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Institutions and policies

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Summary

Why do countries as similar as the industrialized OECD countries go through such different experience in terms of public deficits and debts or in terms of inflation? The answer cannot come from macroeconomic policy responses to different disturbances, nor from the principles of optimal taxation, but rather from politics. This article focuses on the role that particular institutions exert in providing constraints and incentives which shape the actions of policymakers. The electoral process and political traditions affect the ability of governments to deal with deficits and mounting debts. What seems to matter most, it is found, is the effect of the durability of governments. Governments with short horizons act myopically and never quite tackle the hard choices. Such governments typically exist in countries with an electoral system favouring many small political parties. Central bank independence promotes low inflation with no apparent costs in terms of real economic performance, irrespective of the political institutions. In fact there is no link between monetary and fiscal discipline. These findings carry powerful implications for countries facing high indebtedness or stubborn inflation, but also for the construction of the European Economic and Monetary Union.

Political and monetary institutions and public financial policies in the industrial countries

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1. Introduction

The post-war experience of industrialized countries features striking differences in public debt policies. Table 1 reports data on the accumulation of net public debt in 18 OECD countries. At the end of the 1980s, the debt to GNP ratio in these countries ranged from about 10% in Switzerland to over 100% in Belgium and Ireland.

What are the reasons for these differences? Normative macroeconomic theory stresses the 'shock absorber' and 'distortion smoothing' role of budget deficits and prescribes that government debt should be adjusted over time to respond to exogenous shocks. According to this view, public debts differ because the various national economies have undergone different shocks. This is quite unconvincing for the OECD countries which are quite similar and highly interconnected. In addition, the positive trend displayed by government debt in many countries after World War II is difficult to reconcile with the view that budget deficits were only smoothing the effects of temporary shocks. This is why we

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Table 1. Government net debt (% of GNP)

	1960	1970	1980	1989
Australia	na	40.1	24.9	16.5
Austria	na	19.4	37.2	57.8
Belgium	82.3	52.6	69.3	122.4
Canada	27.5	11.6	13.0	38.0
Denmark	na	−2.8	4.3	23.1
France	na	9.7	14.3	25.4
Germany	na	−8.1	14.3	21.9
Greece	9.2	21.3	27.8	79.0
Ireland	na	35.7	78.0	122.6
Italy	25.2	36.8	54.0	94.3
Japan	−4.4	−6.5	17.3	14.1
Netherlands	na	29.9	24.9	57.2
New Zealand	na	na	na	74.7
Portugal (a)	23.0	24.0	40.0	71.8
Spain	na	na	7.9	29.3
Switzerland	na	na	na	10.4
UK	123.2	79.2	47.3	30.3
US	45.0	27.8	18.8	29.2

Sources: *OECD Economic Outlook* and Bank of Portugal.
Note: (a) Only data for gross debt are available.

focus instead on those political and institutional aspects which may affect the process of policy formation, and ask whether constitutional differences among the various democratic regimes have any bearing on debt policy decisions. For example, does the level of government debt depend on electoral and representational systems?

Public debt is not the only dimension along which countries differ. In Table 2 we observe that, in the 1980s, average inflation was 3% in Japan and 21% in Greece. In the current debate over the European monetary union, an important issue is whether such divergences in inflation are related to the differences in fiscal policies described above. Are large deficits associated with inflation? Is there any connection between the political system and inflation? If this were the case the creation of a monetary union among countries with dissimilar fiscal policies could be problematic.

To explain international differences in monetary stability, we extend the institutional analysis beyond the general characteristics of political systems to include regulations which are specific to the activity of national central banks such as their degree of independence. In the current debate over monetary and political union in Europe one of tbe crucial issues is wbether a complete convergence in monetary and fiscal policy should be achieved before the monetary union. If it can be established that the institutional and political systems have a significant

Table 2. Inflation rate (%)

	1950–59	1960–69	1970–79	1980–89
US	1.8	2.3	7.1	5.6
UK	3.5	3.6	12.6	7.4
Austria	6.8	3.3	6.1	4.0
Belgium	1.9	2.7	7.1	5.1
Denmark	3.8	5.3	9.3	7.1
France	6.2	3.8	8.9	7.8
Germany	1.1	2.4	4.9	2.9
Italy	2.9	3.4	12.5	11.8
Netherlands	3.8	4.2	7.1	3.1
Switzerland	1.1	3.1	5.0	3.3
Canada	2.4	2.5	7.4	6.7
Japan	3.1	5.4	9.1	2.5
Greece	6.5	2.0	12.3	20.1
Ireland	3.9	4.0	12.7	9.9
Portugal	0.7	4.0	17.1	18.2
Spain	6.2	5.8	14.1	10.6
Australia	6.5	2.5	9.8	7.6
New Zealand	5.0	3.2	11.4	12.5
Mean	3.7	3.5	9.7	8.1
Standard deviation	1.99	1.08	3.28	5.04

Source: International Monetary Fund, *International Financial Statistics.*
Note: Inflation is based on the GNP deflator.

and independent effect on the choice of economic policy, then waiting for further convergence would be inappropriate. Complete convergence, in fact, could only be achieved by a political and monetary union.

Our investigation is also motivated by the recent positive theories of economic policy. This literature studies the incentives brought on policymakers by political and monetary institutions. So far, though, there exist very few empirical studies which attempt to explore the implications and hypotheses of these recent theories. An important forerunner of this paper is the work of Roubini and Sachs (1988, 1989) who also relate observed fiscal policies to political institutions in the industrial countries. Some of our results confirm their previous findings, but our paper is based on a more detailed description of the institutional environment, and bears a closer tie to the theoretical debate. In addition, we study monetary policy and monetary institutions, which were absent from their research.[1] The recent literature, pioneered by Rogoff

[1] Empirical evidence similar to that of Roubini and Sachs (1988) and to the evidence of this paper is presented, for developing countries, in Edwards and Tabellini (1990, 1991).

(1985), showed that the design of the monetary regime can he a fundamental determinant of public financial policies and more generally of macroeconomic performance. Our paper investigates the empirical validity of this approach, providing an accurate definition of central bank independence.

A preliminary caveat is in order. When trying to establish a link between institutional structure and economic policy decisions, one has to keep in mind that the terms of the contract establishing a central bank and even the constitutional structure of a country evolve and change over time. Institutional arrangements are possibly affected by economic performance. These types of feedback, however, occur over long periods of time, and thus we take institutional arrangements as given over the relatively short horizon which is the focus of our analysis. When we take into account institutional changes we ignore the possibility that they may have been induced by current economic performance.

The paper's outline is as follows. In Section 2 we analyse the determinants of debt policies and ask whether observed fiscal decisions are consistent with 'shock absorber' behaviour, as predicted by the theory of optimal taxation. For many countries they are definitely not. In fact, in a number of countries, public debt is on an explosive path: this will require major changes in future spending and tax policies. In Section 3, we ask whether the political system has any effect on public deficits. A comparison of political systems of the 18 OECD countries shows that, in almost all instances, explosive debts are found in countries governed by highly proportional electoral systems, with short-lived coalition or minority governments. In Sections 4 and 5 we turn to monetary policies. The recent literature on seigniorage (e.g. Mankiw, 1987) stresses that inflation is a source of revenue and should be considered a part of the global budgetary policy. Tbere is little evidence that tbis is a fruitful way of looking at monetary policies. Moreover, contrary to popular opinion, we find no evidence tlıat budget deficits lead to lax monetary policies. If for some countries seigniorage is indeed an important source of government revenue, for most countries seigniorage has actually declined in the 1980s when the budget deficits were largest. Next, in Section 5, we compare the monetary regimes of the 18 countries. While lower and less variable inflation is associated with central bank independence, there is no indication that the monetary regime matters for real economic performance (growth or unemployment) or for budgetary choices. Thus, fiscal discipline and monetary discipline seem to be unrelated, being determined by respectively the political and the monetary institutions. Section 6 concludes and sunımarizes the main findings.

