

**IMF Working Paper**

© 1997 International Monetary Fund

This is a *Working Paper* and the author(s) would welcome any comments on the present text. Citations should refer to a *Working Paper of the International Monetary Fund*. The views expressed are those of the author(s) and do not necessarily represent those of the Fund.

WP/97/93

INTERNATIONAL MONETARY FUND

Office of Internal Audit and Inspection

**Effects of the European Economic and Monetary Union (EMU)  
on Taxation and Interest Spending of National Governments**

Prepared by Francesco Paolo Mongelli <sup>1</sup>

Authorized for distribution by Eduard Brau

July 1997

**Abstract**

This paper examines the interest spending and taxation channels through which EMU could affect the public finances. It provides a framework for examining different views on a further narrowing of interest rate differentials. A model of Blanchard and Fischer is amended to analyze the two channels, and empirical evidence on the tax harmonization process is presented. The paper argues that “high-debt” and “high-tax” countries pursuing prudent fiscal policies could benefit the most from EMU: if monetary and widespread fiscal discipline are jointly established, interest rates could decline rapidly, while tax harmonization is likely to be gradual.

**JEL Classification Numbers:** E63, F36, and H20

**Keywords:** economic integration, tax harmonization, joint analysis of monetary and fiscal policy, European Monetary Union

**Author’s E-Mail Address:** [fmongelli@imf.org](mailto:fmongelli@imf.org)

---

<sup>1</sup>This paper benefitted from the comments and suggestions of Carl F. Christ, W. Max Corden, Nouriel Roubin, Eduard Brau, Tim Lane, Francesco Caramazza, Donogh McDonald, Fred Ribe, Karen Swiderski, Paolo Mauro, Shahbaz Khan, Jody Scarlata, Fabio Rossi, Massimo Giulimondi, Ariana Gilbert, and the participants in a session of the July 1995 meeting of the Western Economic Association. Isabelle Tavernier of the CAT team of BCS provided valuable research assistance. This paper was written while the author was in FAD and MED. The author is solely responsible for any errors or omissions.

## Contents

|      |   |    |
|------|---|----|
| I.   | Introduction .....  | 5  |
| II.  | The Likely Decline and Convergence in Interest Rates  |    |
|      | 1. The factors underlying interest rate differentials .....   | 6  |
|      | 2. The critical factors to establish monetary and fiscal discipline .....   | 10 |
|      | 3. The effects of monetary and fiscal discipline, or the lack thereof,<br>on interest rates .....                             | 13 |
| III. | A Model to Analyze the Trade-off Between the Fall in Interest Rates and the<br>Possible Difficulty of Raising New Taxes ..... | 16 |
|      | 1. The relation between real interest rates, debt, and deficits .....   | 16 |
| IV.  | The Possible Effects of the EMU on the Ability to Raise Additional Taxes .....  | 24 |
|      | 1. The process of harmonization of EU tax systems .....   | 24 |
|      | 2. Empirical evidence on tax harmonization .....  | 27 |
|      | 3. Some potential effects of the EMU on the ability to raise<br>additional taxes .....  | 29 |
| V.   | The Possible Balance Between the Interest Spending and Taxation Channels ...  | 30 |
| VI.  | Concluding Remarks .....  | 32 |

### Appendices

|     |   |    |
|-----|---|----|
| I.  | Selected Conditions for a Decline in the Level of EU Interest Rates ..... | 32 |
| II. | List of Notation .....  | 33 |

|                    |    |
|--------------------|----|
| Bibliography ..... | 34 |
|--------------------|----|

### Tables

|    |   |    |
|----|---|----|
| 1. | Selected Financial and Budgetary Indicators, and Current and<br>Projected Credit Ratings, 1993-1997 ..... | 7  |
| 2. | Tax Ratios and Selected Statistical Indicators for the EMU Member .....                                   | 25 |

### Figures

|    |  |    |
|----|--|----|
| 1. | European Union: Developments and Convergence of Nominal<br>Interest Rate Differentials with Germany, January 1990-January 1997 ..... | 9  |
| 2. | The Critical Factors to Establish Monetary and Fiscal Discipline<br>and the Main Risks and Challenges .....                          | 11 |
| 3. | Total Expenditure, Total Revenue, and the Equilibrium Level of Public Debt. ....   | 17 |
| 4. | Interest Rates and Debt Dynamics, and the Effects of<br>Unanticipated and Anticipated Tax Increases .....                            | 23 |

## SUMMARY

This paper examines two channels, interest spending and taxation, through which EMU could affect the public finances of participating countries. It provides a framework for examining different views on a further narrowing of interest rate differentials. This framework shows that, when monetary and widespread fiscal discipline are jointly established, interest differentials are likely to narrow further across EMU members. With monetary discipline but a lack of fiscal discipline in only one member country, interest rates are still likely to continue to converge across all other EMU members, but will rise in the “undisciplined” country owing to financial market-based discipline. When monetary discipline has not yet been established and fiscal discipline is lacking in one member country, all other EMU members will cross-subsidize the undisciplined country. Their interest rate may not fall as much, whereas that of the undisciplined country may not rise as much.

A model by Blanchard and Fischer is amended to analyze the two channels. A generalized decline in the level of interest rates (benefiting all EMU member) is differentiated from a decline in country-specific risk premiums that benefit a high-debt country undertaking a fiscal consolidation. The level of taxation is postulated to be positively related, but at declining rates, to the level of public indebtedness.

Selected indicators of tax harmonization in the European Union (EU) are presented, and the main forces behind the ongoing harmonization of EU tax systems are examined. The prospects for a deepening of tax harmonization in several, but not all, areas of taxation are also discussed.

The paper argues that tax harmonization is likely to be gradual, whereas interest rates are likely to fall rapidly. If significant, this fall could reduce the need for revenue increases or other fiscal adjustments. High-debt and high-tax countries that pursue cautious fiscal policies and steadily reduce their public indebtedness are likely to benefit the most from EMU.

## I. Introduction

The current members of the European Union (EU) are becoming increasingly integrated from an economic and financial standpoint. In the coming years, some EU members may also establish the European Economic and Monetary Union (EMU) and adopt a common single currency, the "euro." While integration was deepening, the fiscal performance of most EU members gradually deteriorated leading to higher, albeit uneven, public indebtedness. How could the EMU affect the public finances of the participating countries?

The above question is very broad and this paper focusses on two channels, interest spending and taxation.<sup>1</sup> Specifically, the contribution of the paper is in examining the possible balance between the interest spending and taxation channels in the wake of the EMU. A framework to examine different views concerning a further narrowing of interest rate differentials is provided. In addition, a model of Blanchard and Fischer (1989) is amended here to analyze the two channels. Finally, empirical evidence on the EU process of tax harmonization is presented and the main forces behind this ongoing process of harmonization are examined. Some potential effects of the EMU on the ability to raise additional taxes are also discussed.

In recent years, there have been significant improvements in the government finances of several EU members despite the economic slowdown in 1995-96. Structural deficits have declined by almost 3 percent of GDP during 1991-96, with a further percentage point or so projected for 1997. There is also a decline, or incipient decline, in debt ratios in high debt countries. If the current economic recovery stays on track and fiscal consolidation continues, the EU members will find it easier to reduce unemployment compensation and other social expenditures. Interest rates and interest expenditures should continue declining. The need for further increases in tax rates will fall, and debt ratios may decline. On the other hand, extended uncertainty about the start of the EMU and EU members' participation may reduce market confidence, weaken the economic recovery, and slow down any further fiscal adjustment. As a result, the EU financial markets may be subjected to some risks of turbulence and higher interest rates. Tension may arise in countries that have more difficulty raising taxes due to political reasons or due to the constraints inherent in the deepening of economic and financial integration. Hence, there are upward potentials and downside risks as EU members establish the EMU.

There is largely a consensus that interest rate differentials are likely to narrow, with respect to the current levels, in the wake of the EMU. There is less consensus, though, on the possible extent of such a decline in each prospective member, i.e., **interest rate differentials may not completely vanish in the wake of the EMU**. Section II provides a framework to examine different views on this issue. We start by looking at the current interest rate

---

<sup>1</sup>There are other channels, such as, the loss of control of current and prospective money financing, a set of common fiscal requirements, an enhanced mechanism for budget surveillance, and downward adjustments in expenditure. These channels are not discussed here or are touched upon very briefly below.

differentials of each EU member with Germany and at their credit rating. Next we discuss the factors underlying interest rate differentials, i.e., the inflation/devaluation and the outright default risk premia. Last we ask what may be the likely trade-off between the vanishing inflation/devaluation risk premium and the outright default risk premium. We illustrate how the response to this question--and the extent of further convergence in interest rate--hinges on the combined strength of monetary and fiscal discipline. Appendix I discusses some of the main conditions for a decline in the EMU level of interest rates benefitting each participating country.

Section III provides an analytical framework to examine the interest spending and the taxation channels. This framework is based on a model that is a specialization of Blanchard and Fischer's (1989) model. Their model is amended here in two ways. First, the model used here differentiates between a generalized decline in the level of interest rates that will benefit each EMU member, and the potential decline in the country-specific risk premium that will benefit a high debt-to-GDP country undertaking a fiscal consolidation. Second, the level of taxation is postulated to be positively related, but at declining rates, to the level of public indebtedness. Hence, the model establishes an analytical bridge between the two channels.

Section IV presents selected indicators of tax harmonization across the EU and discusses the main forces behind the ongoing process of harmonization of EU tax systems. This section also examines the prospects for a deepening of tax harmonization in several, but not all, areas of taxation, and the potential effects of the EMU on the ability to raise additional taxes. A relevant question for this paper is: **under what circumstances could tax harmonization bite the most?** A country with a relatively high level of taxation could be more affected than the others particularly if a shock lessens its chances of participating in the EMU, or if a shock increases the risk that EMU itself would be postponed for a significant period. Section V, ties together the previous analysis and presents three scenarios. Section VI provides the paper's concluding remarks.

The new EU members--Austria, Finland, and Sweden--are excluded from the analysis in this paper, because, having joined at a late stage some of the statistical relationships presented in the paper may be less defined. The discussion of the interest spending and taxation channels is not meant to provide a specific forecast of narrowing of interest differentials or further tax harmonization across EU members. Instead, the discussion describes the possible balance of the influences of the two channels. The list of notation is in Appendix II.

## II. The Likely Decline and Convergence in Interest Rates

### 1. The factors underlying interest rate differentials

In recent years, the gradual, albeit uneven, fiscal adjustment--in most, but not all, EU members--and the continuing decline in inflation have fostered a **general, but erratic, decline in nominal interest rates and interest rate differentials with Germany** (Table 1 and

Table 1. Selected Financial and Budgetary Indicators, and Current and Projected Credit Ratings, 1993-97. 1/

|                        | Consumer Price Inflation |     | Budget Deficit /GDP |      | Public Debt /GDP |       | Long Term Nominal Interest Rates 2/ |         | Credit Rating on Public Debt        |                                      |  |
|------------------------|--------------------------|-----|---------------------|------|------------------|-------|-------------------------------------|---------|-------------------------------------|--------------------------------------|--|
|                        | 93-96                    | 97  | 93-96               | 97   | 93-96            | 97    | 93-96                               | Jan. 97 | Foreign Currency S & P's/Moody's 3/ | Domestic Currency S & P's/Moody's 3/ | Euros after EMU start S & P's/Moody's 3/ |
|                        |                          |     |                     |      |                  |       |                                     |         |                                     |                                      |  |
| Belgium                | 2.4                      | 1.8 | -4.9                | -2.9 | 134.0            | 127.1 | 7.3                                 | 5.9     | AA+/Aa1                             | AAA/Aa1                              | AA+/Aa1                                  |
| Denmark                | 1.8                      | 2.5 | -3.0                | 0.1  | 74.5             | 67.1  | 7.0                                 | 6.5     | AA+/Aa1                             | AAA/Aa1                              | AA+/Aa1                                  |
| France                 | 2.0                      | 1.5 | -5.2                | -3.3 | 50.9             | 57.5  | 7.1                                 | 5.8     | AAA/Aaa                             | AAA/Aaa                              | AAA/Aaa                                  |
| Germany                | 2.5                      | 1.7 | -3.4                | -3.3 | 54.3             | 61.7  | 7.0                                 | 5.8     | AAA/Aaa                             | AAA/Aaa                              | AAA/Aaa                                  |
| Greece                 | 10.6                     | 6.9 | -10.6               | -5.1 | 114.9            | 107.7 | 15.4                                | 10.9    | BBB-/Baa1                           | nr/A2                                | BBB-/A2                                  |
| Ireland                | 2.1                      | 2.2 | -2.0                | -1.6 | 85.5             | 72.3  | 7.9                                 | 6.3     | AA/Aa1                              | AAA/Aaa                              | AA/Aaa                                   |
| Italy                  | 4.6                      | 2.6 | -8.3                | -3.3 | 123.8            | 123.2 | 10.7                                | 7.3     | AA/Aa3                              | AAA/Aa3                              | AA/Aa3                                   |
| Luxembourg             | 2.4                      | 2.0 | 0.1                 | -0.1 | 5.7              | 6.8   | 6.1                                 | 5.7     | AAA/Aaa                             | AAA/nr                               | AAA/Aaa                                  |
| Netherlands            | 2.3                      | 2.6 | -3.1                | -2.2 | 78.9             | 75.7  | 6.6                                 | 6.1     | AAA/Aaa                             | AAA/Aaa                              | AAA/Aaa                                  |
| Portugal               | 4.7                      | 2.7 | -3.1                | -2.9 | 70.3             | 69.6  | 10.2                                | 6.8     | AA-/Aa3                             | AAA/Aa2                              | AA-/Aa2                                  |
| Spain                  | 4.4                      | 2.8 | -6.3                | -3.2 | 64.2             | 67.4  | 10.1                                | 6.8     | AA/Aa2                              | AAA/Aa2                              | AA/Aa2                                   |
| United Kingdom         | 2.5                      | 2.6 | -6.0                | -3.1 | 45.7             | 49.4  | 7.8                                 | 7.6     | AAA/Aaa                             | AAA/Aaa                              | AAA/Aaa                                  |
| EU Average             | 3.5                      | 2.7 | -4.6                | -2.6 | 75.2             | 73.8  | 8.6                                 | 6.8     |                                     |                                      |  |
| EU Weighted Average 4/ | 3.0                      | 2.2 | -5.5                | -3.1 | 71.6             | 74.7  | 8.2                                 | 6.5     |                                     |                                      |  |

Source: National Sources; IMF International Financial Statistics and World Economic Outlook; and Standard and Poor's and Moody's.

