1}^{wj} + p_t^u H_{t+1}^{ej} \right) + w_t^u. \quad (16)$$

The capitalised future pensions of workers S^w also enter the consumption rule. To simplify the analysis we assume that pensions of workers and unemployed are identical. This does not seem to be too strong an assumption since we assume that each member of the labour force has identical characteristics they will spend equal proportions of their working life in unemployment. The expression for the present value of future pensions is given by

$$S_t^{wj} = \frac{\lambda_t^w \varepsilon_{t+1}^{1-\sigma}}{(1 + r_{t+1})\Omega_{t+1}} S_{t+1}^j + \frac{(1 - \lambda_t^w)}{(1 + r_{t+1})\Omega_{t+1}} S_{t+1}^{wj}. \quad (17)$$

Notice, the marginal elasticity of substitution between consumption during working life and during retirement enters this expression, because workers value consumption in the two states differently. Aggregation across workers, unemployed and retirees is straightforward and yields the following aggregate consumption rule

$$C_t = \pi_t \left[(1 - s_t)A_t + H_t + \varepsilon_t (s_t A_t + S_t) \right] \quad (18)$$

where s is the share of total assets held by retirees and H is the present discounted value of net wages and unemployment benefits.

Notice also, like in the standard finite horizon model the dynamics of aggregate consumption differs from the dynamics individual consumption. While the change of individual consumption is only a function of the difference between the real rate of interest and the rate of time preference, the aggregate rate of time preference becomes a positive function of financial wealth because households belonging to different age cohorts have different financial wealth positions. This implies that in the steady state the rate of interest will exceed the rate of time preference, because high interest rates are needed in order to induce newly created worker households to save.

The life cycle feature also has consequences for the dynamics of assets and interest rates in open economy models. With infinitely lived consumers the steady state requires the same rate of time preference in all regions. In contrast with the life cycle model of consumption the effective rate of time preference becomes a positive function of financial wealth, i. e. an endogenous distribution of wealth will be generated in steady state equilibrium which equalises the effective rate of time preference across regions. In other words those regions with above average rates of time preference will, everything else equal, end up with a lower asset stock.

It is also instructive to compare consumption in this model to the standard infinite consumption model. A first difference applies to permanent income. Permanent income consists of discounted labour income throughout the expected working life as well as the expected present value of pension income. Adjusting the discount factors of H and S with the respective probabilities of staying in the two states takes care of the finite durations of work and retirement. Thus there is saving for retirement.

There is another important feature of the utility function which can potentially work in the other direction. Workers value the marginal utility of a unit of consumption differently between their working life and retirement. This valuation depends crucially on the intertemporal elasticity of

substitution. For $\sigma > 1$ the marginal utility of consumption in retirement exceeds the marginal utility of consumption during work and vice versa. Especially the case $\sigma < 1$ has the interesting consequence that workers prefer consumption during working life. Intuitively this phenomenon can be related to the preference for income smoothing implied by a low intertemporal elasticity of substitution. Effectively this increases the rate of time preference of workers.

Total financial wealth A_t consists of three types of assets, government bonds B_t , domestic equity $q_t K_t$, where q_t is the share price and K_t are units of real capital owned by the household. Households can also store wealth in the form of internationally traded bonds F_t issued by private agents in both countries.

$$A_t = q_t K_t + B_t + F_t. \quad (19)$$

Imperfect international capital mobility is introduced via a trading friction for internationally traded bonds expressed as a function which captures the cost for the domestic household of undertaking positions in the international capital market. As borrower, the household is charged a premium on the foreign interest rate and as lender he receives a remuneration which is below the foreign interest rate. Effectively this implies that uncovered interest parity does not hold between the domestic and the foreign economy where the spread between the domestic and foreign interest rate depends on whether the home country is a borrower or a lender in the market for international bonds. We specify the interest differential as a linear function of the net foreign asset position of the respective country

$$r_t^F = r_t - \psi \left(\frac{F_t}{Y_t} \right), \quad \psi \geq 0 \quad (20)$$

The corporate sector in each region operates under perfect competition. Output is produced with a constant returns to scale Cobb Douglas production function

$$Y_t = F(K_t, L_t) \Gamma_t = K_t^{1-\alpha} L_t^\alpha \Gamma_t \quad (21)$$

where Γ_t is an exogenous shock to technology. Capital stock changes according to the rate of fixed capital formation J_t and the rate of geometric depreciation

$$K_t = J_t + (1-\delta)K_{t-1}. \quad (22)$$

Total investment expenditures are equal to investment purchases plus the cost of installation. The unit installation costs are assumed to be a linear function of the investment to capital ratio with a parameter ϕ . Total investment expenditure is therefore given by

$$I_t = J_t \left(1 + \frac{\phi}{2} \left(\frac{J_t}{K_t} \right) \right). \quad (23)$$

The corporate sector in country i maximises the net present value of its cash flow

$$V_t = E_t \sum_{j=0}^{\infty} \prod_{k=0}^j (1+r_{t+k})^{-1} \{ (1-t_c)[Y_{t+j} - w_{t+j}^e L_{t+j}] - I_{t+j} \} \quad (24)$$

subject to the technology, the adjustment cost and the capital accumulation constraint. Define with λ^k the multiplier associated with the constraint on capital respectively. Differentiating the objective function with respect to $K_{t+j}, J_{t+j}, L_{t+j}$ ($j=0,1,\dots$), gives the following system of stochastic Euler equations (subject to the transversality condition)

$$(1-t_c)(1-\alpha) \frac{Y_{t+j}}{K_{t+j}} = (r_{t+j} + \delta) \lambda_{t+j}^k - \frac{\phi}{2} \left(\frac{J_{t+j}}{K_{t+j}} \right)^2 - E_{t+j} [\lambda_{t+j+1}^k - \lambda_{t+j}^k] \quad (25)$$

$$\left(\phi \frac{J_{t+j}}{K_{t+j}} + 1 \right) = \lambda_{t+j}^k \quad (26)$$

$$\alpha \frac{Y_{t+j}}{L_{t+j}} = w_{t+j}^e \quad (27)$$

Equation (25) is the equation of motion of the marginal shadow value of capital λ^k . Equation (26) is the first order condition for total investment and it implies that the cost of a marginal unit of capital, including both its purchase and adjustment costs, must equal the shadow value of capital λ^k . It has been shown by Hayashi (1980) that marginal and average value of Tobin's Q coincides under the technology and market structure assumed here, i. e. $\lambda^k = q$. The cost of capital includes both the pure rental price and adjustment costs. Equations (27) defines labour demand

Unlike in the goods market we assume imperfect competition in the labour market in both countries. Instead of deriving a labour supply equation from the household optimisation problem we assume a standard wage rule which can be derived from various labour market models. As discussed by Pissarides (1998) for example, the following generic wage rule

$$w_t^e = (1-\chi)w_t^u + \chi \left(\alpha \frac{Y_t}{L_t} + \frac{v_t}{LF_t/L_t - 1} \right). \quad (28)$$

could be derived from alternatively from search model, a union bargaining or an efficiency wage model of the labour market. According to this rule, wage costs are a weighted average of the reservation wage (w^u) labour productivity plus an additional mark-up term that depends positively on labour market tightness.

The government provides three types of transfers to households: it pays unemployment benefits $(LF_t - L_t)w_t^u$, subsidises pension transfers at the amount $(TRPEN_t)$ and provides lump sum transfers (TR_t) . In addition the government purchases goods and services (G_t) . Expenditures are financed by labour income and company taxes plus taxes on consumption. The tax rates on wages (t_l) and corporate income (t_c) as well as the consumption tax rate (t_v) are assumed to be constant. Alternatively, the government can issue debt. Thus the government budget constraint is given by

$$B_{t+1} = (1+r_t)B_t + (LF_t - L_t)w_t^u + G_t + TR_t + TRPEN_t - t_l w_t L_t - t_c (Y_t - w_t^e L_t) - t_v C_t \quad (29)$$

Since we allow the government to subsidise the PAYG pension system, the financing constraint is given by the following equation

$$w_t^r \text{part}_t^r N_t^r = ssc_t w_t^e L_t + TRPEN_t \quad (30)$$

The left hand side gives current pension expenditures which are determined by the number of persons older than 65 eligible for a pension. Eligibility criterion is past labour force participation (part_t^r) and N_t^r is the total number of persons in retirement age. Pensions (w_t^r) are determined as a percentage of current wages. Pensions are financed from two sources, social security contributions of current workers plus government subsidies.

Lump sum transfers are adjusted proportionally to the gap between the debt to GDP ratio and its target level b_0 according to the following rule

$$\Delta T = -\psi_1 \left(\frac{B_t}{Y_t} - b_0 \right) - \psi_2 \left(\frac{B_t}{Y_t} - \frac{B_{t-1}}{Y_{t-1}} \right). \quad (32)$$

Equilibrium

There is a homogeneous good which is traded internationally, therefore world supply is equated to world demand in each period and the market clearing condition is given by

$$\sum_{i=1}^5 Y_{it} = \sum_{i=1}^5 (C_{it} + I_{it} + G_{it}) \quad (32)$$

All bonds and equity supplied by the domestic government and the corporate sector are held by domestic households. The market clearing condition for internationally traded bonds is

$$\sum_{i=1}^5 F_{it} = 0. \quad (33)$$

Output price serves as numéraire. The competitive equilibrium of this economy consists of a sequence of real interest rates (r_{it}) and allocations ($C_{it}, I_{it}, G_{it}, K_{it}, F_{it}, B_{it}$) that satisfy the first order conditions of households and firms, the budget constraints of households, governments and firms and goods and bond market equilibrium conditions. Real wages (w_{it}) are determined by the wage contracting rule (28) and firms set employment optimally according to the first order condition (27). The labour market equilibrium can coexist with involuntary unemployment. Furthermore, the evolution of the economy is subject to initial conditions ($K_{i0}, F_{i0}, B_{i0}, \Gamma_{i0}, N_{i0}^y, N_{i0}^w, N_{i0}^r$) and a sequence of fiscal instruments ($t_r, t_l, t_c, t_v, b_0, g_0$) as well as a debt targeting rule that ensures intertemporal solvency of governments.

Because the initial position of the economy is far from the steady state, the solution of a model, which is linearised around the steady state may give imprecise results. Therefore we have opted for a solution procedure developed by Laffargue (1990), Boucekkine (1995) and Juillard (1996) to

solve the dynamic non-linear forward looking model by Newton-Raphson. The simulation horizon must, however, be chosen long enough such that the solution is close to the steady state at the final date. We set the simulation horizon to 500 years. Roeger and In't Veld (1999) provide a more detailed technical discussion of this solution method as well as some sensitivity analysis in the context of permanent shocks.

2. Model Calibration

We select parameters such that the model fits some basic economic ratios both within and across regions. The objective of this exercise is to limit the international variation of structural parameters as much as possible and to explain divergences of economic development by the exogenous shocks and institutional differences. To select parameter values we largely follow standard procedures, *i.e.* we base these values on evidence from growth observations and some microeconomic evidence.

Demographics: We calibrate the model such that it can closely replicate the most recent EUROSTAT projections until 2050⁹. Because we make some simplifying assumptions on the evolution of the birth rate and life expectancy and because we do not consider migration our demographic projections in the model are not identical to the EUROSTAT projection. However, as can be seen from Table 1, using the old age dependency ratio as a summary measure of the demographic trend, the model projections follow the fundamental trends of the EUROSTAT projection. The survival probabilities in the three age groups are chosen such that the mean duration in each group is consistent with the age classification (0-14), (15-64) and (65-life expectancy). The demographic trend is fundamentally determined by two features, namely a decline in the fertility rate from 2.4 in 1970 to 1.6 in 1990. Since 1990 the decline has slowed down and has reached a value of 1.3 in 2004. The projections assume that it will slightly increase to 1.6 in 2050. More important for the dependency ratio is the development of life expectancy, which is supposed to increase from currently 81.7 to 86.7 for women and from 76.0 to 86.7 for men.

Table 1: Old Age Dependency Ratio

	2004	2010	2020	2030	2040	2050
EUROSTAT	24.5	26.2	31.9	39.7	47.4	51.4
Model	25.5	27.3	31.4	38.1	45.7	52.0

Preferences: Consumption and savings behaviour is characterised by three parameters, the intertemporal elasticity of substitution, the rate of time preference and the elasticity of substitution between domestic and foreign assets. Most studies using household survey data (see e.g. Attanasio and Weber (1993), Attanasio and Browning (1995)) tend to find estimates for sigma which are below one. We choose a value of .5 which is compromise between a value of one which is often used in the business cycle literature and smaller values often used in micro simulation studies. For the rate of time preference we choose a value of 1% per year. This is at the lower end compared to existing studies. This value is necessary for the model to generate a realistic level of the real interest rate. As discussed above, the effective rate of time preference is higher since it is a function of financial wealth. In selecting values for the rate of time preference we also take into

⁹ We use United Nations (2000) and US Census (2001) data for the other regions.

account household savings rates across regions. An outstanding feature is the relatively low US household savings rate. To better capture this phenomenon we set the US rate of time preference to 1.5%.

Production: The output elasticity of labour is set equal to an average wage share across OECD countries. An annual depreciation rate for capital of 6% is assumed. The adjustment cost parameter is difficult to pin down on the basis of first moments of the data. It has been shown in the business cycle literature, however, that this parameter is crucial for determining the relative volatility of investment (see, for example, Mendoza (1991)). It is therefore set in such a way as to make investment about 3 times as volatile as GDP.

Labour market: Wage setting is characterised by three parameters, the level of the unemployment replacement rate, the parameter χ which determines “bargaining strength” of workers and the elasticity of wages w. r. t. unemployment. Since our starting point is 1970 where we observe low unemployment rates across the world we assume identical parameters for wage setting for all regions. Unemployment benefits are set such that they amount to roughly 30% of gross wages, which is around the order of magnitude found for a weighted average of EU countries and the US. The elasticity of wages with respect to unemployment is set to .5 which again corresponds to a weighted average of elasticity estimates found for the EU and the US. The bargaining strength is set to .5. The indexation of unemployment benefits to gross wages is chosen such that an increase in labour taxes or social security contributions by 1% leads to an increase of the unemployment rate of around .3% in the long run. This is about the average value reported by various empirical studies with values ranging from practically zero (Blanchard and Wolfers (2001)) to a value of .5 obtained by Daveri and Tabellini (2000) for example.

International financial markets: Little is known about the degree of international capital mobility. Earlier simulation exercises have, however, shown that full capital mobility between EU15, US and Japan on the one hand and the ROW would have led to net foreign asset positions which would by far exceed the observed international imbalances. It is assumed that international financial markets are incomplete by introducing a risk premium which depends on the net foreign asset position of the respective region. We impose a small risk premium. Previous research (Roeger 2003) has shown that higher risk premia for the non OECD regions are necessary such that the model approximately fits the observed net foreign asset position of the fast and slow ageing RoW. For example, without risk premia, the fast and slow ageing RoW economies would exhibit net foreign debt ratios in the order of magnitude of about 120%, which is nearly ten times larger than the observed level in 2000.

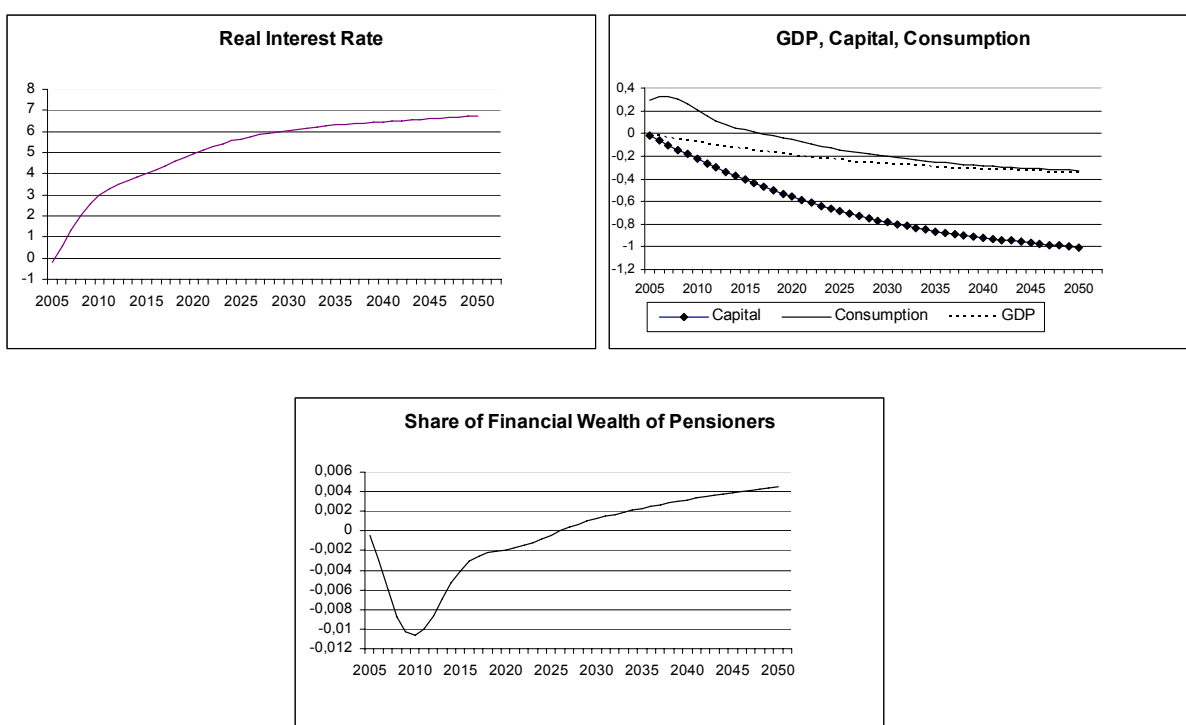
3. Standard Policy Experiments

The pension reform scenarios analysed below will be combinations of changes in government debt combined with changes in social security contributions (combined with changes in the generosity of the pension system). In order to better understand the total effect it is useful to look at the individual effects separately by conducting two standard simulation experiments. This also allows us to see how the effects in this model relate to results in the literature. We analyse two experiments, a permanent increase in government debt and a reduction in pensions.

3.1. An increase in government debt

Because of finitely lived households Ricardian equivalence does not hold in this model. In this experiment we show the degree in which Ricardian equivalence is violated by showing the real interest rate response of an increase in the debt to GDP ratio in Europe of 10% points. Enders and Hubbard (2004) provide a summary of recent research (in the US case). Their reported estimates for a 1% point increase range from zero to 24 basis points. Their preferred estimate lies between 2 and 3 basis points. Our model is more Ricardian than the results obtained by Engen and Hubbard. A 1% increase in the debt to GDP ratio increases the long run real interest rate by slightly less than 1 basis point. Notice this result is obtained by increasing government debt in Europe only. The results obtained in standard regression analysis are probably biased upwards because the debt dynamics are positively correlated internationally over the sample period used for the regression analysis.

Figure 1: Increase in Government Debt (10% points)



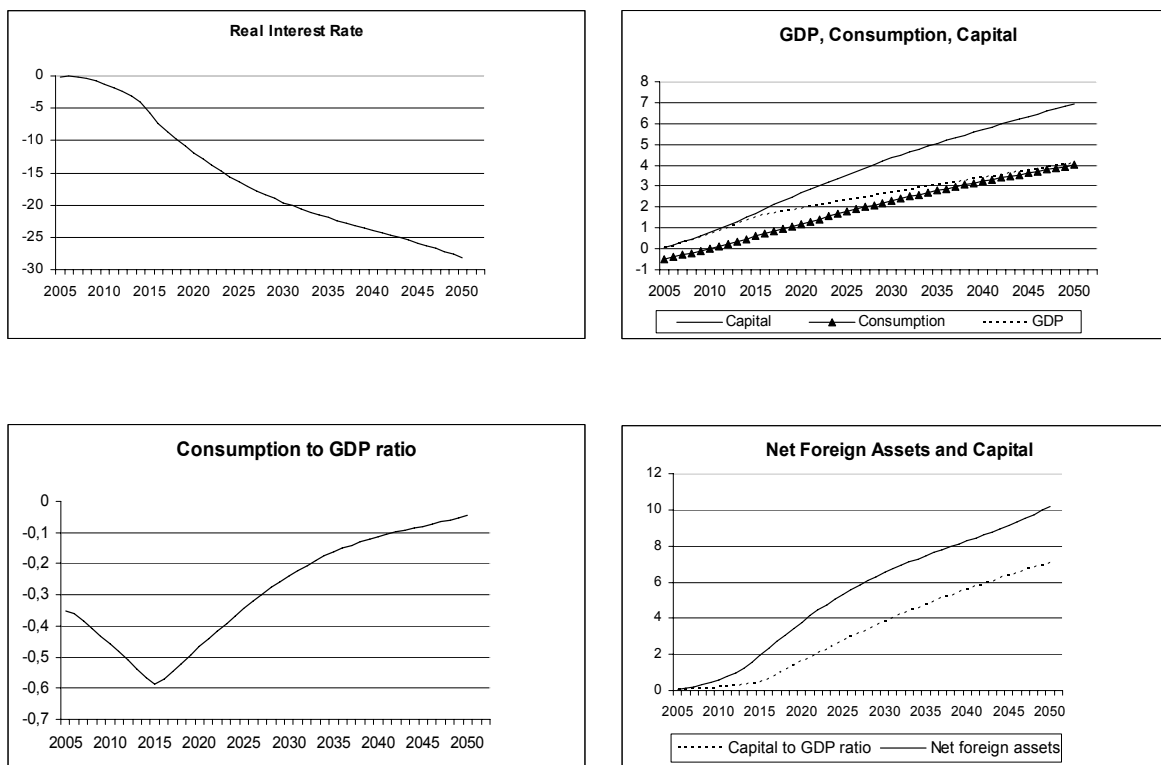
After 50 years the real interest rate increases by about 7 BP and the capital stock declines by about 1% and GDP by around .3%. The effects on the intergenerational wealth distribution are minor. This compares to Gertler's closed economy case where a 10% increase in government debt leads to an increase in interest rates of about 25 BP and reduces the capital stock by roughly 2.5%

3.2. A reduction in pensions

In 2005, the share of pensions in total GDP is roughly 11%. What would happen if the pension system would become less generous? In this experiment it is assumed that the share of pensions in total GDP would be reduced by 2.5% points (gradually phased in over a period of 10 years). This corresponds to the pension experiment conducted by Gertler for the US. The most important question is, how such a reform would increase financial wealth and in particular capital accumulation. A less generous pension system in the EU would increase savings and reduce

interest rates by about 60 BP in the long run and lead to an increase in the capital stock of about 7%. Notice, however, a significant part of the additional savings would flow abroad. Foreign wealth as a per cent of GDP would increase by about 10% points, while domestic capital as a per cent of GDP would only increase by 7% points. Associated with the reform is a redistribution of financial wealth from pensioners to worker households. These results compare to a reduction of the real interest rate of 275 BP in the closed economy model of Gertler, accompanied by an increase in the capital stock of 20%.

Figure 2: Reducing PAYG Pensions (2.5% of GDP)



One striking feature of this comparison is the relatively small crowding out effect of both government debt and the PAYG social security system. Two features of the model are probably crucial for this result. First unlike Gertler who models the US as a closed economy, we model the EU economy as having access to international capital markets. Second, we assume a higher intertemporal elasticity of substitution (σ), namely .5 vs. .25 in Gertler's paper. Both features tend to reduce the crowding out effect. The openness assumption implies that interest rates are essentially determined by world savings and investment. A higher σ induces a stronger response of savings to the initial wealth shock and does therefore require a smaller long run interest rate response.

4. EU Pension Scenarios

We conduct three policy experiments. The first (baseline) experiment leaves the generosity of PAYG system in place and explores its economic and budgetary consequences. The second scenario looks what happens if EU governments resort to debt financing of additional age related expenditure and the last scenario analyses a partial transition to a funded system, with deficit financing of transition costs. All three alternatives face certain trade offs between fiscal sustainability and macroeconomic efficiency. The PAYG system does not pose a particular fiscal sustainability problem. However ever increasing social security contributions are likely to generate negative labour supply incentives. Along with it goes an erosion of the tax base. The debt solution could reduce the macroeconomic costs especially in environments characterised by near Ricardian equivalence. However, sustainability of the government budget will certainly become an issue in this scenario. The third option is likely to yield the best long term economic and budgetary outcome, however transition costs are potentially large, leading to high permanent but sustainable debt burden as well.

4.1. The Baseline Scenario: Letting the PAYG System in Place

Without reforms, the share of pensions financed via the PAYG system will nearly double until 2050 from currently 9.7% to more than 17%. This is accompanied by an increase in pension contributions in the EU from 16 to 27%. The demographic trend is leading to permanently lower GDP (per capita) growth rates in the EU over the coming decades. Reduced labour supply is likely to cut GDP per capita growth by one third in 2050. Notice, rising social security contributions will reinforce the labour supply pressure. With the significant increase in social security contributions, a further rise in structural unemployment by nearly 5% points seems possible. Though higher savings and increased capital formation will somewhat alleviate the demographic pressure, the current pension system does not provide sufficient investment incentives to compensate the decline in labour input by increased productivity generated via higher capital intensity.

Table 2: Baseline Scenario: Keeping Generosity of PAYG

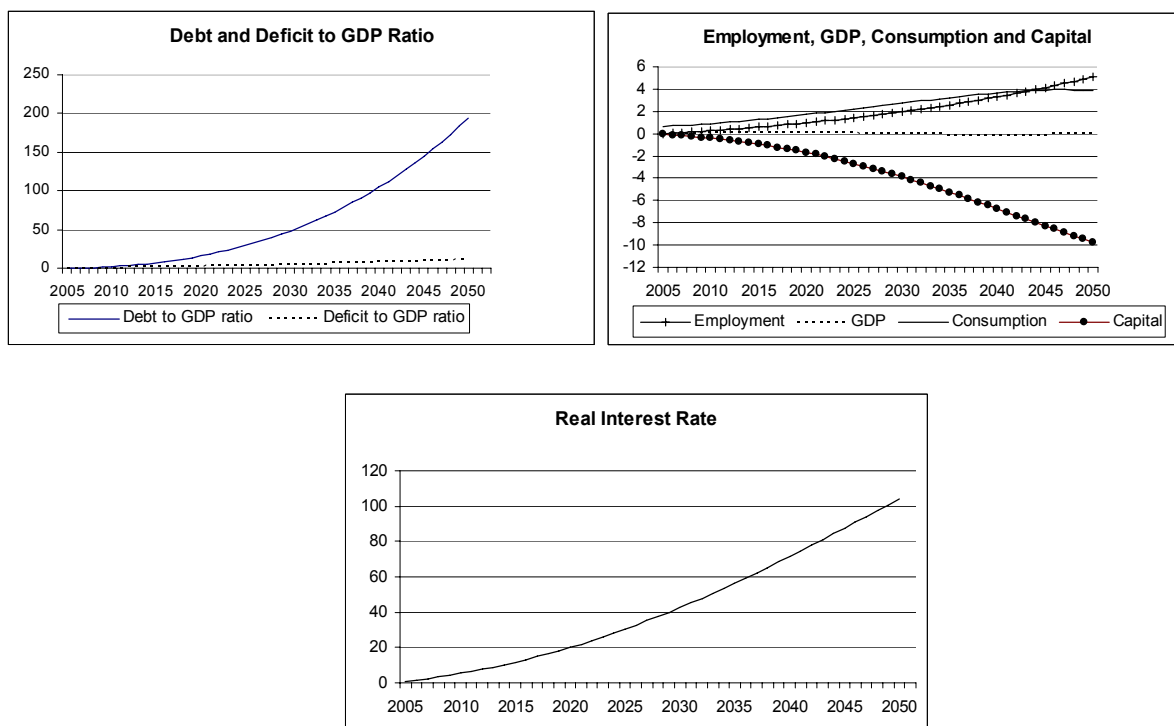
	2004	2010	2020	2030	2040	2050
GDP per capita	1.7	1.7	1.6	1.5	1.3	1.2
Private Investment/GDP	15.5	16.5	18.1	19.3	19.3	19.0
Unemployment Rate	8.1	8.3	9.0	10.0	11.3	12.8
Real Interest Rate	4.9	4.6	4.0	3.4	3.0	2.9
Retiree Cons./Worker Cons.	1.8	1.7	1.7	1.6	1.6	1.6
Pension/GDP	9.7	10.3	11.6	13.3	15.4	17.3
Social Security Contributions	14.9	15.8	17.8	20.4	23.5	26.5

GDP per capita: % deviation from baseline levels. The remaining figures are percentage point deviations from baseline levels.

4.2. Scenario 1: Debt financing of additional pension spending after 2005

The government guarantees the 2005 pension replacement rate and at the same time freezes the pension contribution to the current level. The difference between contributions and actual pension expenditure is financed via an increase in government debt. With a constant contribution rate (of currently 16%) the share of pensions covered by the PAYG contribution would decline from 100% to about 66% in 2050. In other words the pension contributions of workers would only finance a replacement rate of about 50% in 2050. After 2050 debt accumulation is stopped via an increase in lump sum taxes. As shown in figure 3, debt is on an explosive and clearly unsustainable path.

Figure 3 Debt Financing of additional Pensions



In 2050 the debt to GDP ratio would reach about 250%. However, debt financing is less distortionary than financing via social security contributions. Thus relative to the baseline scenario, employment increases, leading to an increase in GDP. Since households perceive government debt partly as net wealth, consumption rises as well. Initially, debt accumulation would be relatively slow because of the positive employment effects resulting from keeping pension contributions constant. However, the macroeconomic gains would be small. The employment gains would largely be compensated by a crowding out of the domestic capital stock, due to the increase in real interest rates.

4.3. Scenario 2: A partial move to a funded system

In this scenario the government makes an effort to reduce current pension contributions and the generosity of the PAYG system such that the ageing induced increases in pension contributions will lead to a rate in 2050 equal to the current pre reform rate. This essentially means a reduction of the generosity of the current first pillar by about 50%. In terms of rates, the replacement rate is reduced from 75% to 37.5% and social security contributions are reduced from 16% to 8% and will gradually rise to 16% in 2050. The government respects the entitlements of current pensioners fully but only partially the entitlements of workers older than 40 years in 2005 by providing subsidies to individual age cohorts at a (linearly) declining rate according to the following formula.

$$w_t^r(\text{age}) = \begin{cases} wold_t^r - \left(\frac{\text{retage} - \text{age}}{\text{retage} - 40} \right) (wold_t^r - wnew_t^r) & \text{for } \text{age} \in (40, \text{retage}) \\ wnew_t^r & \text{for } \text{age} < 40 \end{cases}$$

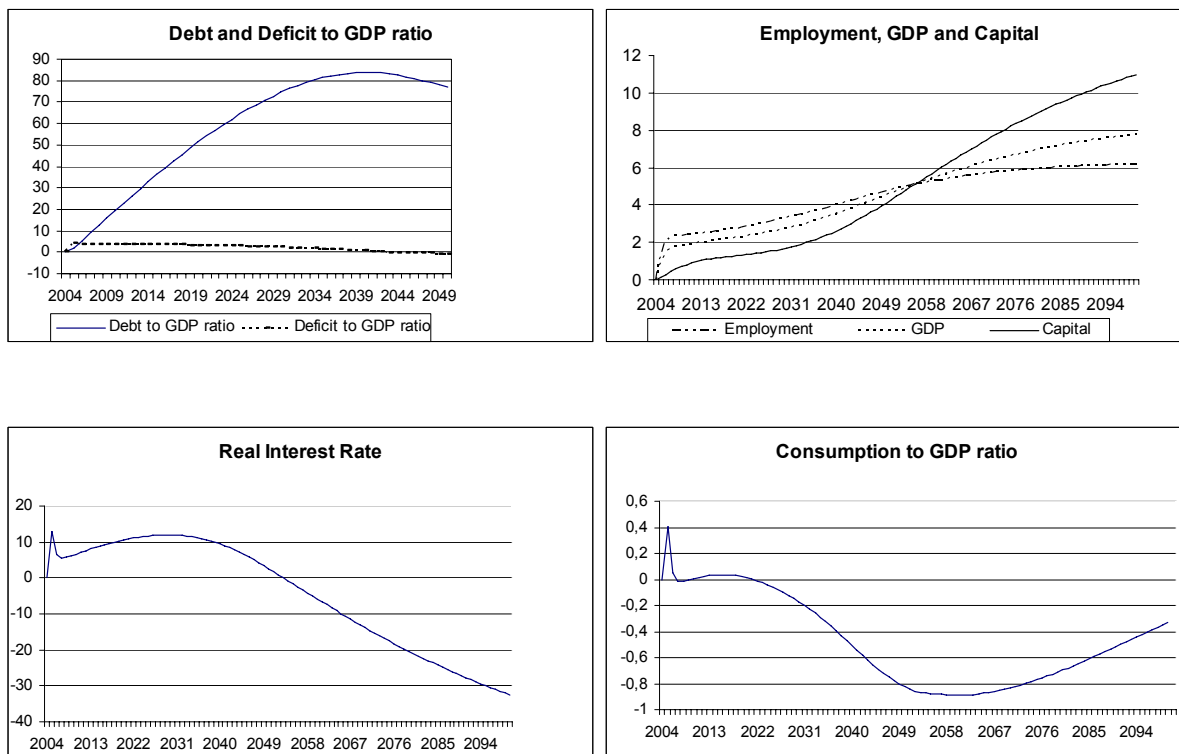
where $wold^r$ is the pension paid under the pre-reform rule while $wnew^r$ is the pension consistent with the new contribution rate. Workers below 40 years of age at the year when the reform is introduced only receive $wnew^r$. The pension subsidies for those cohorts fulfilling the eligibility criteria are financed via issuing new debt. Notice, this transition is not actuarially fair for current workers, since the government only partially compensates current workers for their pension contributions and does not compensate at all workers younger than 40 in 2005. Nevertheless the government provides old age income support in such a way that a change in savings allows individual age cohorts to adjust smoothly to the new institutional environment. Also taking into account the life expectancy this policy implies increased government transfers for more than 40 years to come.

Even under this restrictive compensation scheme, the transition burden would be large. As can be seen from figure 4, government debt would increase by 80% of GDP over the next 40 years and would only decline afterwards. Government deficits would increase by about 4% points initially and decline gradually until the subsidies to older age cohorts are terminated after about 40 years.

These simulation results show that a transition to a funded system is most likely not self financing via increased economic activity. Because of the transition burden, the question can be raised when to expect positive economic effects from such a reform. There are at least two arguments in favour of a positive effect. First, because of a reduction in social security contributions positive employment effects should emerge and second there should be increased savings and higher capital formation to build up a second pillar. However, the build up of government debt accompanying the transition could dampen or even offset the positive savings effect.

As can be seen from the following figures, there is indeed a level increase of GDP, however this is mostly explained by the increase in employment. Additional effects from increased capital accumulation only arrive gradually. Over the first 15 to 20 years, the transition does not lead to additional savings.

Figure 4: Partial Move to a Funded System



5. Conclusions

This paper has provided a projection on the likely macroeconomic impact of leaving the current PAYG system in place and has analysed a number of alternative strategies of avoiding an increase in non-wage labour costs. Special emphasis was laid on the question whether a partial move to a funded system could be a feasible option from a budgetary perspective under the constraint that age cohorts older than 40 must be subsidized by the general public over a transition period. At least for the transition as outlined in this paper, the fiscal costs appear to be rather large and hardly feasible from a budgetary perspective.

Apart from the generosity in which older worker cohorts are compensated, the crucial question is, what are the real growth effects of such a reform and what is happening to growth of the tax base. In this paper it is found that the macroeconomic benefits from a transition to a funded system are limited, initially because the build up of government debt is crowding out private investment activities. Higher savings occur in the longer term. However, in an ageing open economy it is likely that a substantial fraction of savings will be invested abroad. The question arises whether it will be possible to tax the returns from foreign assets.

Thus all the options discussed in this paper will have to be supplemented by other measures in order to keep the budgetary and macroeconomic costs within some limits. At the end it appears unavoidable to also consider other measures such as an increase in the retirement age as a means to cushion demographic pressure.

References

- AGLIETTA, M., CHAREAU, J., FAYOLLE, J., JUILLARD, M., LE CACEHEUX, J. AND G. LE GARREC (2001). "Macroeconomic Consequences of Pension reforms in Europe: An Investigation with the INGENUE World Model." CEPREMAP Working Paper.
- ATTANASIO O.P. AND M. BROWNING (1995). "Consumption over the Life Cycle and over the Business Cycle" *American Economic Review* 85, 1118-37.
- ATTANASIO O.P. AND G. WEBER (1993). "Consumption Growth, the interest Rate and Aggregation." *Review of Economic Studies* 60, 631-49.
- BALDWIN, R. AND P. MARTIN (1999), "Two waves of globalisation : Superficial similarities, Fundamental Differences", NBER Working Paper 6904.
- BENIGNO, P. (2001), "Price Stability with imperfect financial integration", New York University, *Working Paper*.
- BLANCHARD, O. J. (1985). "Debt, Deficits and Finite Horizons." *Journal of Political Economy* 93, 223-247.
- BÖRSCH-SUPAN, A. H., A. LUDWIG AND J. K. WINTER (2001), "Ageing and international capital flows", *NBER Working Paper No. 8553*.
- BOUCEKKINE, R. (1995). "An Alternative Methodology for Solving Nonlinear Forward-Looking Models." *Journal of Economic Dynamics and Control* 19, 711-34.
- DANG, T., P. ANTOLIN AND H. OXLEY (2001), "Fiscal implications of ageing: projections of age-related spending", *OECD Working Paper No 305*.
- ENGEN, E. M. AND R. G. HUBBARD (2004a), "Federal Government Debt and Interest Rates" NBER Macroeconomics Annual 2004, Cambridge, MA.
- EUROPEAN COMMISSION (2001a), "The EU economy: 2001 review".
- EUROPEAN COMMISSION (2002), "Responses to the challenges of globalization", Working document of the Commission services.
- EUROSTAT (2000), Population Projections 2000-2050.
- FELDSTEIN, M. AND C. HORIOKA (1980), "Domestic Savings and International Capital Flows", *Economic Journal*, June.
- GERTLER, M. (1999), "Government debt and social security in a life-cycle economy", *Carnegie-Rochester Conference Series on Public Policy* Vol. 50. pp. 61-110.
- HERBERTSSON, T. AND G. ZOEGA (1999), "Trade surpluses and life cycle saving behaviour", *Economic Letters*, Vol 65.