2. The evolution of public debt

2.1. Sustainable paths for public debt

Governments, like private economic agents, face budget constraints. However, unlike private agents, governments do not always bear the burden of servicing the debt that they have issued; the burden can be pushed onto future governments or future generations of tax payers. What determines whether governments pay attention to their budget constraints? In particular, what determines the division between taxes and deficits? According to the theory of optimal taxation, public deficits should be designed to minimize the distortionary effects (the so-called excess burden) of taxation, given a politically desired path of public spending. The government should equate the marginal distortions associated with the last dollar of revenue collected on all tax bases at all points in time. The role of public debt should be to 'smooth' tax distortions over time. Temporary expenditures or temporary shortfalls in revenue should thus be financed hy issuing debt, whereas tax rates should be changed right away in the face of permanent shocks. In particular, government debt should not be used to postpone unavoidable tax increases, since doing so would simply result in larger tax distortions when the debt eventually has to be serviced.[2]

Without knowing the exact nature of the economic shocks, this normative theory is difficult to test. There are, however, certain minimal conditions that an efficient debt policy should satisfy, irrespective of the particular shocks which affect the economy. In particular, the government should not allow the debt to become unsustainable. More precisely government debt (as a percentage of GNP) cannot forever grow faster than the excess of its rate of return over the growth rate of the economy.[3] Only then is the stock of debt outstanding at any

[2] The 'tax smoothing' principle of debt policy was first applied by Barro (1979, 1986) to explain the debt policies of the US and the UK.

[3] Consider the government budget constraint (all variables are expressed as a percentage of GNP):

$$b_t \geq R_t b_{t-1} + d_t \tag{1}$$

where b is public debt, R is one plus the rate of return divided by one plus the growth rate of real GNP, and d is the primary deficit. By recursive forward substitution, Equation (1) can be rewritten as:

$$b_{t-1} \leq \sum_{i=0}^{N-1} q_{t+i} d_{t+i} + q_{t+N} b_{t+N} \tag{2}$$

where:

$$q_{t+i} = \prod_{k=0}^{i} R_{t+k}$$

Since the market will not allow public debt to grow in excess of the government capacity to service it,

$$\lim_{N \to \infty} q_{t+N} b_{t+N} = 0 \tag{3}$$

Table 3. Government surplus (% of GNP)

	Primary				Total			
	1950–59	1960–69	1970–79	1980–89	1950–59	1960–69	1970–79	1980–89
US	1.3	0.9	−0.3	−1.5	−0.2	−0.6	−2.1	−3.9
UK	2.6	2.2	−0.5	0.0	−1.1	−0.9	−3.7	−3.7
Austria	−2.1	−1.2	−2.0	−2.2	−2.4	−1.8	−2.5	−4.7
Belgium	−2.0	−0.1	−1.6	na	−4.1	−2.6	−4.5	−11.3
Denmark	1.8	1.5	1.5	−0.7	−0.1	1.0	0.8	−4.9
France	−2.7	−0.2	0.1	−1.0	−4.4	−1.0	−0.6	−2.4
Germany	−0.6	−0.1	−0.5	−0.6	−0.8	−0.5	−0.9	−1.6
Italy	−1.5	−1.4	−6.9	−5.0	−3.2	−2.7	−9.8	−13.5
Netherlands	1.2	0.0	−0.5	−3.1	1.2	−1.3	−1.9	−5.3
Switzerland	1.3	0.7	−0.3	0.2	0.4	0.2	−0.7	−0.03
Canada	2.2	0.8	−1.1	−4.5	0.4	−1.0	−2.7	−4.4
Japan	na	na	na	na	na	na	na	na
Greece	−1.1	−1.1	−1.6	−2.9	−1.2	−1.6	−3.0	−9.4
Ireland	−0.5	−2.3	−5.2	−5.8	−4.8	−5.4	−9.6	−12.5
Portugal	na	na	na	na	na	na	−5.8	−10.8
Spain	na	na	na	na	na	−1.5	−1.5	−6.2
Australia	na	na	na	na	1.5	−1.8	−1.9	−2.0
New Zealand	na	na	na	na	−2.7	−3.0	−4.9	−6.1
Mean	−0.01	−0.02	−1.45	−2.53	−1.43	−1.53	−3.25	−6.04
Standard deviation	1.74	1.21	2.16	2.46	1.98	1.42	2.86	4.04

Source: International Monetary Fund, *International Financial Statistics*.

point in time equal to the present discounted value of all future surpluses.

2.2. The evidence

Several pieces of evidence suggest that, in many countries, the debt path is unsustainable. Table 3 presents 10-year averages of primary (i.e. exclusive of interest payments) and total surpluses in the post-war period (both measures disregard seigniorage revenues). The pattern of the two variables is similar. We observe an increase over time in both the size and the cross-country dispersion of deficits. In the 1960s and especially in the 1950s surpluses were as common as dehcits. A number of countries – Austria, Belgium, Italy, Greece, Ireland (and possibly Portugal and Spain for which we lack data) – have kept running primary deficits throughout the period. The consecutive build-up of debt and debt service explains why their total budget deficits far exceed those of tbe remaining countries. These hve, possibly seven, countries are thus the most likely to have an unsustainable debt path. These conclusions are confirmed by the examination of Figure 1 where we present the evolution of net debt to GNP ratios in the OECD area. The countries

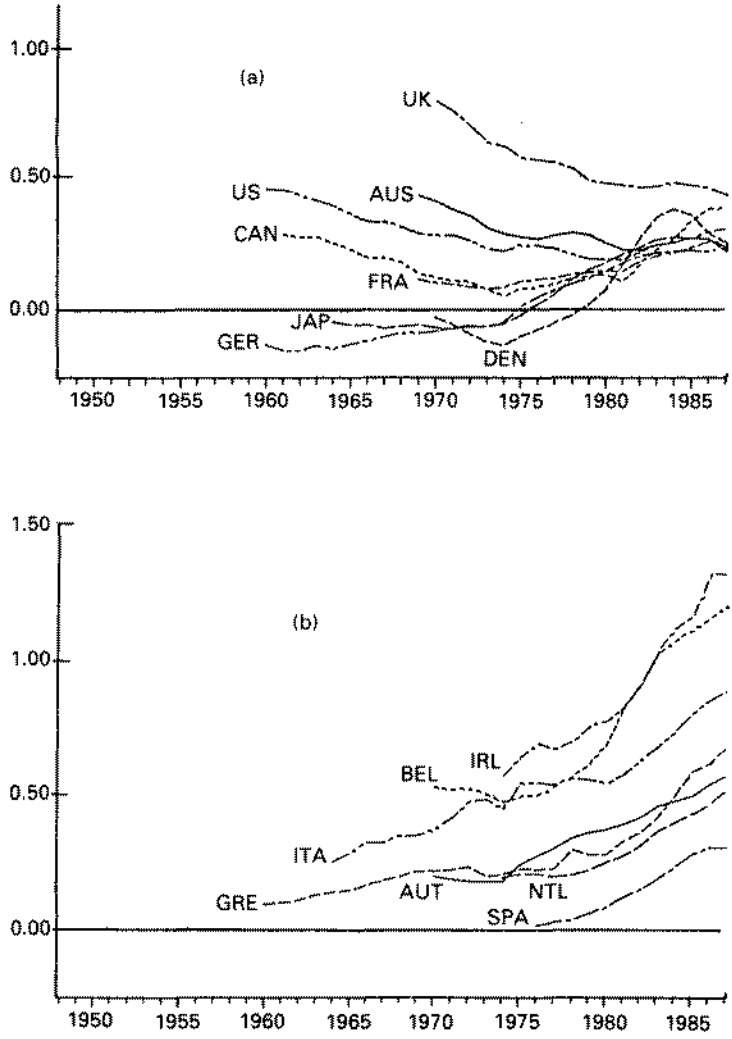

Figure 1. Net debt to GNP ratios

Source: *OECD Economic Outlook.*

can be divided into two groups. In the first group (Panel a) the debt to GNP ratio is stable or converges toward moderate levels of about 35%. In the second group (Panel b) the debt to GNP ratio has a clearly explosive pattern. In this group we find Austria, Belgium, Italy, Greece, Ireland, Portugal, Spain, as before, and the Netherlands.