1/ 1997 data are April 1997 IMF World Economic Outlook Projections.

2/ Ten-year government bond yield or nearest maturity. See footnote 1 Figure 2 for description of interest rates.

3/ End 1996 - beginning 1997 credit rating by Standard and Poor's and Moody's respectively. The last column reflects the projected unified rating under the hypothesis of a participation in the EMU. nr denotes no rating

4/ Weighted by national GDP.

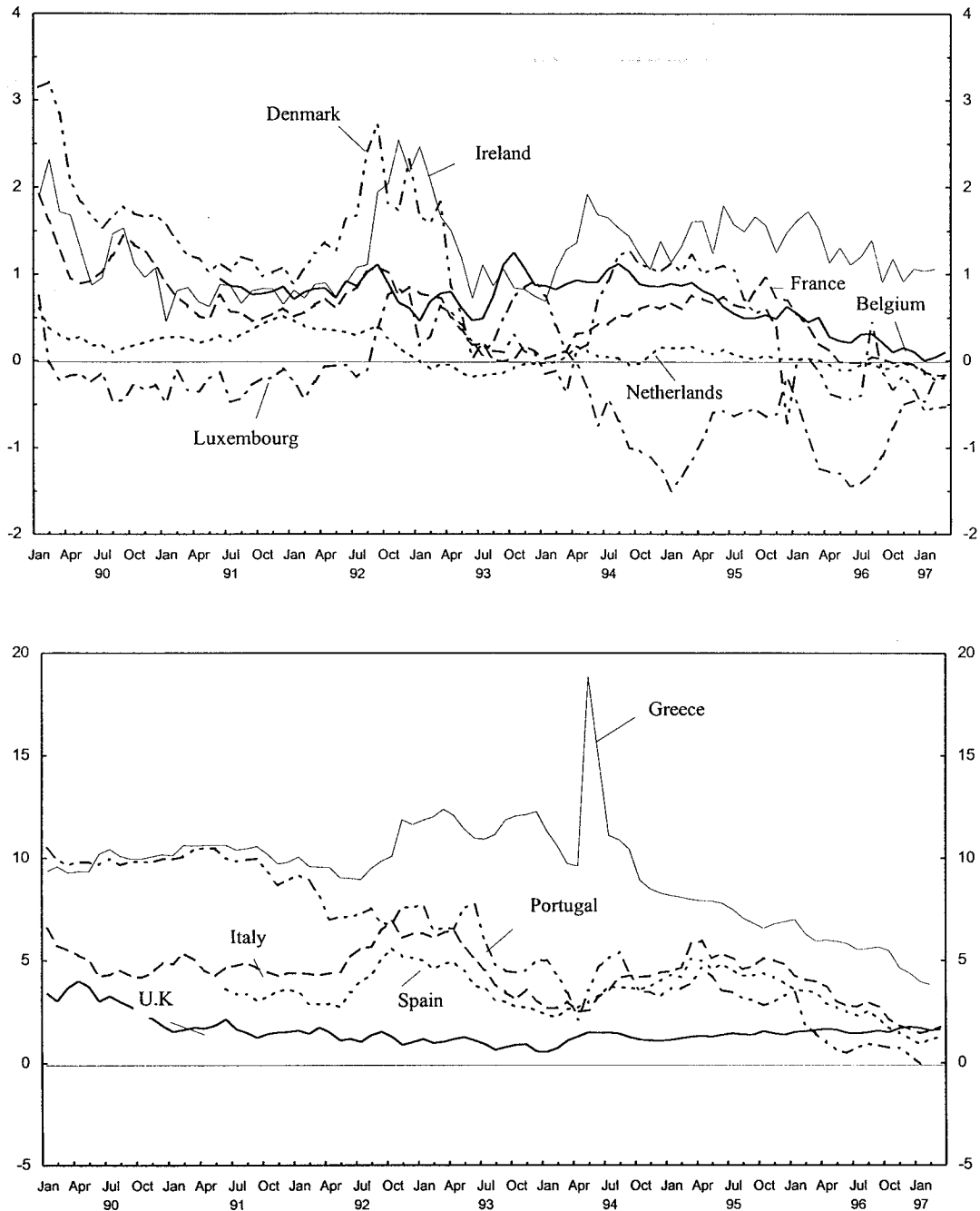
Figure 1). Despite this progress, there are still broad differences in fiscal standing and international financial markets still discriminate among EU sovereign borrowers. In particular, nominal interest rate differential with Germany, and the credit rating on national public debt set by Standard and Poor's and Moody's permit to classify EU members as follows:

- "low-interest rate" countries. This group exhibits a very low nominal interest rate differential with Germany (currently within 30 basis points) and a high credit rating. In addition to Germany, this group includes Belgium, France, Luxembourg, the Netherlands, and the United Kingdom. The last country has a relatively low interest rate in the perspective of the past few years (1993-96) and a credit rating equal to that of Germany;
- "medium-interest rate" countries. This group exhibits a modest interest rate differential with Germany (currently between 50 and 100 basis points) and in some cases a lower credit rating than the countries in the first group. It includes Denmark, Ireland, and Spain; and
- "high-interest rate" countries. This group exhibits more significant nominal interest rate differentials with Germany and lower credit ratings particularly on foreign currency denominated debt. It includes Greece, Italy, and Portugal. The last country has a lower credit rating on its foreign-currency debt than Italy.

Before discussing the prospect for a further narrowing of interest rate differentials, it is necessary to gauge the **extent to which the financial market penalizes relatively higher debt and current or expected inflation/devaluation**. Alesina, De Broek, Prati and Tabellini (1992) have found that in highly indebted OECD countries the differential between domestic public and private nominal rates of return is positively related to the stock of debt. However, the magnitude of the outright default risk premium, although statistically significant, is quantitatively small. Masson and Symansky (1995) estimate default risk premia from the long term interest rates prevailing on the EU members' foreign currency debt. In their procedure, German long term bonds are used as the reference "risk free" bonds for the calculation of the interest differentials. These differentials provide estimates of country-specific outright default risk premia. The premia are relatively small and never exceed 40-50 basis points even in highly indebted members.

Favero, Giavazzi, and Spaventa (1996) focus on total interest rate differentials on government bonds between high yield countries and Germany. In the long-run they find evidence of cointegration between total interest rate differentials and exchange rate factors and of uni-directional causality going from the exchange rate factors to the total yield differential. Hence, total interest rate differentials are largely determined by exchange rate factors. Furthermore, membership in the ERM was not sufficient to stabilize exchange rate expectations. Last, the default risk premium (that is calculated as a residual) is low, highly variable, consistently positive, and increases with maturity.

Figure 1. European Union: Developments and Convergence of Nominal Interest Rate Differentials with Germany, January 1990-January 1997. 1/2/



Sources: National Sources; and IMF International Financial Statistics.

1/ Ten-year government bond yield or nearest maturity. For Denmark, five-year government bond yield. For Greece, Treasury bill rates. For Ireland, yield on government securities with 15-year maturities. For Luxembourg, weighted average yield to final maturity of all government bonds quoted in the Luxembourg Stock Exchange. For Portugal, beginning July 1993, simple monthly average of daily yields of fixed rate bonds with residual maturity of 108 to 126 months. Previously, weighted monthly average of daily yields of floating rate bonds.

2/ It must be noted that long term government bonds can widely differ in their main attributes--i.e., maturity, tax status, and solvency--which often renders comparisons of cross-country interest rates problematic.



The above studies, as well as Cottarelli and Mecagni (1990) and Giovannini and Piga (1992) concur that current EU outright default risk premia, although somewhat elusive, are small: hence, the **interest rate differentials in Table 1 reflect for the most part differences in current inflation/devaluation risk premia**. This finding has important implications because intra-EMU exchange rates will be irrevocably fixed and the European Central Bank (ECB) is mandated to maintain inflation low and stable. As a result, differences in inflation/devaluation risk premia across EMU members can be expected to vanish. However, differences in fiscal standings will likely not vanish (Section IV). **Hence, could higher outright default risk premia replace the vanishing inflation/devaluation risk premia in the wake of the EMU?**

## **2. The critical factors to establish monetary and fiscal discipline**

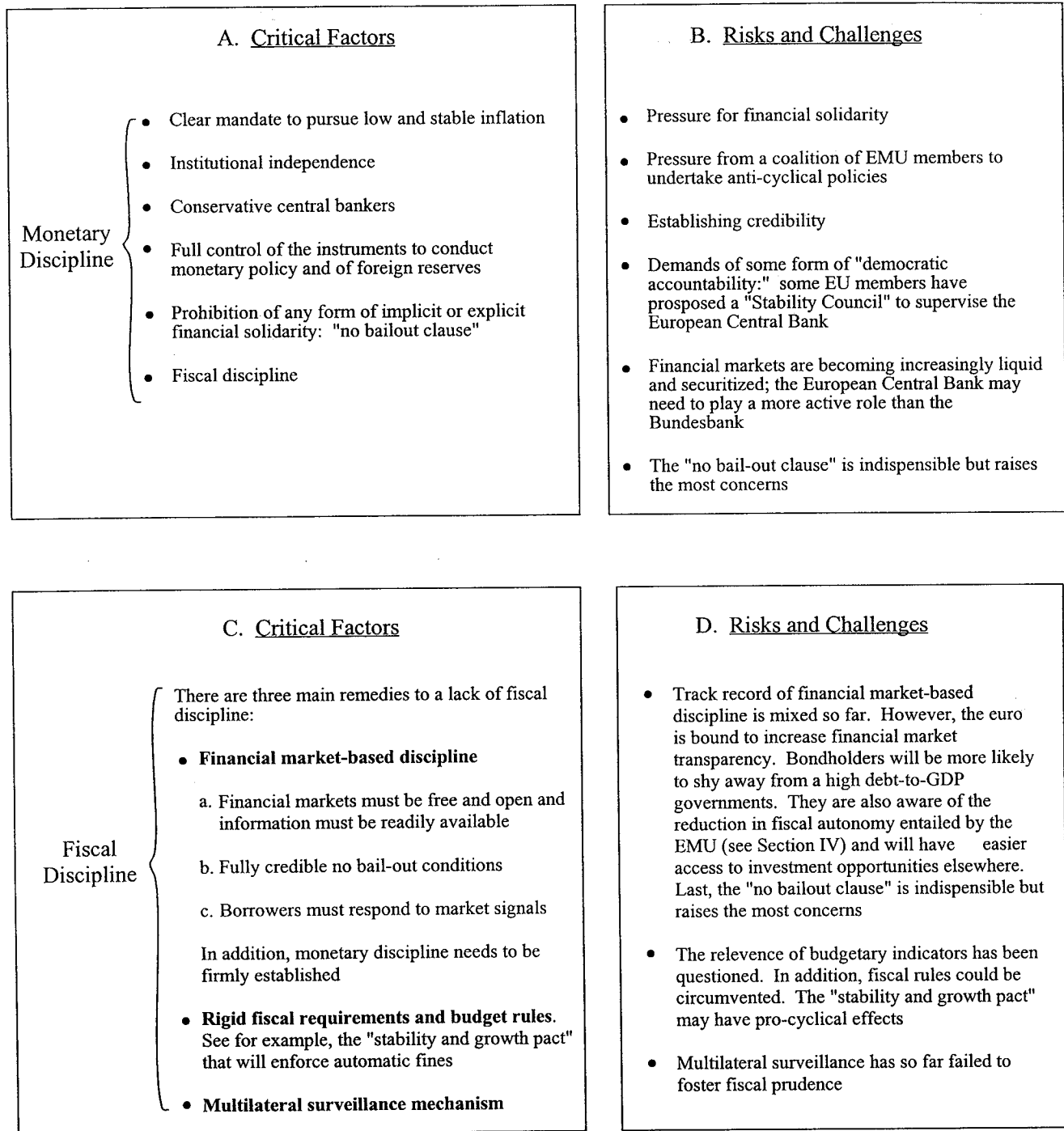
The answer to the above questions is not simple. The EMU will in fact be “guided” by the European Central Bank (ECB) that will set the common monetary policy; the national governments of the participating countries that will maintain a considerable degree of fiscal autonomy; and to a certain extent also the bodies of the EU that manage very limited but not insignificant resources. Coordinating these “actors” may be complex because their goals and instruments may overlap and even conflict at times. This paper does not attempt to examine the implications of coordinating these actors. Instead, it focusses on **how monetary and fiscal discipline can jointly reduce the likelihood of any explicit or implicit bailout--or “financial solidarity”** as some authors prefer to call it (where the two terms are used interchangeably here below)--and foster lower interest rates.