- HIGGINS, M., AND J. G. WILLIAMSON (1996), "Asian Demography and Foreign Capital Dependence", NBER Working Paper, No.5560.
- HIGGINS, M. (1998), "Demography, National Savings and International Capital Flows", *International Economic Review*, Vol. 65.
- Japanese Institute of Population and Social Security Research (2002). *Population Projections for Japan : 2001-2050*.
- JUILLARD, M. (1996). "DYNARE: A Program for the Resolution and Simulation of Dynamic Models with Forward Variables Through the Use of a Relaxation Algorithm." CEPREMAP Working paper no. 9602.
- LAL, D. (1991), "World Savings and Growth in Developing Countries", Discussion Papers in Economics, No.91-05, University College London.
- LANE, P.R. and G.M. Milesi-Ferretti (2000), "The transfer problem revisited : net foreign assets and long-run real exchange rates" CEPR Discussion Paper No. 2511.
- LANE, P.R. and G.M. Milesi-Ferretti (2001), "Long-term capital movements", IMF Working Paper 107.
- LANE, P.R. and G.M. Milesi-Ferretti (2001), Dataset "The external wealth of nations : measures of foreign assets and liabilities in industrial and developing countries", *Journal of International Economics* 55 No.2, December.
- LOAYZA, N., K. SCHMIDT-HEBBEL AND L. SERVEN (2000), "What drives private savings across the world", *Review of Economics and Statistics* Vol. LXXXII.
- LUCAS, R.E. (1990), "Why doesn't capital flow from rich to poor countries ? ", *AEA Papers and Proceedings*, Vol 80, No.2.
- MASSON, P.R., T. BAYOUMI AND H. SAMIEI (1998), "International Evidence on the Determinants of Private Saving", *The World Bank Economic Review*, Vol 12, No. 3.
- MC MORROW, K. AND W. ROEGER (1999), "The economic consequences of ageing populations - a comparison of the EU, US and Japan", *EC DG ECFIN Economic Papers* No 138.
- MC MORROW, K. AND W. ROEGER (2002), "EU pension reform – An overview of the debate and an empirical assessment of the main policy reform options", *EC DG ECFIN Economic Papers* No 162.
- MILES, D. (1999), "Modelling the Impact of Demographic Change Upon the Economy", *The Economic Journal*, Vol 109 N° 452.
- MUSSA, M (2000), "Factors driving global economic integration", IMF.
- OBSTFELD, M AND A.M. TAYLOR (2002), "Globalization and capital markets", NBER Working Paper 8846.

ROEGER, W. AND J. IN'T VELD (1997), "Quest II - A multi country business cycle and growth model", *EC DG ECFIN Economic Papers* No 123.

TAYLOR, A.M. (1994), "Domestic Saving and International Capital Flows Reconsidered", NBER Working Paper No. 4892.

TAYLOR, A.M. (1996), "International Capital Mobility in History : The saving – investment relationship", NBER Working Paper 5743.

TURNER, D., C. GIORNO, A. DE SERRES, A. VOUREC'H AND P. RICHARDSON (1998), "The Macroeconomic Implications of Ageing in a Global Context", OECD Working Paper N° 193.

UNCTAD (2001), "World Investment Report", United Nations.

UNITED NATIONS (2000), "World Population, 1950-2050 (2000 Annual Revision)"
UN Population Division, New York.

US CENSUS BUREAU (2001), National Population Projections 2000-2100.

The short-term budgetary implications of structural reforms.

Evidence from a panel of EU countries

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Abstract

The EU fiscal framework has been criticized for neglecting a possible trade-off between short-term budgetary objectives and the implementation of reforms that could improve public finances in the long term. This concern was reflected in the 2005 reform of the Stability and Growth Pact, which acknowledges that under certain conditions structural reforms can be taken into account both in the preventive and in the corrective arm of the Pact.

The aim of the paper is that of making a step forward on the understanding of the empirical relevance of the trade-off between structural reforms in EU countries. The analysis will focus on product and labour market reforms and pension reforms. The main issue investigated is as follows: which impact do reforms have on budgets in the short term?

Results show that, in the aftermath of reforms, budgets do not worsen significantly compared with cases where no reforms occur. However, when the short-term budgetary impact of reforms is evaluated controlling for the response of fiscal authorities to the cycle and debt developments via the estimation of “fiscal reaction functions”, there is evidence that product and market reforms and pension reforms are associated with a deterioration in budgets. The impact appears rather weak (a primary CAB reduced by few decimal GDP points depending on the specific reform considered) and not always statistically significant.

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Acknowledgements: this paper draws upon analytical material prepared for the 2005 Public Finance in EMU European Commission report and a previous version was circulated as a CEPR Discussion Paper. It has benefited from inputs from Per Eckefeldt and Werner Roeger and helpful comments from Alfonso Arpaia and participants at a CEPR/CEPR workshop in Copenhagen and at a seminar at the Federal Reserve in Washington. Xavier Debrun is gratefully acknowledged for providing the data on structural indexes used in IMF, World Economic Outlook, April 2004.

Disclaimer: The views expressed in this paper represent exclusively the positions of the authors and do not reflect necessarily those of the European Commission.

1. Introduction

Structural reforms are at the centre of the EU agenda. Reforms in the functioning of markets and the government sector are perceived as a necessary ingredient for re-launching the growth potential for the union, in accordance with priorities set in the Lisbon agenda. In addition, growing focus is placed on the link between structural reforms and public finances in implementing the EU framework for fiscal policy. It is often claimed (e.g., Eichengreen and Wyplosz (1998)) that the Stability and Growth Pact neglects a possible trade-off between short-term budgetary objectives and the implementation of reforms that could improve public finances durably in a medium-to-long term perspective. The idea of a possible trade-off between the implementation of structural reforms and the pursuit of budgetary objectives was reflected in the 2005 reform of the Stability and Growth Pact, which permits, under certain conditions, to take into account structural reforms in the implementation of both the preventive arm and the corrective arm of the EU fiscal framework. In future years, the evaluation of budgetary impact of reforms is likely to acquire greater relevance in the implementation of the SGP. Better knowledge on the implication of structural reforms for public finances will be required in EU fiscal surveillance.

A first reason for why there could be a trade-off between reforms and budgetary objectives is that reforms may have a temporary negative effect on budget balances. There can be direct budgetary costs associated with reforms. This is for instance the case of pension reforms introducing a funded pillar classified outside the government sector. In the case of this particular type of reforms, budgets would normally undergo a temporary deterioration (due to lost social security contributions by the government) offset by long-term improvements (associated with saved pension payments by the government). Alternatively, higher deficits could be the result of policy action aimed at overcoming resistance to reforms in the political arena via tax cuts or targeted government expenditure programmes. Moreover, to the extent that fiscal expansions are expected to produce a positive short-run impact on economic activity and employment, keeping an accommodating fiscal stance could help to ease to the political cost of reforms. Finally, the budgetary deterioration could also be associated with short-term output losses stemming from corporate restructuring and temporary increases in unemployment due to higher job destruction.

Some papers have analysed the trade-off between budgetary objectives and structural reforms mainly from a theoretical perspective (e.g., Razin and and Sadka (2002), Beetsma and Debrun

(2003, 2005)). Relatively few works exist instead attempting to estimate empirically whether fiscal consolidation has a negative impact on the probability of carrying out economic reforms.

The aim of the paper is that of making a step forward on the understanding of the empirical relevance of the trade-off between structural reforms in EU countries. The analysis will focus on product market, labour market and pension reforms. The main issue investigated will be the following: which impact do reforms have on budgets in the short term? Due to lack of systematic data on the direct budgetary impact of the type of reforms considered, the analysis will not disentangle the direct budgetary impact of reforms from the impact arising via the payment of “compensation packages” to ease resistance to reforms. There is instead an attempt to: (i) perform a disaggregated analysis in the change in relevant government revenue and expenditure items (e.g., social security contributions, social transfers,...) in reform and non-reform years; (ii) control for other factors that may have contributed to short-term budgetary developments (e.g., output and debt stabilization objective by fiscal authorities) via the estimation of “fiscal reaction functions” (see, e.g., Gali and Perotti (2003)).

Indicators of structural reforms are constructed starting from indexes on regulatory restrictions used in IMF, World Economic Outlook, April 2004. Indicators of pension reforms are based on the information provided in the Fondazione Rodolfo De Benedetti database. While indicators on labour market and product market reforms represent sufficiently large reductions in regulatory restrictions, indicators of pension reforms refer to enacted legislative changes concerning pension systems. The dataset used in the analysis comprises observations on EU-14 for the 1970s (in the case of labour market and product market reforms), the 1980s and the 1990s. In spite of limitations related to small sample size and quality of reform indicators, a number of results of interest emerge.

On average, the evolution of the primary cyclically adjusted budget balance is not significantly different in the aftermath of reforms compared with years not following reforms. Product market reforms are associated with slower growth in government revenues – accompanied, however, by correspondingly slower growth in expenditure. After pension reforms, social benefits paid by the government grow at a significantly slower rate, but the overall impact on the budget is compensated by government revenues also growing at a slower rate. There is also evidence suggesting that the impact of reforms can be quite different depending on the characteristics of the reform, notably whether it mainly introduces parametric changes or also allows for systemic changes in the national pensions framework. Estimating the budgetary impact of reforms after controlling for the response of fiscal authorities to the cycle and debt developments, there is

evidence of a slight deterioration in budgets (in the order of few decimal of percentage points of GDP) which is however not always statistically different from zero.

The remainder of the paper is structured as follows. The next section illustrates the main arguments for the emergence of a possible trade off between budgetary discipline in the short-term versus the long-term related with numerical fiscal rules preventing the implementation of structural reforms. It also outlines the provisions concerning structural reforms that have been included in the reform of the Stability and Growth Pact. Section 3 presents the empirical analysis. The concluding remarks follow.

2. Structural reforms, numerical deficit rules, and the trade-off between short and long-term fiscal discipline.

2.1. Structural reforms: definitions, main features, and their long-term impact on public finances

The term reform is used with reference to rather different types of policy interventions: trade reforms, labour market reforms, tax reforms, pension reforms, health sector reforms, etc. In general, compared with other types of policies, reforms (i) have a long-lasting impact and (ii) concern the general functioning of economic (market or state) institutions rather than specific elements. The adjective “structural” often accompanies the word reform, to remark the fact that the policy concerned are aimed at affecting the economy in its structure.

Sometimes by reform it is meant a policy aimed at modifying the institutional setting shaping the interplay among private economic agents. This is typically the case of *reforms changing the functioning of markets* (product or factor markets). In other instances, reforms may be aimed at *modifying the working of government*. This is the case for instance of reforms affecting the working of the welfare state (e.g., pension or health care reforms) or the set-up of policy institutions (e.g., reforms concerning the institutional set-up of monetary authorities, or the status of authorities enforcing competition policy or regulating public utilities).

Another relevant distinction is between reforms that modify the features of existing policies and institutions (e.g., pension reforms modifying social security rates) from those that replace or complement existing policies and institutions with new ones (e.g., pension reforms introducing new pension pillars). The former are often refer to as *parametric* reforms, the latter as *systemic*. A

further distinction is that between reforms that concern all agents in a given sector or only particular groups. An example is that of labour market reforms extending to all labour market participants as opposed to reforms addressed only to individuals entering the labour market for the first time.

Reforms can be as seen as the outcome of a continuous effort to adapt market and government institutions to changing fundamentals: technological progress, evolving needs of individuals and the society, demography, etc. In spite of such a constant need of adapting institutions to fundamental changes, *the process of reform of a given sector of the economy is not always smooth and gradual*. Indeed, the reform process seems quite often characterized by jumps and discontinuities: substantial policy changes are concentrated in few periods of time.¹⁰ Moreover, when evaluated over sufficiently long periods of time, there is evidence that *reforms in one particular sector of the economy are quite often accompanied by reforms in other sectors*. In several advanced countries labour market, product market and tax reforms occurred broadly at the same time (IMF, 2004).¹¹ Finally, the *international dimension* seems to matter: reforms in a given country are more likely if other countries have already carried out reforms in the same sector or are in the process of doing it.¹²

One of the most salient features of economic reforms, which has attracted increasing attention by academic and applied economists, is the considerable resistance that reforms could encounter in the policy-making process. Several political economy arguments have been offered in the literature

¹⁰ For instance, in most advanced countries reforms in the banking sector were concentrated in the early eighties, while the deregulation of air transportation was mostly achieved between the mid eighties and the early nineties. A common thesis is that reforms tend to *follow periods of crisis*. See, e.g., Drazen (2000) for a discussion of this thesis and for a survey on empirical evidence. The point here is not so much that reforms follows periods of unsatisfactory economic performance (“the reform should follow crisis...is no more surprising than smoke following fire” (Rodrik (1996, p. 27)). The thesis is rather that reforms are triggered only by periods of exceptionally bad economic performance.

¹¹ The fact that reforms in different sectors of the economy tend to occur together could be explained by *complementarity relations* that often characterises reforms. For instance, a labour market reform aimed at increasing the employment rate would be more effective if not acting exclusively on one aspect of the labour market legislation (e.g., only on legislation concerning firing practices) but rather when considering several aspects at the same time interrelated among them (e.g., both hiring and firing practices, unemployment benefits). Complementarities could also concern reforms in different sectors of the economy. For instance, product market reforms that increase the degree of contestability of sectors may trigger reforms in labour markets. The reduction in the extra-profits associated with entry-barriers and anti-competitive practices could reduce the incentives by organized labour to capture part of these rents, thereby leading to a higher probability of success for reforms aimed better aligning wages to productivity. This argument has been put forward, for instance, by Blanchard and Giavazzi (1993).

¹² The *relevance of the international dimension* for economic reforms could be *due to several reasons*, including international agreements on reforming sectors for which cross-border spillovers are relevant (e.g., trade and trade-related reforms as a result of WTO agreements) peer pressure within the context of regional arrangements (e.g., labour market reforms within the context of the EU open method of co-ordination), pressure to reform associated with the direct spillovers from other countries’ reforms (e.g., as in the case of tax competition or deregulation of particular industries) or learning spillovers occurring across the border.

to explain why even when there is quite widespread perception that carrying out reforms in a given sector would be in the general interest, action could be delayed or blocked altogether.¹³ A common explanation for why potentially beneficial reforms could be blocked for long times there is the role of *lobbying* in the policy-making process. Such arguments have been first put forward in Olson (1971). According to this explanation, reforms, even when they can potentially benefit a majority of citizens, often produce losses to particular groups in the society. These groups, even if comprising a minority, could be highly motivated to organize resistance to reforms and may face lower costs to structure themselves into organized pressure groups, thus prevailing in the political arena over large, dispersed groups in favour of reforms. Lobbies can explain quite successfully why reforms aimed at reducing protection to given sectors of the economy (e.g., trade protection, regulation of industries,...) are blocked.¹⁴ However, arguments based on lobbying are probably less suited to explain resistance to reforms with effects on all sectors of the economy (e.g., labour market reforms, tax reforms).

An alternative political economy explanation for why reforms could be blocked relies on *uncertain reform payoffs at the individual level* (Fernandez and Rodrik (1991)). When individuals are uncertain about whether they will benefit from a given reform, there could be ex-ante a majority of individuals in favour of blocking the reform even when ex-post the reform benefits a majority of citizens. Although it is quite difficult to assess the empirical relevance of this argument, it provides an explanation for the observed case of reforms that, after being blocked for long times, find gradual support among the public once, for some reason, the reform process is put in place.

An explanation for reform deadlocks that has received large attention by both academic economists and policy makers is based on *uneven distribution of reform payoffs over time* coupled with short-sightedness of governments.¹⁵ In the presence of short-run costs from reforms and reforms gains materialising only in the long run, politicians that base their decisions on a short time horizon (because, for instance, uncertain about being re-elected), may opt not to carry out welfare-enhancing reforms. The fact that the reform gains could be delayed in time could in turn

¹³ However, as stressed by several academicians and policy-makers, stalemates in the implementation of reforms could simply be related to technical uncertainty. Politicians may disagree on the need for reforms and on which type of measures are better suited to tackle the problem at stake. Such disagreement may result into substantial delays. Rodrik (1994) quotes the health care reform proposed by the Clinton presidency as an illustrative example of reform on which disagreement was related, among other things, to uncertainty on whether the proposed one was technically the best solution. See also Sachs (1994) for anecdotal evidence on the frequent disagreement within governments on how to proceed with economic reforms in countries facing macroeconomic crises.

¹⁴ See Grossman and Helpman (2002) for theory and empirical evidence on the idea that lobbies can explain the presence and persistence of protection.

be related either to the way reforms are designed (e.g., pension reforms that modify only gradually the retirement age) or to the fact that the economic effects of reforms need time to materialize.¹⁶ Short-run costs from structural reforms could be associated to several factors: a temporary reduction in economic activity (due, e.g., to resources shifting across sectors and firm restructuring); direct negative budgetary impact from reforms (e.g., tax reforms); indirect budgetary costs associated with the compensation of reform losers.

European countries are currently focused on reforms aimed at increasing growth and employment in line with the goals of the Lisbon strategy and at making public finances sustainable.¹⁷ The objective of improving the growth potential is mainly pursued through reforms strengthening the incentives for the supply of labour and human and physical capital (e.g., via reforms in product and factor markets), innovation, and the contribution of the public sector to growth (e.g., tax reforms, reforms in the education sector, R&D,...). These reforms permit indirectly to improve public finances in the medium-to-long run via a more favourable dynamics of government revenues and increased resources to pay back the outstanding stock of public debt. Concerning the goal of improving the sustainability of public finances in EU countries, there is agreement among experts and policy-makers on reforms aimed at limiting the upward tendency in age-related expenditures, increasing employment rates, and favouring a reduction in public debt.¹⁸ Among the reforms having a major role in containing the dynamics of age-related expenditures, *pension* reforms have a prominent role in the debate.¹⁹

¹⁵ In this vein, Alesina and Drazen (1991) show theoretically how governments may be induced to delay reforms aimed at stabilizing public finances. See also Tabellini and Alesina (1990) for a model explaining the origin of a deficit bias by governments on the basis of short-sighted politicians.

¹⁶ Available evidence shows that the timing of economic reforms on growth depends quite crucially on the specific type of reform considered. Simulations based on a small scale econometric model contained in IMF (2004) show that while product and labour market reforms take time to produce positive effects on output, financial market and tax reforms have effects on output already in the short term. Kim (2003) calibrates a model of corporate sector restructuring on Japanese data and shows that product market reforms boost output in the long-term but has short-term costs. Econometric estimates in Salgado (2002) point to a U-shaped impact of labour and product market reforms on productivity growth. Mendoza, Milesi-Ferretti and Asea (1997) report that tax cuts can have significant positive effects on output already in the short term.

¹⁷ See Economic Policy Committee, 2005, 'Annual Report on Structural Reforms' and European Commission, 2005, 'Working together for growth and jobs. A new start for the Lisbon Strategy', Commission Communication to the European Council.

¹⁸ The Stockholm European Council of March 2001 agreed on a three-pronged strategy for ensuring public finance sustainability: increasing employment rates, reducing public debts, reforming pension and health care systems.

¹⁹ See, e.g., Economic Policy Committee (2002) for an assessment of the impact of alternative hypothetical parametric pension reforms in EU countries (concerning the calculation of pension benefits and the effective retirement age) using simulations based on the national non-behavioural models used in EU countries' national administrations. Results indicate that a reduction in the indexation of pensions by 1/2 percentage point would contribute to reduce pension expenditures projected for 2050 by a range between 0.5 and 2 % of GDP in systems

2.2. Do numerical rules for deficits discourage structural reforms?

In the policy debate, it is sometimes claimed that carrying out economic reforms could go at the expense of the respect of budgetary objectives, and criticisms have been moved to the Stability and Growth Pact for not taking properly in consideration this trade-off (e.g., Eichengreen and Wyplosz (1998)). In particular, it has been argued that an excessive focus on short-term budgetary discipline could act as a constraint on the pursuit of reforms that could improve public finances in the long term. This could occur if reforms worsen the budgetary position in the short to medium-term while gains appear mainly after some time, so that a choice has to be made in the short-term between implementing the reform and keeping deficits unchanged.

There are several arguments that could provide a justification for the claim that structural reforms could worsen the budget in the short-run in spite of an improvement in the medium/long-term in public finances.

The first argument is that reforms *may temporarily worsen budget balances*. This may be due to the presence of direct budgetary costs associated with the reform. A notable example is that of systemic pension reforms implying that the social contributions previously collected by the government are diverted to a new pillar, which may be privately run or classified outside the government. This type of reforms help to contain the impact of ageing on the dynamics of government expenditure related to the payment of pensions. However, they will also normally entail a reduction of government revenues not immediately compensated by reduced pension payments.

The above argument has been formalized in several recent theoretical papers. Razin and Sadka (2002) develop a political economy model providing a rationalisation of the trade-off between the budgetary objectives of the Stability Pact and the implementation of social security reforms. In this model, an ageing population has a double effect on the political balance of interests for what concerns the implementation of pension system reforms from PAYG to funding. On the one hand, it reduces the expected returns from PAYG schemes, thus raising the incentive to reform the

where pension benefits are earnings-related, and by a 0.6-3 GDP points in systems where pensions are paid on a flat rate. Moreover, increasing by one year the effective retirement rate would lead to a reduction of pension expenditures in 2050 in the order of 0.6 to 1 % of GDP. Estimates of the long-term budgetary impact of various types of pension reforms have also been provided by EU countries in their updated stability and convergence programmes submitted to the European Commission. All programmes report long-term budgetary improvements associated with the reforms, which range between 0.6 to almost 2 % of GDP (stability and convergence programmes are available at: http://europa.eu.int/comm/economy_finance/about/activities/sgp/scplist_en.htm).

system for the young cohorts. On the other hand, since the size of old cohorts increases, this tends to reduce the likelihood of pension reforms. In such a framework, feasible reforms worsen the budget because the income of alive retired workers need to be maintained. Beetsma and Debrun (2004) analyse the trade-off between short-term budgetary discipline and growth-friendly reforms with up-front budgetary costs in a model comprising inefficiencies related to deficit bias in governments' behaviour which justify the need for deficit rules. The authors show that in such a context there may be a case for designing numerical deficit rules in such a way to account for the budgetary impact of growth-enhancing structural reforms.

In the present context of European policy-making, the argument related to systemic pension reforms introducing funded schemes recorded outside the government sector are of particular relevance. Following a Eurostat decision of March 2004, all mandatory, fully-funded, defined-contribution pension schemes need to be classified outside the government sector, even if the pension fund is organized and managed by the government. This implies the reclassification of pension schemes in countries that implemented reforms creating funded pillars in recent years (Denmark, Estonia, Latvia, Lithuania, Hungary, Poland, Slovakia) or that plan to carry out such type of reforms in the future.²⁰ The negative impact on budgets of systemic pension reforms implying the classification outside the government of funded schemes can be quite substantial, amounting up to more than one percentage point of GDP in some cases.²¹ Moreover, although being transitory, the negative budgetary impact could be quite long-lasting. Simulations for the EU-15 aggregate based on the QUEST ageing model of the European Commission show that the budgetary deterioration associated with a partial replacement of a government-run PAYG scheme with a funded scheme classified outside government would cause an increase in the debt/GDP

²⁰ The decision by Eurostat of 2 March 2004 on the classification of pension schemes implies that funded defined contribution pension schemes should be classified outside the government sector. The rationale underlying the decision is that these schemes, even when run by the government, should be considered as owned by the pension beneficiaries, who are those bearing most of the risk of the scheme. EU countries are required to implement the Eurostat decision, by classifying funded, defined-benefits schemes outside the government sector, by March 2007 at the latest. See Eurostat News Release 30/2004, 2.3.2004, available at: http://epp.eurostat.cec.eu.int/cache/ITY_PUBLIC/2-02032004-BP/EN/2-02032004-BP-EN.HTML

²¹ In the case of Sweden, the re-classification of the funded DC pension scheme introduced with the reform of 1998 will result in a reduction of the general government budget balance estimated in the order of 1% of GDP per year. An overview of the Swedish pension system is provided in "The Swedish National Pension System", Ministry of Health and Social Affairs and National Social Insurance Board, September 2003 and can be found at <http://regeringen.se/content/1/c4/05/07/aa589a7c.pdf>. Hungary has reported in its March 2004 Excessive Deficit Procedure fiscal notifications a negative budgetary impact from the reclassification of its funded scheme of 0.9% of GDP in 2003 and 2004. Poland in its fiscal notifications reported a negative impact of, respectively, 1.7 and 2% of GDP in 2003 and 2004 (European Commission (2005)).

ratio lasting about 25 years, followed by a substantial reduction afterwards (European Commission (2005)).²²

A further reason for why reforms that could be beneficial in the long run may imply budgetary deteriorations at least in the short term is that the resistance to reforms coming from reform-losers can be overcome by means of *compensation packages having a cost on the budget*. This could either mainly take the form of increased expenditures (government transfers and subsidies) or that of reduced revenues. A significant example of increase government transfers related to the implementation of structural reforms is that of several Eastern European countries during the transition process. The liberalization and privatisation of economic activities was often followed by the temporary provision of government subsidies to permit the restructuring of firms. On the revenue side, economic reforms were quite often implemented together with tax cuts; this seems especially the case for product and labour market reforms (IMF, 2004). A related, but somewhat different argument is based on a trade-off between budgetary adjustment and economic reforms associated with the *political costs* of a restrictive macroeconomic stance. Fiscal consolidations could in fact be politically costly due to possible losses of output and jobs in the short term. Given that governments dispose of “political capital” in limited supply, whenever part of this political capital is allocated in carrying out economic reforms, few could be left for adjusting budgets. By the same token, expanding budgets could compensate for using up political capital in carrying out reforms.

Finally, short-term budgetary losses associated with reforms could be the result of a deteriorating output gap (and a consequent reduction in the cyclical component of the budget balance) resulting in some cases from structural reforms. Some reforms permit to improve potential output but actual output could react slowly, and this will result into a rising output gap.²³ Alternatively some reforms could even have temporary effect on actual output which is negative, due for instance to firm restructuring or increased job destruction due to the sectoral relocation of workers.

²² The ‘QUEST ageing model’ is a variant of the European Commission macro model, allowing for an overlapping generations structure (see McMorro and Roeger (2004) for a description). Demographic parameters are calibrated to the main features of the Eurostat projections until 2050. The model distinguished between various tax and expenditure categories and the government is constrained by an intertemporal budget constraint. The simulation considers a pension reform that: i) shifts pension contributions into a non-government funded scheme so that the amount of contributions received by government fall from 16% to 11% of the net wage; ii) reduces the pension benefits paid by the government, guaranteeing accrued rights to PAYG pensions. Workers retiring at the time of the reform are assumed to receive pension benefits from the government equal to 75% of the gross wage, as before the reform. The cohorts in between receive pension benefits from the government between 50% and 75% of their gross wage in proportion to their age, i.e., to the length of the period during which they have been contributing to the PAYG system.

²³ Hughes Hallet, Hougaard Jensen and Richter (2004) analyse the budgetary implications of a rising temporary output gap associated with labour market reforms in the Oxford Economic Forecasting model.

Although there could be some foundation for the above arguments under given circumstances, generalizations are difficult. In fact, there is also a series of reasons that point rather to a positive relation between economic reforms and short-term government budgets.

First, there are reforms with a *direct positive impact* on budgets. This is for instance the case of many parametric pension reforms or of labour market reforms (e.g., labour market reforms reducing the generosity of unemployment subsidies). Moreover, compensation packages to ease resistance to reforms, if appropriately designed, are not necessarily costly to the budget. Schemes could be found such that the groups that lose for reforms are compensated via transfers paid by the groups benefiting from reforms. There are anecdotal cases which seem consistent with this possibility. The Dutch labour market reform started in 1982 and aimed at supporting wage moderation was accompanied by cuts in labour taxes and social security contributions paid by employees. This permitted to reduce labour costs to businesses without losses in net wages. Employment growth followed from 1984 onward. At the same time, government expenditure was cut substantially, so that, in spite of the tax cut, the government budget balance improved.

Second, a *credible commitment by the government towards medium-term budgetary discipline* could help to win the resistance of groups opposing reforms. Once governments are credibly committed to sound public finances, the adoption of reforms that permit structural improvements in public finances in the medium/long term may become easier. Since voters and interest groups anticipate that know that governments will not loosen budgetary policy to ease the resistance to reforms, there will be less resistance to reforms in the first place. would be weaker in the first place. The credibility of government commitment to budgetary discipline is enhanced when there is a wide perception of the need to take action to reverse unsustainable trends in public finances. The credibility of government commitment is also strengthened when taken at the international level. The experience with the pension reforms in several EU countries in the run up to EMU (Spain, Italy, Portugal) seems consistent with this argument.

Overall, whether a trade-off exists between budgetary discipline in the short run and the adoption of reforms is mainly an empirical question.

2.3. Structural reforms in the 2005 SGP reform package

On 22 March 2005 the EU head of states and governments endorsed a 20 March ECOFIN Council report reporting agreed lines for reforming the Stability and Growth Pact (SGP). The ECOFIN

Council adopted regulations amending the original SGP on 27 June 2005.²⁴ The 2005 SGP reform is the outcome of several months of discussions within the Eurogroup, the Council and the Commission with a view of improving the EU rules-based framework for fiscal discipline.²⁵ The main objectives of the 2005 SGP reform package are as follows: (i) strengthening the preventive part of the Stability and Growth Pact, mainly via country-specific medium-term objectives (MTOs) and the definition of minimum annual budgetary adjustment for countries not having reached yet their MTO; (ii) enriching the economic rationale of the corrective arm of the Pact through a more comprehensive assessment of the case for launching the excessive deficit procedure (EDP) and the possibility of extending deadlines for correcting the deficits and repeating steps in the EDP; (iii) complementing the EU rules with improved fiscal governance both at the EU and national level, notably strengthened statistical institutions.

The amended Stability and Growth Pact includes provisions reflecting the view that numerical targets and ceilings for deficits may clash with the implementation of structural reforms. Such provisions are found both in the new text of the regulations disciplining the preventive arm (CR 1055/2005) and the corrective arm of the SGP (CR 1056/2005). In particular, regarding the preventive arm of the SGP,

- “major structural reforms” will be a possible reason for revising countries’ medium-term budgetary objectives (Art. 1.1 CR 1055/2005);
- “...major structural reforms which have a direct long-term cost saving effects, including by raising potential growth, and therefore a quantifiable impact on the sustainability of public finances...” could justify temporary deviations from the medium-term objective and the adjustment path towards. Structural reforms will be taken into considerations provided “...an appropriate safety margin with respect to the deficit reference value is preserved...” and that “...the budgetary position is expected to return to the MTO within the [stability or convergence] programme period...” (Art. 1.3 CR 1055/2005).
- Special attention should be given to pension reforms introducing “a multi-pillar system that includes a mandatory fully funded pillar” (Art. 1.5 CR 1055/2005).
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²⁴ Council Regulations 1055/2005 and 1056/2005, Official Journal of the European Union L 174, Volume 48.

²⁵ For an assessment by the European Commission of the performance of the EU fiscal framework see European Commission (2004). For an illustration of the approach of the European Commission to the reform of the

- For what concerns the corrective part of the Stability and Growth Pact, i.e., the implementation of the Excessive Deficit Procedure,
 - structural reforms enter the broad definition of “policies in the context of the Lisbon agenda” and are therefore among the elements considered in the evaluation of “all relevant factors” in the implementation of the EDP (Art. 1.1.3 CR 1056/2005);²⁶
 - pension reforms introducing “a multi-pillar system that includes a mandatory fully funded pillar” shall be considered by the Commission and the Council in the application of the EDP (Art. 1.1.5 and Art. 1.1.7 CR 1055/2005);
 - for countries with excessive deficits close to the reference value reflecting the implementation of pension reforms introducing a multi-pillar system, the “cost of the reform to the publicly managed pillar” will be considered when assessing developments in EDP deficit figures and (Art. 1.1.7 CR 1055/2005).

The new SGP also recognizes the need of adequate information concerning the implementation of structural reforms to implement the EU fiscal framework, and consistently states that “a detailed cost-benefit analysis of major structural reforms which have direct long-term cost-saving effects, including by raising potential growth” should be included in Member States’ stability and convergence programmes (Art. 1.2. and 1.4. CR 1055/2005).

Overall, the reformed SGP comprises provisions that in principle would allow help to avoid a possible clash between budgetary discipline and the implementation of structural reforms. The extent to which such provisions could lead to an effective improvement in the conduct of budgetary policy in Europe will depend to a large extent on the actual implementation of the framework. Although the amended SGP regulations define criteria that need to be satisfied for the consideration of structural reforms in the implementation of the SGP, some implementation issues are left open.²⁷ Which reforms could be considered for the definition of the adjustment path and

SGP, see, e.g., Deroose and Langedijk (2005). For a description of the contents of the March 2005 ECOFIN report see European Commission (2005).

²⁶ In addition, Art 1.1.3. CR 1056/2005 mentions that the Commission analysis shall reflect “...developments in the medium-term budgetary position (in particular, fiscal consolidation efforts in “good times”, debt sustainability, public investment, and the overall quality of public finances).”

²⁷ For instance, deviations from the medium-term objective could only concern “...major structural reforms with direct long-term cost saving effects...”. Moreover, deviations from the medium-term budgetary objective are conditional on the respect of a safety margin against the breach of the 3% deficit ceiling under representative weak cyclical conditions. Concerning the consideration of structural reforms among the “other

the granting of temporary deviations from countries' medium-term objectives? How to define the size of the granted deviation from the MTO? How to assess the adjustment path towards the MTO in light of implemented reforms? A better understanding of the short-term link between structural reforms and budget balances is key for addressing the above questions.

3. The short-term link between structural reforms and budget deficits: evidence from EU panel data

3.1. Data

A first necessary step for the analysis is the measurement of economic reforms. Such measurement involves the major difficulty of having to quantify the degree of intensity of policies of very different types. Several attempts have been made in recent times by the academia and policy institutions to collect data on economic reforms and to develop indicators for the measurement of the effectiveness of such reforms.

A first approach to measure reforms consists of constructing indicators based on information on actual policies that have been implemented in given sectors, periods, and countries. Information is generally provided on the number of policy measures of certain types, possibly accompanied by an evaluation of such policies according to pre-defined criteria. This approach permits to obtain information on the action taken by governments with the purpose of reforming the functioning of markets or state institutions.²⁸ A second approach consists of constructing indicators measuring the extent of existing distortions associated with government policies, for instance, the distortions associated with taxation or with the presence regulations in particular markets.²⁹ The impact of reforms is measured in this case by the change in the level of the indicator measuring the degree of distortions. This second approach does not account directly for government reform initiatives, but permits to gauge the impact of such initiatives on the structural conditions of the different sectors considered. This approach also permits to assess the extent to which reforms are needed.

relevant factors" which needs to be taken in the corrective arm of the SGP, this is subject to the overarching principle that the deficit in excess of the Maastricht reference value remains close to this value and that such excess is deemed to be temporary.

²⁸ Databases on policy measures of different types are constructed and maintained by national and international policy institutions and by independent research centres (e.g., Rodolfo de Benedetti Foundation (FRDB) for what concerns labour market policies).

²⁹ Abundant work in this area has been done by the OECD. See, for instance, Nicoletti and Prior (2001) and Nicoletti and Scarpetta (2003). For international data on various types of government regulations in the economic field see also Fraser Institute, Economic Freedom of the World Annual Report, Vancouver, various issues.

Whenever the indicator reveals a high degree of distortions in particular sectors (as compared with other countries or periods) there is indication of a stronger need to carry out reforms.³⁰

In the following analysis, indicators for labour and product market reforms are constructed on the basis of structural indexes measuring the degree of policy-induced distortions used in IMF (2004), while pension reform indicators are built on information collected and processed by the Rodolfo de Benedetti Foundation (FRDB) reporting the year of adoption and the main characteristics of reforms.

Table 1 describes the sources of the original data and the methodology followed for constructing the reform indicators used in the analysis that follows. The indicators take value 1 in countries and years in which reforms took place and zero otherwise. Indicators constructed in this way permit to better compare results across different types of reforms starting from data representing different type of information (indexes summarizing the degree of distortions in the economy for labour and product market and tax reforms, and dicotomic variables reporting when and where reforms took place, and with which characteristics, for pension reforms).³¹ These indicators also account for the discrete character of reforms, i.e., the fact that reforms are generally not evenly spread across time and space.³² The indicators constructed cover EU-14 countries (except Greece for what concerns labour and product market reforms). Data are available starting from the '70s and up to late '90s or early 2000 for product and labour market reforms and for the 1985-2001 period for pension reforms.

Table 2 reports the frequency across the sample of the type of reforms considered distinguishing between different decades. It shows that labour and product market reforms have been more frequent in the '90s than they were in the '80s and especially in the '70s. As for pension reforms, they were considerably more frequent in the '90s than in the '80s (information on the '70s is not

³⁰ A further method for measuring reforms is the use of structural indicators providing information on the functioning of the economy. For instance, in the case of the measurement of the functioning of the labour market, this approach would imply using a number of indicators concerning the magnitude and the characteristics of unemployment, job creation and job destruction flows, etc. This approach has been followed at the EU level to measure the progress towards the goals of the Lisbon strategy. Progress is benchmarked against indicators measuring outcomes achieved in specific sectors of the economy in EU Member States.

³¹ Reforms in labour and product markets correspond to changes in the structural indexes indicating a sufficiently big reduction in the degree of policy distortions. A similar approach is followed, for instance, in Heinemann (2004). By convention, it is assumed that reforms need to induce a reduction in the degree of distortion greater than the median reduction observed across the sample. The choice of the median value as a benchmark allows an easy interpretation (reforms are events leading to a reduction in the degree of distortion belonging to the top 50%) and implies a frequency of events classified as reforms in the order of 20-to-30% of the total, which permits using statistical inference in the analysis of the links between reforms and fiscal variables across the sample.

³² However, the use of discrete reform indicators has the drawback of not permitting to take into account the different intensity of the impact of policies in different countries and periods, while this can be captured by using directly indexes summarizing the extent of policy-induced distortions.

included in the dataset used). Table 3 reports the rank correlation coefficients among the reform indicators across the sample. The coefficients indicate that while the correlation appears very low among labour market reforms and product market reforms and among labour market reform and pension reforms, the correlation is quite high (0.14) between product market reforms and pension reforms, denoting a greater tendency for these two type of reforms to occur at the same time, in the same country.

Prima-facie evidence on whether the adoption of reforms were negatively associated with fiscal consolidations can be obtained by comparing across the EU countries included in the sample the frequency of reforms in years during which there was an improvement in primary cyclically-adjusted budgets (primary CAB) with that in years in which primary CABs deteriorated. Graph 1 reports such information. The difference is negligible in case of labour market reforms, it is slightly higher in consolidation years for product market reforms, while in the case of pension reforms there is a quite substantially higher frequency of reforms in years in which primary CABs improved (31% of the cases as compared with 22% when a reduction in the primary CAB was recorded). *Overall, prima-facie evidence does not support the view that reforms were less frequent in year were fiscal consolidations took place.* Additional useful prima-facie information on the link fiscal consolidation and the implementation of reforms is obtained by comparing the frequency of reforms across the sample before and after the introduction of the EU fiscal framework. This permits to have a first check on the presumption that the EU framework for fiscal discipline acts as a constraint on the implementation of reforms. Graph 2 reports data on the frequency of reforms in the 1990s, separately for the period before and after the start of phase II of EMU (i.e., 1994). The data suggest that *while labour market reforms became less frequent in the EU countries covered by the sample, after the introduction of the EU fiscal framework, the opposite holds for product market and pension reforms.*

Looking simply at the difference between reform frequencies in years with and without budgetary consolidation does not permit to take into account the impact that factors different from budgetary policy had on the timing of the adoption of economic reforms. There are very few attempts to estimate empirically whether fiscal consolidation has a negative impact on the probability of carrying out economic reforms controlling for other factors. In IMF (2004), regression analysis on a panel of advanced countries is performed to assess the impact of alternative determinants of

various reforms, including budget balances.³³ Results indicate that fiscal consolidation could be negatively associated with tax reforms and labour and product market reforms, while there is no significant relation with financial market reforms and trade reforms. Conversely, the level of the cyclically-adjusted budget balance is generally significantly and positively related to structural reform indicators.³⁴ Analogous results are found in Duval and Elmeskov (2005). This paper investigates the determinants of the probability of undertaking structural reforms increasing the flexibility of labour and product markets in a sample of OECD countries. The findings indicate that while the probability of reforms is positively related with the level of the budget balance, a negative but not statistically significant relation is found with the cyclically-adjusted balance.³⁵

The strategy of the present paper is that of focusing the analysis on a particular reason for why there could be a trade-off between budgetary discipline and reforms, namely the presence of short-term costs to the budget associated with the implementation of reforms. The next section analyses whether the changes that occurred in different categories of government expenditures and revenues in the aftermath of reforms were significantly different compared with those when reforms were not implemented. In section 3.3. there is an attempt to measure the impact of reforms on budgets controlling for the response of fiscal authorities to the cycle and debt levels.