A more formal approach is presented in Appendix A and provides indications of debt unsustainability for the same seven countries: Austria, Belgium, Italy, Greece, Ireland, Portugal and Spain. The consistency in the results makes it difficult to accept the view that public

debt accumulation in those countries was the optimal response to temporary economic shocks.

3. Political institutions and fiscal policy

3.1. Political theories of government debt

Can international differences in debt accumulation be due to differences in the political incentives faced by the governments? We attempt to answer this question by comparing the domestic political institutions of the OECD countries. The recent literature on the theory of economic policy pays considerable attention to how political institutions shape the policy-makers' incentives. (For a survey, see Persson and Tabellini, 1990). A first approach (pioneered by Alesina and Tabellini, 1990; Persson and Svensson, 1989; and Tabellini and Alesina, 1990) investigates how the political system affects over time the behaviour of governments with different ideological preferences which alternate in office. The central result concerns how policy-makers weigh the future (their rate of time discount). Two features of the political system matter: instability (i.e. how likely it is that the current government or legislative majority will be thrown out of office) and polarization (i.e. how strong is the disagreement between the alternating policy-makers). More unstable and polarized political systems behave more myopically, i.e. they discount the future more. This approach yields the sharp empirical prediction that public debts should be larger in more unstable and polarized societies.

The second theoretical approach also focuses on disagreement between different political actors but focuses on the role of different decision-makers (such as different cabinet ministers or different levels of government). The greater is the conflict between these different decision-makers, the more difficult it is to change the status quo or to enact controversial policies. (This idea has been applied to the coordination of monetary and fiscal policies by Tabellini, 1986; to the choice of stabilization programmes by Alesina and Drazen, 1989; to the inflation tax by Aizenman, 1989 and Drazen and Grilli, 1990; and to budget deficits by Sanguinetti, 1990). Disagreement results in the postponement of unpopular policies. Thus, here too, collective decisions are short-sighted and political conflict is associated with the accumulation of public debt, the more so the more difficult is the resolution of the political conflict.

There is an important conceptual difference between the first and the second explanation of why political institutions can induce collective myopia. The second approach stresses *government weakness* so that the

postponement of unpopular decisions is not a deliberate policy choice. Rather, it reflects a sequence of disparate and unrelated spending and taxing decisions, accompanied by the inability to change the status quo. The first approach, on the other hand, emphasizes *political stability* to explain how the electorate ends up favouring budget deficits because their future costs are not fully recognized. This distinction is important, because it leads to different policy implications. According to the second approach, what matters is the support that governments enjoy in the legislature and among the voters at large. According to the first line of thought, instead, collective myopia is not caused by the weakness of the executive, but rather by its instability. In the empirical analysis, we attempt to discriminate between these two alternative hypotheses.

3.2. The political institutions

The countries that we study were democracies throughout the postwar period, except for Greece, Portugal and Spain, and all of them have been democracies since the second half of the 1970s. We describe three main features of these democracies: (a) their broad constitutional rules; (b) their party systems; and (c) the attributes of their governments. Except for France and for the countries that became democracies, the constitutions did not significantly change during the post-war period, at least along the dimensions considered in this section. Hence the features described under (a) are independent of economic policies in general, and of the evolution of public debts in particular. While the political indicators examined below can in principle be influenced by economic events and by previous economic policy decisions, these indicators are quite stable over time. In fact, they can be classified quite precisely according to the constitutional rules and the properties of the party system. This suggests that, even for the features described under (c), the main direction of causation runs from the political system to economic policies, and not vice versa.

3.2.1. The political constitution. The first distinction (column 1 in Table 4) is between presidential and parliamentary democracies. In the former, the president is voted directly into office and has significant independent authority. In the latter, the prime minister is accountable to the legislature. Even though there are some mixed arrangements (Switzerland can almost be considered a multiperson presidential system, and since 1958 France combines elements of both systems), most countries are parliamentary democracies. Parliamentary systems in turn differ by the degree of proportionality of the electoral laws. We follow Bingham Powell (1982) in identifying the degree of proportionality with the

Table 4. Political fractionalization

Country	Democracy (a)	Representatives (b)	Fractionalization (c) 1960–64	1965–76	1980–90
Australia	Pa-M	1	0.63	0.61	0.59
Austria	Pa-R	6	0.54	0.54	0.59
Belgium	Pa-R	7	0.63	0.76	0.86
Canada	Pa-M	1	0.62	0.63	0.52
Denmark	Pa-R	10	0.72	0.79	0.81
France	Pr	1	0.69	0.71	0.68
Germany	Pa-M	2	0.58	0.57	0.66
Greece	Pa-R	6	0.59	0.68	0.55
Ireland	Pa-M	4	0.62	0.61	0.64
Italy	Pa-R	19	0.73	0.73	0.75
Japan	Pa-M	4	0.54	0.60	0.63
Netherlands	Pa-R	150	0.77	0.84	0.73
New Zealand	Pa-M	1	0.51	0.49	0.49
Portugal	Pr	14 (d)	na	0.68 (d)	0.66
Spain	Pa-R	7 (d)	na	0.76 (d)	0.62
Switzerland	Pa-M	na	0.79	0.81	0.82
UK	Pa-M	1	0.50	0.48	0.53
US	Pr	1	0.44	0.61	0.48

Sources: Bingham Powell (1982), Banks (1987) and various other years, Keasing archives, various years.

Notes: (a) Pr = Presidential Democracy, Pa-M = Majoritarian Parliamentary Democracy, Pa-R = Representational Parliamentary Democracy; (b) Representatives per district, defined as the number of legislators in the popular house of the legislature, divided by the number of electoral districts. The numbers refer to the late 1960s. In 1971 Austria decreased the number of districts, increasing the number of representatives per district to nearly 20; (c) Fractionalization Index, defined as the probability that two legislators chosen at random belong to different parties. The second column is computed from elections in the 1966–76 period, and refers to the average votes taken by each party. The other two columns refer instead to the average number of seats in the lower house taken by each party in elections held during the specified periods; (d) Years 1975 and 1976 only (dictatorship prior to then).

number of representatives per district (column 2 of Table 4). Systems with less than five representatives per district are classified as majoritarian, with five or more as representational. Naturally, electoral laws differ in several other dimensions, which can reinforce or weaken the degree of proportionality of a political system.[4]

All the countries that seem to have an unsustainable debt, except Ireland and Portugal, are governed by representational systems. Conversely, all representational democracies except Denmark have unsustainable fiscal policies. This finding is strikingly illustrated in Figure 2

[4] In particular, Germany, Ireland and Japan also have less representational features in their electoral laws.