**Establishing monetary discipline and pursuing low and stable inflation will be the primary responsibility of the European Central Bank** (Figure 2). The Bank will also independently manage the instruments to conduct monetary policy and the common foreign exchange reserves of the EMU. Any form of financial solidarity, or bailout, will be barred (Art. 105 of the Maastricht Treaty).<sup>2</sup> Two dilemmas are likely to arise in the operation of the European Central Bank. The first dilemma is that some flexibility in monetary policy may be desirable from time to time to offset the adverse effects of tight budgetary policies or a downturn in the economy. To what extent does the Bank need to stick to “unwavering” tight monetary precepts--even in the face of increasing unemployment across Europe--to ensure monetary discipline? The second dilemma is that the resources of the Bank could be used to rescue a member in financial distress through some form of discreet or open financial solidarity,

---

<sup>2</sup>It became apparent early on that to minimize doubts and concerns about the ECB’s operation the ECB will rely on the Bundesbank model for its institutional framework. However, Schinasi and Prati (1997) and McCauly and White (1997) observe that the increasing “liquidity” and securitization of EU financial markets will compel some adaptation of the Bundesbank model.

Figure 2. The Critical Factors to Establish Monetary and Fiscal Discipline and the Main Risks and Challenges



or bailout.<sup>3</sup> Financial solidarity could be dictated, for example, by the desire to avoid any systemic ill-effect--such as a potential disruption of the financial market or trade--and could be interpreted as a form of risk sharing. Any actual or expected loosening of the monetary stance or any form of implicit or explicit financial solidarity, or bailout--may hamper financial market-based discipline and even reduce the incentive of national governments to pursue prudent fiscal policies. Hence, **monetary discipline** will be established when there will be no doubts concerning the Bank's commitment to pursue low and stable inflation and both dilemmas are resolved. In this case the Bank will be able to loosen the monetary stance in the wake of a recession, or alter its portfolio, without jeopardizing the public's perception about the Bank's commitment to low inflation.

**Fiscal discipline will be crucial in the EMU to allow national governments to pursue counter-cyclical fiscal policies and reduce the negative spill overs of high debt.**<sup>4</sup> When fiscal discipline is low there are three main remedies. The first remedy is provided by financial market-based discipline that would leave each country largely in control of its fiscal policy: i.e., market forces would exert a restraining role on national governments by rendering continuous and excessive borrowing progressively more expensive.<sup>5</sup> The second remedy calls for rigid fiscal requirements and/or budget rules that reduce the room for national governments'

---

<sup>3</sup>Financial solidarity can take several forms which differ in their intensity and include: (1) a portfolio shift entailing a discreet, or implicit, bailout; (2) a monetization of the debt; and (3) a proper, or explicit, bailout by the ECB with or without other EMU members.

<sup>4</sup>A lack of fiscal discipline could result from imperfections in the system of formal and informal rules and regulations governing the budgetary decision making process; a failure of the political system to fully internalize all future effects of current policy decisions; and economic and informational factors (see von Hagen and Harden (1995 and 1996), and Alesina and Perotti (1996), Grilli, Masciandro, and Tabellini (1991)Milesi-Ferretti (1996)

<sup>5</sup>The track record of financial market-based discipline is mixed so far. Bishop, Damrau, and Miller (1989) and Goldstein and Woglom (1991) find positive evidence. The Delors Report (1989), Lamfalussy (1989), Calvo (1995), Emerson (1992), and Lane (1993) are more doubtful. However, most concur that the EMU is likely to strengthen this discipline.

arbitrariness.<sup>6</sup> The third remedy entails a system of mutual budgetary surveillance that could allow better consideration of national circumstances.<sup>7</sup> The rest of the paper assumes that **fiscal discipline** will rely on a combination of all three remedies: i.e., a strengthening of financial market-based discipline; some common fiscal requirements; and a “stability and growth pact” that will institutionalize the fiscal criteria of the Maastricht Treaty, strengthen mutual surveillance, and enforce automatic fines against excessive budget deficits.

### **3. The effects of monetary and fiscal discipline, or the lack thereof, on interests**

We now tie together the previous discussion. For simplicity and clarity, we focus on three illustrative cases. Mongelli (1996c) discusses more cases in greater detail.<sup>8</sup> In **Case A**, tight monetary discipline complements and ensures tight fiscal discipline. Accordingly, the task of both the European Central Bank and the national governments should be eased because countries would not be allowed to run sizable and continuing budget deficits or to accumulate public debts in excess of the Maastricht debt criteria. The decline and convergence in interest rate is likely to be significant in every EMU member, albeit by a different extent. In particular, who gains the most from the standpoint of interest rates? The medium- and high-debt-to-GDP countries with relatively higher interest rates and a track record of relatively higher inflation may benefit the most by borrowing from the anti-inflationary reputation of the European Central Bank. In addition, all EMU members are likely to benefit from a general decline in interest rate levels along the lines discussed in Appendix I.

In **Case B**, we relax for a moment the assumption of fiscal discipline but there is tight monetary discipline. Specifically, one (and only one) member country is “caught” circumventing the fiscal regulations and running continuous and excessive budget deficits. Investors will hold the liabilities of the “free-rider” only until its risk-adjusted rate of return is comparable with those of other similar assets issued by other countries. The risk (and the

---

<sup>6</sup>The merits and demerits of rigid fiscal requirements and rules are discussed, inter alia, by Von Hagen and Harden (1996), Goldstein and Woglom (1992), Alesina and Perotti (1995), Milesi-Ferretti (1996 and 1997), and Ter-Minassian (1996). Binding legislative measures have lost considerable support since the Delors Report and have been criticized on several grounds. For example, the relevance of several budgetary indicators has been questioned (Buiter, Corsetti, and Roubini (1993) and Blejer and Cheasty (1993 and 1992)). Furthermore, fiscal rules could be circumvented, and formal fiscal restraints could be bypassed (Bennet and DiLorenzo (1983), Von Hagen and Harden (1996), and Goldstein and Woglom (1992)).

<sup>7</sup>The principal concern about this remedy is that the multilateral surveillance mechanism currently in place (in the Monetary Committee and Ecofin) has failed to foster budgetary prudence (see Emerson, et al. (1992) and Giavazzi and Spaventa (1991)).

<sup>8</sup>For example, the case of more than one country circumventing the fiscal regulations is not discussed here: it is far more complicate and would not necessarily add to this discussion.

costs) of a partial or complete outright default are borne entirely by the bondholders and the taxpayers of the free-rider. As a result, this country's specific interest rate will rise, but the reference interest rate of the EMU (e.g., the German interest rate) should be relatively unaffected as long as this undisciplined member is not expected to be bailed out by the European Central Bank. Therefore, even in this adverse scenario the fall in interest rate can be significant in fiscally disciplined countries while any undisciplined member will be penalized by the financial market. In this case interest rate differentials may not disappear and could even widen depending on the extent of the fiscal unbalance, the strength of financial market-based discipline, and the loss in fiscal autonomy.

In **Case C**, one country circumvents the fiscal regulations (and free-rides the others' fiscal discipline) while the European Central Bank has not yet fully established monetary discipline. For example, a coalition of member countries could "persuade" the Bank to undertake some form of financial solidarity, or bailout, to rescue any member in financial distress. Let's consider the following hypothetical initial situation: one profligate national government starts running continuous and excessive budget deficits. Under normal conditions, additional borrowing should take place at progressively higher interest rates: i.e., financial market-based discipline should "kick-in." The country-specific outright default risk premium should in turn signal to the national government that it needs to reverse its budgetary stance and reduce deficits and borrowing. However, if the financial market does not rule out some form of financial solidarity, or bailout, the country-specific risk premium may not rise as fast. If the financial market is convinced that somebody else will "foot the bill," it may not cautiously screen and appropriately penalize the free rider.<sup>9</sup> At the same time, a negative interest rate externality could occur and the "reference" interest rate of the whole monetary union (e.g., the German interest rate) would go up because it would no longer be risk free. In the mean time, the fiscal problem of the profligate government is hidden, or delayed, by the lack of a strong financial market signal. Hence, there is an element of cross-subsidy at work, and every EMU member will lose, albeit to different extent. Paradoxically, the free-rider's interest rate may not raise as fast, and even fall, if financial markets expects the European Central Bank to undertake some form of financial solidarity directly or indirectly. If, at this stage, the free-riding member is unable, or not "required" (for example through the stability pact) to reverse its fiscal stance and thwart the accumulation of debt, the financial distress may become more severe over time. Eventually, the critical debt threshold at which some form of financial solidarity, or bailout, will indeed be needed may be higher, and the resource transfer process may become more severe.

---

<sup>9</sup>**Who pays when financial solidarity takes place?** The answer depends on the type of financial solidarity. A non-optimal portfolio shift would increase the market price of the bonds issued by the country in financial distress, reduce its market-based risk premium, and burden most the issuers of the forfeited claims. A monetization of the debt may increase the rate of inflation, spreading the cost of a bailout across the union in proportion of money holdings. Nominal interest rates will also rise. A proper bailout organized directly by the ECB, or with the contribution of EMU members, would spread the losses across all taxpayers of the union in the first case, and particularly across those of the rescuing countries in the second case.

At this point, the pressure on the European Central Bank to rescue this government by reducing the real value of the country's debt may increase even further since more resources are at stake (see also Restoy (1996) and Barber (1997)).

We are now ready to respond to the earlier question: what is the trade-off between the vanishing inflation/devaluation risk premium and the outright default risk premium in the wake of the EMU? Some authors, such as McKinnon (1991) and Bishop (1991), fear that the vanishing inflation/devaluation risk premium could be offset by a one-to-one increase in the outright default risk premium, at least in the "high-debt" EMU members that previously had a relatively higher inflation rate. Therefore, the expected decline in interest rates may be negligible in those countries. These authors implicitly assume that monetary discipline and financial market-based discipline will be firmly established, and that some EMU members will not be able, or willing, to reduce their public indebtedness after being admitted in the EMU: i.e., binding legal requirements and mutual surveillance will be ineffective and the financial market will punish the free riders. Others, such as Masson and Symansky (1995), maintain that interest rates will converge even further in the EMU. Eventually, interest rate differentials may fall below 40-50 basis points (which is the highest outright default differential estimated in their paper). These authors implicitly assume that both monetary and fiscal discipline will be established in the EMU and that the "high-debt" EMU members will continue their fiscal consolidation. Restoy (1996), and several other authors, take an intermediate view but assumes a "subsidy element" between "high-debt" and "low-debt" countries.

Standard and Poor's unifies its credit rating in euro on the credit rating in foreign currency before the EMU because national governments will lose their privileged position (i.e., to monetize the public debt if needed) after adopting the single currency. Moody's, instead, unifies its credit ratings in euro on domestic credit rating before the EMU because it assumes that national governments have already lost the ability to monetize the public debt by granting independence to their central banks. Hence, Standard and Poor's is taking a more conservative approach to the effects of EMU on the "high-debt" members. Incidentally, Moody's domestic currency ratings are lower than those of Standard and Poor's.

What is the possible order of magnitude of the decline in interest rate levels in the high- and medium-interest countries? Early in 1997 interest rate differentials with Germany were still in the 150-200 basis points range in some EU members (excluding Greece). However, outright default risk premia are estimated at about 40-50 basis points, or less, in these countries (see Masson and Symansky (1995)). The gap between 150-200 basis points and 40-50 basis points could decline if both monetary and fiscal discipline are established (i.e., if Cases A or B prevail).

The rest of the paper assumes that monetary discipline will be firmly established from the onset of the EMU and that financial market-based discipline will rapidly deepen. In addition the EMU will also foster a decline in the overall level of interest rates along the lines discussed in Appendix I. The conditions discussed in the appendix will benefit each participating country and will be strengthened by a tight monetary discipline and widespread fiscal discipline. Hence,

benefit each country).<sup>10</sup> The next section examines the gains that a country with a relatively high debt-to-GDP ratio could obtain by pursuing a fiscal consolidation after being admitted in the EMU.