3.2. Developments in budgetary items in the aftermath of reforms

The purpose of this section is to provide evidence on the short-term budgetary impact of structural reforms by tracking the developments occurred in various budgetary items after reforms took place

³³ The analysis concerns several types of reforms: labour product and financial market reforms, tax reforms and trade reforms. The dependent variable employed is the time change in structural indicators inversely measuring the extent of policy-induced market distortions. The explanatory factors considered are as follows: initial structural conditions, variables relating to international factors and openness, macroeconomic variables, and factors affecting the policy-making process. The initial structural conditions are captured by lagged variables of the structural indicators used as dependent variables and by demographic variables. International factors are captured by the share of trade on GDP (trade openness) and by a dummy variable for EU membership. The macroeconomic variables used include cyclically-adjusted primary budget balances, both levels and year-to-year changes and dummy variables denoting years with very low growth (bad years) and how many of the previous 3 years were bad years. Factors affecting the policy-making process were captured by a list of dummies capturing political variables (e.g., whether in the year were there elections, electoral rule followed,...).

³⁴ Analogous analysis to that contained in IMF (2004) has been carried out in Debrun and Annett (2004) separately on a sample of EU countries only. It is shown that when the analysis is restricted to EU countries, the impact of fiscal consolidation on the implementation of reforms becomes significantly weaker.

³⁵ The dependent variable used in this analysis is dycotomic: it takes value 1 if reforms are carried out and 0 otherwise. A reform is defined as a change in indexes measuring inversely the degree of policy-induced market distortions that exceeds the sample average by two standard deviations. Probit regressions are performed on dependent variables measuring the conditions of the labour market, macroeconomic conditions, the state of public finances and the political context. In addition regressions include dummies capturing whether countries are small or large and whether monetary policy is independent or tied by exchange rate agreements or currency unions.

and comparing such developments with what happened instead when no reforms were implemented. A negative budgetary impact of reforms could be due either to direct effects associated with the reform (e.g., losses of pension contributions in case of systemic pension reforms) or to costs associated with the need to win resistance to reforms out via increased budgets (e.g., via subsidies or tax cuts). Due to the absence of systematic evidence on the budgetary impact of reforms that can be attributed exclusively to direct effects, in the following analysis no distinction will be made between the direct component and the component associated with the implementation of compensation schemes.

There is no obvious way in which labour market and product market reforms could impact directly budgets in the short term. Depending on the particular reforms considered, the effect could be either negative or positive. For instance, labour market reforms could either contribute to contain government expenditure if including reductions in unemployment subsidies or raise expenditure if comprising active labour market policies to promote employability (e.g., training programmes). As for product market reforms, they can for instance have a direct effect on budgets by altering the size of government subsidies and transfers to the corporate sector. Although the direct budgetary impact of labour and product market reforms is likely to be quite limited in the short-run, one needs to take into account the impact on public budgets that could be associated with the implementation of compensation schemes.

A first approach to assess the short-term budgetary impact of reforms is to look at the change in various budgetary items in years immediately following reforms and to compare them with that in years where no reforms took place. Table 4 reports average changes in primary cyclically-adjusted primary budgets (primary CABs) and selected components distinguishing between years immediately following the adoption of reforms and remaining years. T tests are performed to check whether differences in reform and “non-reform” years are statistically significant.

Results indicate that *neither in the case of labour market reforms nor in that of product market reforms the variation in primary CABs is significantly different in reforms or non-reform years*. In the case of labour market reforms it is observed a weaker reduction in government investment on average. In the case of product market reforms, the growth in cyclically-adjusted revenues is significantly lower in reform years, but the effect on budgets is compensated by lower growth in primary expenditures.

Turning to pension reforms, their short-term direct budgetary impact depends crucially on the elements touched upon by the reform and on how the reform is designed. Parametric reforms in government pension schemes that reduce the generosity of the system are likely to exert a direct positive impact on budgets. This is generally the case of reforms increasing pension contributions, revising the criteria for the determination of pension benefits (e.g., modifying the indexation criterion of pensions), tightening the entitlement criteria for pensions, or increasing the statutory retirement age. As illustrated previously, systemic reforms may have instead a temporary negative impact on budgets even when having a possible long-term impact on public finances if they imply the shifting of social contributions into pension schemes privately run or classified outside the government. It should also be taken into account that the short-term budgetary impact of pension reforms could be affected to a relevant extent by the fact that reforms are quite often designed in such a way to take effect gradually. Table 5 compares average changes in primary CABs and selected budgetary items in periods with and without reforms. Results show that, *in spite of a non-significant difference in the changes in the primary CAB between periods with and without reforms, there is a statistically significant difference in the short term dynamics of social benefits, which on average rise in periods without reforms, while falling immediately after the implementation of reforms.*³⁶ The difference in the change in social contributions in reform and “non-reform” years appears instead negligible.

Since the short-term budgetary impact of pension reforms could be quite different depending on the specific reforms considered, it could be helpful a close look at budgetary variables of interest in the years before during and after each one of selected structural pension reforms. Of course, such an analysis would not be very informative on the impact of reforms on budgets (since there is no counterfactual for judge what would have been the evolution of budgetary variables without the reform) but could help to shed light on whether there are systematic differences in the evolution of reforms depending upon the type of reforms considered. The reforms included in the analysis are all those reducing overall the generosity of the system and classified as structural in the FRDB database, i.e., reforms applying to the whole population and not only to particular categories.

Table 6 reports the value (as a percent of GDP) of the primary CAB, social security contribution and social benefits other than in kind in the year before, during and in the two years after each reform. Almost all the reforms considered were mainly of the parametric type, aimed at modifying

³⁶ The ESA95 item social benefits other than in kind (D.62), comprises 4 sub-items: social security benefits in cash (D.621), private funded social benefits (D.622), unfunded employee social benefits (D.623), social assistance benefits in cash (D.624). Pension reforms are likely to affect especially the first two categories, that on average constitute about 2/3 of the aggregate social benefits other than in kind in the EU-15 in the past 10 years.

the functioning of PAYG government pension schemes. The only exceptions are the 1996 reform in the Netherlands, the 1998 reform in Sweden, and the 1987 reform in the UK.

The 1996 Dutch reform consisted in the privatization of the pension fund for civil servants. The reform carried out in Sweden in 1998 was a broad reform, that implied, inter-alia, revising the functioning of the government PAYG pension scheme (from defined benefit to notional defined contribution) and the gradual introduction of gradually an additional funded, defined-contribution pillar. The 1987 UK reform introduced the possibility of opting out from the government PAYG for joining individual private funded schemes.³⁷ In almost all the parametric reforms considered in table 6, elements aimed at reducing pension benefits and increasing pension contributions were present, together with revisions in the statutory retirement age.³⁸ The following points emerge from the data reported in table 6. First, the evolution of the primary CAB in correspondence with reform years were to a considerable extent driven by changes in cyclically adjusted revenues and primary expenditures not directly related to changes in pension contributions and social benefits. Second, the pension contributions as a share of GDP moved quite little after the reform in almost all cases (never more than 1 GDP point between the year of the reform and the two consecutive years). There is some indication that the evolution of social contributions differed depending on whether reforms were mainly parametric or systemic. After all parametric reforms (except Italy 1992), social contributions increased, while in the case of the Dutch, and UK reform there was a slight reduction in pension contributions. Third, social benefits changed quite substantially after reforms. They fell after systemic reforms. The case of parametric reforms is instead mixed: an increase is observed after the German reform, the two Italian reforms and the Portuguese reform, while after the Spanish and the Finnish reform a reduction in benefits is observed. Overall, the evidence broadly supports the expectation that the impact of reforms is likely to be quite different depending on the specificities of the reforms considered, in particular whether they are mainly parametric or systemic reforms.

³⁷See http://www.frdb.org/documentazione/scheda.php?id=55&doc_pk=9027).

³⁸ FRDB reports as uncertain the impact of the German reform of 1992 on pension benefits, while in all other cases reforms are indicated as reducing benefits and increasing contributions. As for revisions in the retirement age, all reforms include an increase in the statutory retirement age, generally introduced gradually, except for the 1995 Italian reform where the retirement age was made more flexible compared with the regime introduced in 1992. Moreover, the Italian reforms of 1992 and 1995 were not purely parametric in that they also introduced fiscal incentives for the accumulation of individual private pension schemes

3.3. Estimating the impact of reforms on budgets through the estimation of fiscal reaction functions

From the prima-facie evidence reported in the previous section there is not strong support to the view that labour market, product market, or pension reforms were associated with short-term budgetary costs. However, the analysis so far did not control for other factors that may have affected government budgets.

A common way to perform such control is to estimate “fiscal rules”, describing the reaction of fiscal authorities (in terms of chosen levels of budget balances) to key macroeconomic developments, such as those related to the cycle and the level of debt.³⁹ The strategy followed in the following analysis is therefore that of augmenting fiscal rules with variables relating to the implementation of reforms.⁴⁰ The budgetary impact of reforms can be gauged by looking at the regression coefficient of the reform variables.

Table 7 reports the results for panel data estimation of fiscal rules. The dependent variable is the primary CAB, the explanatory variables are the output gap, the debt/GDP ratio and a dummy variable taking value 1 if reforms were implemented in the current or previous year. Estimates have been performed separately for the case of labour and product market reforms. In accordance with existing estimates of fiscal rules for EU countries, results indicate a non-significant response of fiscal authorities to output gaps and a significant positive response to debt.⁴¹ *The coefficient of reform dummies is negative but barely significant in both the case of labour and product market reforms.*

The size of the coefficients is also similar, indicating that in correspondence with both labour and product market reforms budgets are loosened by about 0.3 GDP points. The analysis does not permit to distinguish whether this budgetary effect is a direct one or whether it is related to the objective of policy authorities of winning resistance to reforms by relaxing the budget. It should be

³⁹ The basic idea is that fiscal authorities are motivated by an objective of output stabilization (so that chosen budget balances should respond positively to expected output gaps) and by a debt stabilization motive (so that a positive response of budget balances to the existing stock of debt is expected). For the estimation of fiscal rules for EU countries see, e.g., Von Hagen, Hugues-Hallet and Strauch (2001), Gali and Perotti (2003), European Commission (2004), Ballabriga and Martinez-Mongay (2004).

⁴⁰ An alternative analytical strategy is followed in Pirttila (2001) in analysing the impact of reforms in transition countries (privatisation, price liberalization, trade liberalization) on fiscal adjustment. In that analysis, the change in the budget balance is regressed against reform variables and on measures of growth, unemployment, private firms' entry and initial conditions (number of transition years). Results indicate that while privatisation has a significantly negative impact on the fiscal balance, the impact of price liberalization was significant and positive.

⁴¹ However, it has been shown that the coefficients of output gaps and debt of fiscal rules have not been constant over time (e.g., Gali and Perotti (2003), European Commission (2004), Ballabriga and Martinez-Mongay (2004)).

stressed that these results must be interpreted with care. In particular, they are likely to be affected significantly by the chosen method for measuring structural reforms.

An issue of robustness arises: to what extent are the results concerning the budgetary impact of labour and product market reforms driven by the specific way chosen to construct the reform indicators? Results do not seem to crucially depend upon the chosen benchmark for the change in structural indexes to define when structural reforms occur, i.e., the median value of positive changes. In fact, by using the mean value instead, one obtains reform indicators that are still correlated with those based on the median (with rank correlations equal to 0.85 in the case of labour market reforms and 0.88 for product market reforms). The estimation of fiscal reaction functions using reform indicators based on the mean of positive changes in the structural index yields results similar to those presented in table 7 (see table 8). We have also performed a further robustness check on the labour market reform indicator used in our analysis. We have constructed two alternative indicators based on policies actually implemented. Using the FRDB database on reforms concerning employment protection legislation and unemployment subsidies, two indicators have been constructed. One indicator takes value 1 in years/countries where reforms in employment legislation which overall reduce firing costs have been introduced. The other indicator takes value 1 in case of reforms in unemployment subsidies that improve incentives to labour market participation. In spite of the fact that the correlation of these new labour market indicators with the one used in our analysis is rather low, the employment protection reform indicator so obtained performs in a quite similar way in the estimation of fiscal reaction functions as compared with our benchmark indicator for labour market reforms (see table 9).⁴²

Table 10 presents the results from the estimations of fiscal reaction functions in the case of pension reforms. This time, fiscal reaction functions are augmented by a pension reform dummy that takes value 1 if a pension reform was implemented in the current or previous year. The analysis in this case refers separately to the determinants of the primary CAB, cyclically-adjusted revenues and primary expenditures. Results show that *the pension reform dummy has a negative but non-significant impact on primary CABs*. The coefficient indicates that a reform implemented in the current or previous year reduced the value of the primary CAB by about 0.2 GDP points. However, given the high uncertainty surrounding this estimate (a high standard error of the

⁴² The rank correlation between the labour market indicator used in our analysis and that based on reforms in employment protection is 0.02, while the correlation with that with the indicator based on reforms in unemployment benefits is -0.01.

regression coefficient) it cannot be judged to be significantly different from zero. By carrying out the same analysis using a dependent variable the cyclically-adjusted government revenues and primary expenditures one notices that most of the deterioration of the primary CAB in the aftermath of pension reforms is associated with a reduction in revenues rather than with increased expenditures. Again, the impact on revenues is however not statistically significant. It is to notice that, although the analysis does not permit to distinguish whether the budgetary impact of pension reforms is a direct or an indirect one, interpreting the impact of pension reforms on government revenues as being mostly direct does not seem consistent with the evidence illustrated in table 5: on average, social security contributions do not change significantly in the aftermath of pension reforms.

Finally, alternative specifications of fiscal reaction functions have been estimated with the purpose of analysing the impact on budget deficits arising from the interaction between different types of reforms. In table 11, specifications (1) – (3) include each one of the reform dummies in isolation but impose a sample size such that there are no missing observations for any of the reform dummies. This permits to compare these results with those in specification (4), which include all reform dummies simultaneously, and with those in specifications (5) – (8) which instead include dummies taking value 1 when, respectively, are carried out: labour market and product market reforms; labour market and pension reforms; product market and pension reforms; all three type of reforms. Results show that when the sample is restricted to year/country combinations for which there are no missing observations for any reform dummy the impact of labour market and product market reforms taken in isolation appears less negative (and less statistically significant) while that of pension reforms more negative and statistically different from zero (compare table 11 with tables 7 and 10). By including all reform dummies in the specification, the dummy for product market reforms turns slightly positive, becoming largely statistically insignificant, whereas the coefficient for labour market reforms and pension reforms becomes more negative compared with the case in which they are included separately in the regressions (specifications (1) and (3) in table 11). The lack of robustness of reform regression coefficients signals a possible problem of multicollinearity which affects especially the coefficient of the product market reform dummy. This seems consistent with the evidence from correlation analysis, which reveal a quite significant correlation across the sample between product market reforms and pension reforms. Does it matter if different types of reforms occur at the same time? Comparing results from specifications (5) – (8) with those in specification (4) in table 11 could help answering this question. In all cases, the

coefficient of the dummy for the simultaneous presence of different types of reforms is negative (and significant only when pension reforms are concerned) but lower in absolute value compared with the sum of the coefficients for the corresponding type of reforms in specification (4). This suggests that, on average, the simultaneous implementation of different types of reforms is associated with a budgetary deterioration that is lower compared with the cumulated budgetary deterioration that would result by implementing the same reforms sequentially.

4. Concluding remarks

The main messages from the previous analysis can be summarised in the following way. Looking at average changes in budget balances in years with and without reforms, no significant differences emerge for what concern the evolution of the primary CAB in the short-term, irrespective of the type of reform considered. Product market reforms are associated with slower growth in government revenues accompanied by corresponding slower growth in expenditure. In the aftermath of pension reforms, social benefits paid by the government grow at a significantly slower rate, but the overall impact on the budget is compensated by government revenues also growing at a slower rate. The analysis of the evolution of budgetary variables during the implementation of selected structural pension reforms suggests that the impact of reforms can be quite different depending on the characteristics of the reform, mainly on whether the reforms mainly introduce parametric changes or also allow for systemic changes in the national framework for pensions. When the short-term budgetary impact of reforms is evaluated after controlling for the response of fiscal authorities to the cycle and debt developments, there is evidence that product and market reforms and pension reforms are associated with a deterioration in budgets (due either to a direct budgetary impact of reforms or to other reasons, like tax cuts or expenditure increases aimed at easing resistance to reforms). The impact appears rather weak (a primary CAB reduced by few decimal GDP points depending on the specific reform considered) and not always statistically significant. Moreover, the simultaneous implementation of different type of reforms seems to imply a slighter budgetary deterioration compared with the cumulated budgetary deterioration arising from the sequential implementation of the same types of reforms.

It is important to stress that the results from the empirical analysis suffer from the fact that the dataset is of limited size and because any measurement of reforms involve to a certain degree arbitrary choices which may however matter for results. Caution is needed also in comparing results across different type of reforms, given that the reform indicators used in the analysis represent somehow different phenomena, (improvements in indexes of labour market and product

market restrictions, data on pension reforms implemented). Finally, our empirical analysis of structural reforms suffers from an inevitable problem of self-selection bias. The reforms observed are only those that have not been blocked in the political process. However, many reforms project may have been blocked exactly because of their budgetary impact, but the analysis does not take into account of that.

Overall, there is a strong indication that generalizations are not easy to make for what concerns the link between structural reforms and budgets in the short-run. Results differ depending on the specific type of reforms considered. Also within a given type of reforms (e.g., pension reforms) the fiscal implications are likely to differ considerably depending on the main elements of the reform and on how reforms are designed. Furthermore, the weak statistical significance of results reveals in general a high degree of dispersion in results across the sample, i.e., each reform case cannot be easily assimilated to the average.

These results point to some lessons for policy. In the implementation of the EU fiscal framework there are reasons for taking better into account the role of economic reforms, especially when there is a strong ex-ante expectations that reforms may have a positive impact on public finances in the long run coupled with budgetary costs in the short term. However, a mechanistic, one-size-fits-all approach whereby all reforms or all reforms belonging to some broad categories are judged the same way should be avoided. Judgement should be used on a case-by-case basis, on the ground of information on the relevant specificities of the various reforms at stake.

References

- Alesina, A., and A. Drazen, (1991), 'Why are stabilisations delayed?', *American Economic Review*, 81, pp. 1170-88.
- Ballabriga, F., and C. Martinez-Mongay (2004), 'Sustainability of EU public finances', European Commission, mimeo. fn 33, fn 35
- Beetsma, R. and X. Debrun, (2003), 'Reconciling stability and growth: Smart pacts and structural reforms', *CEPR Discussion Paper*, 3930.
- Beetsma, R., and X. Debrun (2005), 'Implementing the Stability and Growth Pact: Enforcement and procedural flexibility', IMF Working Paper 05/59
- Blanchard, O. and F. Giavazzi, (2003), 'Macroeconomic Effects of Regulation and Deregulation in Goods and Labor Markets', *Quarterly Journal of Economics*, 118, 879-907.
- Debrun, X., and A. Annet, (2004), "Implementing Lisbon: Incentives and constraints", ch. II in *Euro Area Policies: Selected Issues*, 2004, IMF, Washington D.C.
- Deroose, S., and S. Langedijk, (2005), 'Improving the Stability and Growth Pact: the Commissions' three pillar approach', European Economy Occasional Paper No. 15.
- Drazen, A., (2000), *Political Economy in Macroeconomics*, Princeton University Press, Princeton.
- Duval, R., and J. Elmeskov, (2005), "The effects of EMU on structural reforms in labour and product markets", OECD Economics Department Working Paper No. 438.
- Economic Policy Committee, (2002), 'Reform challenges facing public pension systems: The impact of certain parametric reforms on pension expenditure', EPC/ECFIN/237/02-final, available on http://europa.eu.int/comm/economy_finance/epc_en.htm.
- Eichengreen, B. and C. Wyplosz, (1998), 'The Stability Pact: more than a mirror nuisance?', *Economic Policy* 26, pp. 67-104.
- European Commission (2004), "EMU after 5 years", European Economy Special report No. 1.
- European Commission (2005), "Public Finances in EMU report - 2005", European Economy No. 3.
- Fernandez, R., and D. Rodrik, (1991), "Resistance to reform: Status-quo bias in the presence of individual-specific uncertainty", *American Economic Review*, 81, pp. 1146-55.
- Gali and Perotti (2003), "Fiscal policy and monetary integration in Europe", *Economic Policy*, 37, pp. 533-72.
- Grossman, G.M., and E. Helpman, (2002), *Interest Groups and Trade Policy*, Princeton University Press. Princeton, N.J.

- Hagen von, J., A. Hughes Hallet and R. Strauch (2001), 'Budgetary consolidation in EMU', European Commission, *Economic Papers*, 14. fn 33
- Heinemann, F., (2004), 'Explaining reform deadlocks', ZEW Discussion Paper ,04-39.
- Hughes Hallet, A., S. E. Hougaard Jensen, and C. Richter, (2004), The European Economy at the cross roads: Structural reforms, fiscal constraints, and the Lisbon agenda, mimeo, CEBR, Copenhagen Business School.
- IMF (2004), *World Economic Outlook*, April 2004, Washington, D.C.
- Kim, S., (2003), 'Macro-effects of corporate restructuring in Japan', *IMF Working Paper*, 03/2003.
- Kneller, Bleamey and Gemmell (1999), "'Fiscal policy and growth: Evidence from OECD countries', *Journal of Public Economics*, 74, pp. 171–90. fn 23
- Mendoza, E., G. Milesi-Ferretti, and P. Asea, (1997), 'On the effectiveness of tax policy in altering long-run growth: Harberger's superneutrality conjecture', *Journal of Public Economics*, 66, pp. 99-126.
- McMorrow, K., and W. Roeger, (2004), *The Economic and Financial Market Consequences of Global Ageing*, Springer-Verlag, Berlin.
- Nickell, S. and L. Nunziata (2001): 'Labour market institutions database', LSE, London., available at <http://cep.lse.ac.uk/pubs/download/data0502.zip>
- Nicoletti and Scarpetta (2003), Regulation, Productivity and Growth: OECD Evidence, *OECD Economics Department Working Paper*, 2003(1).
- OECD, (2003), *The Sources of Economic Growth in OECD Countries*, OECD, Paris.
- Olson, M. (1971), *The Logic of Collective Action: Public Goods and the Theory of Groups*, Harvard University Press, Cambridge, MA., 1971.
- Pirttila, J., (2001), 'Fiscal policy and structural reforms in transition economies. An empirical analysis', *Economics of Transition*, 1, pp. 29-52.
- Razin, A. and Sadka, E. (2002) 'The Stability and Growth Pact as an Impediment to Privatizing Social Security'. *CEPR Discussion Paper*, 3621.
- Rodrik, D., (1996), 'Understanding economic policy reforms', *Journal of Economic Literature*, 34, pp. 9-41.
- Sachs, J., (1994), 'Life in the Economic Emergency Room', in J. Williamson, ed., *The Political Economy of Policy Reform*, Institute for International Economics, Washington DC.
- Salgado R., (2002), 'Impact of structural reforms on productivity and growth in industrial countries', IMF Working Paper 02/10.

Tabellini, G., and A. Alesina, (1990), 'Voting on the budget deficit', *American Economic Review*, 80, 65, pp. 147-62.

Table 1: Source and coverage of data on structural reforms

	Source	Description of data from which reform indicators have been constructed	Country coverage	Year coverage	Reform indicator
Labour market reform	IMF	Labour market index consisting of the unweighted average of indicators of employment restriction, unemployment benefit replacement rate and benefit duration. The index is normalized in such a way to be between 0 and 1 and to increase as labour market restrictions are reduced. Original data source: Nickell and Nunziata (2001), Labour Market Institutions Database and data used in OECD data.	EU-14 except EL	1970-1998*	The yearly change in the labour market index is positive and bigger than the median positive change
Product market reform	IMF	Index measuring entry barriers, public ownership, market structure, vertical integration and price controls in public utilities and transport services. The index is normalized in such a way to be between 0 and 1 and to increase as product market restrictions are reduced. Original data source: Nicoletti and Scarpetta (2003).	EU-14 except EL	1975-1998	The yearly change in the product market index is positive and bigger than the median positive change
Pension reforms	FRDB	Data reporting the years in which reforms in the pension systems were approved by the parliament and the main characteristics of reforms.	EU-14	1985-2001	A pension reform making the system less generous took place in the year

Notes: *Except AT (1973-1998), PT (1975-1998) and FI (1971-1998).

**Table 2: Frequency of different types of reforms in different time periods
(see table 1 for sample definition)**

	Before 1980	Between 1980 and 1990	After 1990
Labour market reforms	0.1	0.24	0.38
Product market reforms	0	0.16	0.62
Pension reforms	n.a.	0.16	0.31

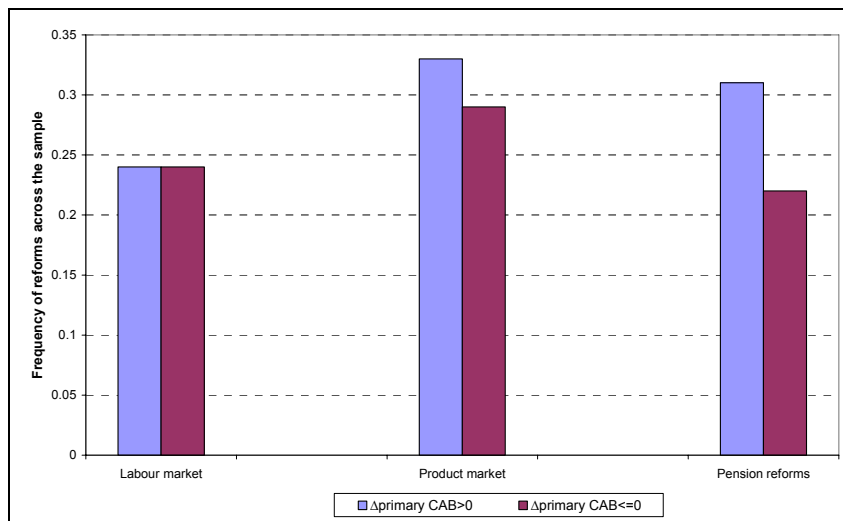
Figures represent the ratio between the total number of cases in which reforms occurred over the total number of years for which information is available on reform indicators. See Table 1 for the definition of reform indicators and for country/year availability.

Table 3: Rank correlation between indicators of labour market, product market and pension reforms across the sample (see table 1 for sample definition)

	Labour market reforms	Labour market reforms	Labour market reforms
Labour market reforms	1
Product market reforms	-0.01	1	..
Pension reforms	0.02	0.14	1

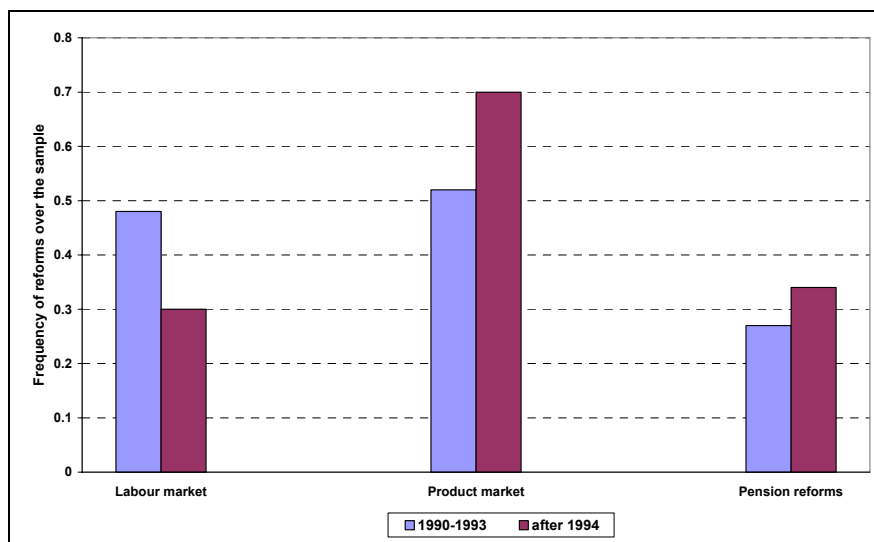
Source: Authors' calculation on data described in table 1

Graph 1: Frequency of reforms during years of consolidations and years where primary cyclically-adjusted budget balances worsened (see table 1 for sample definition)



Source: Authors' calculation on data described in table 1

Graph 2: Frequency of reforms before and after phase II of EMU (see table 1 for sample definition)



Source: Authors' calculation on data described in table 1

Table 4: Average changes in budgetary variables during reform periods and periods where no reform took place: labour and product market reforms (see table 1 for sample definition)

Year-to-year change in fiscal variables (% GDP), simple average	Labour market reforms			Product market reforms		
	No reforms (1)	A reform took place in the current or previous year (2)	t test for (1)≠(2)	No reforms (1)	A reform took place in the current or previous year (2)	t test for (1)≠(2)
Primary CAB	0.06	0.08	-0.14	0.15	0.15	-0.0
Cyclically-adjusted revenues	0.43	0.3	0.65	0.54	0.01	2.89***
Social security contributions	0.17	0.08	1.3	0.12	0.017	1.7*
Primary expenditure	0.38	0.19	0.93	0.36	-0.11	2.44**
Social benefits other than in kind	0.2	0.05	1.6	0.17	-0.005	1.97**
Government subsidies	-0.003	-0.048	0.85	-0.033	-0.072	0.79
N. obs.	238	114		153	141	

Source: Authors' calculation on data described in table 1 and DG ECFIN AMECO database.

Table 5: Average changes in budgetary variables during reform periods and periods where no reform took place: pension reforms (see table 1 for sample definition)

Year-to-year change in fiscal variables (% GDP), simple average	Pension reforms		t test for (1)≠(2)
	No reforms (1)	A reform took place in the current or previous year (2)	
Primary CAB	0.012	0.18	-0.87
Cyclically-adjusted revenues	0.16	-0.04	1.06
Social security contributions	0.02	-0.015	0.6
Primary expenditure	0.11	-0.23	1.54
Social benefits other than in kind	0.06	-0.11	1.85*
Government subsidies	-0.08	-0.09	0.11
N. obs.	123	101	

Source: Authors' calculation on data described in table 1 and DG ECFIN AMECO database.

Table 6: Evolution of selected budgetary during structural pension reforms in the EU, 1986-1999

Pension reform	Change in primary CAB between t+2 and t (% GDP)	Change in social contributions between t+2 and t (% GDP)	Change in social benefits between t+2 and t (% GDP)
Germany 1992	1.7	1	1.4
Spain 1997	-0.1	0	-0.9
Italy 1992	1.1	-0.1	0.8
Italy 1995	3.1	0.5	0.6
Netherlands 1996	-1.4	-0.2	-1.8
Portugal 1993	1.3	0.3	0.6
Finland 1997	0.8	-0.2	-1.7
Sweden 1998	-0.5	0.6	-1.2
UK 1987	0.4	-0.4	-1.8

Note: Including only structural reforms decreasing the generosity of the pension system as reported in the FRDB database. Social benefit figures refer to the “social benefits other than in kind” category in the ESA95 government accounts.

Source: authors’ computations on FRDB and AMECO databases

Table 7: Budget balances, labour and product market reforms: estimating fiscal rules (see table 1 for sample definition)

Dependent variable: primary CAB	(1)	(2)
Explanatory variables		
Constant	-1.35*** (-5.49)	-1.58*** (-5.15)
Lagged dependent variable	0.75*** (23.74)	0.76*** (23.71)
Output gap	-0.21 (-0.48)	-0.06 (-1.43)
Lagged debt/GDP ratio	0.032*** (6.78)	0.036*** (6.21)
Dummy for labour market reforms	-0.306* (-1.65)	
Dummy for product market reforms		-0.29 (-1.53)
N. obs.	342	293
R sq.	0.73	0.76
Chi sq	1121	1171

Notes: Estimations method: fixed effects, instrumental variables regression. The output gap is instrumented with its own lag and the US lagged output gap. All fiscal variables are expressed as shares on potential output.

Z statistics are reported in parentheses. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level.

Coefficients for country fixed effects are not reported.

Source: Authors' calculation on data described in table 1 and DG ECFIN AMECO database.

Table 8: Budget balances, labour and product market reforms (reform dummies defined as changes in reform indicators greater than the average positive change. See table 1 for sample definition)

Dependent variable: primary CAB	(1)	(2)
Explanatory variables		
Constant	-1.42*** (-5.5)	-1.61*** (-5.19)
Lagged dependent variable	0.75*** (22.65)	0.77*** (23.71)
Output gap	-0.09 (-0.2)	-0.06 (-1.5)
Lagged debt/GDP ratio	0.034*** (6.81)	0.037*** (6.3)
Dummy for labour market reforms	-0.45** (-2.13)	
Dummy for product market reforms		-0.35* (-1.84)
N. obs.	330	291
R sq.	0.72	0.76
Chi sq	1005	1163

Notes: Estimations method: fixed effects, instrumental variables regression. The output gap is instrumented with its own lag and the US lagged output gap. All fiscal variables are expressed as shares on potential output.

Z statistics are reported in parentheses. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level.

Coefficients for country fixed effects are not reported.

Source: Authors' calculation on data described in table 1 and DG ECFIN AMECO database.

Table 9: Budget balances, labour market reforms (reform dummies defined as policies reducing the restrictiveness of EPL or the generosity of unemployment subsidies. EU-14 except EL, 1986-2001)

Dependent variable: primary CAB	(1)	(2)
<u>Explanatory variables</u>		
Constant	-2.6*** (-5.11)	-2.48*** (-4.83)
Lagged dependent variable	0.73*** (18.76)	0.76*** (23.71)
Output gap	-0.014 (-0.32)	0.034 (0.08)
Lagged debt/GDP ratio	0.049*** (6.24)	0.046*** (5.64)
Dummy for labour market reforms based on EPL restrictiveness reduction	-0.27 (-1.36)	
Dummy for labour market reforms based on reductions in the generosity of unemployment subsidies		0.036 (0.19)
N. obs.	238	238
R sq.	0.70	0.70
Chi sq	1174	1164

Notes: Estimations method: fixed effects, instrumental variables regression. The output gap is instrumented with its own lag and the US lagged output gap. All fiscal variables are expressed as shares on potential output.

Z statistics are reported in parentheses. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level.

Coefficients for country fixed effects are not reported.

Source: Authors' calculation on FRDB data and DG ECFIN AMECO database.

Table 10: Budget balances and pension reforms: results from the estimation of fiscal rules (see table 1 for sample definition)

Dependent variables	Primary CAB	Cyclically-adjusted government revenues	Primary government expenditure
Constant	-2.48*** (-4.40)	8.14*** (5.54)	4.99*** (2.85)
Lagged dependent variable	0.71*** (17.57)	0.78*** (21.89)	0.91*** (22.76)
Output gap	-0.003 (-0.08)	0.14*** (3.65)	0.14*** (2.86)
Lagged debt/GDP ratio	0.048*** (5.5)	0.034*** (4.21)	-0.018** (-2.18)
Dummy for pension reform	-0.24 (-1.18)	-0.22 (-1.3)	-0.05 (-0.24)
N. obs.	224	224	224
R sq.	0.69	0.79	0.73
Chi sq	1128	405731	255782

Notes: Estimations method: fixed effects, instrumental variables regression. The output gap is instrumented with its own lag and the US lagged output gap. All fiscal variables are expressed as shares on potential output.

Z statistics are reported in parentheses. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level. Coefficients for country fixed effects are not reported.

The pension reform dummy is constructed as an indicator taking value 1 if a pension reform was carried out in the current or previous year and zero otherwise.

Source: Authors' calculation on data described in table 1 and DG ECFIN AMECO database.

Table 11: Budget balances and structural reforms: results from the estimation of fiscal rules (sample defined in such a way that there are no missing observations for any of the reform dummies)

Dependent variable: primary CAB	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variables								
Constant	-2.2*** (-3.65)	-2.2*** (-3.65)	-2.58*** (-4.14)	-2.67*** (-4.26)	-2.35*** (-3.78)	-2.39*** (-4.01)	-2.62*** (-4.12)	-2.57*** (-4.14)
Lagged dependent variable	0.75*** (16.26)	0.76*** (16.58)	0.75*** (16.66)	0.74*** (16.02)	0.76*** (16.6)	0.75*** (16.79)	0.77*** (16.99)	0.75*** (16.68)
Output gap	0.019 (0.42)	0.006 (0.14)	0.018 (0.41)	0.034 (0.73)	0.012 (0.28)	0.022 (0.5)	0.005 (0.13)	0.016 (0.36)
Lagged debt/GDP ratio	0.044*** (4.73)	0.043*** (4.6)	0.051*** (5.18)	0.055*** (5.33)	0.04*** (4.71)	0.047*** (5.19)	0.05*** (5.04)	0.049*** (5.16)
Dummy labour market reforms	-0.26 (-1.18)			-0.34 (-1.55)				
Dummy product market reforms		-0.12 (-0.56)		0.01 (0.05)				
Dummy pension reforms			-0.49** (-2.26)	-0.54** (-2.39)				
Interaction labour market/product market reforms					-0.24 (-1.1)			
Interaction labour market/pension reforms						-0.68*** (-2.74)		
Interaction product market/pension market reforms							-0.37* (-1.68)	
Interaction labour market/product market/pension reforms								-0.65** (-2.38)
N. obs.	188	188	188	188	188	188	188	188
R sq.	0.65	0.65	0.65	0.66	0.65	0.66	0.66	0.66
Chi sq	853	848	875	878	853	941	908	879

Notes: Estimations method: fixed effects, instrumental variables regression. The output gap is instrumented with its own lag and the US lagged output gap. All fiscal variables are expressed as shares on potential output.

Z statistics are reported in parentheses. *, **, and *** denote, respectively, significance at the 10, 5 and 1 per cent level. Coefficients for country fixed effects are not reported.

The pension reform dummy is constructed as an indicator taking value 1 if a pension reform was carried out in the current or previous year and zero otherwise.

Source: Authors' calculation on data described in table 1 and DG ECFIN AMECO database.

How Distant is Lisbon from Maastricht? The Short-run Link Between Structural Reforms and Budgetary Performance

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Paper prepared for the DG ECFIN Workshop
“Budgetary implications of structural reforms”
Brussels, 2 December 2005

Abstract

This study analyzes the mutual short-run link between structural reforms and budgetary performance. The empirical basis is the reform experience of 20 OECD countries since 1975 with respect to reforms of product, financial and labour markets and the tax system. The testing identifies the typical budgetary features both on the eve of reform and over reform cycles. Furthermore, a dynamic reform model and a model relating reforms to economic sentiments are estimated.

Overall, the results do not point towards a general short-run trade-off between Maastricht and Lisbon since the link between budgetary phenomena and structural reforms is rather weak. While Maastricht and Lisbon tend to be mutually reinforcing for the liberalization of financial and product markets, there can be short-term conflicts for tax and labour market reforms. For all covered policy fields, the results indicate that expectation effects may be a more important part of the link between reforms and the budget compared to other often debated dimensions such as compensation issues.