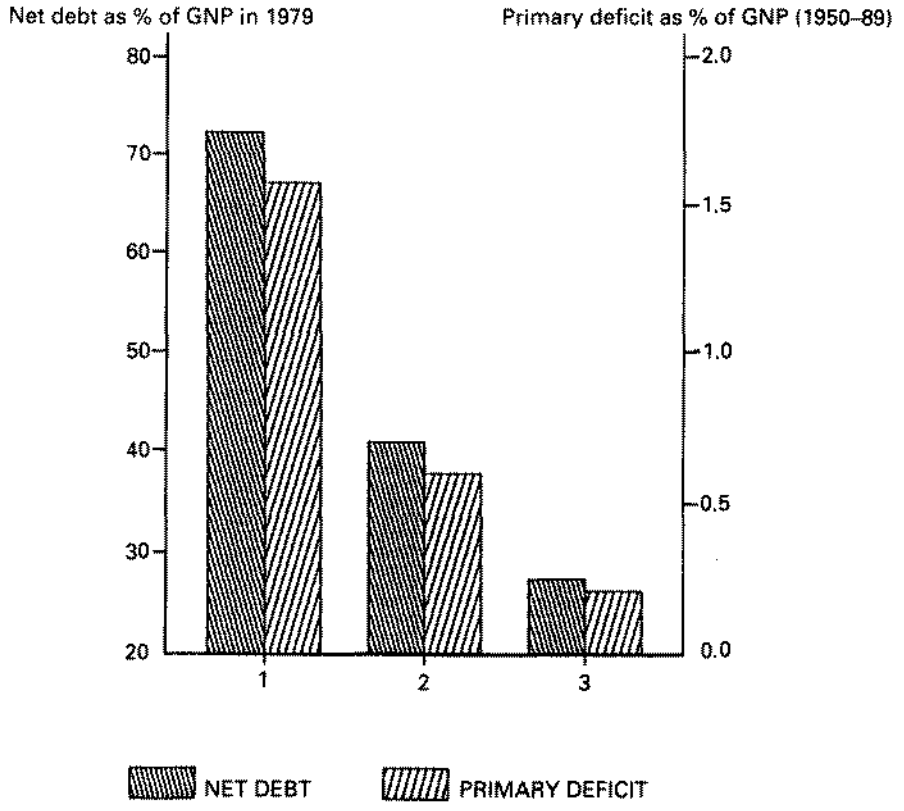

Figure 2. Net debt and primary deficits

Notes: Group 1: Representational Parliamentary Democracies (Austria, Belgium, Denmark, Greece, Italy, the Netherlands, Spain); Group 2: Majoritarian Parliamentary Democracies (Australia, Canada, Germany, Ireland, Japan, New Zealand, Switzerland, UK); Group 3: Presidental Democracies (France, US). France 1950–58 is included in Group 1. Only the years of democratic regime for Greece and Spain are included. Data for Portugal are missing.

which displays for tbree country groupings the average net debt in 1989 and the average primary deficit between 1950 and 1989, both as percentage of GNP. Group 1 consists of all representational democracies, group 2 is made up of majoritarian parliamentary systems and group 3 of presidential democracies (except Portugal, for which data are missing).[5] Clearly, net debts and primary deficits are much larger in the representational democracies.

[5] France is included in the second group, but its primary deficit is only averaged between 1960 and 1989, since before 1959 it was a representative democracy. The primary deficit of France in 1950–59 is instead included in group 1.

Tbis strong association between representational political systems and lack of fiscal discipline is also evident from particular episodes of constitutional reform. In 1958, France reformed its electoral law and enacted a number of constitutional changes. The constitutional role of the president was strengthened relative to the parliament and the government, while the government in turn was strengthened relative to the parliament. The electoral law was changed from proportional to majoritarian. As can be seen from Table 3, the size of fiscal deficits changed dramatically. While in the 1950s France had an average primary deficit of 2.7% of GNP (the largest of all countries in the sample), its average primary deficit from 1960–89 was 0.4% of GNP, one of the smallest in the sample.

3.2.2. The party system. The electoral laws, and in particular their degree of proportionality, influence two central features of a party system: the number of parties, and the extent to which minority interests are represented in the legislature. With a high degree of proportionality, several parties are likely to coexist; moreover, extremist parties that represent the interests of minorities are more likely to survive. These two features determine the kind of government (coalition, majority government or minority government) that is likely to be formed, as well as its durability, thereby indirectly shaping the policy-making process.

The last three columns of Table 4 present an indicator of fractionalization of the party system over three sub-periods. We follow the literature in defining fractionalization as the probability that two legislators chosen at random belong to different parties.[6] This index ranges between 0 and 1. A value of 0.5 is associated with a perfectly balanced two-party system. A value larger than 0.5 is generally associated with more than two parties.The larger the index, tbe greater is the number of parties in tbe legislature. The lowest values of this index are found in two-party systems, such as the US, the UK and New Zealand. Countries with several parties, such as Italy, Denmark, Switzerland or the Netherlands, have the highest values. Tbe fractionalization index is quite stable over time, and it is highly positively correlated with the index of proportionality of the electoral system. This confirms that proportionality of the electoral laws leads to fractionalization.

The relative importance of extremist parties (measured by their percentage of votes in the elections) is reported in Table 5. These parties

[6] This definition is based on Rae (1967); it is $(1-\sum_{i=1}^{N} T_i^2)$, where N is the number of parties and T is the ith party's decimal share of the vote in the legislature. See also Bingham Powell (1982, p. 233).

Table 5. Political extremism

Country	1960–64	1965–75	1980–90
Australia	0	0	2
Austria	0	1	2
Belgium	6	21	15
Canada	0	0	0
Denmark	10	18	20
France	22	25	12
Germany	0	3	4
Greece	7	11	5
Ireland	2	0	0
Italy	32	37	38
Japan	4	16	14
Netherlands	5	13	4
New Zealand	0	1	0
Portugal	na	20	15
Spain	na	7	12
Switzerland	2	8	5
UK	0	3	3
US	0	0	0

Sources: Bingham Powell (1982) and *Europe World Yearbook* Various years.
Notes: The first and last columns refer to the average number of seats in the Lower House taken by extremist parties, whereas the second column refers to their average votes.

promise radical changes of the status quo and represent either stable constituencies or temporary dissatisfaction with the existing political apparatus. The classification is due to Bingham Powell (1982). He defines a party as extremist if it is associated with any of the following characteristics: (a) a well developed non-democratic ideology; (b) a proposal to change the boundaries of the nation; (c) diffuse alienation and distrust of the existing political system. The communist parties in France and Italy, or the linguistic parties in Belgium are examples of extremist parties. Like fractionalization, extremism is stable over time and is more prevalent under highly proportional electoral systems. Naturally, historical events beside electoral laws are important determinants of the size of extremist parties.

Tables 4 and 5 show that unsustainable fiscal policies are prevalent in countries with fractionalized party systems and where there are large extremist parties. To further understand this finding, we now turn to a description of the types of government that are generally formed in each country.

3.2.3. The government. The political theories of public debt summarized in Subsection 3.1 have different predictions regarding which

government attributes create the incentives to borrow. Government weakness means that public debt is a residual source of finance which simply reflects government inability to cut expenditures or raise taxes. The political stability interpretation instead views public debt as a legacy deliberately left by a government to its successors. The borrowing government doesn't expect to inherit tomorrow the debt issued today, because it doesn't expect to be reappointed in office. The less likely is the reappointment, the higher is the amount borrowed. This second approach thus predicts that public debt is larger in countries with more frequent government changes from one party or leading group to another, i.e. in more politically unstable environments.

Government weakness is a rather vague concept which is difficult to quantify. A first possibility is to consider government support in the legislature. We distinguish between three kinds of government: majority, coalition and minority governments. A majority government is supported by a single party that has a majority in the legislature. A coalition government is supported by a coalition of parties, that together reach a legislative majority. A minority government is supported by a single party or by a coalition without a legislative majority. Clearly, decision-making capacity is greatest in majority governments and lowest in minority governments. The first three columns of Table 6 describe the fraction of time between 1950 and 1989 for which the government was of each of these three types. A second measure of government weakness is average durability, defined as the average number of years between one government change and the next. A short-lived government is also likely to be weak, and frequent government crises are a symptom of a divided executive with weak support in the legislature. Average government durability between 1950 and 1989 is displayed in the fourth column of Table 6.