### III. A Model to Analyze the Interest Spending and Taxation Channels

This section is based on a model that is a specialization of Blanchard and Fischer (1989). Their objective was to examine whether an increase in the government budget deficit and public debt increases the real interest rate. With this purpose in mind, Blanchard and Fischer adopted a version of the overlapping generation model in an exchange economy in which fiscal policy is not neutral. Their model is amended here in two ways to examine the operation of the two channels.

#### 1. The Relation Between Real Interest Rates, Debt, and Deficits

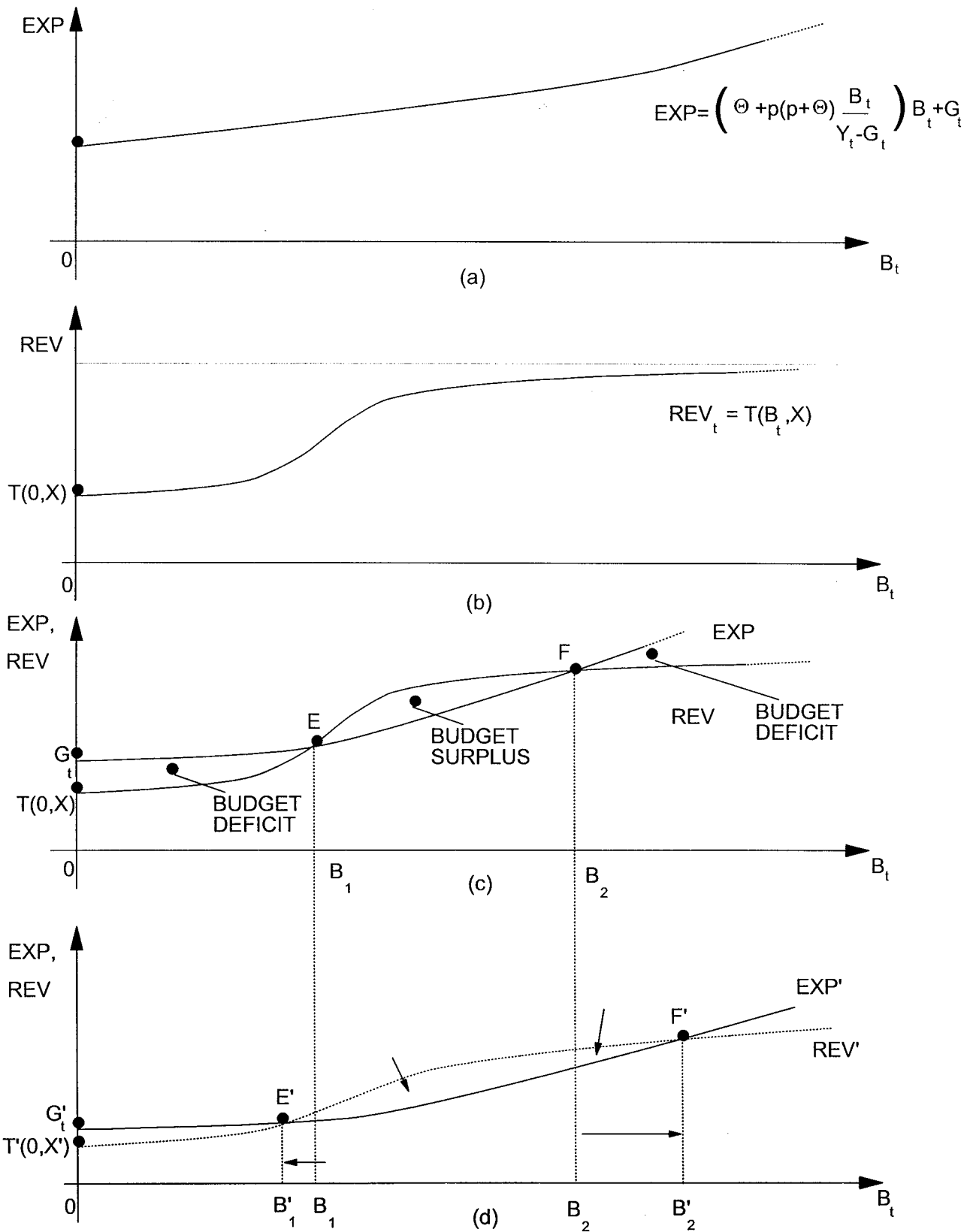
Blanchard and Fischer (1989) show that real interest rates depend on the anticipated sequence of debt, or, equivalently, on the current level of debt and the anticipated sequence of deficits. The main features of this model are also described by Yaari (1965), Blanchard (1994 and 1985), Calvo (1988), Weil (1989), and others. This paper amends the Blanchard and Fischer model in two ways. The **first amendment** is that the model used here differentiates between: (a) the potential decline in country-specific risk premium, that will benefit more the high debt-to-GDP EU members that are willing to undertake a fiscal consolidation; and (b) a generalized fall in the level of interest rates reflecting, inter alia, the reduction in transaction and information costs following the adoption of a single currency (Appendix I).

The **second amendment** is in the assumptions concerning the tax function  $T(B_t, x)$ . In the Blanchard and Fischer model, taxes are lump sum, and are positively related, but at declining rates, to the level of public indebtedness  $B_t$ ; i.e., as public expenditure increases the authorities respond by increasing taxes. A feedback function from debt to taxes that is similar to the above specification is discussed in Sims (1993) and Leeper and Sims (1994). The signs of the first and second partial derivatives are respectively  $T_B \geq 0$  and  $T_{BB} < 0$ .  $T$  has an upper limit which is given by the asymptote in Figure 3 (b), i.e., national governments cannot increase taxation indefinitely. However, this limit cannot be reached and  $T_{BB} < 0$  even for high levels of debt. Taxes also rise in the event of an increase of a fiscal policy shift parameter  $x$  ( $T_x > 0$ ). In the EMU the ability to increase taxation as the debt rises (i.e.,  $T_B$ ) is likely to decline as follows.

---

<sup>10</sup>The order of magnitude of a decline in the overall level of interest rates is not easy to assess. However, long term real interest rate levels inched up to about 4-5 percent in most EU members in early 1997: a high level by international and historical standards. Comparable real interest rates are about 1 to 2 percent lower in other regions (North America and Japan). Appendix I argues that lower budget deficits and public debt could foster a decline in EMU interest rates--and the above gap--through several channels including a reversal of the "crowding out effect," lower financial instability, and a reduction in intermediation costs.

Figure 3. Total Expenditure, Total Revenue, and the Equilibrium Level of Public Debt





The EMU will expedite the process of economic and financial integration of each country with the other members. Integration will in turn foster tax harmonization, as is discussed in Section IV, and reduce the ability of each country to increase their tax rates beyond those of the trading partners. Such a decline in fiscal autonomy is likely to be more significant in "high tax" countries.

To illustrate the foundation of the model, the behavior of economic agents is now briefly described. Time is continuous, and economic agents have a finite horizon. Output in the model is assumed to be exogenous and constant. Each agent is uncertain about his or her life span and faces an instantaneous probability of death  $p$  (where  $0 < p < 1$ ). Therefore, life expectancy is  $p^{-1}$ . These assumptions imply that, although agents are of different ages, their expected remaining life and marginal propensity to consume out of wealth are identical. Agents have a subjective discount rate  $\theta$ , share labor income equally (independently of age), and save or dissave by acquiring or selling actuarial bonds  $b_t$  that pay an interest rate  $r(z)$  at time  $z$  plus a premium  $p$  until the bondholder dies. The agents choose to sell the claims on their wealth in the event they die and obtain a premium.

The premium derives from life insurance in the presence of an uncertain lifetime; bondholders cannot go bankrupt, and upon their death the debt of the government is canceled. This assumption eases the following analysis but is not the source of the non-neutrality of fiscal policies. As a result of this assumption, future utility is discounted at a rate  $[\theta + p]$ , which differs from the effective interest rate faced by individuals  $[r(z) + p]$ . Finally, the agents of this economy maximize their expected lifetime utility under uncertainty about their lifespan. Specifically, at each point in time  $t$  they maximize,

$$(1) \quad E \left| \int_t^{\infty} u(c_z) e^{-\theta(z-t)} dz \right| t$$

Assuming a logarithmic utility that is a function of consumption  $c_t$  and that the probability of being alive at time  $z$  is  $e^{-p(z-t)}$ , that in turn implies an increase of the rate of time preference, the objective function can be rewritten as,

$$(1') \quad \int_t^{\infty} \log(c_z) e^{-(\theta+p)(z-t)} dz$$

Individual's wealth consists of human and nonhuman wealth. The first is the discounted stream of future disposable labor income, that is obtained by subtracting lump-sum taxes  $\tau_t$  from gross income from labor  $y_t$ . Nonhuman wealth is held in the form of actuarial bonds  $b_t$  yielding a return of  $[r(z) + p]$  per period until the bondholder dies. The budget constraint faced by individuals, while alive is,

$$(2) \quad \frac{db_z}{dz} = [r_z + p] b_z + y_z - c_z$$

Economic agents cannot accumulate debt forever at a rate higher than the effective rate of interest  $[r(z) + p]$  which they face. Therefore, the following no-Ponzi game condition must be satisfied,

$$\lim_{z \rightarrow \infty} b_t e^{-\int_t^z (r_u + p) du} = 0$$

By integrating (2) forward and applying the no-Ponzi game condition, the following intertemporal budget constraint is obtained,

$$(2') \quad \int_t^\infty c_z e^{-\int_t^z [r_u + p] du} dz = b_t + h_t$$

It postulates that lifetime consumption of an individual is equal in present value to its total wealth because he or she leave no bequests. Applying the maximum principle to (1') subject to (2') yields the following first order condition  $\frac{dc_z}{dz} = [r_z - \theta] c_z$  which when integrated to express  $c(z)$  as a function of  $c(t)$  and after substitution in (2') yields  $c_t = (\theta + p) [b_t + h_t]$ .

Hence,  $[\theta + p]$  is the propensity to consume out of total wealth.

The aggregate consumption of the population involves the consumption of all the agents who are still benefitting from the insurance scheme (i.e., agents who are alive at time  $t$ )

$C_t = \int_{-\infty}^t c(s, t) p e^{-p(t-s)} ds$ . The double time index indicates all those agents born at time  $s$  (i.e., those from the generation "s"), that is prior to the current time  $t$ , who may still be alive today. Using the previous definitions and assuming that the propensity to consume is independent of age, aggregate consumption can be expressed as,  $C_t = (\theta + p) [B_t + H_t]$ . The aggregate budget constraint of all the individuals alive is,

$$(3) \quad \frac{dB_t}{dt} = r_t B_t + Y_t - C_t,$$

In a state of equilibrium, individuals save by purchasing the government's liabilities. The aggregate non-human wealth accumulates at a rate  $(r)$ , and not  $(r+p)$ , because a portion  $pB_t$  of debt is extinguished with the death of individuals. Aggregate human wealth is given by the discounted stream of future disposable incomes,

$$(4) \quad H_t = \int_t^\infty [Y_z - T_z] e^{-\int_t^z [r_u + p] du} dz$$

The discount rate for aggregate human wealth  $(r+p)$  is higher than the discount rate for aggregate non-human wealth  $(r)$  due to the positive probability of death faced by individuals. This is the cause of the non-neutrality of debt and deficits.

In order to focus on the process of adjustment ensuing a change in fiscal policy, it is now assumed that output is exogenous and constant, and that the existing capital endowment is constant and cannot be traded by individuals. Therefore, the aggregate outstanding stock of wealth over which economic agents have control is  $H_t + B_t$ , where the latter term embodies the stock of public debt of the government. This assumption implies that the interest rate is not linked to the stock of capital but must adjust to secure equilibrium between aggregate demand and supply. The budget constraint of the government is,

$$(5) \quad \frac{dB_t}{dt} = r_t B_t + G_t - T(B_t, x)$$

It is assumed that government expenditure does not affect marginal utility of private consumption, and that owing to finite lifetime and the absence of bequest in this model, taxes are shifted upon future generations. The public debt cannot be accumulated forever and the no-Ponzi game condition must be satisfied by the government as well: therefore public indebtedness must grow asymptotically at a rate lower than the real interest rate at which it is discounted. It must be reiterated that the government faces a lower interest rate than economic agents. Integrating (5) forward subject to the no-Ponzi game condition yields

$$B_t = \int_t^{\infty} [G_z - T_z] e^{-\int_t^z r_u du} dz, \quad \text{which is the intertemporal government budget constraint. It}$$

implies that the current level of debt must be equal to the discounted stream of future primary surpluses. The equilibrium at the aggregate level is described by the budget constraint (5), which illustrates the dynamic of public debt, and

$$(6) \quad Y_t = (p + \theta) (B_t + H_t) + G_t;$$

$$(7) \quad \frac{dH_t}{dt} = (r_t + p) H_t - Y_t + T(B_t, x).$$

(6) illustrates the equilibrium in the goods market. The first term on the right hand side represents consumption of economic agents, which is a share of the stock of total wealth. This wealth is constituted by nonhuman wealth  $B_t$  and aggregate human wealth  $H_t$  (this is the discounted stream of all future disposable incomes in the economy). (7) is obtained by taking the time derivative of (6), and it describes the dynamic of aggregate human wealth. Whenever the condition  $\frac{dB_t}{dt} + \frac{dH_t}{dt} = 0$  is satisfied, and after some substitutions, the following expression for the short-term interest rate is obtained,

$$(8) \quad r_t = \theta + (p + \theta) p \left| \frac{B_t}{Y - G} \right|.$$

The short-term interest rate increases with the level of public debt and government expenditure (note that throughout this discussion that  $Y_t \neq G_t$ ). Budget deficits will affect the short-run interest rate over time, as they lead to a progressive increase in debt. Given a level of output and government expenditure, the interest rate must adjust in order to maintain aggregate consumption. Therefore, the sum of public debt and human wealth must remain constant as

well, which implies that  $\frac{dB_t}{dt} = -\frac{dH_t}{dt}$  (such that  $(H_t+B_t)$  remains unchanged). Substituting in (6) and (7) the expression  $rB_t + (r+p)H_t = Y_t - G_t$  is obtained. Using (5) to simplify this expression again yields (8), showing that this relationship holds at any point in time.