JEL-Classification: E 63, H00

Keywords: economic policy reforms, structural reforms, regulation

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1 INTRODUCTION

In a number of EU countries, governments are facing a double economic-policy challenge: Not only that many features of labour markets, social security and tax systems are in need of an overhaul given the constraints of an ageing population and increasing global competition. In addition, significant consolidation steps are necessary in order to guarantee long-run sustainability of budgetary policies.

Defining an adequate strategy which successfully copes with these twin tasks requires a thorough understanding of possible conflicts or complementarities between both fields. If budgetary consolidation and structural reforms are of an instantaneously mutually reinforcing nature there would be a strong case of a “big bang” approach combining measures on both policy fields. If, however, there are - at least in the short-run - conflicts it can become necessary to define reform and consolidation sequences carefully.

For the EU, the possible conflicts between budgetary objectives and required structural reforms have a specific framing represented by the fiscal constraints of the Stability and Growth Pact (SGP) on the one and the Lisbon strategy’s growth objective on the other hand. If there is a conflict between budgetary prudence and measures to increase the flexibility of markets and the viability of social security systems, it may be hard to reconcile “Lisbon” with “Maastricht”. The recent reform of the SGP (European Commission, 2005) reflects this potential problem as it has allowed taking account of major structural reforms in the so called “preventive part” of the Pact. Specifically, reforms may now justify a temporary deviation from the given medium term fiscal objectives. Obviously, the Pact’s reformers are convinced that fiscal consolidation and structural reforms are not always complementary undertakings.

The SGP’s contentious reform underlines the need for a more thorough understanding of the link between fiscal prudence and structural reforms. The SGP’s guardian, the Commission, has to decide in future which reform episodes may have an exculpating character for a temporary deterioration of the fiscal position.

Given these policy challenges, this study is to contribute to a better understanding of the link between fiscal prudence and structural reforms. It adds to the limited literature which is surveyed in the next section. This study explicitly does not treat the long-run link between structural reforms and budgetary performance. In regard to the long-run, it is hardly controversial that

certain types of structural reforms are able to boost productivity, potential growth and, therefore, alleviate fiscal pressures (see, for example, Nicoletti and Scarpetta, 2003).

This paper contributes new insights to the existing literature in the following respects: First, it clarifies conceptual issues how to disentangle typical fiscal features of reform periods on their outset on the one hand and over the course of the reform cycle on the other hand. Second, it analyzes the mutual link between budgetary policy and structural reforms by looking not only at the budgetary balance but also at specific developments on both sides of the budget. This refinement is important to make a better empirical distinction between different possible mechanisms ranging from compensating reform losers up to demand management considerations. Third, it also studies expectation effects of structural reforms which so far have largely been neglected although they can be of major importance for government budgets. The empirical basis is given by reform indicators depicting structural change of tax system and product, financial and labour market for 20 OECD countries between 1975 and 1998/2002 depending on the policy field.

Overall, the results do not point towards a general short-run trade-off between Maastricht and Lisbon since the link between budgetary phenomena and structural reforms is not very close. However, the results show that the reform-budget-link differs significantly among reform fields. While Maastricht and Lisbon tend to be mutually reinforcing for the liberalization of financial and product markets, there may be some short-term conflicts for tax and labour market reforms. The challenge of tax reforms is the inherent deterioration of the budgetary balance, which, fortunately, is dampened by significant positive growth effects. Labour market reforms appear to suffer from negative expectation effects. For all reform fields, the results indicate that expectation effects may be a more important part of the link between reforms and the budget compared to other often debated dimensions such as compensation issues.

The next section combines a conceptual clarification of the reform cycle with a survey on the existing literature on the short-run mutual link between reforms and budgetary development. Section 3 presents a detailed analysis of the situation on the eve of reforms and the evolution of fiscal and economic variables over the reform cycle. Section 4 presents estimation results for a model of reform processes based on lagged adjustments towards a given target level. Section 5 presents some insights on direct expectation effects of reforms. Section 6 concludes.

2 THE ARGUMENTS AND LITERATURE SURVEY

There is a small but growing literature aiming at identifying the drivers of structural reforms. With a focus on financial deregulation, Abiad and Mody (2005)⁴³ have developed a model describing deregulation processes as a lagging adjustment characterized by status quo preferences towards some target level. Helbling et al. (2004), Annett et al. (2004) and Heinemann (2005) have applied this deregulation model to a larger spectre of reform issues including labour markets, product markets, tax and trade reforms. Approaches abstracting from deregulation dynamics but concentrating on explaining the likelihood of reforms under given economic and political circumstances with the help of probit estimations are Pitlik (2003), Heinemann (2004), Duval and Elmeskov (2005), Belke et al. (2005) and Deroose and Turrini (2005). Different reform indicators and different potential drivers of reforms are being tested in this literature including proxies for the state of the economy, the degree of globalization, political-economic factors or the exchange rate system. A number of these studies also discuss the role of the budgetary situation and include fiscal variables among the factors relevant for a country's ability to achieve structural change.

2.1 The arguments

For summarizing and supplementing the main arguments of the literature and as a conceptual framework for the empirical testing it is helpful to work with the following stylized time scheme of a reform cycle.⁴⁴

Table 1: Stylized scheme of a reform cycle

S	BR	R	SA	LA (=S)
stable institutional setting	instable institutional setting, period before reform takes place	period of reform	period after reform - "short-term"	full realization of reform; period after reform - "long-term" - stable institutional setting

It can be assumed that the link between the reform event in period R and the resulting long-term fiscal situation (period long-term after reform: LA) is favourable. Basically, this positive link is of

⁴³ The earlier IMF Working Paper version dates back to 2003.

⁴⁴ It is stylized since it is implicitly assuming a reform process to be a one shot event and not a possibly continuous process as it will be modelled in section 4.

a tautological nature since the long-run growth and budgetary consequences should be the guiding criterion for choosing and deciding a reform in the first place. There is much less agreement on the other three time dimensions: the typical fiscal situation prior (period before reforms: BR), during (reform period: R) and immediately after (period short-term after reform: SA) the reform event.

Period BR:

The transition from a period of a stable institutional equilibrium to a pre-reform period occurs through a shock or event which changes the balance of interests of decisive actors (Abiad and Mody, 2005). This transition may occur, for instance, through learning processes, changes in the ideologies of governments or changing structural factors like international competition or demographic developments. With regard to the role of the fiscal situation there are counteracting arguments whether a favourable fiscal situation is required to enter a BR period.

One of the strongest results of the above cited literature on the drivers of reforms is that the perception of crisis is conducive for reforms (for further references see also Drazen, 2000). Bad fiscal data may contribute to a general sense of crisis and as such prepare the ground for the acceptance of reforms. If this aspect dominates, period BR should typically be characterized by especially bad fiscal data which constitute one type of crisis symptoms (compared to normal periods S with a stable institutional equilibrium).

The frequently cited compensation argument hints to the contrary expectations that the fiscal situation at the eve of reforms should typically be positive. If politically influential interest groups lose from the reform, compensation packages may be necessary to buy their consent (European Commission, 2005; Grüner, 2002). If this is relevant, there needs to be budgetary room for manoeuvre before a reform can occur. The same requirement applies if accommodating aggregate demand policies can be helpful for a quick realization of benefits from structural reforms (as argued, e.g., by Bean (1998) in the context of labour market reforms). In this case, too, a comfortable budgetary starting point should make it politically more acceptable to initiate structural change. As a consequence of the compensation and aggregate demand arguments, reform periods should be typically preceded by relatively favourable fiscal situations.

Period R:

The latter arguments immediately carry over to period R when the fiscal compensation measures and/or the accommodating demand-policies have to materialize once the reforms are implemented. The resulting deterioration in the budget can be classified as indirect (European Commission, 2005; Annett et al., 2004) since it is a politically necessary and not a technically inherent part of the reforms.

A further type of indirect consequences can occur through the impact of reforms on the business cycle. Expectation considerations suggest that there may be immediate expansionary consequences as early as a government credibly commits itself to reforms. Duval and Elmeskov (2005) correctly argue that positive long-run supply side effects can lead to an instantaneous demand reaction. Investors and consumers forming rational expectations may at once increase spending due to the perception of increasing expected returns and/or life time income. This kind of expectation effects have been extensively analysed in the context of the so called “non-Keynesian” effects of fiscal consolidation following the contributions by McDermott and Wescott (1996) and Alesina and Perotti (1997). The analogy in the context of structural reforms is obvious. However, depending on the specific type of institutional change and its public perception, negative demand effects can neither be excluded if the general public is (mistakenly) pessimistic about the reform consequences⁴⁵ or if, for example, a decrease of social protection leads to an increase in precautionary savings (Duval and Elmeskov, 2005).

In addition, the fiscal position in period R is affected by possible direct implications of reforms (European Commission, 2005). Structural reforms can have immediate budgetary consequences that may be negative (the mostly cited example are second pillar pension reforms) or positive (e.g. reforms, which decrease the generosity of existing transfer systems).

It should be stressed that the issue of public perception and immediate expectation effects is of high policy relevance to the whole reform debate and has so far not attracted sufficient attention in the empirical literature. To the extent that positive immediate demand effects materialize all problems related to J-curves and short-run costs would be alleviated.

⁴⁵ For the US, there is evidence that beliefs of the general public diverge significantly from professional economists’ beliefs on the economic situation and the relevant drivers of economic performance (Caplan, 2002a).

A further argument in the literature (Annett et al. 2004, European Commission, 2005, dating back to Eichengreen and Wyplosz, 1998) refers to a possibly limited political capital which prevents governments following different politically sensitive projects at the same time. Translated in our stylized setting this is no particularly compelling argument to expect increasing deficits in a reform period but it simply suggests that periods of structural reforms are unlikely to be periods of budgetary consolidation either. The validity of this particular argument, of course, depends on the answer to this paper's overall question whether there is a short-run conflict between consolidation and reform at all.

Period SA:

Finally, the fiscal situation in the immediate aftermath of reforms is characterized by the continuous transcendence from the immediate reform period towards the long-run (positive) outcomes. The question how quick the long-run is reached is important for the acceptance of reforms from the start.⁴⁶ There are different reasons why the future is heavily discounted in political processes. A classical political argument refers to election cycles and the short-sightedness of political actors maximizing re-election chances. A behavioural economics argument hints to short-term impatience characterizing human behaviour. Standard assumptions that people maximize the sum of exponentially discounted expected utilities are not supported by experimental research. Instead, a preference bias towards the presence exists in the sense that the discount rate between today and tomorrow is significantly larger than between two periods somewhere in the future (Frederick et al., 2002).

Period S

In the stylized setting, the periods BR, R, and SA are framed by periods of stable institutional setting, S. In S, existing structures correspond to something like a stable equilibrium and transitory effects from former reforms have tapered off.⁴⁷

⁴⁶ In this sense, any attempt to study the economic consequences of observable reform events necessarily suffers from a selection bias. Reforms associated with pronounced J-curve effects are less likely to occur compared to the ones resulting in a quick transcendence to the beneficial "long-run".

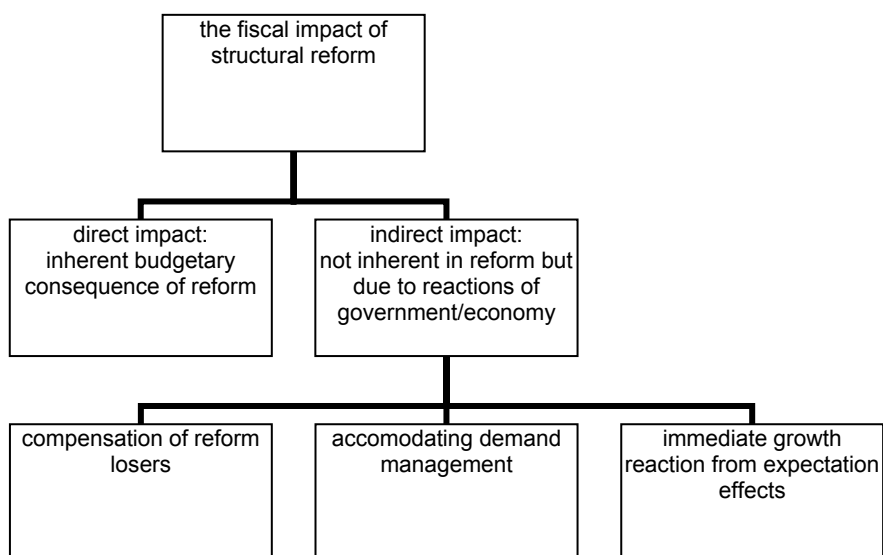
⁴⁷ In reality, things are more complicated as one reform step may breed the next one if, for example, the effects hoped for do not materialize fully, see the model in section 4.

Classification of fiscal effects

In the context of a macroeconomic analysis based on a country panel it is hardly possible to precisely differentiate between the different “stories” being told about the evolution of budgetary policy over a reform cycle (as summarized in figure 1). However, the following properties of reform cycles may offer insights:

While a deterioration of the cyclically adjusted deficit in the course of reforms may be related to either the direct reform consequences, to demand management considerations or to the compensation aspect, a more detailed look at specific categories of the budget may be helpful to differentiate: If, for example, an increase in social spending were behind the deficit deterioration this could be regarded to back the compensation story. Conversely, a largely unspecific increase in the deficit during reform processes tends to support rather the demand management view. Furthermore, if reforms touch the budget mainly via business cycle effects this should be detectable from cyclical variables such as growth, output gap or - more directly and scrutinized explicitly in the following empirical steps - from sentiment indicators.

Figure 1: Classification of budgetary effects of structural reforms



2.2 The findings in the literature

In their time series cross section analysis for the reform experience of OECD countries, Helbling et al. (2004) identify the level of a cyclically adjusted primary balance as a significantly positive determinant of trade deregulation and labour and product market reforms. The change in the balance is significantly negatively related to reforms of labour market and the tax system.

Annett et al. (2004) replicate this finding for labour market reforms in the sense that reform processes tend to be characterized by increasing deficits. For product market, on the contrary, reforms are accompanied by improving government finances.

In its descriptive part of the analysis for EU countries, Deroose and Turrini (2005) have a closer look into different components of the budgets and compare reform with no-reform periods. No significant differences in the overall balance for pension, labour market and product market reforms are found. Some significant differences are detected for single budgetary components: as expected pension reforms tend to reduce social spending and for product market reforms decreasing revenues are matched by decreasing expenditures.

The authors also estimate fiscal reaction functions linking the cyclically adjusted budgetary balance to the output gap, the debt level and reform dummies where the labour market reform dummy has a significantly negative impact on the balance while this is not the case for product market and pension reforms. A probit analysis indicates that higher debt levels increase the likelihood of labour and product market reforms and that a favourable budgetary balance tends to simplify product market reforms. Again, labour market reforms are associated with increasing deficits, at least after 1993.

In their probit estimation for OECD countries 1985-2003, Duval and Elmeskov (2005) include the by now standard fiscal variables (level and change in the cyclically adjusted surplus) and - for a pool of labour and product market reform events - support the view that a sound fiscal situation is helpful for reforms while the change in the surplus is insignificant throughout.

Looking at the literature as a whole it appears by now a well established fact that a good budgetary situation measured by the budgetary balance is typical for the eve of reform while there is some indication that - mostly for labour market reforms - increasing deficits accompany the reform period.

2.3 Unresolved questions

The existing studies leave a number of questions open. Most of the literature merely looks at fiscal policy in a highly aggregated way, restricting empirical tests largely to the budgetary balance and ignoring specific developments on both sides of the budget. Furthermore, a precise analysis of the time profiles of reform related fiscal effects is missing.

A weakness of dominating descriptive approaches is that they do not distinguish between changes within the course of reform cycles on the one hand and differences between stable periods and reform cycles on the other hand. In terms of the stylized setting above a comparison between typical characteristics of R periods with all other periods is not very informative. Instead it is desirable to understand, firstly, which features are typical for the transition from S to PR and, secondly, how economic and fiscal variables evolve from PR to SA. Straightforward comparisons between reform and no-reform periods mix these very different issues up and, hence may lead to misunderstandings.

A further shortcoming is the unclear explanation for the frequent finding of increasing deficits with certain types of reforms. Although the compensation argument is regularly cited in view of this correlation none of these studies is really able to make an empirical distinction between the different possible explanations which, besides compensation, could also be related to direct fiscal implication of reforms or to expectations effects.

Generally, expectation and immediate demand effects are a completely neglected aspect of this empirical literature so far and require further attention.

3 TIME PROFILES AND PROPERTIES OF REFORM PERIODS

3.1 Data and approach

Reforms are measured as changes in the restrictiveness of government regulation of product, labour and financial markets and a measure for the degree of distortions associated with the country's tax system. Data on regulatory rigidity originate from the data collection used in the

World Economic Outlook (WEO) 2004 (Helbling et al., 2004, Appendix 3.1. for details on sources and construction). The 20 OECD countries covered are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States. The time series start in 1975 and extend to 1998 for labour and product markets, to 2000 for the tax system and to 2002 for financial markets.

All indicators are normalized to range from 0 to 1 where an increasing value signals a declining degree of restriction. They are calculated as an unweighted average of sector-specific indicators depicting different dimension of regulatory intervention.

The regulation indicator for the financial sector takes account of the existence of credit controls, interest rate controls and restrictions on international financial transactions. Thus, this indicator does not include regulatory issues linked to reporting and financial stability oriented monitoring of the financial sector which, certainly, would show very different time trends.

The labour market indicator is constructed on the basis of the Labour Market Institutions Database developed by Nickel and Nunziata (2001) and is the aggregate of sub-indicators on employment protection, benefit replacement rates and benefit duration. It excludes information on wage centralization since for numerous countries there is no time variance for related variables.

The product market indicator was constructed by Nicoletti and Scarpetta (2003) and combines indicators on barriers to entry, public ownership, market structure, vertical integration of networks and final consumer services, and price controls for the following non-manufacturing sectors: gas, electricity, post, telecommunications, passenger air transport, railways and road freights. It thus covers the sectors which used to be characterised by heavy government involvement and protected monopolies/oligopolies in the past.

The tax system indicator is based on the following variables: top marginal income tax rate, the total tax revenue share of indirect taxes, the labour and capital income tax ratio and the absolute difference between labour and capital income tax ratios. The authors argue that these indicators are good summary proxies for the growth and employment reducing distortions associated with the tax system (Helbling et. al, 2004, p. 133/134). Note that the design of the tax variable implies that it is largely driven by the structure of the tax system and less by the overall size of tax revenues (and hence the size of the public sector).

Definition of reform event

Any classification of significant reform events is necessarily arbitrary. The selection approach followed here is to choose the critical level of change to qualify as significant reform in such a way that at least ten per cent of all country year combinations are included.⁴⁸ Hence, this analysis implies a focus on relatively substantial reform events. See table A-2 in the appendix for the resulting list of reform periods.

The following variables representing budgetary and business cycle developments and the economic expectations of private households and business are included in the testing, where fiscal and business cycle data originate from the OECD Economic Outlook database whereas sentiment indicators are calculated as annual averages of monthly data from the European Commission for EU countries and from national sources elsewhere. Sentiment indicators are employed after standardization:

Fiscal variables (notation following OECD Economic Outlook database):

Deficits and debt:

- general government net primary lending as % GDP (NLGXQ),
- general government net primary lending cyclically adjusted as % trend GDP (NLGXQA),
- debt-GDP-level in % (DEBT)

Government expenditures:

- general government total primary expenditure as % GDP (YPGXQ)
- general government total primary expenditure cyclically adjusted as % trend GDP (YPGXQA)
- social security benefits paid by government as % GDP (SSPGQ)

Government revenues:

- general government total revenue as % GDP (YRGQTQ)
- general government total revenues cyclically adjusted as % trend GDP (YRGQA)

⁴⁸ The algorithm results in classifying a larger share than 10 per cent of observations as reforms due to value clusters for the change in the regulatory indicators.

- total taxes as % GDP (TYQ)⁴⁹
- total taxes cyclically adjusted as % trend GDP (TYQA)

Business cycle variables:

- growth real GDP in % (GROWTH)
- growth domestic demand in % (GROWTHFDDV)
- output gap in % (OUTPUTGAP)
- unemployment rate in % (UNEMP)
- change in unemployment rate in percentage points (DUNEMP)

Consumer confidence/spending:

- consumer confidence yearly average standardized (CCONFST)
- savings ratio in % (SRATIO)
- growth private consumption in % (GROWTHCPV)
- growth private residential investment in % (GROWTHIHV)

Business confidence/investment:

- business confidence yearly average standardized (BUSCONFST)
- growth business investment in % (GROWTHIBV).

This analytical section is to make a clear distinction between the following two questions: First, to which extent are the economic and fiscal features of reform periods different from periods with relatively stable institutions? And, second, how do these features evolve from the pre-reform situation over the reform period itself up to the years immediately after a reform? So far, these questions have not been precisely distinguished in existing descriptive approaches.⁵⁰

In this section, the results of two tests are presented to shed lights on typical budgetary features of reform processes according to those two distinct questions.

The first test's focus is on the typical properties of budget and the economic environment prior to a reform (period BR in the terminology of the stylized reform phasing of the last section).

⁴⁹ Further differentiations between household and business taxation was included in the testing but did not result in any further insights and, hence, are not reported.

The second test concentrates on the evolution of the budget and the business cycle in the course of reforms (from period BR to period SA).

3.2 Features of pre-reform periods

In order to detect typical features of pre-reform periods the following equation is estimated⁵¹:

$$(1) \quad Y = X\beta + \gamma Reform + \varepsilon$$

Here, Y is the scrutinized fiscal or economic variable and X is a complete matrix of country and year dummies. $Reform$ is a dummy equal to 1 for the two years before a reform event occurs unless these periods are at the same time years following a reform event with lag one or two. The purpose of this procedure is to limit the test to clear cases of pre-reform years that are not at the same time affected by the consequences of recent reforms.⁵² In terms of the above suggested stylized scheme of reform cycles this tests amounts to searching for significant differences between period BR and S. Note that the time and country dummies neutralize year specific and country specific factors. The impact, for example, of global business cycle trends is thus neutralized.

⁵⁰ European Commission (2005), for example, tests for differences between reform and no-reform periods. This test does not allow whether resulting differences are related to changes occurring within a reform cycle or to differences between periods of stable institutions and (multi-annual) periods of reform cycles.

⁵¹ This test has been suggested in a completely different context by Caplan (2002b).

⁵² This refinement is only relevant in the presence of a consecutive sequence of reforms with some reform pauses in between. In these cases, our algorithm only treats the years prior to the start of the whole sequence as pre-reform years.

Table 2: Specific features of pre-reform periods in equation (1)

Dependent variable	impact of dummy for reform R ² of regression, coefficient (standard error)			
	labour market	financial sector	tax policy	product market
	deficit and debt			
NLGXQ	0.23, -0.25 (0.51)	0.33, 0.46 (0.40)	0.30, 0.80 (0.45)*	0.22, 0.54 (0.45)
NLGXQA	0.24, -0.09 (0.44)	0.29, 0.14 (0.36)	0.29, 1.33 (0.41)***	0.24, 0.81 (0.39)**
DEBT	0.56, 3.59 (2.44)	0.48, -1.38 (2.27)	0.65, 3.50 (2.34)	0.56, 3.08 (2.22)
	expenditures			
YPGXQ	0.38, 0.60 (0.51)	0.34, -0.23 (0.41)	0.38, 0.57 (0.46)	0.39, 0.22 (0.44)
YPGXQA	0.34, 0.44 (0.41)	0.30, -0.13 (0.34)	0.31, -0.03 (0.37)	0.35, -0.13 (0.36)
SSPGQ	0.47, 0.46 (0.28)*	0.43, -0.16 (0.22)	0.53, 0.48 (0.023)**	0.48, 0.13 (0.23)
	revenues			
YRGTQ	0.44, 0.35 (0.46)	0.40, -0.02 (0.38)	0.44, 1.79 (0.41)***	0.44, 0.33 (0.41)
YRGQA	0.41, 0.28 (0.45)	0.37, -0.20 (0.38)	0.42, 1.74 (0.41)***	0.41, 0.30 (0.39)
TYQ	0.18, -0.00 (0.27)	0.21, 0.02 (0.22)	0.22, 0.86 (0.24)***	0.19, 0.36 (0.23)
TYQA	0.18, -0.07 (0.26)	0.20, -0.10 (0.21)	0.20, 0.84 (0.24)***	0.18, 0.28 (0.22)
	business cycle/labour market			
GROWTH	0.29, 0.00 (0.00)*	0.29, 0.00 (0.00)	0.32, -0.01 (0.00)*	0.28, -0.00 (0.00)
GROWTHFDDV	0.21, 1.42 (0.47)***	0.20, 0.51 (0.34)	0.23, -0.64 (0.39)	0.19, -0.85 (0.40)**
OUTPUTGAP	0.31, 0.11 (0.45)	0.34, 0.45 (0.32)	0.35, -0.16 (0.36)	0.32, -0.76 (0.37)**
UNEMPLOYMENT	0.44, 0.63 (0.36)*	0.41, 0.05 (0.28)	0.50, 0.55 (0.32)*	0.46, 0.27 (0.30)
Δ UNEMPLOYMENT	0.32, -0.22 (0.17)	0.36, -0.13 (0.13)	0.36, 0.42 (0.15)***	0.32, -0.03 (0.14)
	consumer confidence/spending			
CCONFST	0.29, 0.56 (0.19)***	0.35, 0.05 (0.16)	0.30, -0.39 (0.19)**	0.27, -0.44 (0.16)***
SRATIO	0.25, 0.10 (0.57)	0.28, 0.54 (0.48)	0.39, -0.84 (0.47)*	0.20, -0.01 (0.51)
GROWTHCPV	0.19, 1.16 (0.41)***	0.18, 0.16 (0.31)	0.21, -0.58 (0.35)*	0.18, -0.45 (0.35)
GROWTHIHV	0.16, 4.98 (1.88)***	0.14, 2.42 (1.43)*	0.12, -1.35 (1.71)	0.12, 0.22 (1.73)
	business confidence/investment			
BUSCONFST	0.42, 0.43 (0.21)**	0.40, 0.37 (0.18)**	0.38, -0.42 (0.19)**	0.40, -0.03 (0.17)
GROWTHIBV	0.26, 2.81 (1.50)*	0.26, 1.02 (1.11)	0.34, -2.08 (1.23)*	0.25, -2.28 (1.25)*

*, **, ***: significant at 10 %, 5 %, 1 % level respectively

For deficits the testing indicates that there are no significantly different overall budgetary conditions on the eve of labour and financial market reforms compared to other periods. Contrary to that, deficits tend to be significantly lower in periods preceding product market and tax reforms. For example, the cyclically adjusted deficit is 1.3 percent of GDP lower in periods before tax reforms are taking place compared to all other periods. The high significance in case of tax reforms is hardly surprising: Budgetary leeway is helpful to initiate legislation aiming at reducing tax distortions.

The separate look into both sides of the budgets does only bring about few but revealing significant results: social spending is significantly up prior to labour market and tax reform and tax revenues are up prior to tax reforms.

For labour market reforms, the findings signal different insights with regard to the role of economic crisis. Definitely, a bad cyclical situation is not helpful to prepare the ground for deregulating labour markets, on the contrary: Reform cycles start in periods with significantly above normal growth, strong internal demand and a high level of consumer and business confidence. This is an interesting insight: Times of mental depression are obviously no times to embark on dismantling labour market protection or cutting unemployment benefits. Interestingly the level, not the change in the unemployment rate, is significantly higher prior to reforms. This could be cautiously interpreted as a positive impact of structural and not cyclical unemployment on the likelihood of reforms.

The testing for financial market reforms does not hint towards significant characteristics on the outset of financial market reforms apart from a higher business confidence and private housing investment. The findings for tax and product market reforms are more in line with the crisis hypothesis since here a number of significantly worse business cycle indicators indicate a relatively poor situation in the two years preceding reforms. The typical situation in the years before a tax reform is undertaken is thus one of a combination of a relatively comfortable budgetary situation with a poor growth performance.

The situation prior to reforms thus reveals some insights on the fiscal preconditions for reforms. Clearly, a favourable budgetary situation simplifies tax and product market reforms. For a better understanding of the fiscal repercussions of reforms it is necessary to follow fiscal and economic indicators over the reform cycle which is the next analytical step.

3.3 Developments over the reform cycle

The second, distinct step of the descriptive scrutiny targets at detecting significant differences in the economic and fiscal setting over the reform cycle. After the first step was meant to show to which extent the starting position of reforms is different to years of institutional stability, the attention shifts now towards the evolution over the reform process.

Focusing the analysis on years around major reforms drastically limits the number of included observations so that the same test as in the first step requiring a large number of observations cannot be applied. Instead, an analysis of variance is executed comparing means before, during and after a reform event. Before and after a reform year two years are taken account of. Years

between reform events are coded as “before” or “after” depending on their closeness to the particular reform event.⁵³ The analysis of variance tests for significant differences in the mean of economic and fiscal variables before, during, and after the reform event. Where the F-test indicates significant overall differences between means, a pair wise test for differences in mean is added⁵⁴ (employing the Bonferoni correction for multiple testing). Translated into the terms of the stylized reform cycle above the test algorithm relates to differences between periods BR, R and SA in combination (analysis of variance) and, subsequently, for differences between BR and R, BR and SA and R and SA (pair wise tests).

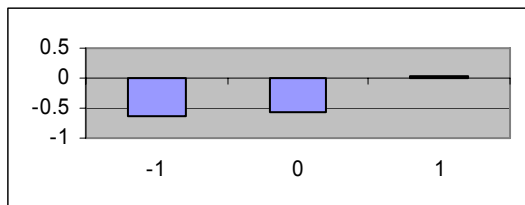
Figure 2 depicts the evolution of the means in government primary net lending. Table 3 summarizes the results of the testing, figures A-1 to A-4 in the appendix show the development of means of important further fiscal variables over the reform cycle.

⁵³ Single years between reform events are dropped; the same applies to the central year of a three year reform pause.

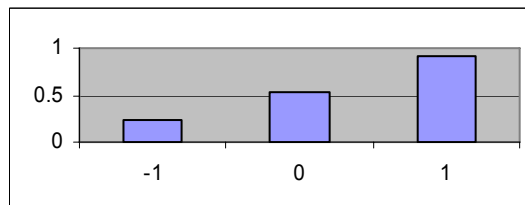
⁵⁴ The analysis of variance only allows inferring whether differences in mean among included classes are significant in total without saying which pairs of means are significantly different. Simple t-tests would lead to biased results due to the problem of multiple testing.

Figure 2: Means government primary net lending, cycl. adjusted in % trend GDP (NLGXQA), over reform cycle

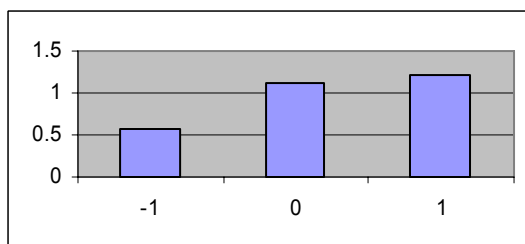
Financial market



Labour market



Product market



Tax system

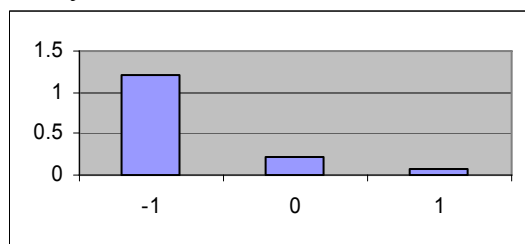


Table 3: Analysis of variance and pair wise mean tests

	Financial market		Labour market		Product market		Tax system	
	F-stat	sign. pair wise differences	F-stat	sign. pair wise differences	F-stat	sign. pair wise differences	F-stat	sign. pair wise differences
deficit and debt								
NLGXQ	0.06	-	0.80	-	1.26	-	1.20	-
NLGXQA	1.29	-	0.48	-	0.78	-	1.88	-
DEBT	1.93	-	1.13	-	0.17	-	0.20	-
expenditures								
YPGXQ	0.51	-	0.75	-	0.45	-	0.16	-
YPGXQA	0.36	-	1.03	-	0.15	-	0.11	-
SSPGQ	1.36	-	0.78	-	0.34	-	0.19	-
revenues								
YRGQT	0.33	-	0.77	-	0.15	-	0.11	-
YRGQA	0.71	-	0.81	-	0.13	-	0.10	-
TYQ	0.45	-	0.31	-	0.36	-	0.28	-
TYQA	0.69	-	0.31	-	0.43	-	0.29	-
business cycle/labour market								
GROWTH	0.62	-	1.85	-	2.24	-	7.14***	-1<1** 0<1***
GROWTHFDDV	0.95	-	2.26	-	3.77**	-1<1**	5.09***	-1<1** 0<1**
OUTPUTGAP	3.31**	1<-1**	0.76	-	1.85	-	1.93	-
UNEMPLOYMENT	1.68	-	0.48	-	0.22	-	0.61	-
Δ UNEMPLOYMENT	0.14	-	0.57	-	2.12	-	7.77***	1<-1*** 1<0***
consumer confidence/spending								

CCONFST	1.43	-	2.70*	1<-1*	4.40**	-1<1**	4.59**	-1<1**
SRATIO	0.57	-	0.35	-	0.49	-	0.11	-
GROWTHCPV	0.83	-	2.75*	1<-1*	2.19	-	4.69**	-1<1** 0<1**
GROWTHIHV	0.12	-	1.24	-	0.42	-	0.11	-
	business confidence/investment							
BUSCONFST	5.58***	1<-1*** 0<-1**	3.33**	1<-1**	0.55	-	1.48	-
GROWTHIBV	1.83	-	0.83	-	2.89*	-1<1*	2.96*	0<1*

*/**/***: 1/5/10 per cent significance; in pair-wise difference tests: -1: period prior to reform, 0: reform period, 1: period post-reform

It is a remarkable result that the fiscal variables - neither deficits nor expenditures nor revenues, neither unadjusted nor cyclically adjusted - show any significant differences over the evolution of the reform process. Only the deterioration of the primary deficit in the course of tax reforms reaches a significance level not too distant from usually accepted critical levels (16 per cent). Figure 2 suggests that this pattern is tax reform specific. For no other reform field there is an increase of structurally adjusted deficits parallel to reforms. On the contrary, the (insignificant) differences in means hint towards falling deficits during reform episodes.

In contrast to these largely insignificant results, the differences in terms of growth and other business cycle related indicators are more pronounced. Growth clearly picks up quickly in the course of tax and product market reforms. This upturn is supported by a fast increase in optimism among consumers feeding into higher growth of private consumption. Obviously, the data point to a swiftly materializing growth dividend for tax and product market reforms. In case of tax reforms this finding hints to a partially self-financing effect of tax reforms which can also be seen from the less pronounced reaction of the non-adjusted compared to the cyclically adjusted primary deficit.

Although labour market reforms are not associated with a significant decline in growth rates⁵⁵ they have nevertheless a clear negative impact on the sentiment of consumers and firms. Furthermore, a significant decline in private consumption is noticeable within the labour market reform cycle.

This section's findings allow some cautious conclusions about the relative important of reforms' budgetary consequences. Demand management or compensation patterns are not strongly supported. Neither for labour market, nor for product nor for financial market reforms, can any systematic increase in the cyclically adjusted deficit be detected. For tax reforms the results

⁵⁵ The F-test results in a confidence level of 0.16.

suggest an unsurprising direct fiscal implication of tax reforms in forms of a falling primary surplus (which is affordable given the initial favourable situation typical prior to tax reform).

However, there is support for indirect fiscal consequences affecting the budget via short-run growth effects. These effects appear to be positive for tax system and product market reforms and negative for labour and financial market reforms.

Overall both test as described in both the last and this section do not show much support for a strong fiscal impact even of major reform processes unless they are related to the fiscal system itself as it is the case with tax reforms. Structural reforms and fiscal performance appear to be quite detached developments.

An interesting link occurs with regard to the employed expectation indicators. Tax and labour market reforms tend to be started when the general economic mood is relatively depressed or positive, respectively. This corresponds to the fact that, once a reform process is initiated, the confidence is boosted by tax reforms and dwindles with labour market reforms. Clearly, the results suggest that expectation effects may constitute an important link between reforms and the budgetary situation and deserve more attention.

4 ESTIMATING A DYNAMIC REFORM MODEL

So far, reform events have been treated in a somewhat schematic way as one-off events characterized as quick and short-run adjustments towards a new environment. This simplification has been helpful to improve our understanding of some typical reform patterns, it does, however, not capture the full dynamics of reform processes. Even when limiting the perspective to relatively big reforms the results show that, sometimes, there are series of events with frequent structural adjustments within a number of consecutive years before a new equilibrium is reached (see table A-2 in the appendix). Furthermore, the preceding analysis had to abstract from the experience of countries implementing strategies of slow but continuous reforms.

Given these limitations, the perspective is broadened in this section. The idea is to search now for the impact of fiscal and general economic variables in the course of reform processes. In addition, the testing is to look for a possible impact of reforms on consumer and investor expectation which

would be a further proof for the existence of a type of indirect budgetary reform effects that have been neglected so far.

For these purposes, two models are tested. The first one extends the specification of reform processes of Abiad and Mody (2005) and includes a number of detailed fiscal variables. The second one is a simple model relating consumer and business confidence towards both reforms and the fiscal stance while controlling for the general economic environment.

Starting point is the specification developed by Abiad and Mody (2005) and applied by Helbling et al. (2004), Annett (2005) and Heinemann (2005). This model allows for the series of reforms to be driven by a steady convergence of regulation to some “optimum” level of regulation $REG^*_{i,t}$. In this notation, larger levels of REG are associated with less restrictive regulatory regimes.

$$(2) \quad \Delta REG_{i,t} = \mu(REG^*_{i,t} - REG_{i,t-1}) + \varepsilon_{i,t}$$

If the status quo bias is relevant the values of μ should be below 1. This parameter of institutional stickiness is assumed to depend on the strictness of current regulation:

$$(3) \quad \mu = k REG_{i,t-1}$$

Thus, this specification allows for learning: Deregulative reforms can be helpful to limit uncertainty about the outcomes of deregulation. In this case, reforms can be self-enforcing.

Furthermore, this basic adjustment process is driven by further determinants including some element of international interaction where the distance to the regulatory situation of the benchmark group (REG_{BM}) has an impact on the country’s deregulation path.⁵⁶ The inclusion of this element is particularly relevant in the European context, where cross-border learning is regarded as an important element of EU policy cooperation – long before the “Open Method of Coordination” has become explicit. This setting results in the following testable specification:

$$(4) \quad \Delta REG_{i,t} = \alpha_1 REG_{i,t-1} + \alpha_2 REG_{i,t-1}^2 + \alpha_3 (REG_{i,t-1}^{BM} - REG_{i,t-1}) + \sum_{k=1}^K \beta_k x_{k,i,t} + \varepsilon_{i,t}$$

⁵⁶ It is left open which specific cross-border interdependencies may drive the interaction, possible explanations range from mobility of regulatory sensitive factors over direct regulatory externalities up to phenomena of yardstick competition where voters judge governments by comparison to policies in third countries (see Brueckner, 2003, for an overview of strategic interactions among governments).

In (4) the coefficient α_3 measures the impact of cross-border regulatory interactions and the β -coefficients the influence of the further control variables. By construction, $\alpha_1 = k \cdot \text{REG}^*_{i,t-1}$ and is expected to be positive, whereas $\alpha_2 = -k$ would be negative if the status quo bias really loses power due to learning from deregulation. From this reduced form, the implicit “optimum” level of regulation equals $\alpha_1 / (-\alpha_2)$.