A change in government does not result in a significant change in political leadership if the new government is still supported by the same political parties and/or it is made up by the same group of individuals as the previous one. Thus it would be wrong to use government durability as an index of political stability. To construct an index of political stability, we compute the average number of years between significant government changes, those which result in a transfer of power from one leading group or party to another. We define a government change to be significant if the following conditions are met: for a majoritarian parliamentary system, there is a change in the party of the prime minister; for a representational parliamentary system, there is a change in both the prime minster party *and* the coalition of parties supporting the government; and for a presidential system, there is a change in the party of either the prime minister or the president (except for the US,

Table 6. Government attributes

Country	Government type (a)			Government durability (b)	Political stability (c)
	Maj.	Coa.	Min.		
Australia	26.8	73.3	0.0	4.44	10
Austria	39.0	58.5	2.4	2.67	40
Belgium	9.8	90.2	0.0	1.43	10
Canada	80.5	0.0	19.5	4.00	8
Denmark	0.0	34.1	65.9	2.11	5.7
France	41.5	39.0	19.5	1.29	2.5
Germany	9.6	90.0	0.0	2.00	20
Greece (d)	91.2	5.9	2.9	0.97	4
Ireland	65.9	24.4	9.8	1.90	5
Italy	0.0	95.1	4.9	0.95	10
Japan	80.5	12.2	7.3	1.67	40
Netherlands	0.0	100.0	0.0	3.33	6.7
New Zealand	100.0	0.0	0.0	4.44	8
Portugal (e)	26.7	53.3	20.0	1.48	5
Spain (f)	50.0	35.7	14.3	2.00	20
Switzerland	0.0	100.0	0.0	1.60	20
UK	92.7	0.0	7.3	4.00	8
US	41.5	0.0	58.5	5.00	8

Sources: Banks (1987) various volumes, Taylor and Jodice (1983), Keasing Archives, various years.
Notes: (a) Maj. = single party majority, Coa. = coalition majority, Min. = Minority (coalition or single party). The number in each column refers to the percentage of years in which the government was of each of the three types, out of the years of democratic regime between 1950 and 1990. The type is defined with reference to the popular chamber; (b) Durability of the executive between 1950 and 1990 (average number of years); (c) Average number of years between 'significant' government changes in the period 1950–89. See the text for more details; (d) Dictatorship between 1967 and 1973; (e) Dictatorship until 1973. New democratic constitution in 1976; (f) Dictatorship until 1974. First democratic election in 1977.

where the president is also prime minister). Naturally, any change from a democracy to a dictatorship or vice versa is recorded as a significant change. The resulting political stability variable is shown in the last column of Table 6 for the period 1950–89.

Table 6 shows that representational democracies tend to have shorter-lived governments and more coalition or minority governments than the other two political regimes. Average government durability is 1.9 years in representational democracies, three years in majoritarian democracies and 3.2 years in presidential democracies. The percentage of governments supported by a single party majority is 23.3%, 57.0% and 49.1% in representational, majoritarian and parliamentary

Table 7. Debt accumulation and government attributes

	Correlation matrix		
	MAJORITY	*DURABILITY*	*STABILITY*
DEBT	−0.298	−0.713	−0.061
MAJORITY		0.332	−0.044
DURABILITY			0.295

Regression

$$DEBT = 3.732^{**} - 0.002\ MAJORITY - 0.981^{**}\ DURABILITY + 0.048\ STABILITY$$
$$(0.904)\quad (0.011)\qquad (0.304)\qquad (0.066)$$

$\bar{R}^2 = 0.408$ $SE = 1.409$ Number of observations = 15
(0.066)

Note: Debt is the change in net debt to GNP ratio between 1970 and 1989. The remaining variables are as defined in Table 6, and also refer to 1970–89. Standard errors are in parenthesis. A* (**) denotes significance at the 5% (1%) level.

democracies, respectively.[7] These government attributes reflect the greater fractionalization and strength of extremist parties in representational democracies. On the other hand, there is no significant difference in the political stability index across the three kinds of constitutional regimes. Note that the three government attributes measures in Table 6 are not correlated with each other in our sample of 18 countries. The correlation coefficients are: 0.02 between political stability and single party majority; 0.12 between political stability and government durability; and 0.31 between durability and single party majority.

3.3. Government attributes and public debt

How do these three government attributes relate to the accumulation of public debt? Table 7, which performs cross-country comparisons, provides a very clear answer. The first part of the table reports correlations between the change in net debt (as percentage of GNP) from 1970 to 1989 (*DEBT*) and the following variables, also measured in the period 1970–89 in a sample of 15 countries:[8] the percentage of governments supported by a single party majority (*MAJORITY*), average government durability (*DURABILITY*) and the political stability index

[7] In computing these numbers, France was considered a representational democracy in 1950–58, and a presidential democracy in 1959–89. Only the years of democratic regime in Spain, Greece and Portugal were included.

[8] Net debt data are missing for Spain, Switzerland and New Zealand. For Portugal the data refer to gross public debt.

(*STABILITY*). Debt accumulation is strongly negatively correlated to average government durability, while it is not correlated with either of the other two variables. The same results are obtained when we regress debt accumulation on all three variables (plus an intercept). The results are displayed in the second part of Table 7: only durability has a negative and significant coefficient. The overall fit of the regression is remarkably good (government attributes explain over 50% of the variance in public debts), and the impact of durability is also quantitatively significant.

More information can be obtained from cross-country differences by separating the whole period 1950–89 into four decades. Since in 1950 many countries had large stocks of debt inherited from the war, it is preferable to consider primary deficits (as percentage of GNP), dropping the years of non-democratic regime in Spain and Portugal. To avoid truncation problems at the start and end of each decade, we replaced the variables *DURABILITY* and *STABILITY* with the frequency of government changes (*FREQUENCY*) and of significant government changes (*SIGNIFICANT*) within each decade (the data used to construct these indices are shown in Appendix B). The regressions results in Table 8 confirm the previous findings.[9] The frequency of government changes always leads to higher deficits and the effect is significant in three out of four decades. The estimated coefficients for the other two variables are generally of the wrong sign and are never significantly different from zero.

These findings are partly consistent with the view that budget deficits are a residual source of finance, used by a weak government that does not have any politically viable alternative. However, it is surprising that budget deficits are not systematically related to the extent of government support in the legislature. On the other hand the results are inconsistent with the view that political instability is a cause of budget deficits. Budget deficits are related to the frequency of *any* government change, not only to changes which transfer power from one leading group to another one, as the theory predicts. Could it be that the results are sensitive to the definition of what represents a 'significant' change in government? To explore this possibility, the definition is weakened by considering that more changes in government are 'significant'. This provides mixed results. First, the effects of any government change in general (i.e. the variables *DURABILITY* and *FREQUENCY*), reported in Tables 7 and 8, are confirmed. Second, the variables *STABILITY* and *SIGNIFICANT* that only refer to significant government changes now are

[9] Regressions performed using the method of seemingly unrelated regressions.

Table 8. Primary budget deficits and government attributes (Dependent variable: primary budget deficit/GNP)

Explanatory variables	1950–59	1960–69	1970–79	1980–89
FREQUENCY	2.868*	1.902*	4.925**	4.460
	(0.944)	(0.765)	(1.256)	(2.604)
SIGNIFICANT	−1.361	−2.205	−4.123	1.566
	(1.721)	(2.148)	(2.657)	(6.110)
MAJORITY	−0.008	0.006	0.007	0.011
	(0.007)	(0.007)	(0.008)	(0.011)
$\bar{R}^2$	0.242	−0.066	0.386	0.458
SE	1.578	1.298	1.763	1.893
Number of observations	13	13	13	12

Notes: Intercept not reported. Standard errors in parenthesis. A* (**) denotes significance at the 5% (1%) level. The system is estimated by seemingly unrelated regressions.

correlated with budget deficits, *but only if the other measures of government change are excluded.* Thus the modified variable *STABILITY* has a high and negative simple correlation coefficient with the change in net debt between 1970 and 1989. Similarly the variable *SIGNIFICANT* has a significant and positive effect on the budget deficit if the variable *FREQUENCY* is omitted from the specification, but it is generally insignificant and of the wrong sign otherwise.