To analyze the effects of fiscal policies on the term structure of interest rates, a long-term rate  $R$  is introduced.  $R$  is the yield of a perpetuity paying a constant coupon flow of unity. Therefore,  $1/R_t$  is the price of these consoles, whose instantaneous rate of return is

$$\frac{1 + d(1/R_t)/dt}{1/R_t} = R_t - \frac{dR_t/dt}{R_t} .$$

Blanchard defines the long-term rate as a "shadow rate," which would apply if the government actually introduced such a console. Due to the arbitrage condition, the relation between the short-term and the long-term rate is

$$(9) \quad r_t = R_t - \frac{dR_t/dt}{R} .$$

Eliminating the short-term interest rate,  $r$  yields the following dynamic system in  $B$  and  $R$ :

$$(10) \quad \frac{dB_t}{dt} = (\theta + p(p + \theta) \frac{B_t}{Y - G}) B_t + G_t - T(B_t, x) , \text{ and}$$

$$(11) \quad \frac{dR_t/dt}{R} = R_t - \theta - (p + \theta)p \left| \frac{B_t}{Y - G} \right| .$$

This system is not linear, and its properties can be investigated around the steady state by performing a linearization around this point. An implicit expression for the steady state can be found by setting the two time derivatives in (10) and (11) equal to zero, and solving for  $(B^*, R^*)$ . However, the steady state may not be unique, and before proceeding further, it is useful to observe some features of the  $\frac{dB_t}{dt} = 0$  schedule.

The first two terms on the right hand side of (10) represent the total expenditure of the government such as interest payments and the other non-interest government expenditure. These terms, which are labeled EXP, are shown in Figure 3(a). The last term represents total revenue, and is labeled REV in Figure 3(b).

Due to the properties of the REV function  $T(B_t, x)$ , the EXP and REV schedules never meet, are tangent to each other, or intersect twice. The schedules will never meet if total expenditure always exceeds total revenue: this scenario will cause public debt to continuously increase. Because it violates the transversality condition it can be excluded from the investigation. The case in which total revenue exceeds total expenditure can also be excluded because it would not lead to any debt issue by the government. Instead, it would lead to an accumulation of assets and, as a result, the two schedules also would never meet.

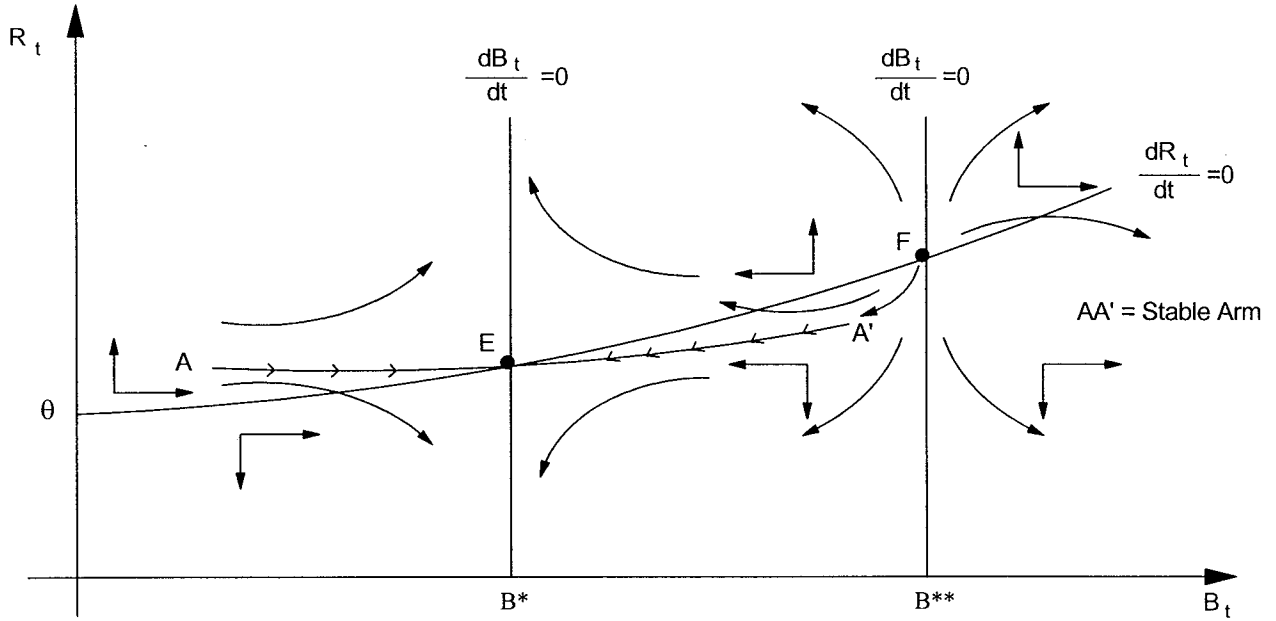
When total expenditure exceeds total revenue but displays a lower slope than the latter, the EXP schedule could be tangent to the REV schedule or intersect the REV schedule twice, as in Figure 3 (c). If the schedules were tangent there would be an unstable equilibrium as the debt would increase before and after the tangency point. The economy could be at equilibrium only if it never departed from the tangency point; an excessively strict and unrealistic condition. In the second case, the system obtained from setting (10) and (11) equal to zero has two solutions, designated E and F, which are the focus of the investigation below. The difference between these solutions lies in the slopes of the EXP and REV schedules.

The slope of the EXP schedule is equal to  $\theta + 2(p + \theta) B_t / (Y_t - G_t)$ , and is always positive and positively related to the stock of debt. However, this slope will fall, if the subjective discount rate  $\theta$  declines. Changes in this rate are discussed by Blanchard and Fischer (1989), and others. Blanchard and Fischer observe that if a lower subjective discount rate  $\theta$  is present elsewhere in an economic area, all  $\theta$ s will equalize at that level. Otherwise, a country (or region) may endure continuous capital accumulation or contraction. For example, a country with a relatively higher interest rate will reduce its consumption, continuously accumulate capital, and expand. A different country with a relatively lower interest rate will have an incentive to increase its consumption, continuously reduce its capital stock, and endure a slow down in economic growth. The slope of the REV schedule is determined by  $T_B$ , reflecting the ability of the government to raise additional taxes as the stock of debt increases. At low levels of the debt (e.g., at the level of debt corresponding to the solution E in Figure 4),  $T_B$  is high, while at high levels of the debt (say at F),  $T_B$  is low.

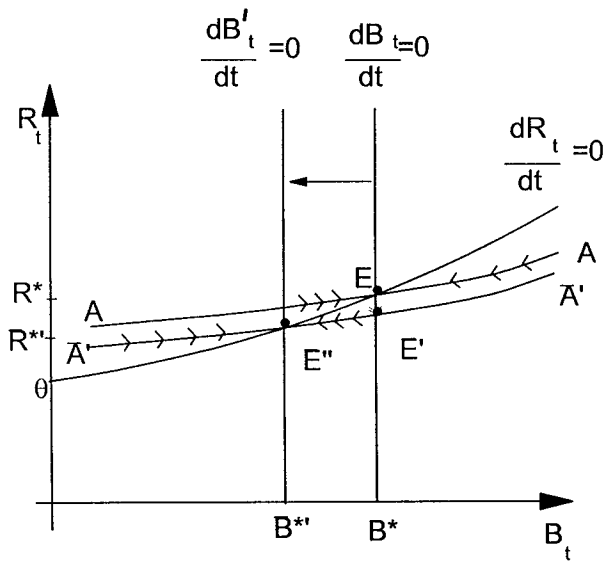
The system is linearized by using the Taylor series expansion over the two candidate steady state solutions. At the first solution E, the linearized system has two real and distinct roots of opposite signs. This establishes the steady state as a saddle point along which the economy can reach the stable arm AA in Figure 4a. The positive root pulls the system away from E, while the negative root pulls the system toward it along the stable arm AA. It can be shown that the slope of AA is positively related to  $T_B$  and  $\theta$ , and negatively related to  $r$  and the level of  $G^*$ . The negative root is subject to an additional interpretation; it is the speed of adjustment of the dynamic process. This speed increases with  $T_B$  and  $\theta$ , and decreases with  $r$ . The dynamic of the points in the  $(B_t, R_t)$  space (i.e., the arrows of the phase diagram) are obtained by taking partial differences from (10) and (11): to the left of the  $\frac{dB_t}{dt} = 0$  schedule,  $B_t$  is increasing, while to the right it is decreasing. Above the  $\frac{dR_t}{dt} = 0$  schedule,  $R_t$  is increasing; below it, it is decreasing.

Solution F cannot be a stable steady state because if the economy falls anywhere near this point, it will tend to move away from it as both roots associated to the Jacobean pull the economy away from it. This result can be further verified by the new direction of the arrows in the phase diagram: specifically, now both partial derivatives have a positive sign, indicating that the system moves away from F. A tangency point would yield an asymmetric equilibrium: if the economy found itself at this point no new debt would be accumulated.

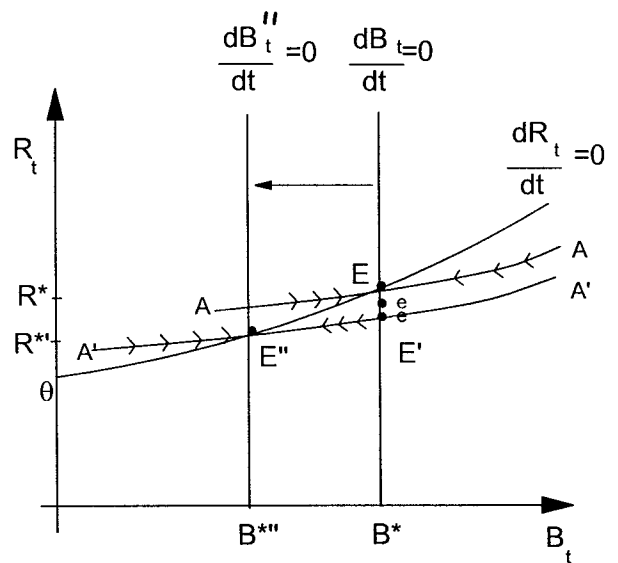
Figure 4. Interest Rate and Debt Dynamics, and the Effects of Unanticipated and Anticipated Tax Increases



(a)



(b)



(c)

● Effect of tax increase before the EMU.

● Effects of a tax increase in the EMU. The real interest rate declines more than the ability to levy additional taxes (i.e.,  $T_B$ ).

The intuition behind the above result is as follows: if the level of taxation is high in a country with a high debt-to-GDP ratio, the government will find it increasingly difficult to raise additional taxes. Therefore, the national government will be constrained in its ability to respond to further increases in the level of indebtedness and secure fiscal sustainability. The debt will thus start to grow. At F, this restriction is so severe that the country joining the EMU may not be able to benefit from the fall in the level of interest rates. Of course, the higher the initial debt-to-GDP ratio and the level of taxation, the more "likely" the country is to lean toward F in the EMU. This point is discussed further in Section V below.

#### **IV. The Possible Effects of the EMU on the Ability to Raise Additional Taxes**

This section discusses the taxation channel, i.e., the extent by which the EMU may contribute to expedite the ongoing tax harmonization process reducing the ability of individual governments to raise additional revenue and curb budget deficits and public debt. Tax harmonization--that is bolstered by market forces and is mandated by institutional factors--is slowly reducing the differentiation in several areas of EU tax systems as is examined below.<sup>11</sup>

Before proceeding it is useful to classify the EU members according to their current "tax" burden (Table 2). This ranking will then be referred to in the ensuing discussion:

- the "low-tax" countries such as Ireland (whose tax revenue-to-GDP ratio was 35.2 percent), Portugal (33 percent), Spain (34.2 percent), and the United Kingdom (35.2 percent);
- the "medium-tax" countries such as Germany (39.1 percent) after the unification with East Germany which exhibited lower tax rates during the communist days, Greece (42.5 percent), and Italy (41.8 percent); and
- the "high-tax" countries, such as Belgium (45.8 percent), Denmark (51.6 percent), France (44.5 percent), Luxembourg (43.7), and the Netherlands (44.4 percent).