The two baseline specifications include following control variables among the x : GDP growth, the extent of FDI flows as a measure of globalization constraints⁵⁷ (sum of absolute values of in- and outflows in % GDP), an EU dummy, dummies for governments led by centre and left parties (compared to governments led by right parties).⁵⁸ Besides these control variables a second baseline specification includes business and consumer confidence indicators, which come at the cost of a substantial loss in the number of observations and which, therefore, will not be used in the subsequent consecutive inclusion of fiscal variables. The benchmark variable is constructed as the difference of the regulatory situation vis-à-vis the EU average for European countries and vis-à-vis the USA for non-European OECD countries.

Any dynamic fixed effect estimation faces econometric problems due to the correlation of the error term with the “within” transformed regressors and a resulting bias. The frequently applied solution with small T is the application of GMM techniques along the lines of Arellano and Bond (1991). However, this solution has been shown to come at the costs of imprecise estimates (Attanasio et al., 2000). Since the time dimension of the regressions is relatively long (the specifications include up to 26 years) the trade-off hints towards the application of standard OLS estimates. Endogeneity problems related to a possible impact of reforms on some of the control variables such as growth or the confidence indicators are limited by the use of lagged right hand variables.

The baseline regression reveal marked differences in reform dynamics among different policy fields. For product and financial market reforms both variants of the baseline robustly point to a stable implied optimum level of deregulation being close to unity (which is defined as the fully liberalized status). In contrast to that, no stable optimum level emerges for labour and tax reforms. The same structure applies to the cross-border interaction term: Whereas for product and financial

⁵⁷ In Heinemann (2005), the FDI variable appeared to be a more important measure of globalization constraints of regulatory policies compared to other frequently used variables such as trade openness.

⁵⁸ For data sources, see Table A-1 in the appendix.

market reforms the benchmark plays a significant role this is not supported for tax and labour market reforms. Conversely, the political orientation has a significant impact in both variants of the benchmark only for the labour reform regression. Low growth is speeding up reforms of the tax system and financial markets in line with the crisis hypothesis. The insignificance of the EU dummy could be due to the fact that the construction of the benchmark variable already covers cross-border links related to European integration. The inclusion of business and consumer sentiment indicators results only in few significant coefficients: business sentiment affects the speed of reforms of labour markets and tax systems in a positive way.⁵⁹

Overall, this picture is consistent with a view that reform trends have been more stable and internationally linked for product and financial market reforms whereas in the realm of labour market reforms and tax policies constant and internationally consistent unidirectional trends have not materialized in the covered period.

Table 4: Dynamic reform model - baseline specifications

	labour market (Δ WEOLABOUR)		financial regulation (Δ WEOFINANCE)		product market (Δ WEOPRODUCT)		tax reform (Δ WEOTAX)	
reform indicator. (-1)	-0.330 (0.095)***	-0.176 (0.257)	0.406 (0.064)***	0.389 (0.144)***	0.141 (0.030)***	0.107 (0.048)**	-0.331 (0.176)*	-0.147 (0.283)
reform indicator. squared (-1)	0.235 (0.091)***	-0.091 (0.139)	-0.383 (0.052)***	-0.411 (0.101)***	-0.106 (0.036)***	-0.081 (0.056)	0.227 (0.175)	0.064 (0.266)
reform indicator divergence benchmark (-1)	-0.032 (0.039)	-0.121 (0.177)	0.126 (0.029)***	0.149 (0.045)***	0.131 (0.024)***	0.172 (0.044)***	-0.005 (0.024)	0.032 (0.057)
GROWTH (-1)	0.029 (0.030)	-0.076 (0.077)	-0.388 (0.204)*	-1.026 (0.475)**	-0.013 (0.057)	0.026 (0.168)	-0.124 (0.054)**	-0.354 (0.131)***
FDI (-1)	0.0003 (0.0004)	-0.0009 (0.0006)	0.0001 (0.0008)	0.0002 (0.0008)	0.002 (0.0009)*	-0.009 (0.0020)	0.00002 0.0003	-0.00003 (0.0003)
EU member dummy	0.002 (0.003)	-0.005 (0.007)	0.025 (0.019)	0.030 0.043	0.002 (0.005)	-0.009 (0.015)	0.007 (0.005)	0.014 (0.010)
centre government (-1)	-0.013 (0.003)***	-0.032 (0.006)***	-0.011 (0.021)	0.014 (0.031)	0.00002 (0.006)	0.013 (0.014)	-0.001 (0.005)	0.004 (0.008)
left government (-1)	-0.004 (0.002)**	-0.004 (0.003)	-0.007 (0.010)	-0.014 (0.014)	-0.006 (0.003)**	0.002 (0.006)	0.005 (0.003)*	0.005 (0.004)
CCONFST (-1)		0.0008 (0.001)		0.006 (0.008)		-0.003 (0.003)		-0.002 (0.002)
BCONFST (-1)		0.003		0.001		0.002		0.006

⁵⁹ For labour market this supports the descriptive finding that a favourable economic situation smoothes reforms whereas for taxes the finding stands in contrast to the descriptive results that the situation prior to tax reform tends to be relatively depressed.

		(0.001)**		(0.007)		(0.003)		(0.002)***
nb. of observations/nb. of countries	436/20	216/17	498/20	268/18	461/21	231/19	388/18	226/17
R-squared	0.16	0.25	0.17	0.27	0.21	0.12	0.12	0.14

The baseline (without the sentiment indicators) is now consecutively augmented by the detailed list of fiscal variables (both lagged level and difference), table 5 summarizes the results.

Table 5: Coefficients of fiscal variables in consecutive inclusion in baseline

determinant	impact in reform regression coefficient (standard error)			
	labour market	financial sector	tax policy	product market
	deficit			
NLGXQA	-0.00052 (0.00031)*	0.00162 (0.00184)	0.00110 (0.00057)*	-0.00053 (0.00061)
Δ NLGXQA	-0.00081 (0.00046)*	-0.00188 (0.00309)	-0.00225 (0.00084)***	-0.00041 (0.00091)
NLGXQ	-0.00061 (0.00026)**	0.00175 (0.00148)	0.00092 (0.00046)**	-0.00086 (0.00050)*
Δ NLGXQ	-0.00084 (0.00043)*	-0.00395 (0.00261)	-0.00134 (0.00081)*	-0.00097 (0.00081)
	expenditure			
YPGXQA	0.00037 (0.00035)	0.00418 (0.00214)*	-0.00010 (0.00056)*	0.00090 (0.0006)
Δ YPGXQA	0.00095 (0.00070)	0.00399 (0.00466)	0.00162 (0.00130)	0.00019 (0.00131)
YPGXQ	0.00041 (0.00028)	0.00204 (0.00165)	-0.00038 (0.00043)	0.00099 (0.00046)**
Δ YPGXQ	0.00081 (0.00063)	0.00619 (0.00391)	-0.00049 (0.00119)	0.00052 (0.00114)
SSPGDP	0.00045 (0.00044)	0.00265 (0.00289)	-0.00013 (0.00068)	0.0024 (0.0008)***
Δ SSPGDP	0.00197 (0.00131)	0.01078 (0.00880)	-0.00322 (0.00232)	0.0032 (0.0025)
	revenues			
YRGQA	-0.00016 (0.00028)	0.00463 (0.00179)*	0.00043 (0.00055)	0.00011 (0.00056)
Δ YRGQA	-0.00055 (0.00058)	0.00455 (0.00398)	-0.00174 (0.00106)	0.00016 (0.00118)
YRGTQ	-0.00017 (0.00029)	0.00438 (0.00163)***	0.00101 (0.00049)**	0.00010 (0.00512)
Δ YRGTQ	-0.00072 (0.00054)	0.00259 (0.0035)	-0.00191 (0.00096)**	-0.00050 (0.00104)
TYQA	-0.00096 (0.00051)*	0.00499 (0.00313)	0.00128 (0.00103)	0.00015 (0.00108)
Δ TYQA	0.00007 (0.00089)	0.00688 (0.00576)	-0.00131 (0.00153)	0.00048 (0.00184)
TYQ	-0.00102 (0.00048)**	0.00478 (0.00284)*	0.00210 (0.00097)**	-0.00028 (0.00094)
Δ TYQ	-0.00003 (0.00082)	0.00181 (0.00509)	-0.00140 (0.00150)	-0.00141 (0.00157)

*, **, ***: significant at 10 %, 5 %, 1 % level respectively

The primary balance has a robustly significant impact only in the labour market reform and the tax reform processes. Labour market reforms tend to be accelerated by bad and deteriorating budgetary data (both cyclically adjusted and non-adjusted), tax reforms are simplified by high budgetary balances which tend to deteriorate. For labour market reforms, the look at both sides of the budget does not show a typical compensation pattern with an increase in (social) spending. Only the difference of social benefits reaches significance levels close to conventional significance levels (0.13) and could be regarded as a weak hint towards compensation. A stronger result is that for labour market reforms, relatively low tax receipts tend to be behind the relatively poor budgetary balance.

The comfortable budgetary situation which characterizes periods of tax reforms is related to both relatively low (cyclically adjusted) expenditure levels and high (non-adjusted) tax receipts.

Whereas the overall budgetary balance is largely insignificant in the product market reform regression there are interesting findings for single budgetary categories: Product market reforms appear to be prepared by higher social spending.

Financial reforms are preceded by above normal revenues and expenditures (cyclically adjusted) with no specific focus on social benefits.

5 THE DIRECT IMPACT OF REFORMS ON BUSINESS AND CONSUMER CONFIDENCE

As final step of the analysis now a closer look is taken at the direct impact of reforms on the economic sentiment of consumers and companies. Reforms may reach sentiment via an indirect and a direct channel. The indirect impact results from reforms' impact on growth, employment and other economic variables which, in turn, bear upon the mood of consumers and companies. The tests of section 3.2 can be understood as a test for the existence of any such indirect effect (which turned out to be positive for tax and product market reform and negative for labour and financial market reform).

The direct impact is related to expectations about reforms' effects before these effects have materialized. In a sense, the measurement of the direct impact resembles a test on the economic agents' perception about the economic merits of reforms. A positive (negative) sign would indicate that agents share the view that liberalizing reform will foster (reduce) economic well-being. There is no doubt that this perception issue is also of fiscal importance. A significant positive expectation effect is a sign that the reform as such stabilizes expectations and, as a consequence, strengthens demand and the budgetary situation.

To test for direct expectation effects the dependent variable - the standardized consumer and business sentiment indicators - are regressed on the lagged endogenous variable, the reform variable (the change in the regulatory index) and a number of standard business cycle and fiscal variables: GDP growth, change in unemployment, the inflation rate, the level and change of the (cyclically adjusted) government balance. An instrumental variable specification is estimated in order to cope with the clearly present reversed causality problem. 60

Tables 6 and 7 summarize the regression results for business and consumer confidence. Apart from the highly significant autoregressive term, sentiment is driven by growth, the inflation rate (more pronounced for consumer than for business sentiment), the change in the unemployment

⁶⁰ Variables mainly related to long-run structural growth potential of an economy are employed as instruments: population share below the age of 14, the fertility rate, the openness, the labour force participation rate, unlit labour costs, the debt GDP level and a dummy for a general election.

rate (more pronounced for business sentiment) and the budgetary situation (only for consumer sentiment). Signs are generally as expected.⁶¹ The results for the level of the government balance in the consumer confidence regressions suggest that a solid fiscal situation stabilizes consumer expectations.

There is no indication that reforms are associated with direct negative expectation effects. On the contrary, tax reforms have a highly significant direct effect towards fostering optimism in the business sector. Product market reforms miss the 10 per cent significance by a thin margin (significance level is 0.107) in the business sentiment regression. The results underline the findings from the reform cycle analysis that tax system and product market reforms are characterized by a favourable time pattern of quickly materializing reform benefits. Results from the inclusion of measures of overall reform intensity by calculating the sum of reform proxies across policy fields are not reported: This variable (including a squared variant) was insignificant and did not support the view that a big bang approach combining reforms over different fields at the same time has a significantly more favourable expectation effect.

⁶¹ The results for the government balance are also plausible: A high level of the balance supports optimism whereas (not very robustly) an improvement in the balance dampens consumer sentiment which could be associated with the negative impact of tax increases or expenditure cuts on sentiment.

Table 6: Drivers of business confidence (dependent variable: change of standardized business confidence, BUSCONFST)

	(1)	(2)	(3)	(4)
BCONFST (-1)	-0.95 (0.06)***	-0.97 (0.06)***	-0.98 (0.06)***	-0.96 (0.06)***
GROWTH	35.70 (4.71)***	31.80 (4.25)***	34.93 (4.37)***	45.08 (4.71)***
Δ UNEMPLOYMENT	-0.16 (0.10)	-0.24 (0.09)***	-0.20 (0.09)**	-0.13 (0.09)
INFLATION	-0.05 (0.03)	-0.05 (0.03)*	-0.04 (0.03)	-0.05 (0.03)*
NLGXQA	-0.011 (0.033)	-0.005 (0.03)	-0.002 (0.03)	0.009 (0.03)
Δ NLGXQA	-0.026 (0.052)	-0.04 (0.05)	-0.04 (0.05)	-0.04 (0.06)
Δ WEOLABOUR	2.74 (4.06)	-	-	-
Δ WEOPRODUCT	-	2.95 (1.83)	-	-
Δ WEOFINANCE	-	-	0.36 (0.57)	-
Δ WEOTAX	-	-	-	9.22 (2.89)***
nb. of observations/nb. countries	195/16	209/18	228/17	205/16
R-squared	0.66	0.66	0.64	0.69

Fixed effects, instrumental variable regression; instruments: age share below 14, fertility rate, openness, labour force participation rate, unit labour costs, debt-GDP-level, election year dummy.

Table 7: Drivers of consumer confidence (dependent variable: change of standardized consumer confidence - CCONFST)

	(1)	(2)	(3)	(4)
CCONFST (-1)	-0.53 (0.05)***	-0.53 (0.04)***	-0.52 (0.04)***	-0.55 (0.05)***
GROWTH	22.38 (2.90)***	21.32 (2.76)***	20.84 (2.72)***	22.80 (3.05)***
Δ UNEMPLOYMENT	0.02 (0.06)	-0.002 (0.06)	-0.01 (0.05)	-0.02 (0.06)
INFLATION	-0.05 (0.01)***	-0.04 (0.01)***	-0.04 (0.01)***	-0.04 (0.01)***
NLGXQA	0.02 (0.02)	0.01 (0.02)	0.03 (0.02)*	0.06 (0.02)***
Δ NLGXQA	-0.02 (0.03)	-0.02 (0.03)	-0.04 (0.03)	-0.08 (0.04)**
Δ WEOLABOUR	0.78 (3.05)	-	-	-
Δ WEOPRODUCT	-	1.15 (1.42)	-	-
Δ WEOFINANCE	-	-	-0.33 (0.38)	-
Δ WEOTAX	-	-	-	0.23 (2.09)
nb. of observations/nb. countries	276/18	291/19	309/18	300/17
R-squared	0.46	0.46	0.44	0.46

Fixed effects, instrumental variable regression; instruments: age share below 14, fertility rate, openness, labour force participation rate, unit labour costs, debt-GDP-level, election year dummy.

6 CONCLUSIONS

Although the different analytical tools applied do not in every case lead to a uniform picture they convey a certain message concerning the extent of a possible short-run trade-off between budgetary consolidation and structural reforms.

Overall, this study shows that there are - if at all - only very limited general conflicts between fiscal prudence (“Maastricht”) and structural reforms (“Lisbon”). Judging on the experience with OECD reform processes since the mid-seventies, any such trade-off does not exist for product market reforms. There is no indication that budgets deteriorate over the reform cycle or that deficits can smooth reform processes. On the contrary, the immediate positive growth and expectation effects hint to short-run benefits which also should swiftly alleviate budgetary problems.

The result of helpful short-run growth and expectation effects also holds for tax reforms where, however, a deterioration of the budgetary balance over the reform cycle appears to be an inherent part of the reforms. Fortunately, the budgetary challenges of tax reform are alleviated by a positive short-run growth effect working through a positive impact on economic sentiment. A good budgetary initial situation is necessary (and typical) for countries trying to reduce the distorting burden of taxation. Hence, although there is a negative short-run link between tax reforms and the deficit tendencies, countries with high deficits will be unlikely to embark on tax reforms in the first place.

The results for financial market deregulation are not particularly pronounced. Positive short-run effects cannot be detected. The descriptive analysis even indicates a deterioration of business sentiment in times of financial deregulation. Only on the basis of this examination it is hard to tell whether, e.g. transitory adjustments of companies towards new capital supply structures may possibly be behind that finding.

The findings for labour market reforms are of high policy relevance since numerous EU countries still have a long way to go on this field. Here, a certain contrast exists between different analytical tools. The reform cycle analysis has brought no indication of an increasing deficit in the course of the implementation of labour market deregulation measures. However, prior to reforms social benefits tend to be slightly at an above average level. Furthermore, the estimation of the dynamic labour market reform equation show that the level and the change in the deficit tends to be

positively linked to the extent of reforms and that a (almost significant) effect of increasing social benefit spending is partly behind this budgetary deterioration - lending some credibility to the compensation hypothesis.

Clearly, labour market effects do not foster business and consumer optimism in a direct and short-run way. This result is consistently found both in the reform cycle analysis (sentiment indicators and private consumption decline with reforms) and the test on direct expectation effects: In the latter labour market reforms do not result in a direct positive expectation effect contrary to the cases of tax and product market reforms. Obviously, economic agents do not typically perceive labour market deregulation as an institutional adjustment improving the economic perspective. This is consistent with the finding that the situation prior to labour market reforms is often characterized by favourable growth and expectation data. A good starting point allows coping with short-run negative consequences of reforms.

Generally, the results stress the fact that expectation effects should be included in any thorough exercise on reform economics. The perception of reforms can be a crucial driver of any short-term consequences for employment, growth and the budget. The finding of negative expectation effects associated with labour market reforms is likely to be one of the explanations that these reforms are particularly slow to materialize.

Finally the results as a whole point to a sometimes neglected aspect in the discussion of structural reforms and the Stability and Growth Pact: Even if certain types of reforms lead to a short-run increase in deficits, an unfavourable deficit situation makes it very unlikely that certain reforms are initiated in the first place. This underlines the necessity of effective deficit rules in the Pact in order to safeguard EU countries' future structural flexibility.

References

- Abiad, Abdul and Ashoka Mody (2005): Financial Reform: What Shakes It? What Shapes It? *American Economic Review*, 95 (1), 66-88.
- Alesina, Alberto and Roberto Perotti (1997): Fiscal Adjustments in OECD Countries: Composition and Macroeconomic Effects, *IMF Staff Papers*, 44 (2), 210-248.
- Annett, A., Estevao, M., Faruquee, H., Debrun, X. and J.-J. Hallaert (2004): Euro Area Policies, Selected Issues, July 8, 2004, International Monetary Fund, Washington.
- Arellano, Manuel and Stephen Bond (1991): Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations, *Review of Economic Studies*, 58, 277-297.
- Attanasio, Orazio P., Picci, Lucio and Antonelle E. Scorcu (2000): Saving, Growth, and Investment: A Macroeconomic Analysis Using a Panel of Countries, *The Review of Economics and Statistics*, 82 (2), 182-211.
- Bean, Charles R. (1998): The Interaction of Aggregate-Demand Policies and Labour Market Reform, *Swedish Economic Policy Review*, 5 (2), 353-382.
- Beck, Thorsten, George Clarke, Alberto Groff, Philip Keefer and Patrick Walsh (2001): New Tools in Comparative Political Economy: The Database of Political Institutions, *The World Bank Economic Review*, 15 (1), 165-176.
- Belke, Ansgar, Herz, Bernhard and Lukas Vogel (2005): Structural Reforms and the Exchange Rate Regime, A Panel Analysis for the World versus OECD Countries, mimeo.
- Brueckner, Jan K. (2003): Strategic Interaction Among Governments: An Overview of Empirical Studies, *International Regional Science Review*, 26 (2), 175-188.
- Caplan, Bryan (2002a): Systematically Biased Beliefs About Economics: Robust Evidence of Judgemental Anomalies from the Survey of Americans and Economists on the Economy, *The Economic Journal*, 112, 1-26.
- Caplan, Bryan (2002b): How does war shock the economy, *Journal of International Money and Finance*, 21 (2002), 145-162.
- Deroose, Servaas and Alessandro Turrini (2005): The Short-term Budgetary Implications of Structural Reforms. Evidence from a Panel of EU Countries, CEPR Discussion Paper No. 5217.

- Drazen, Allan (2000): *Political Economy in Macroeconomics*, Princeton University Press.
- Duval, Romain and Jorgen Elmeskov (2005): *The Effects of EMU on Structural Reforms in Labour and Product Markets*, OECD Economics Department Working Paper, No. 438, Paris.
- Eichengreen, Barry and Charles Wyplosz (1998): *The Stability Pact: More than a Minor Nuisance*, *Economic Policy*, 26 (April), 65-104.
- European Commission (2005): *Public Finances in EMU*, *European Economy*, No. 3, Brussels.
- Frederick, Shane, George Loewenstein and Ted O'Donoghue (2002): *Time Discounting and Time Preference: A Critical Review*, *Journal of Economic Literature*, 40 (2), 351-401.
- Grüner, Hans Peter (2002): *Unemployment and Labour-Market Reform: A Contract Theoretic Approach*, *Scandinavian Journal of Economics*, 104, 641-656.
- Heinemann, Friedrich (2004): *Explaining Reform Deadlocks*, *Applied Economics Quarterly Supplement*, 55, 9-26.
- Heinemann, Friedrich (2006): *The Drivers of Deregulation in the Era of Globalization*, forthcoming in: Peter Bernholz and Roland Vaubel, *Political Competition and Economic Regulation*.
- Helbling, Thomas, Dalia Hakura, and Xavier Debrun (2004): *Fostering Structural Reforms in Industrial Countries*, in: *World Economic Outlook 2004*, chapter III, 103-146.
- McDermott, John and Robert F. Wescott (1996): *An Empirical Analysis of Fiscal Adjustments*, *IMF Staff Papers*, 43 (4), 725-753.
- Nickell, Stephen and Luca Nunziata: *Labour Market Institutions Database*, September 21 2001
- Nicoletti and Scarpetta (2003): *Regulation, Productivity, and Growth: OECD Evidence*", *Economic Policy*, April 2003, 11-72..
- Pitlik, Hans and Steffen Wirth (2003): *Do Crises Promote the Extent of Economic Liberalization? An Empirical Test*, *European Journal of Political Economy*, 19, 565-581.

APPENDIX

Table A-1: Data definitions and sources

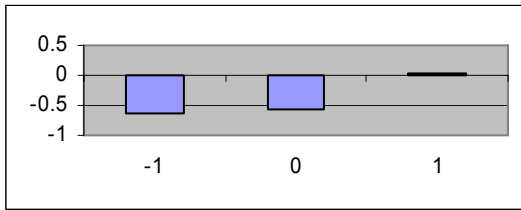
time series	description	source
NLGXQ	general government net primary lending cyclically adjusted as % trend GDP	OECD Economic Outlook database
NLGXQA	general government net primary lending as % GDP	OECD Economic Outlook database
DEBT	debt-GDP-level	OECD Economic Outlook database
YPGXQ	general government primary expenditure as % GDP	OECD Economic Outlook database
YPGXQA	general government primary expenditure cyclically adjusted as % trend GDP	OECD Economic Outlook database
SSPGQ	social security benefits paid by government as % GDP	OECD Economic Outlook database
YRGTQ	general government total revenue as % GDP	OECD Economic Outlook database
YRQQA	general government total revenue cyclically adjusted as % trend GDP	OECD Economic Outlook database
TYQ	total taxes as % GDP	OECD Economic Outlook database
TYQA	total taxes cyclically adjusted ad % trend GDP	OECD Economic Outlook database
GROWTH	real growth GDP	OECD Economic Outlook database
GROWTHFDDV	real growth final domestic expenditure	OECD Economic Outlook database
OUTPUTGAP	output gap	OECD Economic Outlook database
UNEMPLOYMENT	unemployment rate	OECD Economic Outlook database
CCONFST	consumer confidence, standardized	EU Commission, national sources
SRATIO	household saving ratio	OECD Economic Outlook database
GROWTHCPV	real growth private consumption	OECD Economic Outlook database
GROWTHIHV	real growth private residential investment	OECD Economic Outlook database
BUSCONFST	business confidence, standardized	EU Commission, national sources
GROWTHIBV	real growth business investment	OECD Economic Outlook database
WEOFINANCIAL	index financial sector regulation from World Economic Outlook 2004	Helbling et al. (2004)
WEOLABOUR	index labour market regulation from World Economic Outlook 2004	Helbling et al. (2004)
WEOPRODUCT	index product market regulation from World Economic Outlook 2004	Helbling et al. (2004)
WEOTAX	index tax system distortions from World Economic Outlook 2004	Helbling et al. (2004)
INFLATION	inflation, consumer prices	World Bank: World Development Indicators
FDI	gross foreign direct investment in % GDP	World Bank: World Development Indicators
ideology dummy: left	generated from chief executive's party ideology variable	Beck et al. (2001)
ideology dummy: centre	generated from chief executive's party ideology variable	Beck et al. (2001)

Table A-2: Reform years

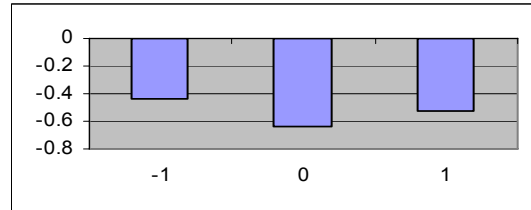
	financial market	labour market	tax system	product market
Australien	81, 83-85, 89		78, 83, 91-92	91, 94, 96-97
Austria	76, 80, 82, 91	91-92	89	89
Belgium	76, 79, 82, 91	88-94		87, 93
Canada				88
Denmark	78, 81, 83, 88	85-86, 93-94	89-91	89, 93, 95, 97
Finland	84, 87, 91	87-88, 96-97	78, 87, 95, 97	93-95
France	86-87, 90-91			89
Germany		93-94		90, 96
Ireland	85-86, 92	83-84		88
Italy	84, 85, 90	96	98	93, 95
Japan	79, 92, 94	76	92, 97-99	85, 87, 90
Netherlands	76, 82-83	89-92	94, 96, 98	92-93, 96-97
New Zealand	84, 86		86-87, 90	83, 86, 89, 93
Norway	84-85, 87, 95			87, 91
Portugal	89, 91-93			86
Spain	88, 93-94, 99	83, 91-92	86, 90	97
Sweden	78, 83-84, 86, 93	88, 91-94	91, 93	92, 95
Switzerland	90			99
United Kingdom	76, 79	89-90	76-77, 83, 87, 90-92	87, 90, 93
United States	81, 87	85-86	81-83	80, 96

Figure A-1: Differences in mean financial market reforms

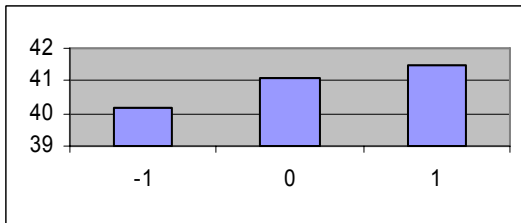
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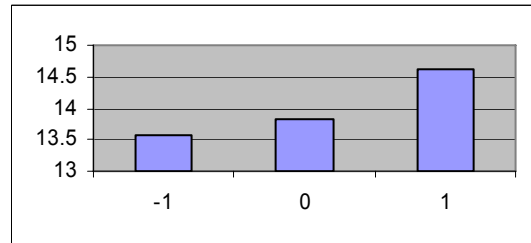
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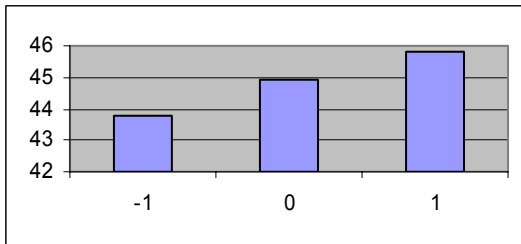
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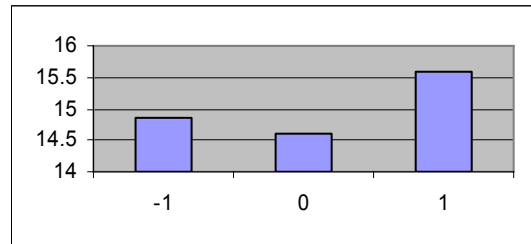
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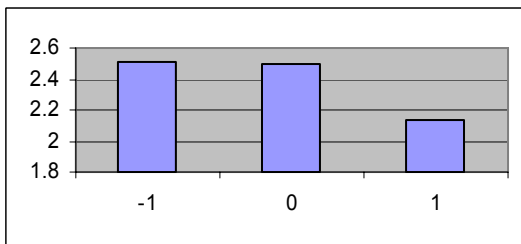
YRGQA



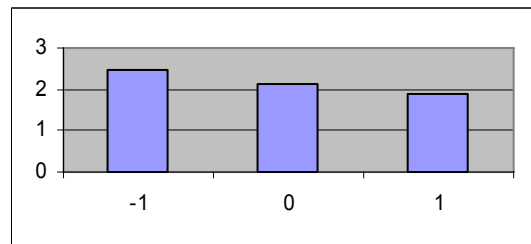
TYQA



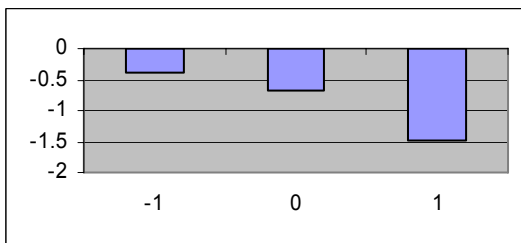
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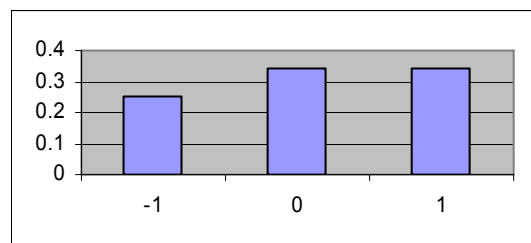
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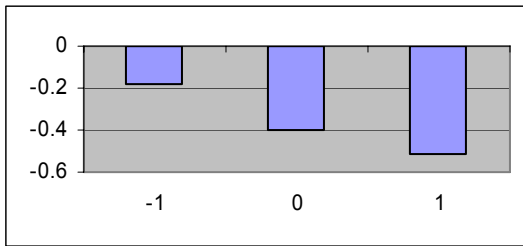
OUTPUTGAP **



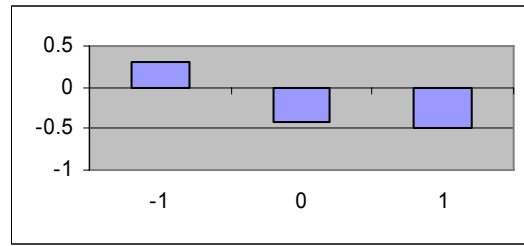
Δ UNEMPLOYMENT



CCONFST



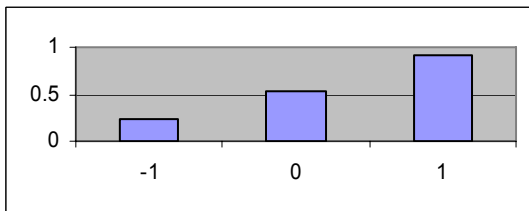
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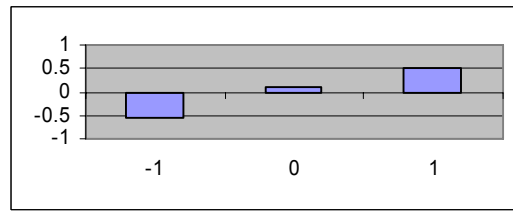
-1: two year period before reform year, 0: reform year, 1: two year period after reform year, ***/*** significance of F-tests as reported in table 3.

Figure A-2: Differences in mean labour market reforms

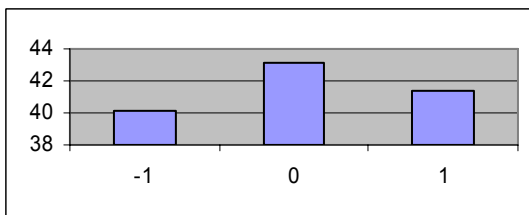
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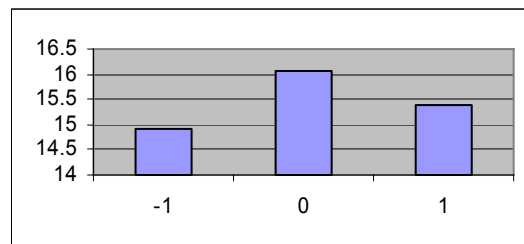
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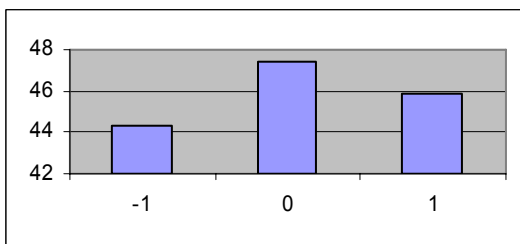
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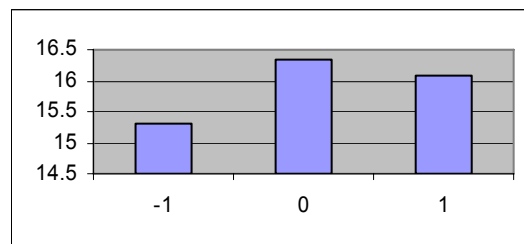
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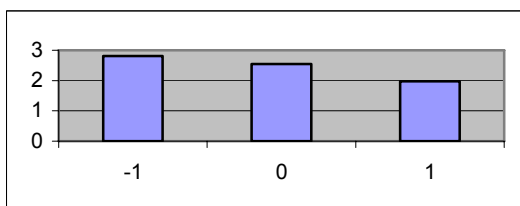
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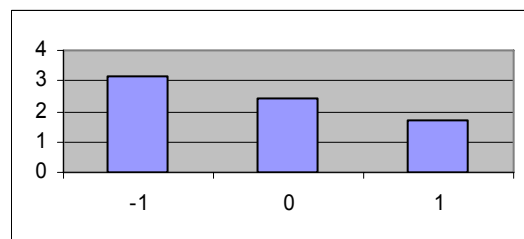
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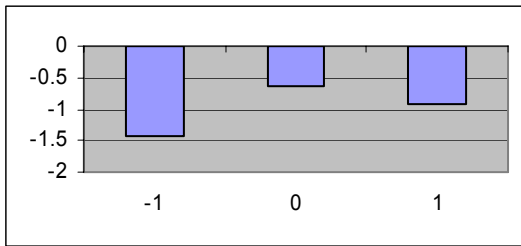
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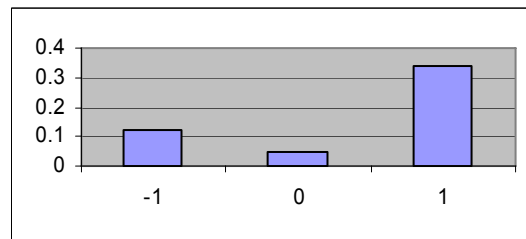
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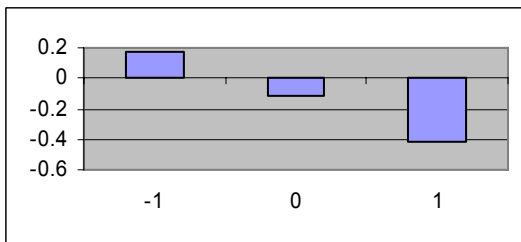
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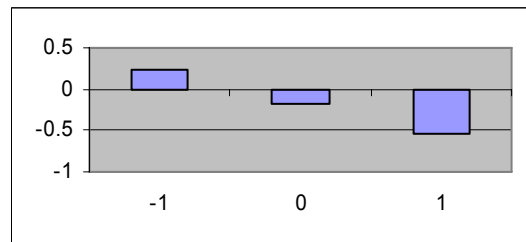
Δ UNEMPLOYMENT



CCONFST *



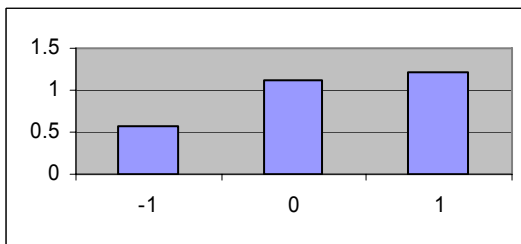
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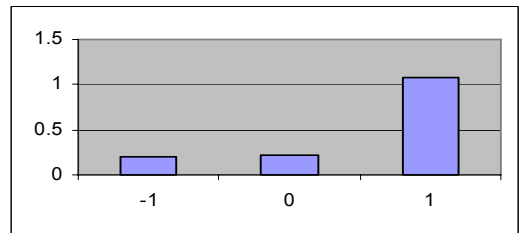
Explanations: see Figure A-1.