These findings strongly indicate that high government turnover plays a crucial role in explaining public borrowing. Yet they do not convincingly discriminate between the two competing views: that short government durability is a symptom of a weak executive, or that it is an indication of political instability. Moreover, other plausible indicators of government weakness (such as government support in the legislature) are not systematically related to government borrowing. Naturally, there may be other explanations, beside these two, of why short government durability creates incentives to borrow.

Summarizing, our analysis of political institutions in the OECD countries suggests the following 'stylized facts'. First, lack of fiscal discipline is almost exclusively found in countries governed by representational democracies and, conversely, there are very few examples of representational democracies that do not have a high public debt problem. Second, the one feature of representational democracies that seems responsible for the lack of fiscal discipline is short government durability. Exactly why that is so remains an issue open for further research.

Table 9. Government fiscal aggregates (% of GNP)

	1950–59			1960–69			1970–79			1980–87		
	Public spending	Tax revenue	Seign.	Public spending	Tax revenue	Seign.	Public spending	Tax revenue	Seign.	Public spending	Tax revenue	Seign.
US	18	18	0.2	18	18	0.3	20	18	0.5	24	20	0.4
UK	27	29	0.5	28	31	0.4	35	34	0.8	40	37	0.1
Austria	21	18	1.6	21	20	1.1	33	31	1.0	39	35	0.4
Belgium	23	18	0.8	24	21	0.9	43	38	0.9	54	45	0.2
Denmark	14	16	0.3	21	23	0.6	34	34	0.2	43	40	0.3
France,	na	20	1.5	na	22	1.1	35	32	0.7	43	41	0.5
Germany	15	14	1.1	14	13	0.6	27	26	1.0	31	29	0.3
Italy	17	16	1.9	17	16	1.6	26	19	3.2	37	27	1.8
Netherlands	24	25	0.7	25	25	0.7	42	41	0.5	57	51	0.4
Switzerland	9	9	0.9	8	8	1.9	9	8	1.5	9	9	0.3
Canada	16	17	0.3	16	16	0.4	20	20	0.7	24	20	0.2
Japan	14	14	0.7	13	12	1.2	12	9	1.3	na	na	0.6
Greece	17	16	1.7	18	17	1.8	22	19	2.6	32	23	3.7
Ireland	26	21	0.6	29	24	1.7	40	31	2.2	55	41	0.9
Portugal	na	na	1.4	na	na	1.7	25	21	4.1	44	35	3.3
Spain	na	na	1.4	12	12	1.5	21	21	2.2	31	26	3.2
Australia	23	25	0.1	23	21	0.4	22	23	0.7	28	26	0.6
New Zealand	32	29	0.3	28	27	−0.1	32	31	0.7	42	38	0.2
Mean	19.7	19.1	0.9	19.7	19.2	1.0	27.7	25.3	1.4	37.2	31.9	1.0
Standard deviation	0.06	0.05	0.006	0.06	0.06	0.006	0.09	0.09	0.010	0.12	0.10	0.012

Source: International Monetary Fund, *International Financial Statistics* and *Government Finance Statistics.*

4. Evidence on inflation and seigniorage

Turning to the analysis of cross-country differences in monetary policies and inflation, the first question is whether there exists a relationship between fiscal and monetary policies and, in particular, whether budget deficits affect the rate of inflation. The potential existence of a link between fiscal policy and inflation is stressed by the public finance approach to monetary policy. This approach considers inflation as just one form of taxation, and as such, it is viewed a source of distortion like any other tax. The principle of optimal taxation asserts that taxes should be set in such a way that the last amount collected with each tax be equally distortionary. Hence, if taxes need to be changed, all of them should be changed in the same direction. In particular, the rate of inflation should be positively corrected with all other tax rates.[10]

4.1. The cross-country evidence

In Table 9, government revenues are broken down in two broad categories: (i) tax revenues, which include all forms of 'explicit' taxation, like income taxes, sales taxes, VAT etc. and (ii) seigniorage, i.e. revenues from monetization (defined as the change in base money). For all countries tax revenues reach their *highest* post-war levels in the 1980s, while in the majority of countries (10 out of 18) this is the decade where seigniorage is *lowest*, and in only two countries (Greece and Spain) is seigniorage higher in the 1980s than in the 1970s. The 1980s is also the period of largest budget deficits. This fact alone should cast serious doubts on the popular opinion that budget deficits are a cause of inflation.

On the other hand, seigniorage is on average higher in the countries that have an unsustainable debt path. This is particularly true for Spain, Greece, Portugal and Italy. In the 1980s the average level of seigniorage for these four countries was 3% of GNP, against less than 0.4% elsewhere. The other three countries on an unsustainable debt path (Austria, Belgium and Ireland) do not have seigniorage levels significantly higher than the rest of the sample. Thus across countries there is some evidence of a link between budget deficits and seigniorage, but not so over time.

[10] The fiscal approach to inflation has been developed by Phelps (1973) (see also Mankiw, 1987). Faig (1988) and Kimbrough (1986) show that since money performs the role of an intermediate input, it should not be taxed. However, as shown by Aizenman (1987), this conclusion does not apply in the presence of tax evasion or tax collection costs.

Table 10. Inflation and taxes (partial correlation)

Australia	0.882*	Italy	−0.059**
	(0.377)		(0.019)
Austria	1.278	Japan	0.937
	(0.721)		(0.797)
Belgium	0.573	Netherlands	−0.806
	(0.472)		(0.537)
Canada	1.075**	New Zealand	0.268
	(0.366)		(0.296)
Denmark	0.325	Portugal	−0.324
	(0.460)		(1.334)
France	1.034	Spain	1.133
	(0.472)		(1.174)
Germany	0.518	Switzerland	−0.923*
	(0.408)		(0.373)
Greece	0.381	UK	−0.330
	(0.420)		(0.361)
Ireland	0.500	US	0.330
	(0.321)		(0.361)

Notes: Partial coefficient of correlation from regressions of inflation on taxes in first differences. The estimation period is 1950–87 or a fraction of it, according to the availability of data. Standard errors in parenthesis. A* (**) denotes significance at the 5% (1%) level. The system is estimated by OLS.

4.2. The time series evidence

To check whether the inflation tax is correlated over time with other distorting tax rates, as predicted by the theory of optimal taxation, we approximate the tax rate on seigniorage by the inflation rate.[11] The non-inflation tax rate is measured as the ratio of tax revenue to GNP. For each country, we regress the change in the rate of inflation on the change in the tax rate. The results, reported in Table 10 show that there is no systematic relationship between tax rates and inflation. For all countries but three (Australia, Canada and France), the link is insignificantly different from zero, and sometimes it has the wrong (negative) sign. Table 11 further shows that in most countries the change in government spending is strongly positively correlated with the change in the tax rate (the estimated coefficient on the tax rate is always positive and generally highly significant), while there is no evidence of a positive correlation between changes in spending and inflation.[12] Thus while

[11] This is standard practice in the literature. Using the rate of money growth instead leads to the same results, while data on the nominal interest rate are not available for all countries over long enough periods of time.

[12] The same results are obtained if the inflation regressions are estimated with instrumental variables, with lagged variables as instruments.