##### **1. The Process of Harmonization of EU Tax Systems**

**Market-based tax harmonization is leading to a spontaneous convergence of tax structures in response to competitive pressures.** This process is evolving along the following lines. The deepening of economic integration is rendering goods, some services, capital, and factors of production increasingly mobile across the EU. Increased mobility, in turn, is blurring the separation between national tax jurisdictions and compelling most EU members to bring their tax rates and fiscal practices closer to those of other EU members.

---

<sup>11</sup>Tax harmonization is also enhancing economic efficiency by reducing tax distortions and promoting international tax neutrality, preventing some tax competition and the migration of the tax base, and raising welfare by improving fiscal equity.

Table 2. Tax Ratios and Selected Statistical Indicators for the EU Members 1/

|                     | Total Tax Revenue 2/ |       |       | Total Taxes on Income Profits and Capital Gains |       |       | Social Security Contributions 3/ |       |       | Taxes on Property 4/ |      |      | Taxes on Goods and Services 5/ |       |       | Taxes on General Consumption 6/ |      |      | Taxes on Specific Goods and Services 7/ |      |      |
|---------------------|----------------------|-------|-------|---|-------|-------|----------------------------------|-------|-------|----------------------|------|------|--------------------------------|-------|-------|---------------------------------|------|------|---|------|------|
|                     | 1965                 | 1980  | 1995  | 1965  | 1980  | 1995  | 1965                             | 1980  | 1995  | 1965                 | 1980 | 1995 | 1965                           | 1980  | 1995  | 1965                            | 1980 | 1995 | 1965                                    | 1980 | 1995 |
| Belgium             | 31.2                 | 44.4  | 45.8  | 8.6   | 18.2  | 17.5  | 9.8                              | 13.5  | 15.5  | 1.2                  | 1.0  | 1.1  | 11.6                           | 11.6  | 11.7  | 6.6                             | 7.5  | 7.3  | 4.0                                     | 3.4  | 4.2  |
| Denmark             | 29.9                 | 45.5  | 51.6  | 13.7  | 25.0  | 31.2  | 1.6                              | 0.8   | 1.6   | 2.4                  | 2.6  | 1.8  | 12.1                           | 17.0  | 16.6  | 2.7                             | 10.1 | 9.9  | 8.7                                     | 6.1  | 5.9  |
| France              | 34.5                 | 41.7  | 44.5  | 5.5   | 7.6   | 7.8   | 11.8                             | 17.8  | 19.3  | 1.5                  | 1.5  | 2.3  | 13.2                           | 12.7  | 12.2  | 8.0                             | 8.8  | 7.8  | 4.9                                     | 3.5  | 4.0  |
| Germany             | 31.6                 | 38.2  | 39.1  | 10.7  | 13.4  | 11.8  | 8.5                              | 13.1  | 15.4  | 1.8                  | 1.3  | 1.1  | 10.4                           | 10.3  | 10.9  | 5.2                             | 6.3  | 6.8  | 4.6                                     | 3.5  | 3.7  |
| Greece              | 22.0                 | 29.2  | 42.5  | 2.0   | 5.7   | 8.7   | 6.9                              | 9.7   | 14.7  | 2.1                  | 1.3  | 1.4  | 10.7                           | 12.1  | 17.4  | 2.3                             | 3.9  | 9.4  | 7.4                                     | 7.4  | 7.7  |
| Ireland             | 24.7                 | 32.4  | 35.2  | 6.4   | 11.8  | 13.7  | 1.6                              | 4.6   | 5.2   | 3.7                  | 1.7  | 1.6  | 13.0                           | 14.1  | 14.2  | 1.4                             | 4.8  | 7.5  | 10.6                                    | 9.1  | 6.2  |
| Italy               | 25.5                 | 30.2  | 41.8  | 4.5   | 9.4   | 15.2  | 8.7                              | 11.5  | 13.0  | 1.8                  | 1.1  | 2.3  | 10.1                           | 8.0   | 11.2  | 3.3                             | 4.7  | 5.8  | 6.1                                     | 2.9  | 4.5  |
| Luxembourg          | 30.6                 | 46.0  | 43.7  | 11.0  | 19.9  | 17.0  | 9.9                              | 13.5  | 11.8  | 1.9                  | 2.6  | 3.2  | 7.6                            | 9.7   | 11.7  | 3.8                             | 4.9  | 6.0  | 3.4                                     | 4.5  | 5.5  |
| Netherlands         | 32.7                 | 45.0  | 44.4  | 11.7  | 14.8  | 11.6  | 10.1                             | 17.1  | 18.8  | 1.4                  | 1.6  | 1.8  | 9.4                            | 11.4  | 12.0  | 4.0                             | 7.1  | 6.7  | 4.8                                     | 3.3  | 4.0  |
| Portugal            | 18.7                 | 28.7  | 33.0  | 4.5   | 5.7   | 8.6   | 4.0                              | 8.5   | 8.7   | 0.9                  | 0.4  | 0.8  | 8.1                            | 16.7  | 14.7  | 4.6                             | 4.6  | 7.5  | 7.6                                     | 7.8  | 7.0  |
| Spain               | 14.7                 | 24.1  | 34.2  | 3.6   | 6.3   | 10.0  | 4.2                              | 11.7  | 12.4  | 0.9                  | 1.1  | 1.8  | 6.0                            | 5.0   | 9.8   | 3.3                             | 2.5  | 5.5  | 2.7                                     | 2.5  | 3.5  |
| United Kingdom      | 30.4                 | 35.3  | 35.2  | 11.3  | 13.5  | 13.0  | 4.7                              | 5.8   | 6.3   | 4.4                  | 4.2  | 3.7  | 10.0                           | 10.3  | 12.2  | 1.8                             | 5.1  | 6.7  | 7.6                                     | 4.6  | 5.0  |
| (in percent of GDP) |                      |       |       |   |       |       |                                  |       |       |                      |      |      |                                |       |       |                                 |      |      |   |      |      |
| European Union 8/   | 29.1                 | 36.2  | 40.4  | 7.8   | 11.2  | 12.2  | 8.1                              | 12.3  | 13.8  | 2.0                  | 1.8  | 2.1  | 10.5                           | 10.3  | 11.7  | 4.5                             | 6.1  | 6.8  | 5.4                                     | 3.6  | 4.3  |
| Weighted Mean       | 27.2                 | 36.7  | 40.9  | 7.8   | 12.6  | 13.8  | 6.8                              | 10.6  | 11.9  | 2.0                  | 1.7  | 1.9  | 10.2                           | 11.6  | 12.9  | 3.9                             | 5.9  | 7.2  | 6.0                                     | 4.9  | 5.1  |
| Mean                | 34.4                 | 55.1  | 29.2  | 13.5  | 34.6  | 36.8  | 11.2                             | 23.3  | 27.5  | 1.0                  | 0.9  | 0.7  | 4.3                            | 10.5  | 5.0   | 3.7                             | 4.3  | 1.6  | 5.1                                     | 4.4  | 1.7  |
| Variance            | 5.86                 | 7.42  | 5.40  | 3.67  | 5.88  | 6.07  | 3.34                             | 4.83  | 5.24  | 1.02                 | 0.96 | 0.82 | 2.09                           | 3.25  | 2.24  | 1.93                            | 2.08 | 1.28 | 2.27                                    | 2.09 | 1.31 |
| Standard deviation  | 0.22                 | 0.20  | 0.13  | 0.47  | 0.47  | 0.44  | 0.49                             | 0.45  | 0.44  | 0.51                 | 0.57 | 0.43 | 0.20                           | 0.28  | 0.17  | 0.50                            | 0.35 | 0.18 | 0.38                                    | 0.43 | 0.26 |
| Coeff. of Variation | 31.02                | 40.92 | 44.83 | 8.67  | 13.88 | 13.98 | 9.80                             | 14.42 | 16.62 | 1.60                 | 1.52 | 2.05 | 10.38                          | 10.62 | 11.67 | 5.15                            | 6.55 | 6.77 | 4.63                                    | 3.52 | 4.17 |
| Mean                | 7.66                 | 29.58 | 9.09  | 7.70  | 19.25 | 10.44 | 1.17                             | 5.09  | 5.11  | 0.06                 | 0.28 | 0.66 | 3.03                           | 2.28  | 0.19  | 2.80                            | 2.08 | 0.34 | 0.70                                    | 0.23 | 0.29 |
| Variance            | 2.77                 | 5.44  | 3.01  | 2.77  | 4.39  | 3.23  | 1.08                             | 2.26  | 2.26  | 0.25                 | 0.53 | 0.81 | 1.74                           | 1.51  | 0.43  | 1.67                            | 1.44 | 0.58 | 0.83                                    | 0.48 | 0.54 |
| Standard deviation  | 0.09                 | 0.13  | 0.07  | 0.32  | 0.32  | 0.23  | 0.11                             | 0.16  | 0.14  | 0.16                 | 0.35 | 0.40 | 0.17                           | 0.14  | 0.04  | 0.32                            | 0.22 | 0.09 | 0.18                                    | 0.14 | 0.13 |
| Coeff. of Variation |                      |       |       |   |       |       |                                  |       |       |                      |      |      |                                |       |       |                                 |      |      |   |      |      |

Sources: OECD, Revenue Statistics of OECD Member Countries 1996 edition.

1/ The selected statistical indicators are the mean weighted by GDP, the simple mean, the variance, the standard deviation, and the coefficient of variation.

The latter is the ratio between the standard deviation and the mean.

2/ 1995 data are the latest available. 1994 data are the latest available for selected tax ratios of Greece and Portugal.

3/ Social security contributions paid by employees, employers, and self-employed.

4/ Includes taxes on immovable property of households, corporation, and government.

5/ Includes general sales tax, value-added tax, excises, and all other consumption taxes.

6/ Is a component of Taxes on Goods and Services. It includes general taxes, general sales taxes, and value added taxes.

7/ Is a component of Taxes on Goods and Services. It includes excises, custom and import duties, taxes on export, taxes on investment goods, and other taxes on international trades and transactions.

8/ Includes all members of the European union before January 1, 1995.

9/ Includes the six founding members of the European union: Belgium, France, Germany, Italy, Luxembourg, and the Netherlands.



The adoption of a single currency will expedite the tax harmonization process directly and indirectly. It will expedite it directly because monetary integrations deepens financial market integration and transparency. As a result, national investors may find it easier to seize investment opportunities abroad. For example, the Ruding Report (1992) remarks that the volume and the mobility of international portfolio investment (in debt instruments as well as in shares) might increase in coming years. It will expedite the tax harmonization process indirectly because economic integration is also expedited by the adoption of a single currency. The deepening of economic and financial integration will increase the share of tradable goods and services. The prices of these goods and services will be increasingly determined on international markets (e.g., as in the case of some types of banking and financial services and some forms of domestic transportation). Correspondingly, tax rates across the EMU will need to converge for competitive reasons at a faster pace than they would without the EMU.

**Institution-based tax harmonization is more complex to describe.** The Ruding Report (1992) defines tax harmonization in terms of an ongoing legislative and institutional process promoting “greater convergence as a result of action[s] at the Community level by the [EU] Commission or other agencies of the Community such as the European Court of Justice. Full harmonization describes the situation where identical tax bases, rates, systems, etc. are proposed or achieved among member States.” Hence, there are two main types of institutional factors promoting tax harmonization: modifications in the existing legislation, and court rulings which invalidate elements of the existing legislation. The first type has led, among others to: (1) the acceptance of common EU external tariffs with respect to the rest of the world; (2) the elimination of internal tariffs, border controls, and restrictions across the EU; (3) the harmonization of several tax bases; and (4) the adoption of several EU directives concerning the operation of the members' tax systems and the acceptance of common regulatory standards for conducting business.

Concerning the second type of institution-based tax harmonization, in recent years the European Court of Justice (ECJ) has been increasingly attentive in safeguarding the four economic freedoms: the right of establishment, the free movement of workers, the freedom to provide services, and the free movement of capital. These economic freedoms are enshrined in the Treaty of Rome (Article 8a). The ECJ is not allowing national tax jurisdictions to slip from permitted discrimination on grounds of residence to forbidden discrimination on grounds of nationality, which may thwart one or more of the four freedoms. For example, the Court has recently established that if an individual lives in a country but works in another, the country where he is employed must tax him the same way as its residents. Of course, the limitation of the role of the ECJ is that it can only indicate to national governments and the EU bodies where the existing legislation is wrong. However, the Court cannot provide a substitute for EU legislation, and cannot instruct national governments on how to get their legislation right.

## **2. Empirical evidence on tax harmonization**

There is now sufficient empirical evidence that the tax harmonization process is advancing in the areas most exposed to international competition, particularly indirect taxation and corporate and capital income taxation. Mongelli (1996b) finds that some fiscal convergence is currently taking place across the EU on the revenue side, particularly concerning tax revenues: i.e., some limited harmonization is already taking place across tax systems. The Ruding Report (1992) finds evidence of a certain amount of convergence of various aspects of corporation taxes over the past decades. Most notably the report investigates convergence of tax revenues, corporate and personal tax rates and their degree of integration, tax bases, and marginal effective corporate tax wedges. Kopits (1992) finds that tax harmonization is more significant for indirect taxation and corporate and capital income taxation. Tax harmonization is, however, less urgent for direct taxation of individuals, due to low labor mobility and immobile production factors.