Figure A-3: Differences in mean product market reforms

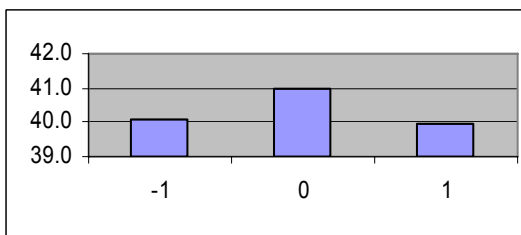
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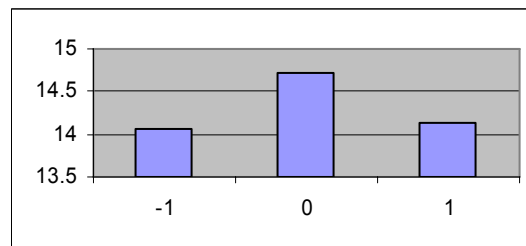
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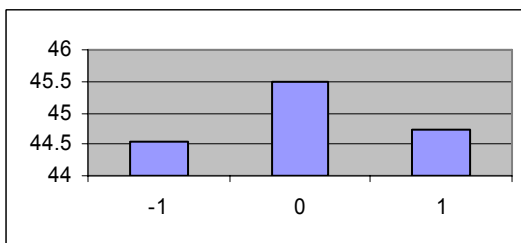
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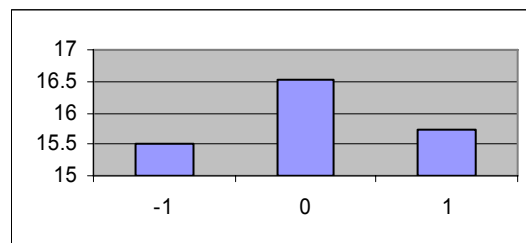
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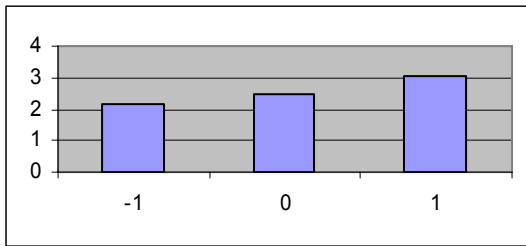
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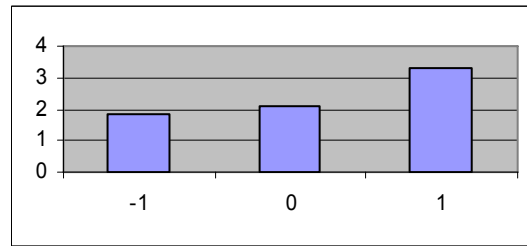
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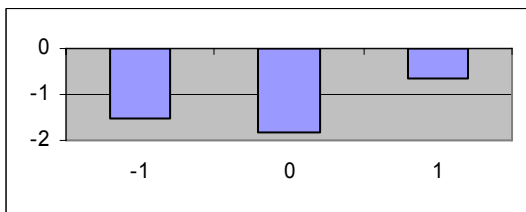
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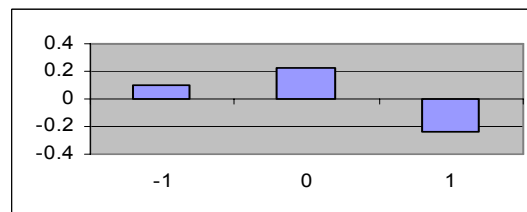
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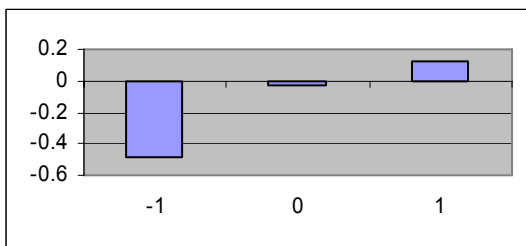
OUTPUTGAP



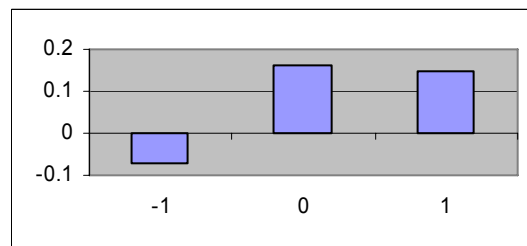
Δ UNEMPLOYMENT



CCONFST **



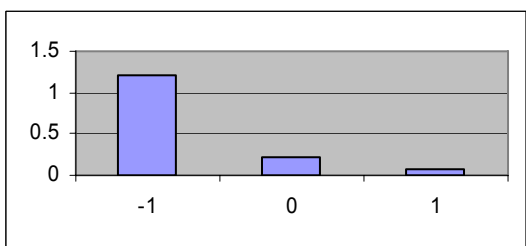
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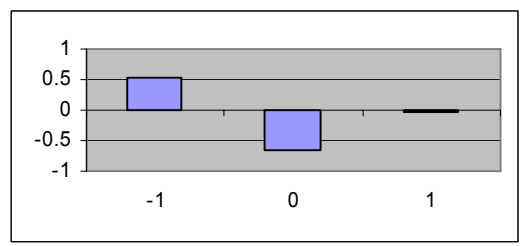
Explanations: see Figure A-1.

Figure A-4: Differences in mean tax reforms

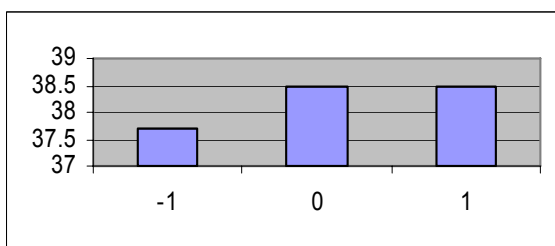
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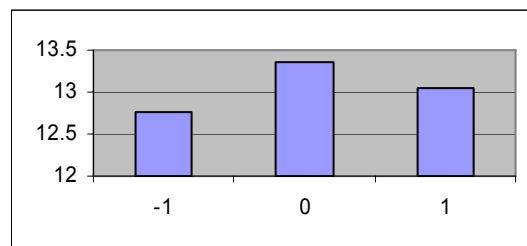
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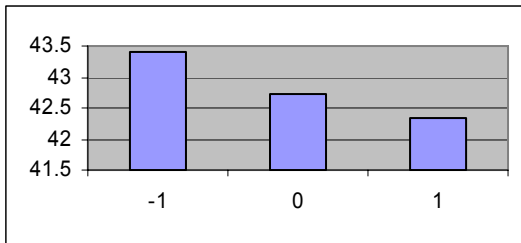
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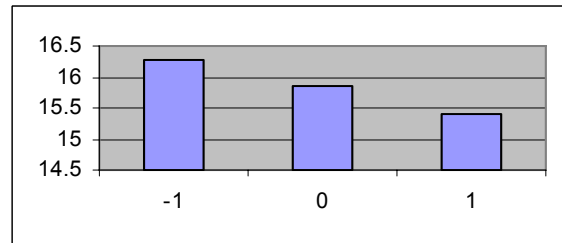
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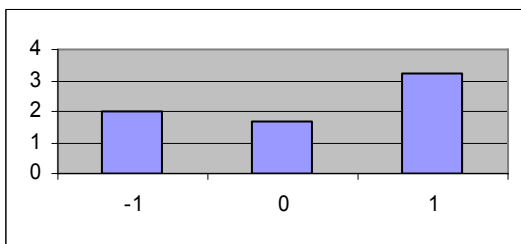
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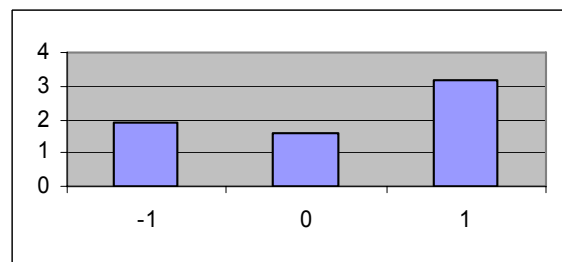
TYQA



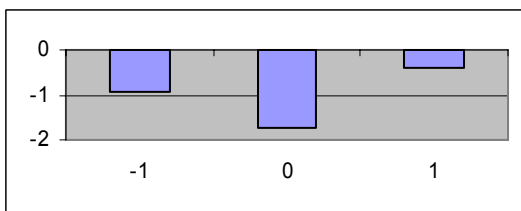
GROWTH ***



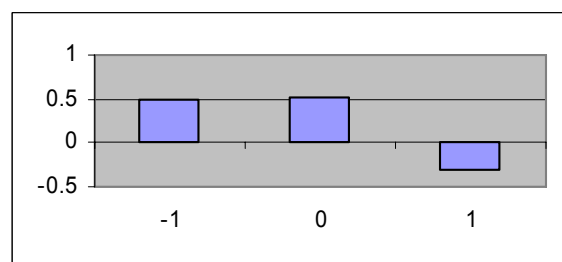
GROWTHFDDV ***



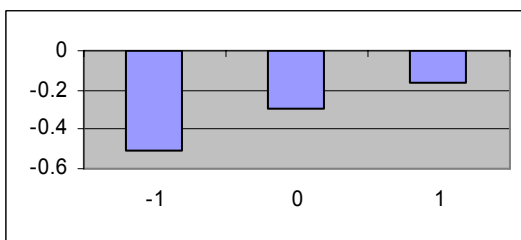
OUTPUTGAP



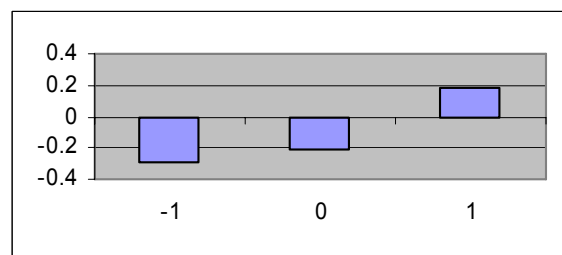
Δ UNEMPLOYMENT ***



CCONFST ***



BUSCONFST



Explanations: see Figure A-1.

FISCAL POSITIONS, FISCAL ADJUSTMENT AND STRUCTURAL REFORMS IN LABOUR AND PRODUCT MARKETS

by

Romain Duval⁶²

[Paper prepared for the conference on “Budgetary Implications of Structural Reforms” organised by the Directorate-General for Economic and Financial Affairs (DG ECFIN) of the Commission of the European Union on 2 December 2005]

1. Introduction

Many European countries, and in particular a number of those that belong to the euro area, are usually seen as being in need of structural reform. The symptoms include high unemployment and low labour-force participation (Figure 1). Contrary to some assertions, low employment in many euro-area countries is not predominantly the result of an idiosyncratic European taste for leisure but to a large extent reflects distortions created by policies and institutions.⁶³ Weak employment also strains government budgets which, in a context of population ageing, is not only undesirable but also may become unsustainable.

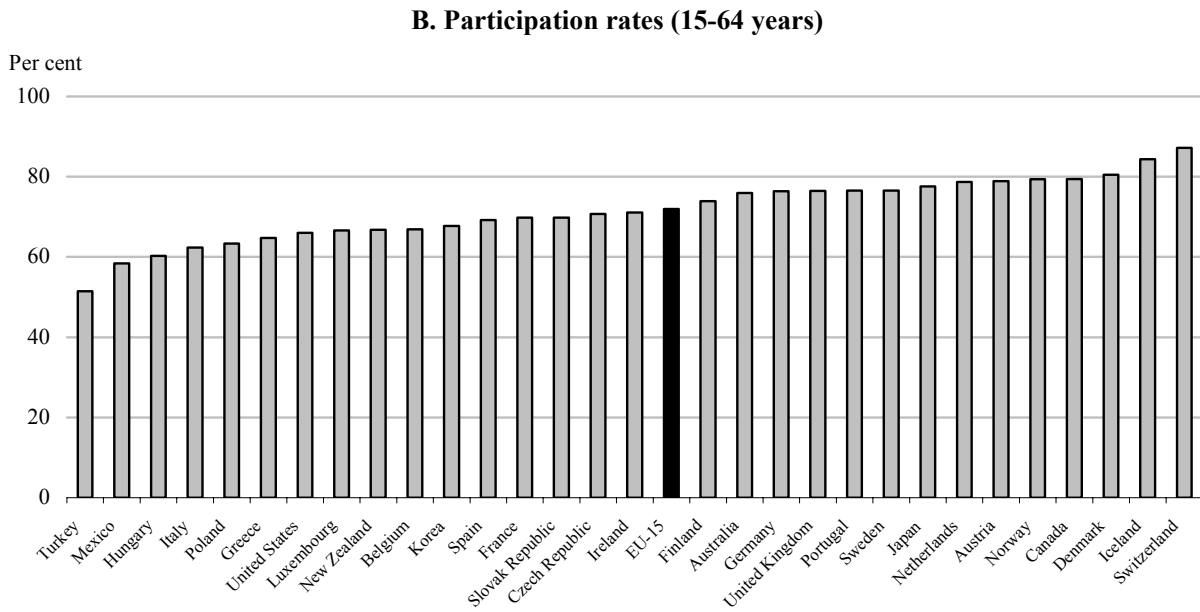
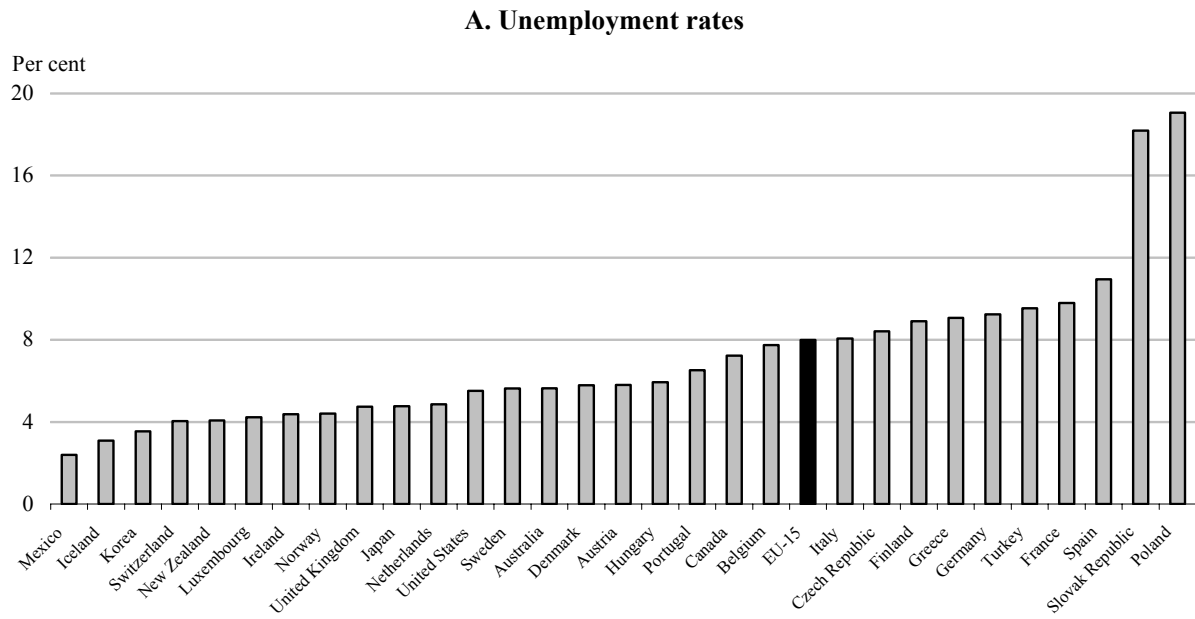
In many EU countries, low employment is accompanied by sub-par productivity levels.⁶⁴ There are many causes for weak productivity, but barriers to competition, reallocation and innovation created by structural policies in product, labour and financial markets are certainly among them. Indeed, in spite of progress over past decades, euro-area countries remain more afflicted by anti-competitive regulatory barriers than most English-speaking countries (Figure 2). This again underlines the need for structural policy reform.

⁶²Principal economist at the OECD Economics Department. This paper builds very heavily on another paper by Romain Duval and Jorgen Elmeskov on the effects of EMU on structural reforms (Duval and Elmeskov, 2005). Jackie Gardel, Lyn Urmston and Martine Levasseur provided secretarial and statistical assistance. The views and results presented in this paper are those of the author and do not necessarily reflect those of the OECD or its Member countries.

⁶³About half of the difference between the number of hours worked per capita in the United States and the “old” members of the European Union reflects lower participation rates and higher unemployment in Europe and these differences can to a large extent be explained by different policy settings (e.g. Duval, 2004; Jaumotte, 2004; and Elmeskov *et al.*, 1998). Moreover, part of the gap in the number of hours worked per employed may also reflect policy distortions (Prescott (2004) highlighted the effect of taxes which may affect labour supply along both the intensive and the extensive margin) even though market failure (e.g. asymmetric information, inter-personal complementarities in leisure consumption) could boost US hours beyond the social optimum (Landers *et al.*, 1996 and Alesina *et al.*, 2005).

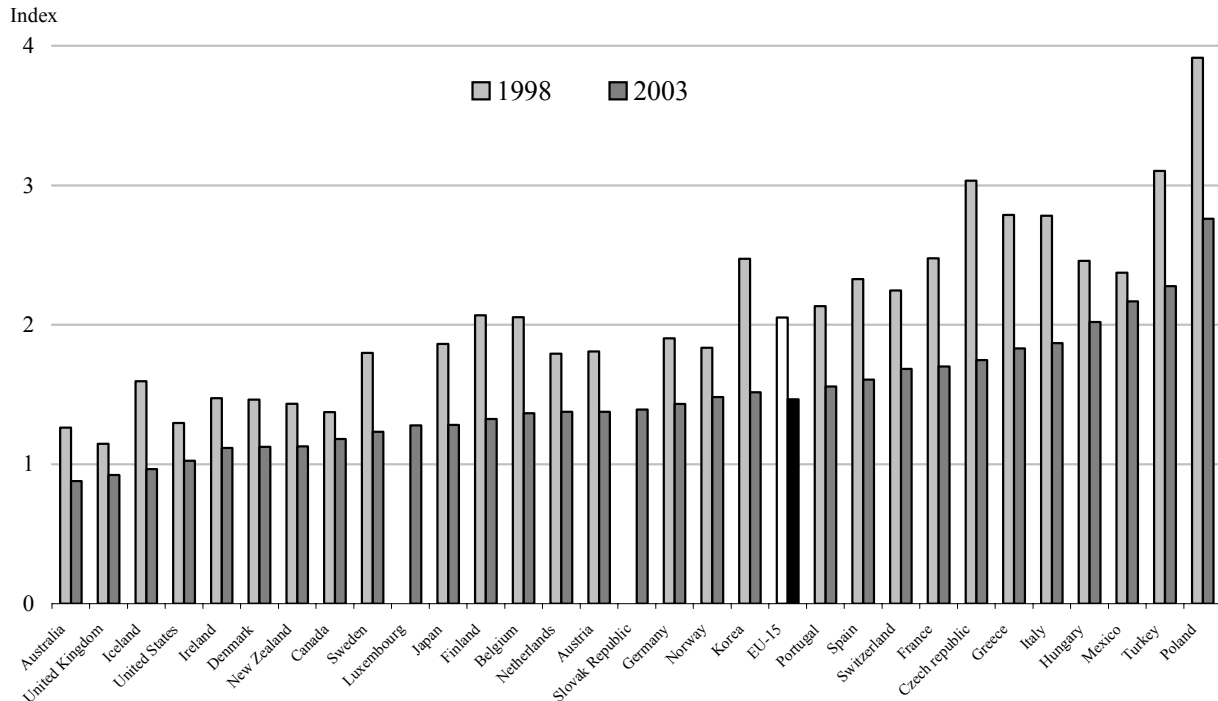
⁶⁴Observed hourly productivity in countries like Belgium and France is as high as or even higher than in the United States but, to a large extent, this reflects the exclusion of low-productive workers from the labour force (Bourles and Cette, 2005).

Figure 1. Unemployment and participation rates across OECD countries, 2004



Source : OECD.

Figure 2. Strength of anti-competitive product market regulation, 1998 and 2003



Note : The indicator of regulation is measured on a scale from 0 (most liberal) to 6 (most restrictive) and is described in Conway et al. (2005).

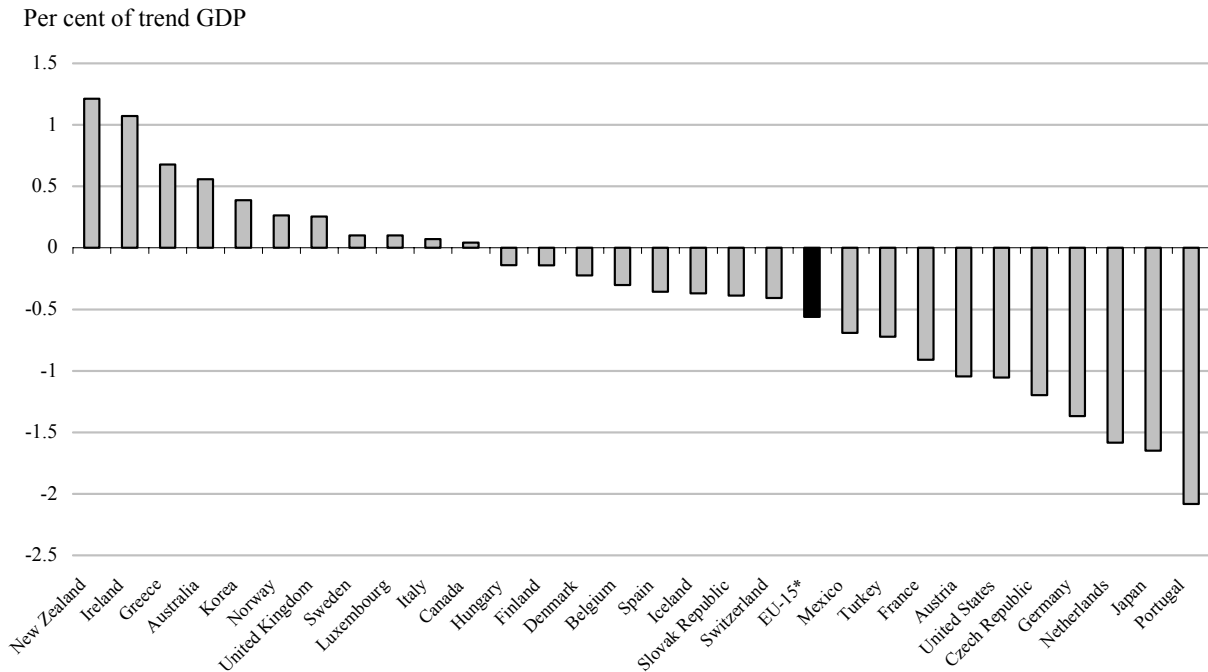
Source : OECD.

Recent episodes of conjunctural weakness in the EU, most prominently in the euro area, also point to a need for structural reform. Indeed, the euro area has exhibited less resilience than a number of non-euro-area countries in the face of a series of common shocks, which since the turn of the century have included the bursting of the IT bubble, corporate governance scandals, terrorist attacks and higher oil prices. It is obviously difficult to standardise across countries, but, nonetheless, it is hard to argue that differences in exposure to shocks or in macroeconomic policy stances between, on the one hand, the euro area and, on the other hand, Australia, Canada, New Zealand and the United Kingdom can account for the divergence in output gaps across the two country groups (Figure 3). These differences in resilience - which are also visible inside the euro area - probably reflect both different capacities to adjust to shocks and different responses to changes in monetary policy - *i.e.* differences in the strength of the monetary policy transmission mechanism.⁶⁵ Again, such differences are likely to reflect structural policy settings.⁶⁶

⁶⁵Recent work suggests that the monetary policy transmission mechanism in the euro area relies more heavily on effects via business investment, whereas in the United States effects via private consumption also contribute importantly (*e.g.* Angeloni *et al.*, 2003).

⁶⁶Catte *et al.* (2004) emphasise the role of structural policies affecting housing and mortgage markets in this regard.

Figure 3. Average output gaps 2001-2006



* GDP weighted average.

Source : Data and projections from OECD Economic Outlook 76.

It could of course be argued that current structural policy settings reflect a collective policy choice and that the associated weaknesses in terms of employment, productivity and resilience are just the price to be paid for this choice. This argument is often presented with reference to a particular European “social model”. In practice, however, there is no such thing as a single European model. Indeed, some smaller European countries combine structural policy settings that result in much better than average macroeconomic outcomes with social outcomes that are as good as or better than in the larger euro-area economies.⁶⁷ Hence, the argument that weak macroeconomic performance is the price to pay for better social outcomes does not ring true.

That said, structural reforms cannot generally be assumed to be Pareto improving. If they were, they would presumably be politically easy to undertake. Rather, structural reforms usually involve a reduction in rents and those who see their rent reduced can hardly be expected to be in favour. The case for structural reform thus rests on a weighing of the losses for those who see their rents reduced against the gains for others. It is a well-known feature of the political economy of structural reform that those who see their rent reduced tend to be easy to identify, to be exposed

to a significant loss, to feel the pain up-front and to be well organised (*e.g.* Olson, 1965). By contrast, the gains from reform accrue to no clearly identifiable group, are usually widely dispersed with limited benefit for each individual and often occur with a considerable delay. As a general observation, opportunity cost is not a concept that plays well in politics.

As a result of those features, structural reform is usually an uphill battle. This paper will not address in detail the overall incentives and disincentives to undertake structural reform. Rather, and more modestly, it deals with the possible impact of fiscal positions and fiscal adjustment on the political economy of structural reform in product and, in particular, labour markets. In this regard, two *caveats* are in order.

First, putting the main focus on labour markets is justified by some of the main obstacles to euro-area growth and employment being related to labour-market policies.⁶⁸ At a more mundane level, and relevant for the empirical part of the paper, more information is available for a wider range of policies over a longer period as concerns labour markets than is the case for most policies directly affecting product and financial markets. However, the focus on labour markets should not be taken to imply that reforms in other markets are unimportant. Second, despite the emphasis on the role of fiscal policy, other general arguments concerning the political economy of structural reform are likely to retain a major role in terms of either facilitating or hindering structural reform.

The paper proceeds by reviewing in Section 2 some of the arguments that have been put forward as to how the state of public finances may affect the political economy of structural reform. Section 3 then provides some descriptive evidence based on recent OECD work on labour and product market reforms. Section 4 proceeds to an econometric investigation of the impact that fiscal positions and/or fiscal adjustment may have on the propensity to undertake structural reform. Finally, Section 5 sums up the evidence and concludes.

2. Arguments linking structural reform intensity to fiscal positions

2.1 Fiscal position and structural reforms

A sound fiscal situation should facilitate the implementation of structural reforms, for at least three reasons:

- A budgetary cushion provides room for compensation of losers who would otherwise block reforms.
- A poor state of public finances is likely to force governments to spend their political capital on unpopular fiscal adjustment measures, leaving them with less ability and/or

67. This is the case whether hard indicators, such as poverty rates, or soft indicators, such as surveys of happiness, are considered (OECD, 2005a).

68. OECD (2005b) uses a consistent procedure to derive policy priorities to enhance economic growth across OECD countries and identifies labour market reforms as being particularly important in euro-area countries.

willingness to undertake structural reforms. By contrast, sound fiscal positions mean less need for fiscal adjustment and thus more room for reforms.

- The stronger the initial fiscal position, the greater the room is for fiscal policy to crowd in resources in the wake of any structural reform that expands potential output but is not necessarily accompanied by a corresponding expansion in aggregate demand. The case for fiscal accommodation is most compelling for those reforms that change an economy's structural rate of employment, since such reforms would improve the cyclically-adjusted budget balance corresponding to a given actual budget balance and employment rate.⁶⁹ Put differently, not changing the actual budget balance post-reform and before employment has had time to adjust would imply an effective tightening of fiscal policy.

This crowding-in argument needs to be qualified in a number of ways, however:

- Other mechanisms exist that allow the added supply capacity to be “crowded in”. In a single country with an independent monetary policy, lower interest rates and exchange rate depreciation could in principle boost demand and thereby allow the added supply capacity to be “crowded in”. In a monetary union such as the euro area, the main – but slower – mechanism for crowding in added supply is a lower real exchange rate brought about by a period of slack and associated weak inflation. Given the nature of this latter mechanism, the up-front costs of structural reform in a monetary union should be greater in large, relative closed economies than in smaller, more open economies. This hints at possible interactions between monetary policy autonomy and the fiscal position in facilitating or hindering the reform process. In particular, the greater the ability of monetary policy to crowd in resources in the wake of structural reforms, the smaller the need should be for fiscal accommodation, and *vice versa*.
- The basic premise of the argument – that demand does not spontaneously expand in response to added supply as a result of structural reform – is not straightforward. In principle, rational and forward-looking households and firms should respond up-front to the increase in, respectively, permanent income and output. The extent to which this would happen in practice might depend on features of financial markets - in particular the extent to which households enjoy wealth gains from higher share prices and firms are able to secure financing on the basis of future production possibilities rather than pre-existing collateral. In general, such spontaneous demand effects are likely to be weaker in euro-area countries than in the United States, as also suggested by the experience of the 1990s.
- It is also the case that the balance between supply and demand effects of structural reform is likely to depend on the nature of the structural reforms. Experience from many countries suggests that structural reforms that remove restrictions in financial markets may well stimulate demand more than supply in the short run. By contrast, it might be thought that reforms in labour markets are susceptible to weaken demand in the short run to the extent they may be associated with reduced public transfers and increased

⁶⁹Reforms differ in their impact on budgets. Reforms that boost productivity without raising equilibrium employment will have only limited impacts on the cyclically-adjusted budget balance unless transfer recipients and public-sector employees do not share fully in the real income gains created by higher productivity.

precautionary saving. This is evidently of particular concern since reform within the EU needs to be concentrated in labour markets.⁷⁰

- The argument obviously rests on the assumption that private saving behaviour does not fully offset changes in fiscal policy. Recent pooled cross-country time-series estimation across OECD countries suggests that the private saving offset to changes in cyclically-adjusted budget balances could be about half in the first year, rising to some 70% in the long run (OECD, 2004b). Tests suggest that the only significant exception to this pattern is to be found outside the euro area (the United States).

2.2 Change in the fiscal position and structural reforms

By the same token, a positive *change* in the fiscal balance –*i.e.* fiscal adjustment– could reduce the probability of reform, for the same reasons that the *level* of the fiscal balance can be expected to increase it: implementing reforms may require a temporary deterioration of the budgetary situation in order to compensate losers; efforts to improve the fiscal situation often entail political costs that may hamper the ability of governments to implement other types of unpopular measures such as structural reforms; fiscal adjustment may depress aggregate demand at a time when the implementation of structural reforms would on the contrary require additional resources to be crowded in (see Section 2.1 above).

3. Labour and product market reforms over the period 1994-2004⁷¹

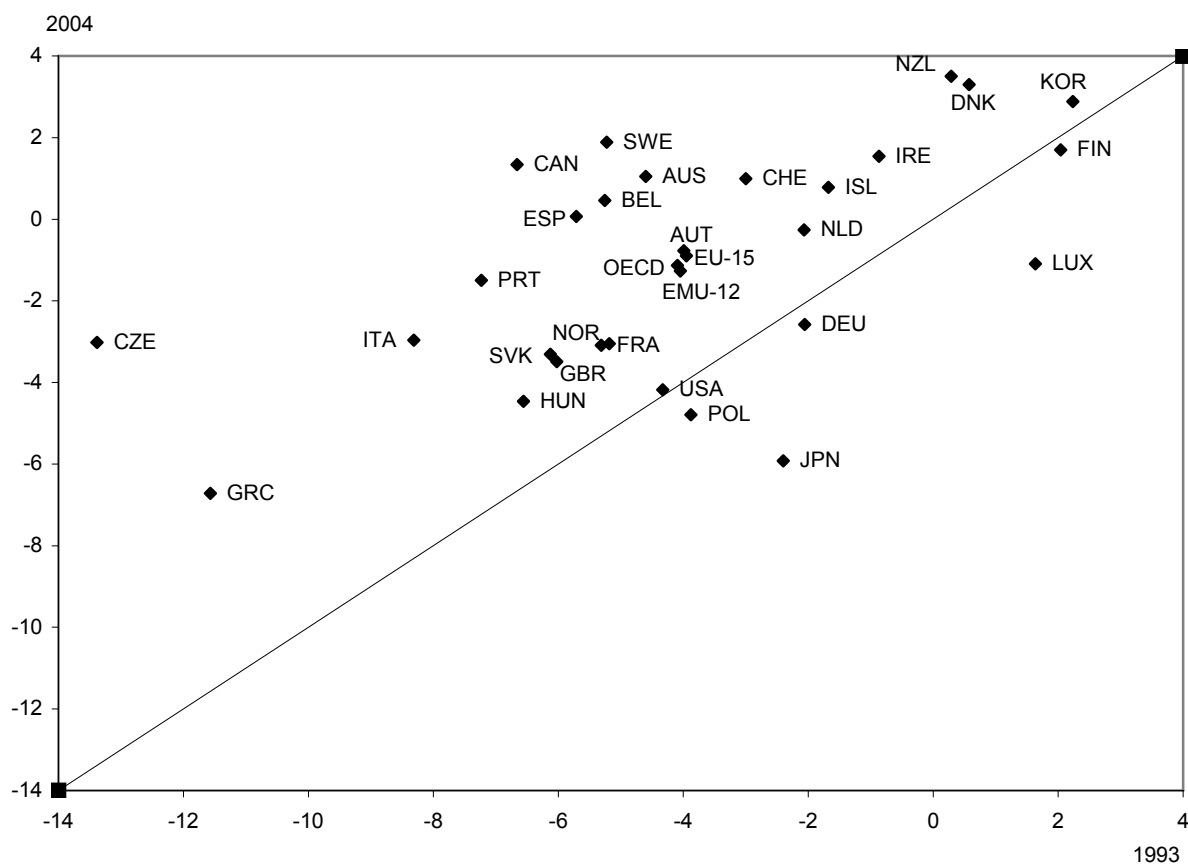
This section uses OECD indicators to examine recent structural reform patterns. In particular, it aims to shed light on possible links between fiscal positions and the intensity and design of the process of structural reform. As background information for the discussion below, Figure 4 presents a brief overview of fiscal policy patterns across OECD countries over the period 1993-2004.⁷² Overall, the Figure shows that cyclically-adjusted budget balances have improved in most OECD countries during the past decade. No significant differences –in terms of both the level of and the change in the fiscal stance– can be observed between EU and other OECD countries.

⁷⁰ Empirical evidence on the current-account effects of structural reform seems to corroborate these differences across types of structural reform (Kennedy and Sløk, 2005).

⁷¹ In this, as well as the following, section, EU refers to the 15 members before the recent expansion of membership.

⁷² This period is chosen so as to match the period covered by the database on labour market reforms (see below).

Figure 4. Evolution of the cyclically-adjusted government fiscal surplus,* 1993-2004



*: Cyclically-adjusted government net lending, in % of GDP. Source: OECD Economic Outlook 77, 2005.
 No cyclical adjustment for Czech Republic, Hungary, Korea, Luxembourg, Poland and the Slovak Republic.
 The period covered is 1994-2004 for Slovak Republic and 1995-2004 for Czech Republic and Poland.
 The Czech deficit for 1995 includes a large capital transfer from voucher privatisation worth nearly 10% of GDP.

3.1 Overall intensity and timing of labour market reforms

As part of the ongoing reassessment of its recommendations to address issues of high unemployment and low labour-force participation, the OECD has recently carried out a thorough assessment of recent labour market reforms (Brandt, Burniaux and Duval, 2005), on which this section relies heavily. All policy measures implemented by OECD member countries over the period 1994-2004 have been evaluated for 44 possible individual categories falling under seven broad policy areas:⁷³

- active labour market policies (ALMPs)
- taxes and social security contributions
- employment protection legislation (EPL)

⁷³.For full details, see Brandt, Burniaux and Duval (2005).

- unemployment benefit systems
- wage formation and industrial relations
- working-time flexibility and part-time work
- old-age pension systems and early retirement schemes

In each of the 44 individual policy categories, scores are assigned to reforms for every OECD country and each of the two sub-periods 1994-98 and 1999-2004.⁷⁴ They can be either positive or negative, depending on whether the measure considered is in line or at odds with the general thrust of OECD policy recommendations, as summed up in OECD (1999). The results are then aggregated up to the seven broader policy areas above.

Whenever possible, the scoring method at the level of individual policy categories relies on quantitative indicators, with the score of an individual policy measure depending on the associated change in the relevant indicator. For example, changes in the OECD summary measure of unemployment benefits are used to assign a score in the sub-category “benefit replacement rates” of the broader area “unemployment benefit systems”. However, in certain cases, sources of information are qualitative and their interpretation is more subjective (*e.g.* some aspects of ALMPs). More broadly, some degree of uncertainty and judgement is inherent to any effort to quantify individual reforms and, perhaps even more so, to aggregate such quantifications across different policy instruments.⁷⁵

Bearing these *caveats* in mind, illustrative indicators of reform intensity within each of the seven policy areas can be calculated as the ratio of the actual to the maximum possible score, where the latter is the score which would be obtained if maximum scores had been reached at the level of all individual policy categories belonging to the relevant policy area. In addition, an illustrative indicator of the overall intensity of reforms is calculated as the ratio of the total actual score across the seven broad policy areas to the maximum possible score.⁷⁶

Aggregate results for the entire period 1994-2004 are presented in Figure 5 (Panel A). On average, the propensity to carry out labour market reforms has been greater in EU than in other OECD countries, with six EU countries in the top six positions. Still, this progress has to be seen in light of the greater scope and need for reform within the EU and, in particular, EMU. Indeed, a noticeable feature of recent reform patterns within the euro area is their apparent lack of relationship with initial conditions. Based on rankings across all OECD countries of initial

⁷⁴The scores assigned for the period 1999-2004 incorporate all legislated reforms up to mid-2004, even though some of these may not yet have been fully implemented (*e.g.* some aspects of the Agenda 2010 in Germany, or various pension reforms that are phased in slowly).

⁷⁵Problems include: *i*) the degree to which a given reform is actually enforced may differ widely across countries; *ii*) no account is made for the possibility of non-linear policy effects (*i.e.* the possibility that a given reform may have different impact on labour markets depending on the initial policy stance in the area considered) and policy complementarities; and, *iii*) sets of weights have to be assigned to individual policy categories in order to compute aggregate scores in broader policy fields.

⁷⁶Extensive testing shows that the ranking of countries in terms of overall reform intensity can be sensitive to the choice of weights attached to the scores in individual policy categories (see Brandt, Burniaux and Duval, 2005).

NAIRUs (in ascending order) and subsequent reform intensities (in descending order), those euro-area countries where reforms were arguably most needed have not necessarily acted more decisively, and *vice versa* (Figure 6, Panel A). Comparatively, and in line with the results of van Poeck and Borghijs (2001), structural policies in other OECD countries seem to have been more responsive to needs for reform (Figure 6, Panel B). Furthermore, reforms have been much more modest in the areas of EPL and employment benefits⁷⁷ where political resistance is likely to be greater, pointing to the role played by political economy considerations in shaping recent reform patterns both in the EU and the rest of the OECD (Table 1).

In terms of dynamics, it is worth pointing out that the advent of EMU did not coincide with an acceleration of labour market reforms, as shown by the lower average reform intensity in EMU countries over 1999-2004 compared with 1994-98 (Figure 5, Panel B).⁷⁸ No such slowdown was observed in non-EMU EU (Denmark, Sweden, United Kingdom),⁷⁹ and it was less pronounced in other OECD countries. Nevertheless, one cannot rule out that the fairly high reform intensity observed in EMU countries during the period 1994-98 was itself fostered by expectational effects of EMU. The time span covered here is too short to explore this possibility.

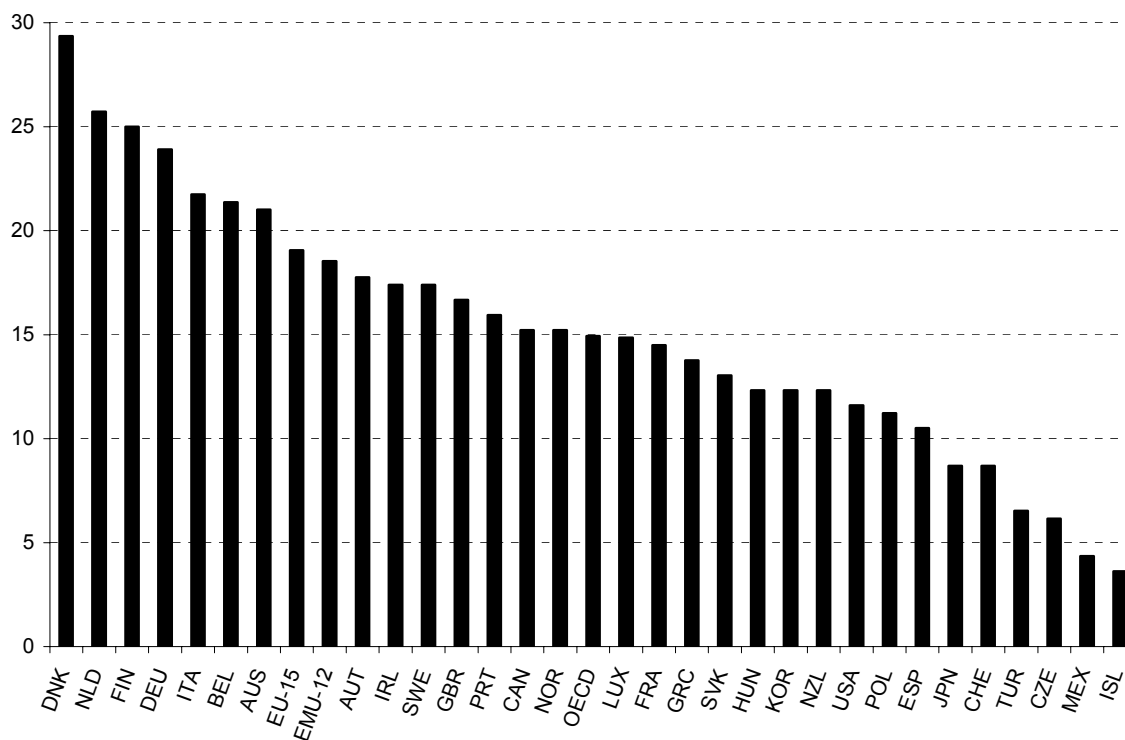
77. Within each of these “difficult” areas, reform profiles also reflected hesitancy to confront insider interests. For example, most of the countries that reformed their EPL did so by easing regulations on fixed-term employment contracts, while generally refraining from lowering EPL for permanent workers (See Duval and Elmeskov, 2005). Likewise, countries which reformed their unemployment benefit systems often tightened eligibility criteria, conditioned benefit receipt on participation in training and/or reduced associated work disincentives, but they typically did not move far in terms of reducing benefit replacement rates and duration or enforcing stricter work-availability criteria. Taking the two areas together, there is no obvious pattern differentiating EU countries from others when it comes to challenging or avoiding entrenched insider positions.