Table 11. Inflation, taxes and government expenditure (partial correlation)

	Inflation and government expenditure	Taxes and government expenditure
Australia	0.295	0.755**
	(0.455)	(0.149)
Austria	1.152	0.436**
	(0.519)	(0.100)
Belgium	−0.074	0.210
	(0.236)	(0.087)
Canada	0.475	0.225
	(0.377)	(0.156)
Denmark	0.288	0.122
	(0.315)	(0.116)
France	0.514	0.339*
	(0.390)	(0.146)
Germany	−0.235	0.087**
	(0.147)	(0.064)
Greece	−0.589	0.684**
	(0.369)	(0.101)
Ireland	0.520**	0.458**
	(0.190)	(0.072)
Italy	−0.025**	0.329**
	(0.009)	(0.056)
Japan	−0.821	0.259
	(0.888)	(0.233)
Netherlands	0.614	0.383**
	(0.328)	(0.085)
New Zealand	−0.23	0.490**
	(0.319)	(0.175)
Portugal	−0.956	0.169
	(0.763)	(0.168)
Spain	0.078	0.459**
	(0.875)	(0.129)
Switzerland	−0.045	0.522**
	(0.435)	(0.157)
UK	0.607	0.570**
	(0.380)	(0.154)
US	−0.313	0.208
	(0.348)	(0.158)

Notes: Coefficients from regressions of inflation or taxes on government, expenditures in first differences. The estimation period is 1950–87 or a fraction of it, according to the availability of data. Standard errors in parenthesis. A* (**) denotes significance at the 5% (1%) level. The system is estimated by OLS.

the tax rate seems to respond to spending changes, inflation does not and this is the reason for the lack of complementarity between taxes and inflation.

It might be that the monetary authorities disregard in the short run the budgetary consequences of their actions. Could the principle of optimal taxation be relevant only in the long run? A way to test this hypothesis is to look for a positive long-run relationship between the average tax rate and the rate of inflation (technically we conduct cointegration tests, not reported).[13] There is no evidence of such a long-term relationship (except for Switzerland where anyway the correlation is negative in contradiction to the theoretical prediction). This accords with the earlier observation that, in the 1980s, tax rates were increasing while seigniorage revenues were declining in most countries.

These results could still be reconciled with the principle of optimal taxation if the velocity of circulation of money is continuously increasing over time. Then the general tax base (income) grows relatively to the base of the inflation tax (money), and it becomes optimal to rely increasingly more on general taxation than on inflation. In this case, Poterba and Rotemberg (1989) and Trehan and Walsh (1989) show that we should expect a long-run relationship between three variables: the tax rate, inflation and velocity. When this is tested (and not reported here) evidence of a positive comovement between inflation and other taxes is found only for the US and UK but not for the remaining 16 countries.

4.3. Summary

First, we have found that the countries that rely most on seigniorage typically have unsustainable debt paths, but the converse is not true: some countries with unsustainable debt paths have managed to maintain low inflation. Second, for most countries regular taxes and inflation are not 'complementary' sources of revenues: these rates do not vary together as predicted by the theory of optimal taxation. Third, inflation does not vary systematically with expenditures, either in the short or

[13] Two non-stationary (i.e. with no stable mean) series are said to be cointegrated if there exists a linear combination of them which is stationary. Cointegration tests are common in the empirical literature on optimal taxation – see Grilli (1989), Trehan and Walsh (1989), among others. However, they raise a problem. The prediction that 'optimal' tax rates are non-stationary is derived from models which neglect the constraint that the rates are bounded between 0 and 1. Proper microfoundations, such as in Lucas and Stokey (1983), imply that the optimal tax rate is stationary, in which case the notion of cointegration does not apply. We reject non-stationarity of the tax rate for the US, the UK, Austria, Denmark, Switzerland, Greece and Ireland. For the inflation rate, non-stationarity is rejected in Austria, Belgium, Denmark, France, Germany, the Netherlands, Switzerland and Japan. Hence, the cointegration tests reported in the text should be taken with a grain of salt.

in the long run, and not even across countries. The conclusion is that for most OECD countries fiscal policy has not been a major determinant of monetary stability in the post-war period. Rather, the evidence suggests that the often observed combination of large seigniorage and high public debt may reflect some other fundamental determinant, possibly linked to monetary institutions.

5. Monetary institutions, credibility and economic policy

The principle of optimal taxation completely overlooks the fact that policy-makers face political constraints and incentives. In the case of monetary policy, credibility has long been known to be of fundamental importance. The reason is that the monetary authorities have an incentive to collect the inflation tax by surprising the private sector with unexpected monetary expansions. Indeed, unexpected inflation acts as a non-distortionary tax precisely because, being unanticipated, it does not affect private behaviour, at least *ex ante*. However, once this is understood, private agents are likely to raise their inflation expectations accordingly. If they cannot convince the private sector that they do not intend to engineer such surprises, the monetary authorities may be forced to accommodate these expectations, with the consequence that inflation will be higher than desired. Lack of credibility, therefore, results in an excessive reliance on seigniorage revenues.

This credibility problem can be overcome by delegating monetary policy to an independent central bank, committed to the goal of low inflation. Having a credible monetary policy may matter not only for the price and wage decisions of the private sector, but also for the budgetary decisions of the public sector. In particular a credible commitment not to inflate away the debt and not to provide monetary financing of the fiscal deficit may strengthen the government incentive to balance its budget. Hence low inflation as well as a more disciplined fiscal policy are more likely to be observed in countries with a more independent central bank.[14] Naturally, having an independent central bank committed to low inflation has its cost too: monetary policy is less likely to respond optimally to unexpected shocks and may tolerate excessive output fluctuations. Similarly, an independent central bank may pay too little attention to the budgetary consequences of its actions. This is why the design of the monetary regime should be an important determinant of public financial policies and, more generally, of

[14] This point is shown in Rogoff (1985). Tabellini (1987a, b) analyses the connection between central bank independence and budget deficits.

macroeconomic performance. In particular, we expect central bank independence to be associated with low inflation and smaller budget deficits, but also with larger output fluctuation and greater deviations from the predictions of the theory of optimal taxation.

5.1. The monetary institutions

To compare the monetary regimes we focus exclusively on institutional features, disregarding behavioural indicators such as the average rate of growth of the money supply or the level and variability of interest rates. There is no doubt that such behavioural indicators shape expectations and thus contribute to identify a monetary regime. The independence of the Bundesbank is the result of specific central bank laws but also of its reputation and a tradition of monetary discipline. Hence, by neglecting behavioural indicators we miss an important dimension of monetary regimes. Our attitude can be justified on the following grounds. First, to assess the effect of institutional design on policy performance we need to keep institutions and behaviour as distinct as possible. Second, behavioural indicators have often varied over time (e.g. with the personalities in charge of monetary policy) whereas monetary institutions have generally been more invariant and, to the extent that there have been institutional reforms, they are more clearly identifiable.

Monetary institutions can be characterized by the political and economic independence of the central bank. Political independence is the capacity to choose the *final goal* of monetary policy, such as inflation or the level of economic activity. Economic independence is the capacity to choose *the instruments* with which to pursue these goals. The few studies which compare monetary regimes in a large number of countries are not consistently linked to the theoretical debate and their classifications are based on somewhat arbitrary criteria. The most comprehensive studies of the political dimension of central bank independence are Fair (1978) and Bade and Parkin (1982). The economic dimension has recently been stressed by Masciandaro and Tabellini (1988), who compare the central banks of the US, Canada, Australia, New Zealand and Japan, by Tabellini (1987b) in a study of Italy, and by Masciandaro (1990).

5.1.1. Political independence of the central bank. The capacity of the monetary authorities to choose the final goals of policy is primarily determined by three aspects of a monetary regime; (i) the procedure for appointing the members of the central bank governing bodies; (ii) the relationship between these bodies and the government; and (iii) the formal

responsibilities of the central bank. In principle, independence to choose the final goals can be defined without reference to the contents of such goals. In practice, however, the main virtue of having an independent central bank is that it can provide credibility. This is why we identify independence with autonomy to pursue the goal of low inflation. Any institutional feature that enhances the central bank capacity to pursue this goal will, on our definition, increase central bank independence.