Table 2 provides a few statistical indicators of the convergence, or harmonization, of some relevant tax ratios. 1995 OECD preliminary estimates of these tax ratios have been used because more recent data were not available. Convergence is defined as a reduction in the dispersion of the fiscal variables over time, and is gauged by means of the coefficient of variation of the principal tax variables. This coefficient consists of the absolute value of the ratio between the standard deviation of each tax variable and its mean. Between 1965 and 1995 the coefficient of variation of total tax revenue has fallen from 0.22 in 1965 to 0.20 in 1980, and 0.13 in 1995. Hence, the evolution of the main tax variables has tended to converge over time. The decline in the coefficient of variation is particularly evident in areas that are most exposed to international competition and the mobility of factors of production. For example, for "Taxes on General Consumption" (including the value-added tax and other sale taxes) and the "Taxes on Specific Goods and Services" (including custom and import duties and other taxes on international trade), the coefficients of variation fall from 0.50 to 0.18 and from 0.38 to 0.27 respectively. The fall in the coefficient of variation is even more prominent in the six founding EU members (EU6) (Belgium, France, Germany, Italy, Luxembourg, and the Netherlands) because they have integrated their economies earlier than the others. The EU6 are shown in the lower part of Table 2. The decline in the coefficient of variation is less significant for the "Taxes on Income, Profits, and Capital Gains" and for "Social Security Contributions" (evidently due to a modest labor mobility), and is absent for the "Taxes on Property."

## **3. Some Potential Effects of the EMU on the Ability to Raise Additional Taxes**

What are the prospects for a further deepening of tax harmonization in the areas more exposed to competitive pressures or new EU legislation in the wake of the EMU? Admittedly, it is difficult to clearly identify all possible effects of tax harmonization and pinpoint its repercussions on each country. This subsection contends that the EMU will expedite harmonization in several areas of taxation, albeit at a slow pace. For example, the adoption of a single currency fosters economic and financial integration, and in turn "market-based tax

harmonization.” However, tax harmonization and tax competition, which are fostered by integration, are not likely to proceed jointly. Whereas in recent years tax competition has supported tax harmonization, overall, in the medium and long run tax competition may slow down (or even hinder) harmonization in some areas of taxation. Given the absence of common accounting practices and transfer payments between EU members, and given the very different fiscal stance of EU members, these two processes are, to a certain extent, conflicting paradigms of the tax system. Their far reaching effects and conflicts are examined, inter alia, by Razin and Sadka (1991), the Ruding Report (1992), Devereux and Pearson (1995), Daly and Weiner (1996), and Kirchgassner and Pommerehne (1996).

Concerning the “institution-based tax harmonization,” the Ruding Report (1992), the European Commission (1996), Daly and Weiner (1996), as well as many other sources, indicate that sweeping reforms of the EU national tax systems are not foreseeable in the immediate future. Specifically, the Ruding Report emphasizes that, at present, complete tax harmonization cannot be pursued owing to: (1) the EU members' need of all the flexibility they can retain in collecting tax revenue; (2) the difficulty in reaching unanimity to implement any new EU-wide tax legislation; (3) the loss of national sovereignty that may result from the new legislation; (4) the different perception of tax systems' functions (and objectives) across the EU; and (5) the fear that any efforts to harmonize the taxation of dividends and interest income could result in a flight of the EU tax base to outside the EU.

Therefore, according to the Report, the immediate, and somewhat narrow, goal of national and EU legislator should be to, slowly but steadily, improve capital import neutrality (CIN) and capital export neutrality (CEN) while also reducing the existing distortions and inefficiencies. CIN occurs when domestic and foreign suppliers of capital to any national market obtain the same after-tax rate of return on similar investments in that national market (i.e., if CIN holds taxation is neutral with respect to the import of capital). CEN prevails when investors in the capital exporting country face the same marginal effective tax rate on income from similar investments, whether they are undertaken domestically or abroad (i.e., if CEN prevails, taxation is neutral towards the export of capital (see also Daly and Weiner (1996)).

In the near future, any new legislation to support the tax harmonization process should concentrate primarily on the following three areas: (1) removing those discriminatory and distortionary features of countries' tax arrangements that thwart cross-border business investment and share holding (e.g., eliminating double taxation, and simplifying tax rules); (2) setting minimum corporate tax rates and tax bases to reduce tax competition between EU members (to attract investment and taxable profit of multinational firms) and limit the erosion of the tax base of the EU as a whole; and (3) promoting transparency of any tax incentives to encourage investment with a preference for non-fiscal character.

In the coming years, the European Court of Justice may undertake additional rulings leading to further amendments of national tax legislation. In fact institution-based tax harmonization may be the single most important source of tax harmonization. For example, the claim of a UK subsidiary of a German chemical company that the UK corporation tax is

discriminatory and conflicts with the right of establishment is to be decided by the Court. A court ruling in favor of the UK subsidiary may boost tax harmonization between the UK and Germany.

### V. The Possible Balance Between the Interest Spending and Taxation Channels

What is the possible balance between the two channels in the wake of the EMU? The following **asymmetry** may help weighing the effects of the two channels. On one hand, the process of tax harmonization, that may restrict the ability of "high-tax" countries to raise taxes beyond those in the main partner countries, takes place gradually over an extended period of time. On the other hand, the fall in interest rates may take place fairly rapidly, and, if significant, could reduce the need for revenue increases or other fiscal adjustments. For simplicity and clarity three scenarios are now examined to gauge the possible effects of EMU on the public finances.

**Scenario A, the most favorable scenario.** In this scenario, at the start of EMU the fall in the ability to levy additional taxes (i.e.,  $T_B$ ) does not exceed the fall in interest rate. In Figure 3(d), this implies that the downward shift of the revenue (REV) schedule is less than the downward shift in the expenditure (EXP) schedule. As a result, the intersection point E will shift leftward toward E', while F will shift rightward toward F'. Furthermore, in this scenario if a government undertakes a tax increase while in the EMU, the improvement in its fiscal sustainability will be more significant than before the EMU.

This improvement can be illustrated as follows. The high debt-to-GDP country is initially at a point such as E in Figure 4(c), where it is assumed that it needs to reduce its outstanding debt. An unanticipated increase in the shift parameter  $x$  will raise taxes and lower the deficit (or possibly generate a budget surplus), which will move the  $(DB_t/dt=0)$  schedule to the left. The economy will temporarily move to point E' along the new stable arm A'A', thus reducing the long term rate. However, the short-term interest rate is still unchanged, as it is a function of the actual stock of debt which has not declined yet; this delay causes a twist in the term structure of interest rates. As the economy moves from E toward the new equilibrium at E'', the debt premium and the short-term interest rate starts falling as well. This will bolster fiscal sustainability. Before the EMU and with the same policy, the country would have been able to reach point  $\bar{E}''$  on Figure 4(b) at which the equilibrium level of debt and interest rate are higher than at E''.

**Scenario B, a less favorable scenario.** If instead the fall in the ability to levy additional taxes (i.e.,  $T_B$ ) and the downward shift of the revenue (REV) schedule exceed the fall in interest rate, the intersection E will shift rightward while F will shift leftward. If the country was initially at point E before the EMU, its fiscal position could still be sustainable as long as the critical fiscal condition  $2r^* - \theta - T_B < 0$  remains satisfied. The higher the tax-to-GDP ratio at the start of the EMU, the greater is the possible decline in  $T_B$ , and in the downward shift of the

REV schedule. In this case, the critical fiscal condition might no longer be satisfied, leading to fiscal unsustainability.

**Scenario C, a clearly unfavorable scenario.** One could also imagine an adverse case in which the fall in the interest rate does not materialize, or is negligible, and the downward shift in the revenue (REV) schedule is very significant (e.g., in a "high-tax" country). If the two schedules become tangent, their unique point of contact will be an unstable one because that country will be running a deficit before and after this point. If instead the two schedules are no longer tangent, the country will need a fiscal adjustment of some sort to satisfy the transversality condition and secure fiscal sustainability.

### **Concluding observations**

Observation 1. The overall fall in interest rates could be smaller in the "low-tax" countries with relatively low public indebtedness and interest differentials with Germany. However, in these countries the fall in fiscal autonomy is likely to be modest or even insignificant. These countries, therefore, could reap significant benefits from the EMU (i.e., these countries are likely to fall into the more favorable Scenario A).

Observation 2. The possible effects of the EMU are less clear for the "high-tax" countries with relatively high public indebtedness and interest differentials with Germany. Over a period of time these countries are more likely to lose some fiscal autonomy. On the other hand, these countries could gain from the EMU if they pursued cautious fiscal policies which led to a substantial reduction of their country-specific risk premia. Of course, the more significant the decline in the overall level of interest rate--i.e., the reference interest rate of the Emu (say the German interest rate)--the more likely such countries could also fall in Scenario A (Appendix I).

## **VI. Concluding Remarks**

Several empirical studies indicate that current EU interest rate differential are largely the result of differences in inflation/devaluation risk premia across EU members, i.e., financial markets appear to fear more a slow debt repudiation by means of money printing than an outright default. However, the EMU entails a single currency, the "euro," and a common monetary policy. Consequently, differences in intra-EMU inflation/devaluation risk premia will disappear. Furthermore, to the extent that monetary discipline is firmly established by the European Central Bank the inflation/devaluation risk premium of the EMU as a whole will be negligible.

Could the financial markets fully assess country-specific outright default risk premia only after the start of the EMU? Will the credit rating of the "high-debt" EU members improve or worsen in the EMU? Three main "stylized" outcomes have been discussed. When both monetary and widespread fiscal discipline are firmly established, interest rate differentials are likely to narrow further across EMU members. With monetary discipline but a lack of fiscal

discipline only in one member country, interest rates are still likely to continue to converge across all other EMU members, but will rise in the "undisciplined" member country. When monetary discipline has not yet been established and fiscal discipline is lacking in one member country, all other EMU members will cross-subsidize the "undisciplined" member country. Their interest rate may not fall as much, whereas the interest rate of the undisciplined countries may not rise as much. Hence, to the extent that both monetary and fiscal discipline are established, the vanishing inflation/devaluation risk premium--still significant at present in some EU members--should not be replaced by a higher outright default risk premium.

A precise estimate of the potential fall in the ability to increase revenue when public indebtedness increases is arduous at this stage. However, the "high-tax" and to some extent also the "medium-tax" countries might be more exposed to the effects of the ongoing tax harmonization process. These countries may find it increasingly difficult to increase their tax levels beyond those of the trading partners. The effects of tax harmonization could be felt the most if a shock lessens its chances of participating in the EMU, or if a shock increases the risk that EMU itself would be postponed for a significant period. On the other hand, the effects of tax harmonization on fiscal sustainability may be mitigated by the savings in debt servicing resulting from the combination of a narrowing of interest rate differentials and a decline in the "reference" interest rate of the EMU (say the German interest rate). Thus, the "high-tax" and in part also the "medium-tax" countries may not need to increase their tax levels further.

The process of tax harmonization is likely to be gradual. Conversely, the fall in interest rates is likely to take place rapidly. If significant, this fall could reduce the need for revenue increases or other fiscal adjustments. Countries with a relatively higher public debt and taxation that pursue cautious fiscal policies and steadily reduce their public indebtedness are likely to benefit the most from the EMU.

This paper has only examined some selected effects of the EMU on interest spending and taxation. There are many more channels through which the EMU could affect the public finances. In addition, most EMU members have gradually reduced--or at least brought under control--their non-interest spending. Hence, the preliminary findings in this paper should be looked at and interpreted in such a broader context.

### Selected Condition for a Decline in the Level of EU Interest Rates

Ford and Laxton (1995) use a model of world-wide interest arbitrage and find that the widespread, albeit uneven, increase in public indebtedness in several OECD countries since the late 1970s was responsible for a general interest rate rise in OECD countries. Tanzi and Fanizza (1995), and Mongelli (1996c) perform a panel data analysis--respectively across the OECD and the EU members--and find a positive systematic relationship between the long term real interest rate and the public debt-to-GDP ratio. Hence, in the face of high and increasing capital market integration, countries with a relatively higher debt-to-GDP ratio impose a negative "pecuniary externality" on other countries. This view, was also advanced in earlier studies--e.g., Feldstein and Eckstein (1970), Wallace (1984 and 1987), and Pigou (1952)--but was not undisputed though. For example, Barro and Sala-i-Martin (1990) and Evans (1987 and 1991) find that fiscal variables have no significant positive effect on real interest rates. However, their studies did not fully consider the extent of current capital market integration. In particular, Ford and Laxton contend that it is incorrect to search for a one-to-one link between domestic fiscal policies and interest rates. Rather, it is an increase (decrease) in world government debt that would raise (reduce) the world interest rate level. Yes, but how?