78. This finding contrasts with the descriptive results obtained by Bertola and Boeri (2001) for a smaller range of policy fields (cash transfers to people of working age –including unemployment benefits– and job protection only) over a shorter period (up to 1999).

79. Not too much should be made of this finding, however, since the non-EMU EU group consists of only three countries, among which the top reformer (Denmark) has its currency tied to the euro (through the new exchange-rate mechanism, ERMII).

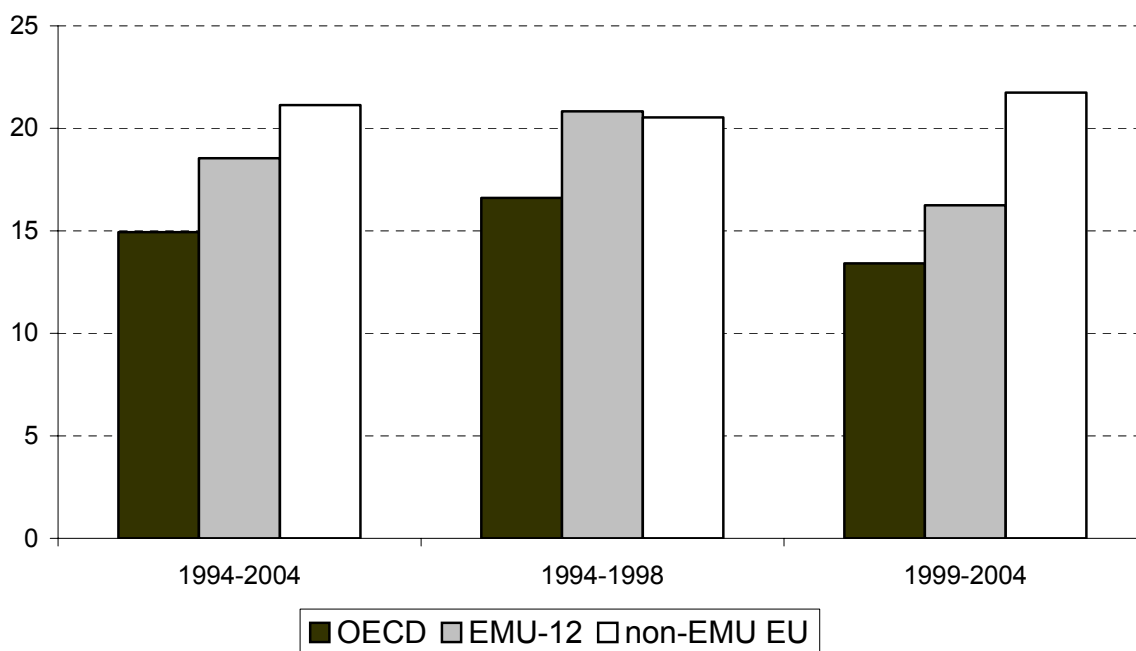
Figure 5. Illustrative evaluation of the intensity of recent labour market reforms in OECD countries (per cent of maximum possible score)

Panel A. Overall intensity of labour market reforms in individual OECD countries, 1994-2004



Source: Brandt, Burniaux and Duval (2005).

Panel B. Timing of recent labour market reforms in EU, EMU and OECD countries



Source: Author's adaptation based on Brandt, Burniaux and Duval (2005).

Table 1. **Aggregate reform intensity indicator, reform intensity indicators by area: 1994-2004**

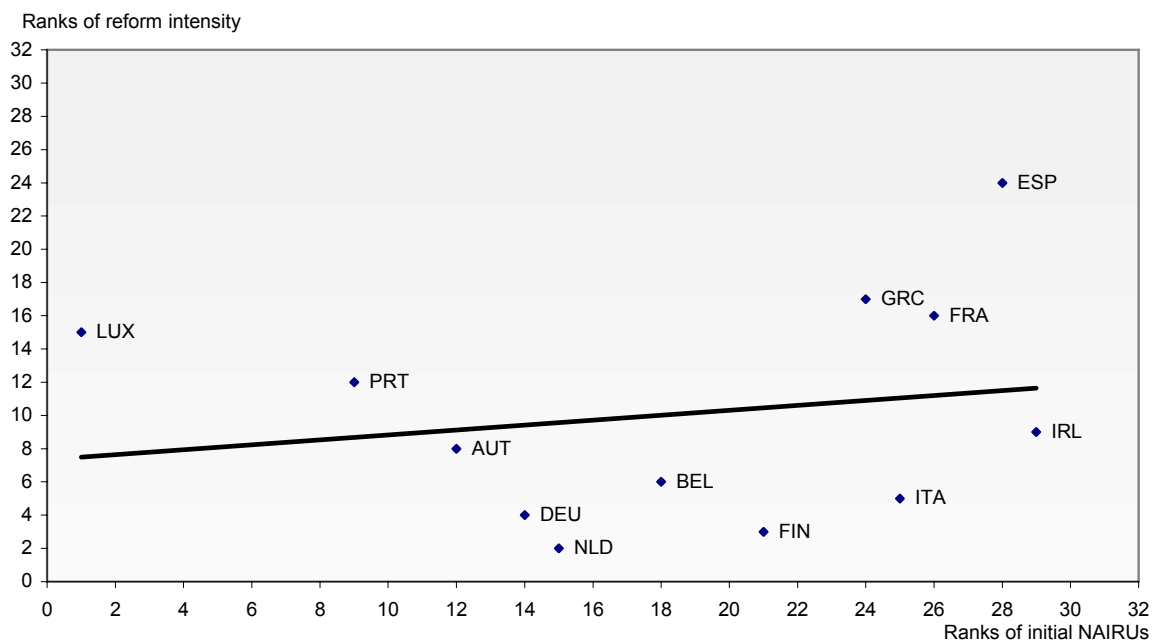
Summary reform intensity indicator ²			Reform intensity indicator by area ¹						
Score	Ranking		Active labour market policies	Taxes and social security contributions	Employment protection legislation	Unemployment benefit system	Wage formation and industrial relations	Working-time flexibility and part-time work	Early retirement, invalidity and old-age pension schemes
Australia	21.0	7	54	25	-7	19	27	0	17
Austria	17.8	8	15	31	13	23	2	17	33
Belgium	21.4	6	40	44	10	15	5	33	17
Canada	15.2	13	38	13	0	23	0	17	17
Czech Republic	6.2	28	17	0	-3	12	-5	-17	33
Denmark	29.3	1	56	13	10	42	27	17	25
Finland	25.0	3	48	13	13	35	0	17	50
France	14.5	16	42	31	-7	0	-5	33	42
Germany	23.9	4	58	13	17	19	9	17	25
Greece	13.8	17	42	13	7	12	5	17	-8
Hungary	12.3	19	31	25	-7	19	-9	0	33
Iceland	3.6	30	19	-38	0	19	0	0	8
Ireland	17.4	9	46	88	-10	15	-14	0	0
Italy	21.7	5	31	56	23	-12	5	33	50
Japan	8.7	25	23	-13	13	4	0	33	8
Korea	12.3	19	27	0	25	8	0	17	8
Luxembourg	14.9	15	33	38	0	4	-5	33	33
Mexico	4.3	29	8	0	0	0	14	17	0
Netherlands	25.7	2	56	25	13	12	14	33	42
New Zealand	12.3	19	42	19	-13	15	-5	0	33
Norway	15.2	13	46	-19	10	27	0	17	8
Poland	11.2	23	29	0	-3	15	5	17	25
Portugal	15.9	12	23	25	17	8	5	33	17
Slovak Republic	13.0	18	12	25	14	19	0	17	8
Spain	10.5	24	8	19	17	8	7	0	8
Sweden	17.4	9	50	13	13	12	5	0	8
Switzerland	8.7	25	23	6	0	15	0	17	0
Turkey	6.5	27	4	0	13	8	0	33	8
United Kingdom	16.7	11	50	56	-10	12	-9	0	25
United States	11.6	22	19	50	0	12	0	0	0
OECD average	14.9	15.3	33.0	19.0	5.6	14.0	2.6	15.0	19.2
EU-15 average	19.1	9.5	39.9	31.7	8.4	13.6	3.3	18.9	24.4
EMU-12 average	18.5	10.1	36.9	32.8	9.4	11.5	2.3	22.2	25.7
non-EMU EU	21.1	7.0	51.9	27.1	4.4	21.8	7.6	5.6	19.4

1: all reform intensity indicators are expressed as a percentage of the maximum possible score, i.e. the score that would be obtained if all possible reforms were implemented. See main text for details.

Source: Brandt, Burniaux and Duval (2005).

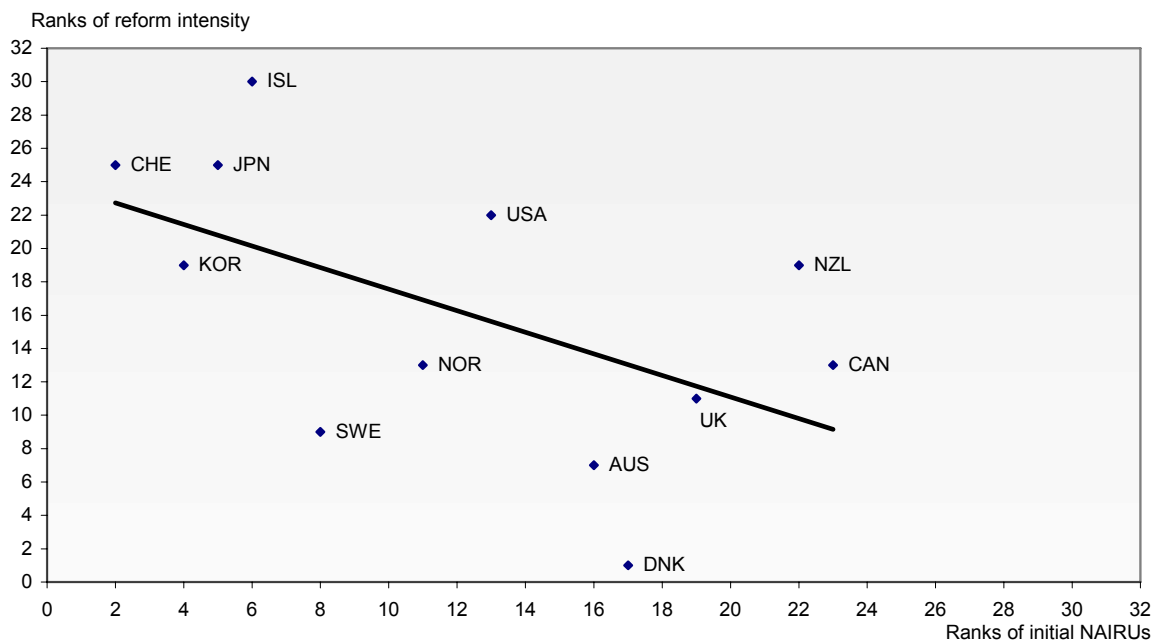
Figure 6. Initial conditions and intensity of labour market reforms

Panel A. Ranks of initial NAIURs¹ and ranks of reform intensities over 1994-2004: EMU countries



(Spearman's rank) correlation coefficient: 0.19

Panel B. Ranks of initial NAIURs¹ and ranks of reform intensities over 1994-2004: non-EMU, non-transition countries



(Spearman's rank) correlation coefficient: -0.55 *

1. Nairu estimates for 1993.

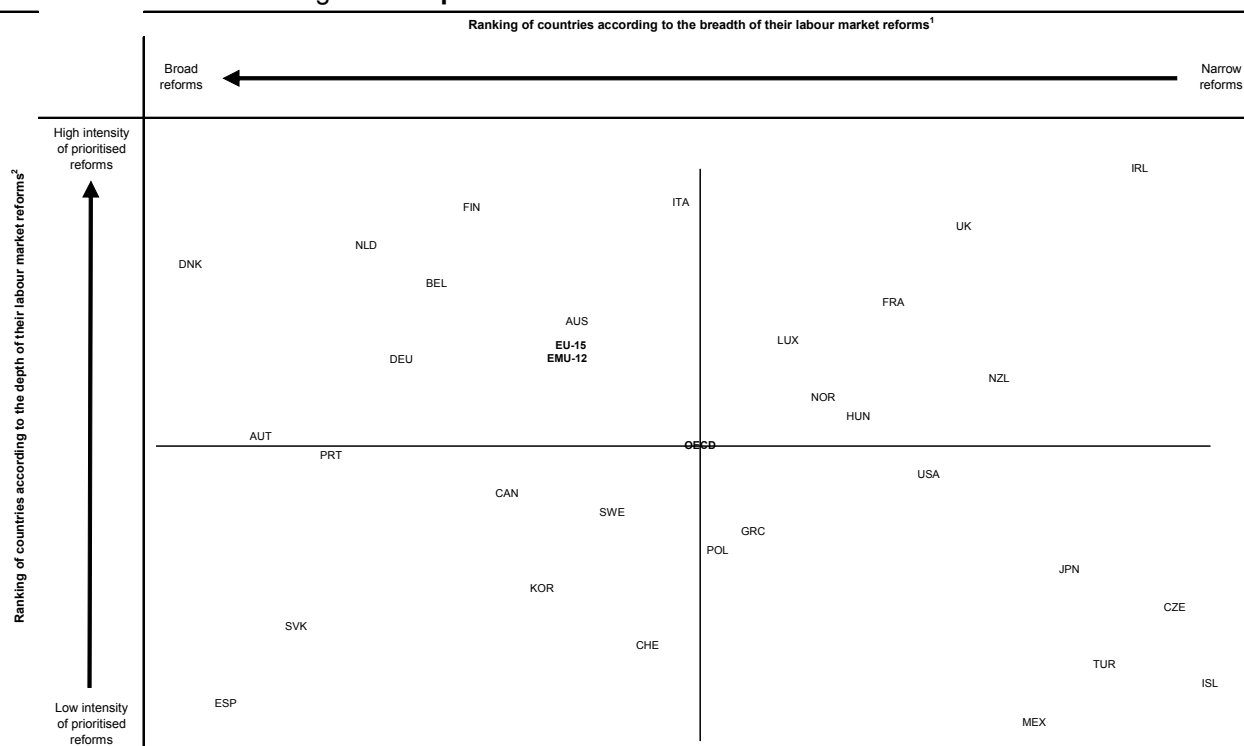
* significant at 10% level; ** significant at 5% level.

Source: Author's adaptation based on Brandt, Burniaux and Duval (2005).

3.2 Strength versus comprehensiveness of reforms

Both theoretical and empirical evidence suggests that policy interactions can be important and that comprehensive reform packages tend to be more effective than “piece-meal” reforms in improving labour market outcomes.⁸⁰ Figure 7 classifies OECD countries according to the breadth and depth of their reforms, in what may be regarded as a rough decomposition of the overall reform intensity indicator along the two dimensions.⁸¹ The breadth of reforms in each country is approximated here by the standard deviation of reform intensities across the seven areas mentioned previously: the lower the standard deviation, the more uniform are reform intensities and the broader is the reform process. Depth is defined as the magnitude of the reform effort in the main areas targeted by the country, measured as the average reform intensity across the three areas (among the seven covered in the aggregate reform intensity indicator) in which measured reform intensity is highest.⁸²

Figure 7. Depth and breadth of labour market reforms



1. The breadth of reforms is measured as the normalised standard deviation of reform intensities across areas (the lower the standard deviation, the more uniform reform intensities are across areas).
 2. The depth of labour market reforms is measured as the average reform intensity across the three areas in which the country's reform effort has been strongest.
 Source: Brandt, Burniaux and Duval (2005).

80. For a theoretical framework stressing the importance of policy interactions, see Coe and Snower (1997). For empirical evidence, see for instance Belot and Van Ours (2000) or Elmeskov *et al.* (1998). As previously mentioned, complementarities may also exist as regards the political economy of reform.

81. For example, behind the broadly similar value of the overall indicator for Austria and the United Kingdom lie in fact very different compositions of reform, as Austria undertook moderate efforts spread over a wide range of areas while the United Kingdom carried out major reforms concentrated on two areas (labour taxes and ALMPs).

82. Considering the two – rather than three – highest reform intensities would alter only marginally the ranking of countries.

On these criteria, Denmark, Finland and the Netherlands stand out for having made deep policy reforms in a wide range of areas since the mid-1990s, opening up for possible synergies.⁸³ From a broader perspective, it is remarkable that the vast majority of countries located in the upper left quadrant of Figure 7 are EU members. At the same time, virtually no EU country - with the exception of Greece - is located in the lower right quadrant. This suggests that relative to the OECD average a number of EU countries have pursued both far-reaching and comprehensive reform strategies, while only few have confined themselves to either minor reforms or reforms covering only a small number of areas.

3.3 Fiscal policy patterns and labour market reforms: preliminary evidence

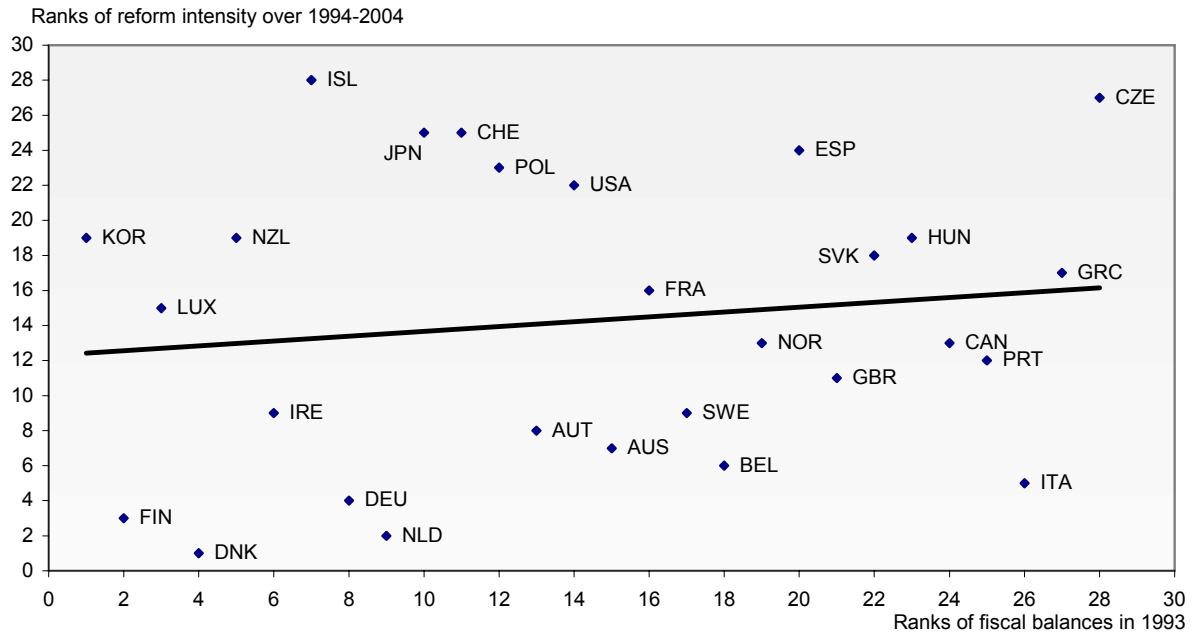
Over and above the usual caveats that apply to simple correlation analysis, any descriptive study is likely to be further complicated by the fact that any causal relationship between fiscal positions and the propensity to undertake reforms runs in both directions. In order to minimise this problem, Panel A of Figure 8 plots the cyclically-adjusted fiscal balances in 1993 –i.e. before the period under study– against subsequent reform intensity over the period 1994-2004. While positive, the correlation is insignificant at conventional confidence levels (p-value = 0.45). Considering reform intensity over the shorter period 1994-1998 yields a larger but still insignificant correlation (p-value = 0.16).

Still, the correlation becomes statistically significant when only EU countries are considered (Figure 8, Panel B). Likewise, it may not be a coincidence that the fiscal positions of top reformers (Denmark, Finland, the Netherlands and Germany to a lesser extent, New Zealand if the major reforms of the early 1990s had been taken into account) were among the most favourable across the OECD back in 1993.

83. New Zealand would have fallen in the same category if the major reforms undertaken in the early 1990s, in particular within the context of the 1991 Employment Contracts Act, had been taken into account.

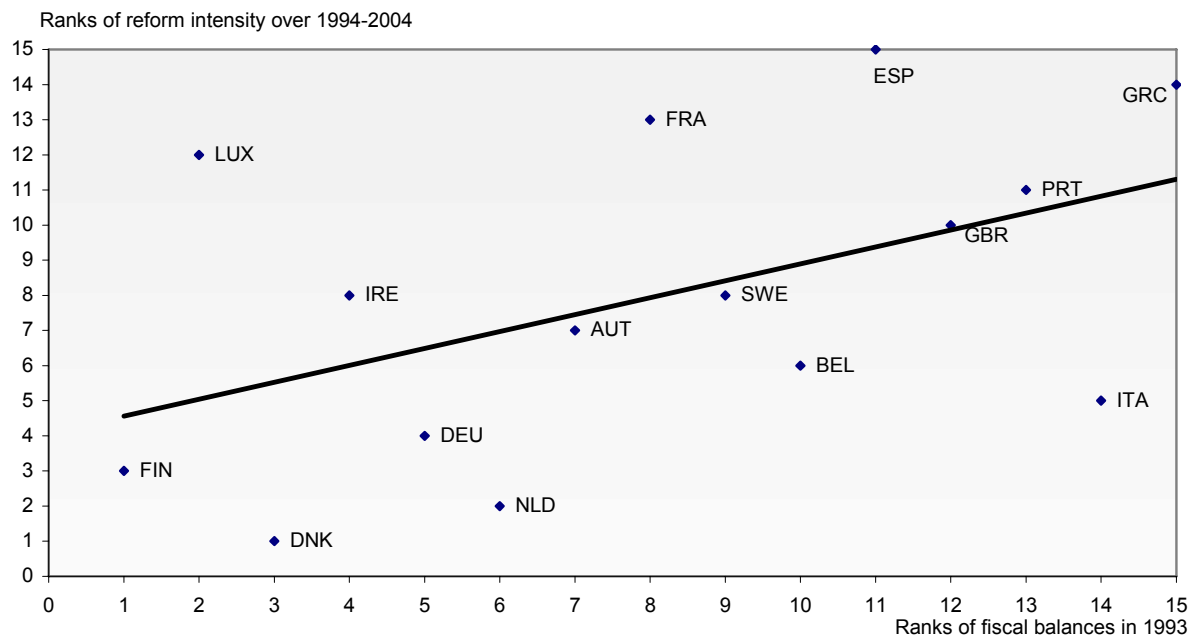
Figure 8. Fiscal positions and intensity of labour market reforms

Panel A. Ranks of initial fiscal positions¹ and ranks of reform intensities over 1994-2004: OECD countries



(Spearman's rank) correlation coefficient: 0.14

Panel B. Ranks of initial fiscal positions¹ and ranks of reform intensities over 1994-2004: EU-15 countries



(Spearman's rank) correlation coefficient: 0.48 *

1. Rankings of cyclically-adjusted fiscal surpluses in 1993 (1995 for Czech Republic and Poland, 1994 for Slovak Republic).

* significant at 10% level; ** significant at 5% level.

Source: Author's calculations.

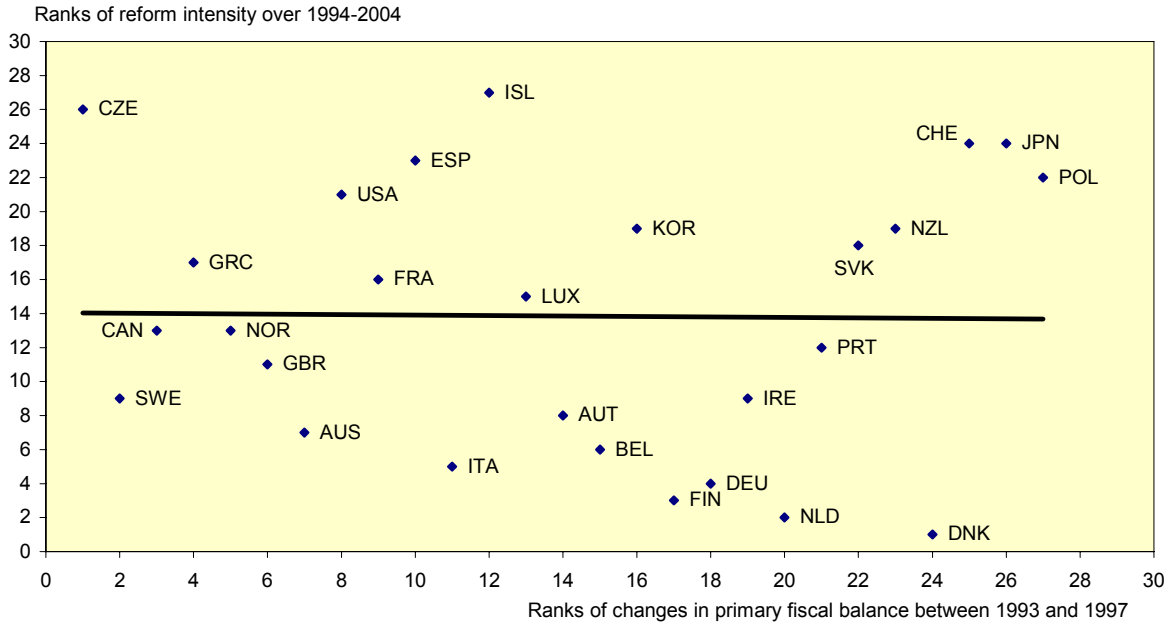
The cross-country correlation between the change in cyclically-adjusted primary fiscal balances over 1993-1997⁸⁴ and reform intensity over 1994-2004 is insignificant across the OECD (Figure 9, Panel A), but becomes significant when only EU countries are considered (Figure 9, Panel B).⁸⁵ Furthermore, it is worth noting that most top reformers have gone through a smaller fiscal adjustment process than other OECD countries during the first half of the period 1993-2004 (Denmark, Netherlands and, to a lesser extent, Finland and Germany). Likewise, weak reform intensity in certain euro-area countries might to some extent reflect the limited political capital governments were left with during the period of fiscal adjustment in the run-up to EMU (Greece and Spain over the 1993-1997 period; Italy in the late 1990s (not apparent in Figure 9)).

84. The change in the *primary* balance is used here in order to get a more accurate measure of fiscal adjustment. Also, fiscal adjustment is measured over 1993-1997 instead of 1993-2004 in order to minimise endogeneity problems that arise from the gradual, positive feedback effects of structural reforms on fiscal positions.

85. Other combinations (correlations over various periods, lagged correlations) also yield insignificant correlation coefficients.

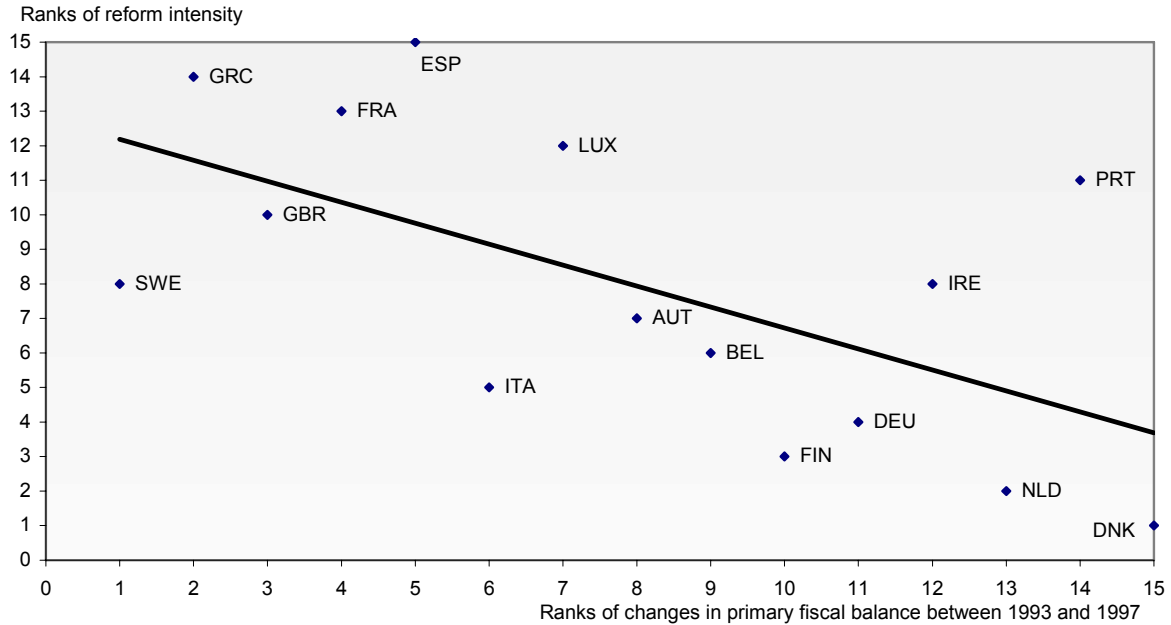
Figure 9. Change in primary fiscal positions and intensity of labour market reforms

Panel A. Ranks of changes in primary fiscal positions¹ over 1993-1997 and reform intensities over 1994-2004: OECD



(Spearman's rank) correlation coefficient: -0.01

Panel B. Ranks of changes in primary fiscal positions¹ over 1993-1997 and reform intensities over 1994-2004: EU-15



(Spearman's rank) correlation coefficient: -0.61 **

1. Rankings of changes in cyclically-adjusted primary fiscal surpluses between 1993 and 1997 (1995-1997 for Czech Republic and Poland, 1994-1997 for Slovak Republic).

* significant at 10% level; ** significant at 5% level.

Source: Author's calculations.

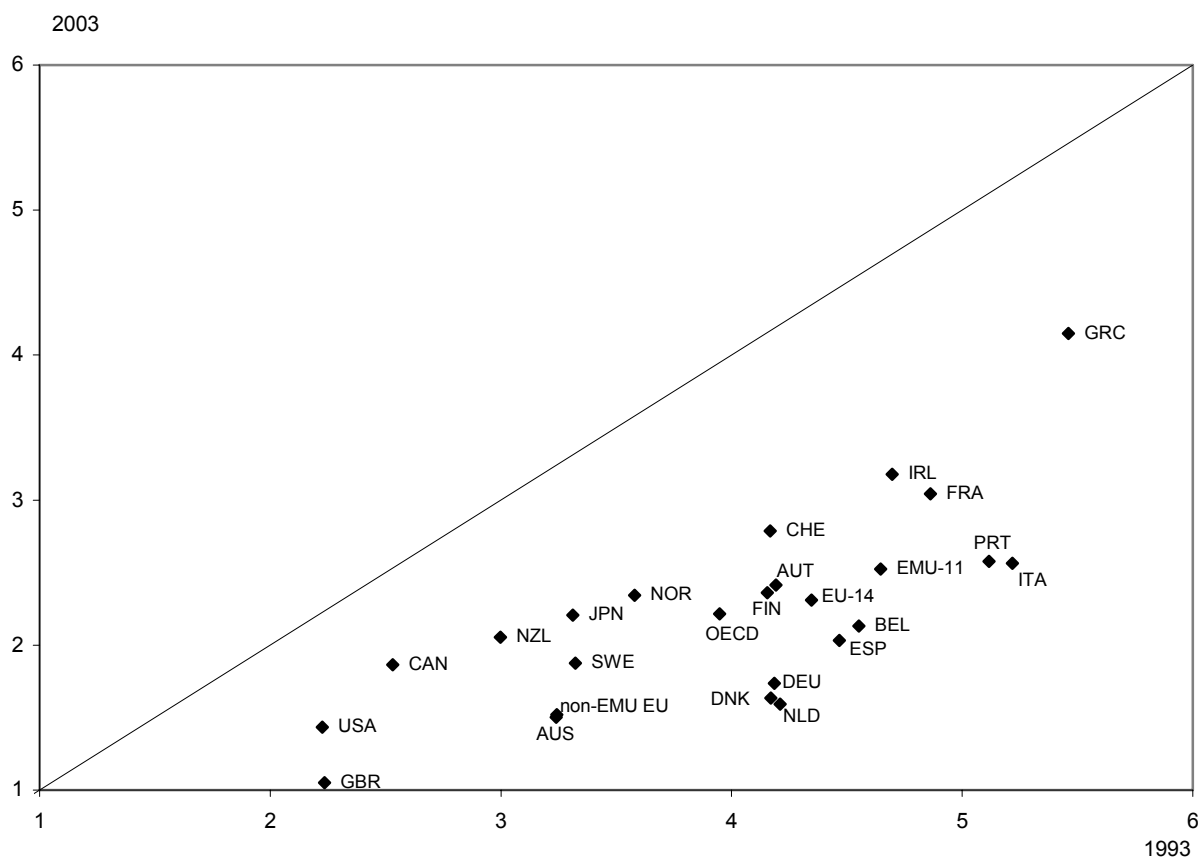
3.4 Product market reforms during the past decade

An update of the OECD indicator of product market regulation (PMR)⁸⁶ for non-manufacturing industries indicates that the reduction of regulatory impediments to product market competition between 1994 and 2004 was somewhat larger in EMU and particularly in euro-area than in other OECD countries, to some extent offsetting their stricter initial policy stance (Figure 10). There has been some convergence within the EU, with greater deregulation occurring in the most regulated countries (Belgium, France, Greece, Ireland, Italy, Portugal and Spain).⁸⁷ No correlation can be found between these product market reform patterns and the indicators of fiscal policy used above.

⁸⁶.See Conway and Nicoletti (2006).

⁸⁷. Much of this move has been driven by the easing or elimination of coercive forms of regulation (such as command-and-control measures and price controls) and a reduction of controls on public or private business enterprise. Significant easing in all types of barriers to trade and investment has also been recorded. In contrast, progress in removing legal impediments to new entry in sectors sheltered from competition has been limited and the extent of privatisation has been modest.

Figure 10. Evolution of the OECD indicator of product market regulation in non-manufacturing industries,* 1994-2003



*: the indicator of regulation in non-manufacturing industries is scaled from 0 (most liberal) to 6 (most restrictive).
 The broader OECD indicator (not reported here) covering both manufacturing and non-manufacturing industries is described in Conway et al. (2005).
 EU-14 denotes EU-15 minus Luxembourg.

4. Regression analysis

The well-known limitations of descriptive analysis such as that undertaken above point to the need for more comprehensive work. In this section, multivariate analysis is used to explore the driving factors of the structural policy reforms which have been carried out in OECD countries over the past two decades. Consistent with the rest of the paper, the analysis focuses on labour and - to a lesser extent - product markets. The modelling makes heavy use of OECD indicators of institutional arrangements and, in contrast with Section 3, restricts itself to major reforms as opposed to small ones. This emphasis facilitates the estimation of (non-linear) models of qualitative choice, which in theory should be more suitable than linear econometrics for the analysis of the decision to undertake a structural reform.

Few comparable attempts to explain cross-country structural reform patterns have been made in the literature, owing mainly to data constraints. One exception is IMF (2004), which seeks to explain the policy stance in a large number of structural policy areas across many OECD countries between the mid-1970s and the late 1990s. The study explores the impact of a range of factors including macroeconomic conditions, political institutions, reform design and variables aimed to capture attitudes towards structural reform. As expected, fiscal surpluses are found to favour reforms in product and labour markets, while fiscal adjustment –measured as an improvement in the fiscal position– hinders them.

The remainder of this section proceeds in three steps. Section 4.1 discusses briefly the expected effects of the explanatory variables featured in the regressions. Section 4.2 presents the annual dataset of major labour and product reforms assembled for 21 OECD countries over the period 1985-2003.⁸⁸ Section 4.3 attempts to explain the probability of carrying out major reforms by means of simple Probit estimates, and Section 4.4 presents linear estimates as a robustness check.

4.1 Potential influences on the propensity to undertake reforms

The analysis essentially seeks to determine whether fiscal surpluses and/or fiscal adjustment facilitate or impede the reform process. As already noted, both variables are captured by the cyclically-adjusted fiscal surplus and the change in the cyclically-adjusted primary balance, respectively. Other potential influences on reform patterns which are controlled for in the econometric analysis are the following: 89, 90

- Macroeconomic situation:

Strict regulation of labour and – possibly - product markets is more likely to be perceived as counter-productive when labour market performance is weak. Over and above the possible impact of initial conditions on reform intensity, of which some simple bivariate evidence was found above for non-EMU countries, economic crises could play a specific role in fostering reforms. This is because a crisis situation may enable governments to

⁸⁸.The countries covered: are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.

⁸⁹.Various attempts to capture the effects of the electoral process on reform patterns were also made but proved unsuccessful. Insofar as structural reforms have short-term political and/or economic costs, governments may be inclined to postpone them until after general elections have been held. Therefore, reforms should occur more frequently right after general elections than just before. In order to test for this assumption, a general election year dummy variable was constructed, taking value 1 on parliamentary or presidential election years and 0 otherwise (Source: Worldbank, *Database on Political Institutions*). However, this dummy variable –as well as various lags and leads of it– was always found to be insignificant in the Probit regressions below.

⁹⁰.Section 2 also hinted at possible interactions between monetary policy autonomy and the fiscal position in facilitating or hindering the reform process. The rationale behind such interactions is that independent monetary policy could more easily crowd in resources in the wake of structural reforms, thereby lessening the need for fiscal accommodation, and *vice versa*. A dummy variable capturing the degree of autonomy of national monetary policy was constructed, which took value 1 when the country was not engaged in any kind of fixed exchange-rate arrangement (e.g. a peg, a monetary union or the former exchange-rate mechanism of the European Monetary System) and zero otherwise (for details, see Duval and Elmeskov, 2005). However, interactions between this measure of monetary policy autonomy and the fiscal variables consistently turned out to be statistically insignificant at conventional levels.

overcome the “status quo” bias which in normal times can prevent welfare-enhancing reforms from being implemented.⁹¹

– Trade openness:

Due to “crowding-in” effects already discussed, it may be politically easier to carry out structural reforms in small open economies than in larger ones. Furthermore, high trade openness and the resulting high labour demand elasticity in small open economies may limit the ability of insiders to set wages above market-clearing levels, resulting in lower rents and thus lower public support for existing institutions (Saint-Paul, 2004).

– Reforms undertaken in other fields:

Some of the specifications estimated below also control for the fact that implementing reforms in certain fields may pave the way for reforms in others. As argued above, reducing rents in one area may undermine the support for structural policies in other areas aimed at capturing such rent. Learning effects may also play a role, *i.e.* public support for structural reform may build up as the benefits of past reforms become more visible. Moreover, policy packages may be easier to implement than isolated reforms because they spread gains and losses more evenly across population groups and/or facilitate the compensation of losers.

4.2 Data construction

The econometric analysis is based on an annual database of major structural reforms in 21 OECD countries over 1985-2003, constructed for the purpose of this paper. Sources and methodology are presented in detail in Annex 1. Compared with the descriptive evidence presented in Section 3, the focus here is as previously mentioned on major reforms only, and the coverage of policies is restricted to those areas that allow for quantitative description over an extended period. Hence, only five fields are considered for which available quantitative indicators of the policy stance make it possible to spot major reforms: unemployment benefit systems, labour taxes, employment protection legislation, product market regulation and retirement schemes.

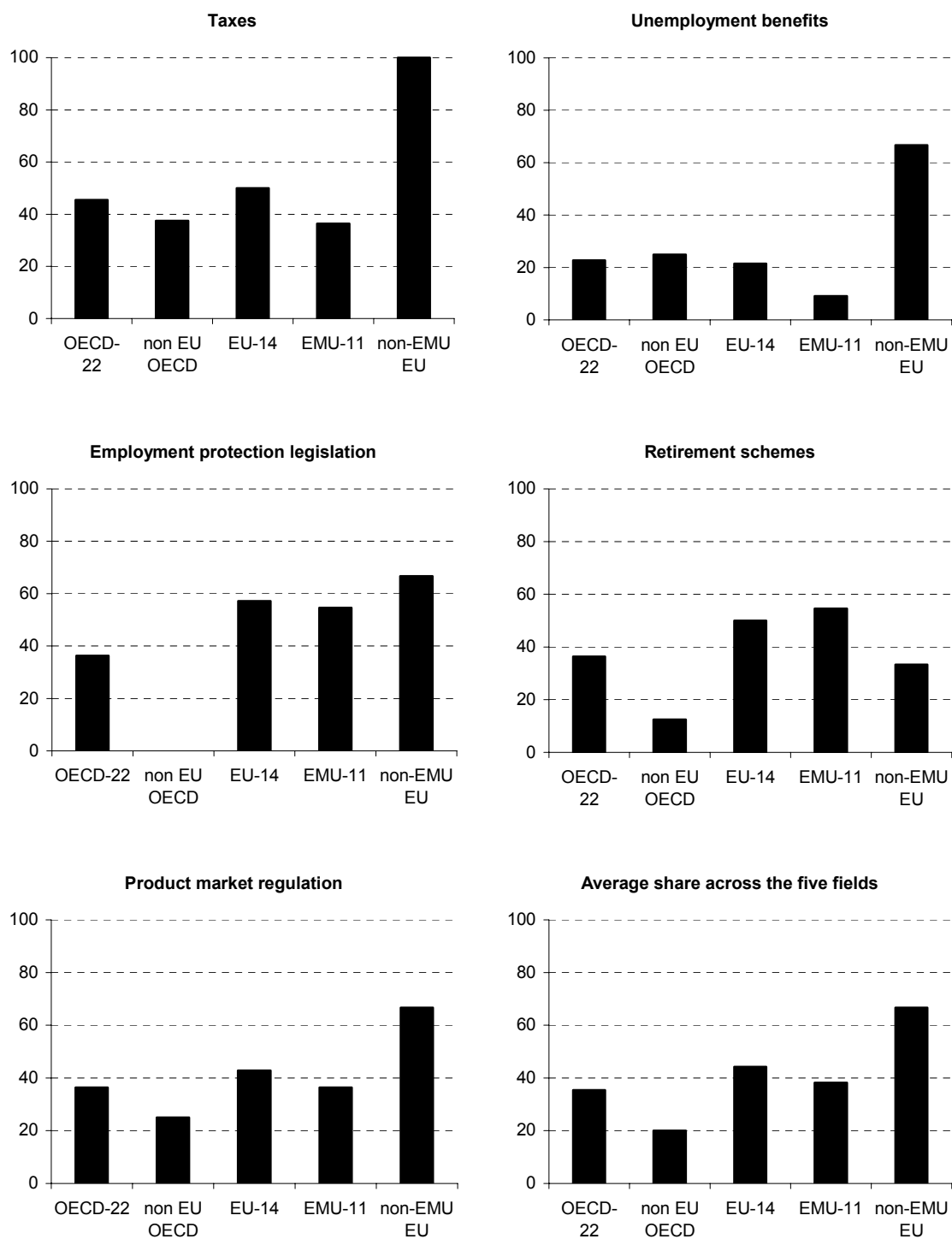
In each of the five policy fields, a major reform is assumed to be undertaken when the change in the corresponding quantitative policy indicator (e.g. the OECD summary measure of replacement rates in the case of unemployment benefit systems) exceeds two standard deviations of the indicator’s sample average.⁹² This approach yields one reform indicator for each policy area, which takes the value 1 when observations – *i.e.* pairs (country, year) - correspond to a major policy reform and 0 otherwise. Cross-country patterns of major reforms thereby identified appear to be roughly consistent with those presented in Section 3 for different types of reforms

⁹¹. See for instance Drazen (2000).

⁹². In the field of product market regulation, there has been a strong general trend toward liberalisation. To distinguish particular moves toward liberalisation from this general trend the indicator of product market regulation was initially de-trended. Without this procedure, which admittedly is somewhat *ad hoc*, product market reforms would have weighed very heavily in the data sample (see Annex 1).

(both minor and major ones, covering a broader range of policy areas) over a shorter period (1994-2004 instead of 1985-2003) (Figure 11).

Figure 11. Share of countries where at least one major reform has been implemented over 1985-2003* (in per cent)



*: EU-14: EU-15 minus Luxembourg.
 EMU-11 = EMU-12 minus Luxembourg.

Source: Author's calculations.

Many reforms do not occur in a single year but rather are spread over several consecutive years, in which case the indicator takes the value 1 throughout the whole period. In principle, this implies a risk that major, but gradual, reforms weigh too heavily in the data sample as compared with major, one-off reforms. As well, such gradual reforms might be implemented in years and under economic conditions that are significantly different from when they were decided, thereby possibly making it more difficult to identify the drivers of reform. In practice, however, protracted reform processes are rare in the policy areas and for the countries covered here.

The key explanatory variables considered in the regressions are the level of and the change in the fiscal balance. These and the control variables are defined as follows:

- Situation of public finances: cyclically-adjusted general government fiscal balance as a share of GDP (Source: OECD, *OECD Economic Outlook 76*, December 2004).⁹³
- Change in the situation of public finances: first difference of the cyclically-adjusted general government primary fiscal balance as a share of GDP (Source: OECD, *OECD Economic Outlook 76*, December 2004).
- Initial labour market performance: unemployment rate of 15-64 year-olds (Source: OECD, *OECD Employment Outlook*, June 2004).
- Economic crisis situation: dummy variable which takes value 1 when actual GDP is at least 4 percentage points below potential and 0 otherwise (Source: OECD, *OECD Economic Outlook 76*, December 2004).
- Small open economy: dummy variable which takes value 1 for the following countries: Austria, Belgium, Denmark, Finland, Greece, Ireland, Netherlands, New Zealand, Norway, Portugal, Sweden, Switzerland and 0 otherwise. These are the smallest countries in the sample in terms of GDP size.⁹⁴

4.3 Probit regression results

The five policy reform indicators can be used in two alternative ways. One option is to merge them so as to obtain an aggregate policy reform indicator which takes value 1 for those pairs (country, year) that correspond to major reform in at least one policy area and 0 otherwise. Alternatively, the individual policy reform indicators can be stacked up in order to expand dramatically the number of observations available for the econometric estimates. One problem with this option is that it rests implicitly on the assumption that structural reforms undertaken in a given pair (country, year) in different fields are independent from one another. However, this can

93. The cyclically-adjusted budget balance is conceptually closer to the political and financial capital available to the government than the actual budget balance. The same holds for the change in the cyclically-adjusted budget balance, which should in principle be more representative of the political capital spent in consolidation of public finances than the change in the actual budget balance. In addition, fiscal variables that are calculated in cyclically-adjusted terms are much less likely to be correlated with other explanatory variables such as the unemployment rate or the economic crisis dummy. This contributes to minimise multicollinearity risks. One important difference between the regressions below and those presented in Duval and Elmeskov (2005) is that *both* the level of and the change in the fiscal balance are calculated in cyclically-adjusted terms here –while actual values were used for the level of the budget balance in Duval and Elmeskov (2005).

⁹⁴Setting a cut-off point is not straightforward, considering for instance that the economic size of the smallest “large” country, Australia, exceeds only slightly that of the largest “small” country, the Netherlands (the gap between the two countries’ GDP in PPPs was about 15% in 2000).

be accounted for in the econometric estimates by controlling for the impact of reforms undertaken in other fields. Therefore, aggregate and stacked up datasets are used each in turn in the Probit regressions below.

Probit estimates on aggregate data are presented in column 1 of Table 2.95 In order to mitigate potential endogeneity problems and to account for the fact that policy decisions may be reflected in the structural policy indicators with lags, most explanatory variables are lagged one (crisis, fiscal and independent monetary policy variables) or more (unemployment variable⁹⁶) periods. Both the fiscal and control variables have the expected signs and are statistically significant. The probability of carrying out a structural reform in at least one of the five fields considered is estimated to be higher the poorer the recent macroeconomic conditions, the smaller the country size, the higher the level of the cyclically-adjusted fiscal position and the smaller the change in the cyclically-adjusted primary fiscal balance. Taking into account that the scale of the explanatory variables differs, the size of the estimated coefficients –as measured in Table 2 by the marginal probabilities under parentheses– seems to imply that the largest impact on the propensity to reform would arise from the prevalence of an economic crisis and the size of the country, but the estimated effects of the fiscal variables are also far from negligible.

However, while Australia has the third lowest trade openness ratio in the OECD area (after the United States and Japan), the Netherlands has the third highest (after Belgium and Ireland). This suggests that Australia should be classified as a large country and the Netherlands as a small one.

⁹⁵.Logit estimates yield (qualitatively) similar results.

⁹⁶.Unemployment being a highly auto-correlated variable, several alternative lags were statistically significant in the regressions. Here we selected the number of lags which maximized the t-statistic of the unemployment rate variable (3 periods).

Table 2.
Probit estimates of the determinants of structural reforms over 1985-2003¹

	(1)	(2)	(3)	(4)
Econometric method:	Probit	Random-effects probit	Probit	Random-effects probit
Dataset:	Aggregate	Aggregate	Stacked up	Stacked up
Dependent variable:	Binary reform index	Binary reform index	Binary reform index	Binary reform index
Unemployment (-3)	0.06 (m.p: 0.02) [2.68]***	0.10 [1.97]**	0.03 (m.p: 0.01) [3.01]***	0.08 [3.69]***
Crisis (-1)	0.95 (m.p: 0.36) [2.90]***	1.19 [3.08]***	0.38 (m.p: 0.09) [2.74]***	0.71 [3.29]***
Small country	0.62 (m.p: 0.23) [3.98]***	0.64 [1.97]**	0.38 (m.p: 0.07) [4.08]***	0.26 [1.31]
Cyclically-adjusted fiscal surplus (-1)	0.12 (m.p: 0.05) [5.32]***	0.15 [3.69]***	0.07 (m.p: 0.01) [5.30]***	0.11 [4.97]***
D(Cyclically-adjusted fiscal surplus (-1))	-0.11 (m.p: -0.04) [1.96]**	-0.13 [2.01]**	-0.04 (m.p: -0.01) [1.30]	-0.08 [1.95]*
Other reforms (-1)			0.2 (m.p: 0.04) [4.02]***	0.27 [3.00]***
Observations	333	333	1655	1655

1. m.p: marginal probability.

Absolute value of robust z-statistics in parentheses, * significant at 10% level, ** significant at 5%, *** significant at 1%.

Source: Author's calculations.

Standard probit estimates such as those presented in column 1 of Table 2 purposefully ignore the panel structure of the data. As a robustness check, in column 2 the equation is re-estimated using a panel data, random-effects probit framework in which countries are considered as different individuals. The results are virtually unaffected, except the unemployment variable and the small country dummy which are now significant only at the 5% (instead of 1%) confidence level.

Estimates on stacked up data (columns 3 and 4) use the same specifications⁹⁷ as those on aggregate data, except that they also control for the (lagged) effect of reforms made in other fields on the propensity to implement a reform in a given field.⁹⁸ As already mentioned, this additional control variable aims to capture positive spillovers between structural reforms in different areas. The results are fairly comparable to those obtained on aggregate data, except that the fiscal adjustment variable is not statistically significant at conventional levels in the standard probit regression (column 3). In line with IMF (2004), reforms made in other fields are found to be

⁹⁷.In principle, the use of stacked-up data also makes it possible to undertake the analysis of the determinants of structural reforms at the level of each policy area. However, the scarcity of reforms in each field considered individually suggests – and estimates confirmed – that this is likely to bring few robust findings.

⁹⁸.For each of the five policy fields considered, this variable takes values comprised between 0 and 4 depending on the number of reforms carried out in the other four fields.

highly significant, supporting the view that major reforms are typically “bunched” into packages and/or that policy changes in certain areas can pave the way for reforms in others.

4.4 Linear regression results

Insofar as the reform process is inherently a binary one, the probit approach adopted above should be appropriate. However, in practice, distinguishing “reforms” from “small policy changes going in the right direction” necessarily involves some degree of subjectivity, which the methodology adopted here to identify major reforms could only at best minimise. Moreover, the probit approach does not allow studying the dynamics of the reform process, and may even unduly reward slow movers as opposed to overnight reformers, even though this problem is probably limited in the context of this paper. For instance, an interesting issue which can not easily be tackled within the probit framework is whether the propensity to undertake reform is greater the stricter the initial policy stance in the field considered.

Against this backdrop, the following linear equation is estimated on the aggregate dataset as a robustness check for previous findings:

$$\Delta(X_{it}) = \alpha X_{it-1} + \sum_k \beta_k Z_{it}^k + \delta_i + \varepsilon_{it},$$

where X_{it} is the overall policy stance in country i in period t , calculated as the sum of normalised –so as to allow comparisons of policy stances across fields⁹⁹– OECD policy indicators in each of the five fields covered (unemployment benefits, taxes, EPL, retirement incentives, PMR). In other

words, $X_{it} = \sum_j (Y_{it}^j - \overline{Y^j}) / stdev(Y^j)$, where Y_{it}^j is the OECD policy indicator in field j (e.g. the measure of unemployment benefits or the strictness of EPL). The term αX_{it-1}^j captures the lagged impact of the policy stance on the change in the policy stance, i.e. on the propensity to undertake reform. A negative coefficient would indicate that reforms –measured here as a decline in the overall policy stance– are likely to be greater the more there is room for reform, i.e. the stricter the initial policy stance. The country fixed effect δ_i captures in a crude way possible cross-country differences in policy preferences. The Z_{it}^k 's denote the set of explanatory variables used previously, including the level and the change of the cyclically-adjusted fiscal balance, but excluding the country size dummy which is now captured by the country fixed effects. The crisis variable is refined and now denotes the number of crisis years over the past three years.

⁹⁹It is acknowledged, however, that there is no straightforward way to normalise the various policy stance indicators. The choice of the normalisation method could have some influence on the results. For instance, here, dividing by the standard deviation of policy stances implies that the weight of a given policy reform in the estimation is inversely related to the cross-country variation in policy stances in the field considered, *ceteris paribus*.

Estimation results obtained with various econometric methods are presented in Table 3. Fixed effect estimates confirm the probit regression analysis, with the exception of the unemployment rate variable which is found to be insignificant (column 1).¹⁰⁰ In particular, both the level of the cyclically-adjusted fiscal position and the change in the cyclically-adjusted primary fiscal balance are significant with expected signs. The country fixed effects are also found to be significant, pointing to cross-country differences in policy preferences and/or the influence of omitted variables on policy stances.¹⁰¹ However, fixed effects estimates can not be relied on since, as already noted, many of the explanatory variables –including the fiscal ones– are likely to be endogenous and thus to bias the results.¹⁰²

Endogeneity problems are tackled in column 2 by means of system-GMM estimates (Blundell and Bond, 1998). This method is particularly appropriate for the estimation of dynamic panel data equations when the dependent variable is highly persistent and/or certain explanatory variables are endogenous (see e.g. Bond, 2002). Here, all explanatory variables are assumed to be endogenous, and standard statistical tests suggest that the model is well specified.¹⁰³ The main difference between System-GMM and fixed effect estimates is that the lagged policy stance becomes significant, suggesting that reforms are more likely to occur when the initial policy stance is strict. However, this effect is quantitatively small, pointing to a high degree of inertia. Both the level of the fiscal balance and the fiscal adjustment variable remain significant, although only at the 10% as regards the latter.

¹⁰⁰. The lack of significance of the unemployment rate can be explained on two grounds. First, its effect may already be captured – at least partly – by the crisis variable. Second, within the fixed-effect framework adopted here, the unemployment rate is likely to work essentially as a proxy for the business cycle position.

¹⁰¹. A Fisher test rejects the null hypothesis of no fixed effects at the 1% level.

¹⁰². Another potential concern is the standard downward dependent variable bias (Nickell, 1981). However, the downward lagged dependent variable bias falls as the time span of the sample increases. Furthermore, it is less of a concern when the time span is large and of the same order of magnitude of the number of countries, as is the case here (Judson and Owen, 1999).

¹⁰³. The Hansen test of over-identifying restrictions does not reject the null hypothesis of valid moment conditions at the 5% (and even the 10%) level, and the Arellano-Bond test rejects the null hypothesis of no first-order autocorrelation in the residuals but accepts –as would be expected– the null of second-order autocorrelation. However, the power of the Hansen test to detect invalid overidentifying restrictions can decline dramatically in small samples if an excessive number of moment conditions is used (Bowsher, 2000). Therefore, the system-GMM estimates presented in Table 3 only use instruments (levels of explanatory variables) lagged 2 and 3 periods in difference equations and instruments (first differences of explanatory variables) lagged 1 period in level equations.

Table 3.
Linear estimates of the determinants of structural reforms
over 1985-2003

	(1)	(2)
Econometric method:	OLS fixed effects	Sys-GMMs ¹
Dataset:	Aggregate	Aggregate
Dependent variable:	Change in policy stance	Change in policy stance
Policy stance (-1)	-0.05 [1.30]	-0.02 [2.60]**
Unemployment	0.003 [0.34]	0.0001 [0.01]
Crisis years	-0.08 [2.92]***	-0.04 [2.29]**
Cyclically-adjusted fiscal surplus	-0.03 [3.05]***	-0.02 [2.88]***
D(Cyclically-adjusted fiscal surplus)	0.04 [3.03]***	0.02 [1.93]*
R squared	0.16	
Hansen test of overidentifying restrictions		Chi2(201) = 16.2
Arellano-Bond test for AR (1)		-3.26***
Arellano-Bond test for AR (2)		-0.52
Observations	333	333

Absolute value of t-statistics in parentheses, * significant at 10% level, ** significant at 5%, *** significant at 1% level

1: instruments (levels of explanatory variables) lagged 2 and 3 periods are used in difference equation and instruments (first differences of explanatory variables) lagged 1 period are used in level equation

Source: Author's calculations.

4.5 Interactions between the fiscal adjustment variable and monetary policy autonomy

As already noted, one theoretical argument for the presence of the fiscal adjustment variable in the above regressions is that a temporary relaxation of fiscal policy may help offset any short-run economic slack associated with the implementation of structural reforms. However, this “crowding-in” argument should be less compelling when the monetary policy reaction to reforms can act as a substitute for fiscal accommodation. In a single country with an independent monetary policy, structural reforms that create short-run economic slack and lower inflation should bring about lower interest rates and exchange rate depreciation, both of which could in principle boost demand and thereby allow the added supply capacity to be “crowded in”. But such

mechanism is not available in a country that pursues a fixed exchange-rate regime or participates in a monetary union such as EMU, and therefore has little or no monetary autonomy.

In order to test whether the impact of the change in the cyclically-adjusted primary fiscal balance is greater in those countries that have no monetary policy autonomy, a dummy variable is constructed which takes value 1 when the country is not engaged in any kind of fixed exchange-rate arrangement (e.g. a peg, a monetary union or the former exchange-rate mechanism of the European Monetary System) and zero otherwise. Information on official exchange-rate arrangements is drawn from various issues of the annual IMF publication Exchange Arrangements and Exchange Restrictions.¹⁰⁴ This definition obviously ignores that fixed exchange-rate commitments come in different shapes and forms. For example, the ERM contained countries that pursued a “hard” peg to the Deutsche Mark (e.g. Netherlands) as well as countries that underwent frequent depreciation. The lack of sophistication in the definition of monetary autonomy may create a bias in the estimations, probably in the direction of not finding any effects. ¹⁰⁵

All regressions in Tables 2 and 3 are then re-run including an interaction between the fiscal adjustment variable and the dummy variable for monetary policy autonomy.¹⁰⁶ The results obtained for the variables of interest –namely the interaction term and the fiscal policy variables– are reported in Table 4. The interaction term is correctly signed in all equations and statistically significant in most of them. Taken at face value, the coefficient estimates imply that monetary policy autonomy partially offsets the impact of the change in the (cyclically-adjusted primary) fiscal balance on the propensity to undertake reforms.

¹⁰⁴ Note that *de jure* exchange-rate regimes are not necessarily applied in practice (Levy Yeyati and Sturzenegger, 2001), even though this issue is generally far more relevant for developing countries than for the developed ones considered here. As a result, some adjustments were made. In particular, Austria was classified as having a fixed exchange rate regime over the full sample period even when it was not a formal member of the exchange rate mechanism of the European Monetary System. This is because this country maintained *de facto* a fixed exchange rate with the Deutsche Mark.

¹⁰⁵ Another potential concern could be the asymmetry of the former European Monetary System. Indeed, it has been argued that German monetary policy acted as a “Stackelberg leader” under this system, while other central banks had to follow suit in order to maintain fixed exchange rates. In order to account for this possibility, the regressions presented in Tables 4 below were re-run assuming that Germany retained its monetary policy autonomy under the former EMS. The findings were qualitatively unaffected, with the interaction term even being marginally more significant in all equations.

¹⁰⁶ These estimates also include the monetary policy autonomy dummy variable itself. Following a standard procedure, interactions between variables X_{it} and Y_{it} –here, the autonomous monetary policy dummy and the fiscal adjustment variable, respectively– are specified as $(X_{it} - \bar{X}_{..})(Y_{it} - \bar{Y}_{..})$, where $\bar{X}_{..}$ and $\bar{Y}_{..}$ are the sample averages of X_{it} and Y_{it} , respectively. With this specification, the coefficients of X_{it} and Y_{it} –and therefore the estimated effect of the fiscal adjustment variable– have a straightforward interpretation, i.e. they measure the direct effects of these variables for an average, hypothetical country. This is because the interaction term is equal to zero at the sample average.

Table 4.
Testing for interactions between the autonomy of monetary policy
and the fiscal adjustment variable¹

	(1)	(2)	(3)	(4)	(5)	(6)
Econometric method:	Probit	Random-effects probit	Probit	Random-effects probit	OLS fixed effects	Sys-GMMs ²
Dataset:	Aggregate	Aggregate	Stacked up	Stacked up	Aggregate	Aggregate
Dependent variable:	Binary reform index	Binary reform index	Binary reform index	Binary reform index	Change in policy stance	Change in policy stance
Cyclically-adjusted fiscal surplus	0.12 (m.p: 0.05) [5.36]***	0.14 [3.76]***	0.07 (m.p: 0.01) [5.42]***	0.12 [4.49]***	-0.03 [2.92]***	-0.02 [2.86]***
D(Cyclically-adjusted fiscal surplus)	-0.13 (m.p: -0.05) [2.10]**	-0.12 [1.82]*	-0.04 (m.p: -0.01) [1.30]	-0.06 [1.41]*	0.03 [2.73]***	0.03 [2.31]**
Interaction (autonomous monetary policy) * D(Cyclically-adjusted fiscal surplus)	0.18 (m.p: 0.07) [1.61]	0.22 [1.73]*	0.11 (m.p: 0.02) [1.66]*	0.19 [2.16]**	-0.03 [1.35]	-0.04 [1.85]*
R squared					0.17	
Hansen test of overidentifying restrictions						Chi2(270) = 15.3
Arellano-Bond test for AR (1)						-3.29***
Arellano-Bond test for AR (2)						-0.62
Observations	333	333	1655	1655	333	333

Absolute value of t-statistics in parentheses, * significant at 10% level, ** significant at 5%, *** significant at 1%.

1: all equations in Table 4 also include the same control variables (not reported) as in Table 2 (for columns 1-4) and Table 3 (for columns 5-6). They also include the dummy variable for monetary policy autonomy described in the main text.
m.p: marginal probability.

2: instruments (levels of explanatory variables) lagged 2 and 3 periods are used in difference equations, and instruments (first differences of explanatory variables) lagged 1 period are used in level equations

Source: Author's calculations.

5. Summary and conclusions

This paper is an empirical attempt to determine whether structural reforms in labour and product markets bear some relationship with fiscal positions and fiscal adjustment processes. A priori, a sound fiscal position should facilitate the implementation of structural reforms, insofar as it provides room for the compensation of losers as well as for crowding in resources if reforms – e.g. in the labour market– create short-run economic slack. Conversely, fiscal adjustment –defined as a positive change in the cyclically-adjusted primary fiscal balance– may hamper the ability of governments to later implement other types of unpopular measures such as structural reforms, particularly those that would further depress aggregate demand. Against this backdrop, the question arises as to whether the persistently poor state of public finances, combined with fiscal adjustment during the run-up to EMU, has slowed down the reform process in a number of EU countries during the past decade.

The descriptive evidence on recent reform patterns presented in this paper suggests that EU (including euro area) countries typically have undertaken more comprehensive and far-reaching labour market reforms than other OECD countries over the past decade. However, this conclusion needs to be qualified in several ways. Different reform intensities between EU and non-EU countries need to be seen in the light of greater need for reform in the former. As well, EU countries – with the exception of a few small ones – have shown no particular ability to carry out needed reforms in areas where political resistance is normally strong (with the exception of retirement schemes where impending fiscal pressures are particularly large in EU countries). Furthermore, in the more specific case of EMU countries, there appears to have been a slowdown in the reform process after the formal advent of the euro – though this could reflect the prior race to qualify for EMU.

In line with theoretical priors, there is some evidence that top reformers (Denmark, Finland or the Netherlands) started their reform programmes with relatively favourable fiscal positions and made only limited efforts to improve them during their reform years. Conversely, in a number of EU countries where only few reforms have been implemented during the past decade, the state of public finances was initially poor and major fiscal adjustment efforts were made, especially during the run-up to EMU (Greece, Italy, Spain).

Nonetheless, the usual problem with descriptive evidence is that it is difficult to identify with any confidence the drivers behind the observed patterns of structural reform. This issue is likely to be even more acute here given the existence of feedback effects of structural reforms on the fiscal balance. Therefore, multivariate probit and linear analysis is carried out for 21 OECD countries over the period 1985-2003 in order to explore the influence of fiscal positions and fiscal adjustment processes on structural reforms, controlling for a number of other potential influences on the propensity to undertake reforms. The focus is on the major reforms made in labour and –to a lesser extent– product markets over the past two decades.

The upshot of the analysis is that many of the “usual suspects” indeed do seem to determine the pace of structural reform, such as going through an economic crisis and more broadly experiencing high unemployment. Small countries are also found to have a greater propensity to undertake reforms, possibly reflecting lower risks of short run economic slack and/or lower product market rents and thus lower public support for existing institutions aimed at capturing them. As expected, there is also robust evidence that a sound fiscal balance helps. Conversely, fiscal adjustment is found to hinder the structural reform process. There is also more tentative evidence that the latter effect may be greater for countries that pursue fixed exchange-rate regimes or participate in a monetary union such as EMU, and therefore have little or no monetary autonomy. Possible extensions to this work include the incorporation of a number of additional control variables into the analysis, such as demographic or political factors. Moreover, the relationship between the reform process and the fiscal balance runs in both directions, and

should therefore ideally be treated as such –an issue tackled here through system GMM estimates but which deserves further attention.

Against this backdrop, the SGP might be seen to prevent an optimal inter-temporal management of fiscal policy, which in theory should allow for a short-run deterioration of public finances followed by a gradual improvement as the structural output gains of reforms materialise. However, the recent reorientation of the SGP should in principle have made the use of fiscal policy to accommodate structural reform easier.¹⁰⁷ Furthermore, accommodation remains of course perfectly feasible all along for countries that undertake reform from a position of close to budget balance or surplus.

¹⁰⁷. For instance, a recent paper by Beetsma and Ribeiro (2005) develops a political economy model to study the interaction between structural reforms and the need to adhere to the Stability and Growth Pact (SGP). In designing a reform package, governments are faced with a trade-off between reducing electoral uncertainty *via* monetary compensation to reform losers and abiding by the deficit limits of the SGP. Within this context, the authors show that looser sanctions and/or sanctions that take account of reform efforts or the business cycle should all facilitate the implementation of reforms.

REFERENCES

- Alesina, A., E. Glaeser, B. Sacerdote (2005), "Work and Leisure in the U.S. and Europe: Why so Different?", *NBER Working Paper Series*, No. 11278.
- Angeloni, I., A.K. Kashyap, B. Mojon and D. Terlizzese (2003), "The Output Composition Puzzle: a Difference in the Monetary Transmission Mechanism in the Euro Area and the US", *NBER Working Paper Series*, No. 9985.
- 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?", *CEPR Discussion Papers* No. 2492, June.
- Beetsma R. and M.P. Ribeiro (2005), "The Political Economy of Structural Reforms under the Stability and Growth Pact", *mimeo*, University of Amsterdam.
- Bertola, G. and T. Boeri (2001), "EMU Labour Markets Two Years On: Microeconomic Tensions and Institutional Evolution", paper presented at the Workshop "The Functioning of EMU: Challenges of the Early Years" organized by the Directorate General for Economic and Financial Affairs, European Commission, Brussels, 21-22 March 2001, April 27th 2001 version.
- Blundell, R. and S. Bond (1998), "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models", *Journal of Econometrics*, Vol. 87, p.115-143.
- Bond, S. (2002), "Dynamic Panel Data models: a guide to Micro Data Methods and Practice", *Cemmap Working Paper*, No. CWP09/02, Institute for Fiscal Studies, London.
- Bowsher, C. (2000), "On Testing Overidentifying Restrictions in Dynamic Panel Data Models", *Nuffield College Discussion Paper in Economics*, No. 2000-W28.
- Bourles, R. and G. Cette (2005), "Une comparaison des niveaux de productivité structurels des grands pays industrialisés", *mimeo*.
- Brandt, N., J-M. Burniaux and R. Duval (2005), "Assessing the OECD Jobs Strategy: Past Developments and Reforms", *OECD Economics Department Working Paper* No. 429, OECD, Paris.
- Catte, P., N. Girouard, R. Price and C. André (2004), "Housing Markets, Wealth and the Business Cycle", *OECD Economics Department Working Papers*, No. 394.
- Coe, D. and D. Snower (1997), "Policy Complementarities: The Case for Fundamental Labour Market Reform", *IMF Staff Papers*, Vol. 44.
- Conway P. and G. Nicoletti (2006), "Product Market Regulation in Non-Manufacturing Sectors in OECD Countries: Measurements and Highlights", *OECD Economics Department Working Paper*, forthcoming, OECD, Paris.
- Drazen, A. (2000), *Political Economy in Macroeconomics*, Princeton, New Jersey, Princeton University Press.

- Duval, R. (2004), “Retirement Behaviour in OECD Countries: Impact of Old-age Pension Schemes and Other Social Transfer Programmes”, *OECD Economic Studies*, No. 37.
- Duval, R. and J. Elmeskov (2005), “The Effects of EMU on Structural Reforms in Labour and Product Markets”, *OECD Economics Department Working Papers*, No. 438.
- Elmeskov, J., J.P. Martin and S. Scarpetta (1998), “Key Lessons for Labour Market Reforms: Evidence from OECD Countries’ Experience”, *Swedish Economic Policy Review*, Vol. 5/2.
- IMF (2004), “Fostering Structural Reforms in Industrial Countries”, Chapter III in *World Economic Outlook. Advancing Structural Reforms*, April, International Monetary Fund, Washington D.C.
- Jaumotte, F. (2004), “Labour Force Participation of Women: Empirical Evidence on the Role of Policy and Other Determinants in OECD Countries”, *OECD Economic Studies*, No. 37.
- Judson, R.A. and A.L. Owen (1999), “Estimating Dynamic Panel Data Models: a Guide for Macroeconomists”, *Economic Letters*, Vol. 65, No. 1.
- Kennedy, M. and T. Sløk (2005), “Structural Policy Reforms and External Imbalances”, *OECD Economics Department Working Papers*, No. 415.
- Landers, R.M., J.B. Rebitzer and L.J. Taylor (1996), “Rat Race Relax: Adverse Selection in the Determination of Work Hours in Law Firms”, *American Economic Review*, Vol. 86/3.
- Levy-Yeyati E. and F. Sturzenegger (2001), “Classifying Exchange Rate Regimes: Deeds vs. Words”, *European Economic Review*, Vol. 49(6), August.
- Nickell, S. (1981), “Biases in Dynamic Models with Fixed Effects”, *Econometrica*, Vol. 49, No. 6.
- OECD (1999), *Implementing the OECD Jobs Strategy: Assessing Performance and Policy*, OECD, Paris.
- OECD (2004a), *OECD Economic Surveys – Euro Area*, OECD, Paris.
- OECD (2004b), “Saving Behaviour and the Effectiveness of Fiscal Policy”, *OECD Economic Outlook*, No. 76, OECD, Paris.
- OECD (2005a), *Society at a Glance – OECD Social Indicators*, OECD, Paris.
- OECD (2005b), *Economic Policy Reforms. Going for Growth*, OECD, Paris.
- Olson, M. (1965), *The Logic of Collective Action*, Harvard University Press, Cambridge, Massachusetts.
- van Poeck, A. and A. Borghijs (2001), *EMU and Labour Market Reform: Needs, Incentives and Realisations*, Blackwell Publishers, Oxford.
- Prescott, E.C. (2004), “Why Do Americans Work So Much More Than Europeans?”, *Federal Reserve Bank of Minneapolis Quarterly Review*, Vol. 28/1.
- Saint-Paul, G. (2004), “Why are European Countries Diverging in their Unemployment Experience”, *IZA Discussion Paper* No. 1066, March.

ANNEX 1: CONSTRUCTION OF THE POLICY REFORM DATABASE

In order to construct an annual database of structural reforms to be used in probit regressions, it would seem natural to collect information for each country regarding when major reforms were voted. However, not only is such an approach difficult - especially for reforms that were carried out prior the first publication of the *OECD Jobs Study* in 1994 - but more importantly it suffers from two important limitations: while our focus should be clearly on major reforms, there is no straightforward criterion *a priori* to distinguish them from small ones; certain reforms start small before getting big over the years and therefore can not be associated with any specific year. One example is the slow but quasi continuous decline in tax wedges in Denmark between the late 1980s and the mid-1990s or in Finland since the mid-1990s.

Here these two limitations are dealt with as follows. First, in order to identify major reforms, we rely exclusively on *a posteriori* criteria: a major reform in a given policy area (*e.g.* product markets) is one that is accompanied by a “substantial” change in a corresponding quantitative policy indicator (*e.g.* the OECD indicator of product market regulation). This approach was already taken to construct the reform intensity indexes presented in Section 4, but only to a limited extent since more qualitative information was also taken into account. Second, if the “substantial” change in the policy indicator does not occur in a particular year but rather is spread over a longer period, then all the corresponding years are assumed to have been reform years. This is implicitly consistent with the view that a country engaged in a reform process has the possibility to opt out every year, so that the continuation of a reform process can by itself be regarded as a “reform”.

We restrict our analysis to five key policy areas for which straightforward quantitative indicators can be used to assess the magnitude of policy reforms. These are unemployment benefit systems, labour taxes, employment protection legislation, product market regulation and retirement schemes, for which the quantitative indicators used are, respectively: the OECD summary measure of benefit replacement rates (an average of replacement rates across various earnings levels, family situations and durations of unemployment); an average of OECD measures of the wedge between labour cost and take-home pay across two situations (a single worker and a couple with a dependent spouse and two children, at average earnings levels in both cases); the OECD summary index of employment protection legislation; the OECD summary index of product market regulation in seven non-manufacturing industries; an average of OECD measures of implicit tax rates on continued work - which sum up deviations from actuarial neutrality - in old-age pension systems and early retirement schemes across three situations (at ages 55 and 60 in early retirement schemes, and at age 60 in old-age pension schemes, for a single worker with

average earnings in all three cases).¹⁰⁸ All these indicators are available for 21 OECD countries over the period 1985-2003.

The threshold beyond which a change in the policy indicator is assumed to signal a major policy reform is set as follows. For each of the five policy areas mentioned above, the standard deviation of the annual change in the corresponding quantitative indicator is calculated over all available observations (typically 399, corresponding to 21 countries over the period 1985-2003). A major reform is then assumed to have been undertaken when the overall change in the policy indicator exceeds two standard deviations. In practice, this corresponds respectively to: a decline in the benefit replacement rate indicator larger than 6.5 percentage points; a decline in the tax wedge measure larger than 5 percentage points; a decline in the summary index of employment protection legislation larger than 0.5 units (the average value of the index over the sample considered is 2.1); a decline in the de-trended indicator of product market regulation larger than 0.6 units (the average value of the de-trended index over the sample considered is 5);¹⁰⁹ a decline in the average implicit tax rate on continued work larger than 6.5 percentage points.

We obtain one reform indicator for each policy area, which takes value 1 when observations - *i.e.* pairs (country, year) - correspond to a major policy reform and 0 otherwise. Two alternative ways can then be envisaged to exploit these five reform variables:

- One option is to merge them so as to obtain an aggregate policy reform indicator which takes value 1 for those pairs (country, year) that correspond to at least one major policy reform and 0 otherwise.
- Alternatively, they can be stacked up in order to expand dramatically the amount of information available for the econometric estimates. One problem with this option is that it rests implicitly on the assumption that structural reforms undertaken in a given pair (country, year) in different fields are independent from one another. However, this can be accounted for in the econometric estimates by controlling for the impact of reforms undertaken in other fields.

Therefore, both aggregate and stacked up datasets are used alternatively in the Probit regressions presented in Section 4.3 of the main text.

¹⁰⁸. The main sources for these indicators are respectively: OECD, *Benefits and Wages*, various issues ; OECD, *Taxing Wages*, various issues; OECD (2004a), *Employment Outlook*, Paris; Nicoletti, G. and S. Scarpetta (2003), "Regulation, productivity and growth", *Economic Policy*, No. 36; Conway P. and G. Nicoletti (2006), "Product market regulation in non-manufacturing sectors in OECD countries: measurements and highlights", *OECD Economics Department Working Paper*, forthcoming, OECD, Paris; Duval, R. (2003), "Retirement Behaviour in OECD Countries: Impact of Old-age Pension Schemes and Other Social Transfer Programs" *OECD Economic Studies* No. 37, 2003/2, OECD, Paris.

¹⁰⁹. The rationale for de-trending the product market regulation indicator is to control for the general decline observed across the OECD area over the sample period. In the absence of such a control, our methodology would identify a disproportionately large number of reforms compared with other policy fields. Instead, here only declines in product market regulation that have gone substantially beyond the general trend towards deregulation are considered as major policy reforms.