Lower budget deficits and decreasing public indebtedness across the EU could foster a decline in interest rate levels through several channels, including: an overturn of the "crowding out effect" and the "pecuniary externality" transmitted via the changes in the market price of saving; lifting current and potential economic growth, which, in turn, increases the supply of saving, leading to lower interest rates; and a reduction in EU-wide financial instability. These channels are discussed, inter alia, in Masson and Mussa (1995), Tanzi and Fanizza (1995), Ford and Laxton (1995), Verbon and Van Winden (1993), Tanzi and Lutz (1993), Reisen (1990) and the references therein.

In addition to the above channels, all EMU members are likely to benefit, albeit to different extent, from a **reduction in financial intermediation cost and the general cost of borrowing** as follows. Financial firms based in the EU are enduring an increasing competitive pressure due to: (1) the deregulation affecting cross-border activities; (2) the decline in the role of the state and diverse direct and indirect means to provide state support to national banking systems; (3) the impact of new information technology; (4) the continuous growth of a more liquid private and public securities market in Europe; and (5) a trend toward increasing concentration and improving corporate governance in the banking system (see McCauley and White (1997), Schinasi and Prati (1997), Emerson, et al, (1992)). The euro will reduce information costs and is likely to back these trends, support greater EU-wide securities market, promote competition in the bond market and reduce issuance cost, and foster overall interest savings by raising the degree of liquidity of the instruments traded. The euro will strengthen international competition and force even more commercial banks to restructure and/or concentrate and reduce costs.

### The List of Notation

In the model all variables are both real and nominal because the economy does not have a separate monetary sector and a price system

- $c_t$  = individual consumption. It is a flow variable,  
 $C_t$  = aggregate consumption. It is a flow variable,  
 $G_t$  = aggregate government non-interest expenditure on goods and services,  
 $\tau_t$  = lump sum individual taxes. It is a flow variable,  
 $T_t$  = aggregate government revenue from all individuals (net of government transfers). It is a flow variable,  
 $TX_t$  = nominal government tax revenue. It is a flow variable,
- $h_t$  = individual human wealth. It is a stock variable,  
 $H_t$  = aggregate human wealth given by the discounted stream of all future disposable individual incomes from labor. It is a stock variable,  
 $r_t$  = real interest rate,  
 $R_t$  = long-term real interest rate per year,  
 $b_t$  = actuarial bonds yielding a return of  $[r(z) + p]$  per period until the individual bondholder dies. It is a stock variable,  
 $B_t$  = net aggregate liabilities of the government with respect to all the bondholders alive It is a stock variable,  
 $M_t$  = monetary base. It is a stock variable,  
 $y_t$  = gross individual income from labor. It is a flow variable,  
 $Y_t$  = aggregate gross individual income from labor of all individuals in the economy. It is a flow variable,
- $\sigma$  = rate of growth of the monetary base per year,  
 $\pi_t$  = annual rate of inflation,  
 $\theta$  = subjective discount rate,  
 $p$  = instantaneous probability of death  $0 < p < 1$  (life expectancy is, therefore,  $1/p$ ),  
 $x$  = shift parameter reflecting the change in fiscal policy,  
 $\mu$  = notation of time used in alternative to  $t$  and  $z$ ,  
 $z$  = notation of time used in alternative to  $t$  and  $\mu$ ,

In addition, starred variables (\*) indicate the steady state level of the respective variables, and  $D$  indicates the first difference operator in the empirical tests.



### Bibliography

Alesina, Alberto, Mark De Broek, Alessandro Prati and Guido Tabellini, "Default risk on government debt in OECD countries," Economic Policy, (1992)

\_\_\_\_\_, and Roberto Perotti, "Budget Deficits and Budget Institutions," NBER Working Paper No. 5556, (May 1996).

Baldassarri, Mario, and Paolo Roberti. Fiscal-Problems in the Single-Market Europe, St.Martin's Press, (1994).

Barber, Lionel, "Shape of Currency Crises to Come," Financial Times, page 9, (January 11-12, 1997)

Bayoumi, Tamim, Goldstein, Morris, and Geoffrey Woglom, "Do Credit Markets Discipline Sovereign Borrowers? Evidence from U.S. States," Journal of Money, Credit, and Banking, Vol. 27 (November 1995, Part I), pp 1046-59.

Bishop, Graham, "Valuing Public Debt in the E.E.C.: EMU Benefits Versus No-Bail-Out Risks," European Business Analysis. London: Salomon Brothers, (October 1991).

\_\_\_\_\_, Damrau, D., and M. Miller, "Market Discipline can Work in the E.E.C. Monetary Union," European Business Analysis. London: Salomon Brothers, (November 1989).

Blanchard, Olivier, "Current and Anticipated Deficits, Interest Rates and Economic Activity," European Economic Review, Vol. 25 (1984) pp. 7-27.

\_\_\_\_\_, and Stanley Fischer, Lectures on Macroeconomics, The MIT Press, Cambridge, Massachusetts (1989).

Buiter, Willem, Giancarlo Corsetti and Nouriel Roubini, "'Excessive Deficits': Sense and Nonsense in the Treaty of Maastricht," Discussion Paper Series, No. 750, Centre for Economic Policy Research (London, December 1992).

Calvo, Guillermo, "Servicing the Public Debt," American Economic Review, Vol. 78 (1988), pp. 647-61.

\_\_\_\_\_, "Varieties of Capital-Market Crises," Mimeo, University of Maryland, (1995).

Cottarelli, Carlo, and Mauro Mecagni, "The Risk Premium on Italian Government Debt, 1976-88," IMF Staff Papers, Vol. 37, No. 4. Washington, D.C.: International Monetary Fund, (December 1990), pp. 865-880.

- Daly, Michael and Joann, Weiner, "Corporate Tax Harmonization and Competition in Federal Countries: some Lessons for the European Community?" National Tax Journal, Vol. XLVI, No.4, (1993), pp. 441-61.
- Delors Report (Committee for the Study of Economic and Monetary Union). Report on Economic and Monetary Union in the European Community. Luxembourg: Office for Official Publications of the EC, 1989.
- Devereux, Michael, and Mark Pearson, "European Tax Harmonization and Production Efficiency," European Economic Review, Vol. 39, (1995), pp. 1657-1681.
- Emerson, Michael, Daniel Gros, Alexander Italianer, Jean Pisani-Ferry, and Horst Reichenbach, One Market, One Money: An Evaluation of the Potential Benefits and Costs of Forming an Economic and Monetary Union. New York: Oxford Press, 1992.
- European Union, "A Common System of VAT: a Programme for the Single Market," Luxembourg, Office for Official Publications of the European Communities, (1996)
- Favero, Carlo, Giavazzi, Francesco, and Luigi Spaventa, "High Yields: the Spread on German Interest Rates," National Bureau of Economic Research, NBER Working Paper no. 5408, (Jan.1996).
- Ford, Robert, and Douglas Laxton, "World Public Debt and Real Interest Rates," IMF Working Paper, IMF WP/95/30, (March 1995).
- Giavazzi, Francesco, and Luigi Spaventa, "Fiscal Rules in the European Monetary Union: a No-Entry Clause," CEPR Discussion Paper Series, No. 516, London: Centre for Economic Policy Research (January 1991).
- Giorgianni, Lorenzo, "Foreign Exchange Risk Premium: Does Fiscal Policy Matter? Evidence from Italian Data," IMF Working Paper, IMF WP/97/39, (March 1997).
- Giovannini, Alberto, and Gustavo Piga, "Understanding the High Interest Rates on Italian Government Securities," CEPR Discussion Paper no. 720 (October 1992).
- Goldstein, Morris and Geoffrey Woglom, "Market-Based Fiscal Discipline in Monetary Unions: The Evidence From the U.S. Municipal Bond Market," in F. Giavazzi and F. Torres (eds) Establishing a Central Bank: Issues in Europe and Lessons from the U.S., Cambridge University Press, (1992).
- International Monetary Fund, World Economic Outlook, May and October 1995 and 1996 issues, and May 1997 issue.

Kirchgassner, Gebhard and Werner, Pommerehne, "Tax Harmonization and Tax Competition in the European Union: Lessons from Switzerland," Journal of Public Economics, Vol. 60, No. 3, , (June 1996), pp.351-72.

Kok, Coraline, "Discussion Paper for Taxation Strategy Presented," European Taxation, Vol. 36, No. 2, (1996).

Kopits, George, Tax Harmonization in the European Community. Policy Issues and Analysis International Monetary Fund, Washington, IMF Occasional Paper no. 94, July 1992.

Lambert, Thierry, "European Communities: a Comment on Harmonization of the Taxation of Saving," European Taxation, Vol. 33. (November 1993), 371-75.

Lamfalussy, A., "Macro-Coordination of Fiscal Policies in an Economic and Monetary Union, Supplement to Delors Report, (1989).

Lane Timothy. "Market Discipline." IMF Staff Papers, Vol. 40, No. 1. Washington, D.C.: International Monetary Fund, (March 1993), pp. 53-88.

Leeper, Eric M., and Christopher Sims, "Toward a Modern Macroeconomic Model Usable for Policy Analysis," National Bureau of Economic Research, Working Paper No. 4761, June 1994.

Masson, Paul R., and S. Symansky, "Paper on EU Convergence Scenario," International Monetary Fund, Mimeo, (October 1995).

\_\_\_\_\_, and Michel Mussa. "Long-Term Tendencies in Budget Deficits and Debt," IMF Working Paper, WP/95/128. Washington, D.C.: International Monetary Fund, (December 1995).

McCauley, Robert, and William White, "The Euro and European Financial Markets," Bank for International Settlements mimeo, (March 1997).

Milesi-Ferretti, Gian Maria, "Good, Bad or Ugly? On the Effects of Fiscal Rules with Creative Accounting," International Monetary Fund, Mimeo, (May 1997).

\_\_\_\_\_, "Fiscal Rules and the Budget Process," International Monetary Fund Working Paper, IMF WP/96/60, (June 1996).

Mongelli, Francesco, "I Benefici ed i Costi della Partecipazione nell'EMU: una Estensione," Rivista di Politica Economica, Vol. 2. (February 1996a).

\_\_\_\_\_, "The Effects of the European Economic and Monetary Union (EMU) on National Fiscal Sustainability," International Monetary Fund Working Paper, IMF WP/96/72, (July 1996b).

- \_\_\_\_\_, "On the Fiscal Effects of Joining the European Economic and Monetary Union," The Johns Hopkins University, Ph.D. Dissertation, (1996c).
- OECD, Economic Outlook, Paris, France, June 1995 and 1996 issues.
- Razin, Assaf, and Efraim Sadka, "International Tax Competition and Gains from Tax Harmonization," Economic Letters, Vol. 37, (1991), pp. 69-76.
- Restoy, Fernando, "Interest Rates and Fiscal Discipline in Monetary Unions," European Economic Review, Vol. 40, No. 8, pp. 1629-46, (November 1996).
- Ruding Report, Report of the Committee of Independent Experts on Company Taxation, Commission of the European Communities, Luxembourg, (1992).
- Schinasi, Garry, and Alessandro Prati, "European Monetary Union and International Capital Markets: Structural Implications and Risks," IMF mimeo, (March 1997).
- Sims, Christopher A. "A Simple Model for Study of the Determination of the Price Level and the Interaction of Monetary and Fiscal Policy," Revised draft of paper presented at Yale University, Mimeo, (1993).
- Smith, Stephen, "Subsidiarity and the Co-ordination of Indirect Taxes in the European Community," Oxford Review of Economic Policy, Vol. 9, No. 1 (1993), pp. 67-94.
- Tanzi, Vito, "Public Expenditure and Public Debt: An International Perspective," in J. Bristow and D. McDonagh, eds., Public Expenditure--The Key Issues, Dublin: Institute of Public Administration, (1986).
- \_\_\_\_\_, and Domenico Fanizza, "Fiscal Deficit and Public Debt in Industrial Countries, 1970-1994," IMF Working Paper, WP/95/49 (May 1995).
- \_\_\_\_\_, and Mark Lutz. "Interest Rates and Government Debt: Are the Linkages Global Rather Than National?." In Harrie A.A. Verbon, and Frans A.A.M. Van Widen (eds.) The Political Economy of Government Debt. Amsterdam: North Holland, 1993.
- Yaari, Menahem E. "Uncertain Lifetime, Life Insurance, and the Theory of the Consumer," Review of Economic Studies, Vol. 32 (April 1965), pp. 137-150.
- Ter-Minassian, Teresa, "Borrowing by Subnational Governments: Issues and Selected International Experiences," International Monetary Fund, Paper on Policy Analysis and Assessment, PPAA/96/4, (April 1996).
- Von Hagen, Jurgen, and Ian Harden, "National Budget Processes and Fiscal Performance," European Economy, Reports and Studies No. 3 (1994) pp. 311-418.
- \_\_\_\_\_, "Budget Processes and Commitment to Fiscal Discipline," mimeo, University of Mannheim and Sheffield University, August 1995.
- Weil, P., "Overlapping Families of Infinitely-Lived Agents," Journal of Public Economics, Vol. 38, (1989) pp.183-98.