Table 12 contrasts these three aspects of the monetary regimes in the 18 countries. Each column refers to a different attribute. A star indicates that the country in question possesses that attribute. Appendix C provides more information on each column. The first four columns describe the rules for appointing the governor and the board of the central bank. The political independence of the central bank is clearly higher if the appointments are not under the control of the government (but are determined by representatives of the bank, like in Italy or in Canada), and if they are for a long and predetermined period of time. Columns 5 and 6 summarize the relationship between the central bank governing bodies and the government. The political independence of the central bank is greater if there is no mandatory participation of a government representative in the board and if prior government approval of monetary policy is not legally required.[15] Finally (columns 7 and 8) the central bank's constitutional position is clearly strengthened if its role in preserving monetary stability is explicitly stated in the constitution, and if there are explicit legal directives that, in case of conflict between the bank and the government, describe a transparent procedure for how the conflict is to be resolved. In other words, both attributes enhance the 'gate keeping' power of the monetary regime: they make it less likely that, in case of conflict, the bank's position will be overruled by the government.

The overall degree of central bank political independence is determined by a combination of these attributes. Combining them is unavoidably arbitrary so we adopt the simplest procedure of adding them up. The result, shown in the last column of Table 12, is our synthetic indicator of the political independence of the central bank. Switzerland,

[15] In some countries – e.g. Italy – the requirement that monetary policy be approved by the government is a mere formality that has never resulted in the approval being denied or even threatened with denial. Nevertheless, we classify these countries as requiring government approval for two reasons. First, as stated in the text, we want to be consistent in classifying institutions rather than behaviour. Second, just observing that approval is never denied is no proof that the formal requirement is not binding: a rational and fully informed central bank would never pursue a policy that would not be approved by the government, even in the case of a strong disagreement.

Table 12. Political independence of central banks

	Appointments				Relationship with government		Constitution		Index of political independence
Countries	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Australia		*					*	*	3
Austria						*	*	*	3
Belgium				*					1
Canada	*	*					*	*	4
Denmark		*				*	*		3
France		*		*					2
Germany		*		*	*	*	*	*	6
Greece			*					*	2
Ireland		*				*	*		3
Italy	*	*	*		*				4
Japan							*		1
Netherlands		*		*	*	*	*	*	6
New Zealand									0
Portugal					*				1
Spain				*	*				2
Switzerland		*			*	*	*	*	5
UK					*				1
US				*	*	*	*	*	5

Sources: See Appendix C.
Notes: (1) Governor *not* appointed by government; (2) Governor appointed for >5 years; (3) *All* the Board *not* appointed by government; (4) Board appointed for >5 years; (5) No mandatory participation of government representative in the Board; (6) No government approval of monetary policy formulation is required; (7) Statutory requirements that central bank pursues monetary stability amongst its goals; (8) Legal provisions that strengthen the central bank's position in conflicts with the government are present; (9) Overall index of political independence, constructed as the sum of the asterisks in each row. See Appendix C for more details.

West Germany and the US, but also the Netherlands, Canada and Italy, enjoy the highest degree of political independence. At the other end are Austria, New Zealand, the UK, Belgium and Portugal, and not far above Greece, Spain and France.[16]

5.1.2. Economic independence of the central bank. The autonomy of a central bank in choosing the instruments of monetary policy is described by: (i) the influence of the government in determining how much to borrow from the central bank; and (ii) the nature of the monetary instruments under the control of the central bank. If the government can influence

[16] Towards the late 1980s New Zealand reformed its monetary system and now has perhaps the most independent central bank of all OECD countries. Its new central bank law even contains an explicit clause stating that the governor can be dismissed if the inflation target is exceeded. Our rankings are based on the older law.

Table 13. Economic independence of central banks

Countries	Monetary financing of budget deficit					Monetary instruments		Index of economic independence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Australia	*	*	*	*	*	*		6
Austria			*	*	*	*	* *	6
Belgium		*		*	*	*	* *	6
Canada	*	*	*	*		*	* *	7
Denmark		*			*	*	* *	5
France				*	*	*	* *	5
Germany	*	*	*	*	*	*	*	7
Greece				*		*		2
Ireland		*	*	*		*		4
Italy				*				1
Japan	*		*		*	*	*	5
Netherlands			*	*	*	*		4
New Zealand			*	*		*		3
Portugal				*		*		2
Spain			*	*			*	3
Switzerland		*	*	*	*	*	* *	7
UK	*	*	*	*		*		5
US	*	*	*	*	*	*	*	7

Sources: See Appendix C.
Notes: (1) Direct credit facility: not automatic; (2) Direct credit facility: market interest rate; (3) Direct credit facility: temporary; (4) Direct credit facility: limited amount; (5) Central bank does not participate in primary market for public debt; (6) Discount rate set by central bank; (7) Banking supervision *not* entrusted to the central bank (**) or not entrusted to the central bank alone (*); (8) Overall index of economic independence (being the sum of the asterisks in columns 1–7). See Appendix C for more detailed information.

the quantity and the conditions on wbich it borrows from the central bank, it also influences tbe creation of monetary base and lessens the economic independence of the central bank. The first five columns of Table 13 summarize the government's ease of access to central bank credit. This can be done in two ways: tbrough direct credit facilities (columns 1–4), and by purchasing government securities in the primary market (column 5: a star indicates tbat the central bank does not participate as a buyer in this market and is more free from implicit or explicit pressures to lend to the government). Economic independence of tbe central bank is greater if direct credit to the government is: non-automatic (column 1), at a market interest rate (column 2), explicitly stated as temporary (column 3), and in a limited amount (column 4).

The second aspect, the nature of the monetary instruments under tbe control of the central bank, is described in the next two columns

of Table 13. If the central bank does not have control of the discount rate, its ahility to determine the general level of interest rates is severely impaired. Column 6 reveals that most, but not all, central banks are responsible for setting the discount rate. Column 7 is concerned with banking supervision, in particular administrative instruments such as portfolio constraints on bank intermediaries or ceilings to private bank loans. Such instruments facilitate the financing of government borrowiiig by administratively increasing the private demand for government securities. They can weaken central bank independence by removing part of monetary control from the market. In column 7 we classify as most independent (denoted with two stars) a bank that has no responsibility for bank supervision, as relatively independent (denoted with one star) a bank that is sharing responsibility for hank supervision with some other institution, and as least independent (no asterisk) a bank which is the only institution in charge of bank supervision.

As before, to determine the overall degree of economic independence of the central bank, we add up the attributes. The resulting indicator appears in the last column of Table 13. Economic independence of the central bank is high in West Germany, Switzerland, the US, but also in Austria and Belgium. Conversely, central banks in Italy, New Zealand, Portugal, Greece and Spain have very little economic independence. Interestingly, political and economic independence are not always positively correlated. Thus a ranking that pays attention to only one of the two dimensions can give rise to very misleading international comparisons.

5.1.3. Central bank independence and seigniorage. Figure 3 summarizes Tables 12 and 13 showing the overall degree of economic and political independence of the 18 countries under consideration. Four groups of countries are identifiable. Those in the upper-right portion of the diagram have the most independent central banks, those which enjoy both political and economic independence. The countries on the lower-left portion have the least independent central banks, both economically and politically. The remaining two groups of countries are in between, with monetary institutions independent in only one of the two dimensions.

It is instructive to compare Figure 3 with Figure 1 and Table 9. Of the four countries with highly dependent central banks (Greece, New Zealand, Portugal and Spain), three (Greece, Portugal and Spain) also have highly unstahle political systems and unsustainable debt paths. These are the three countries with the highest level of seigniorage. Other politically unstable countries also have unsustainable debt policies (Austria, Belgium, Ireland, Italy and the Netherlands), but they have relatively independent central banks, at least on one dimension. These

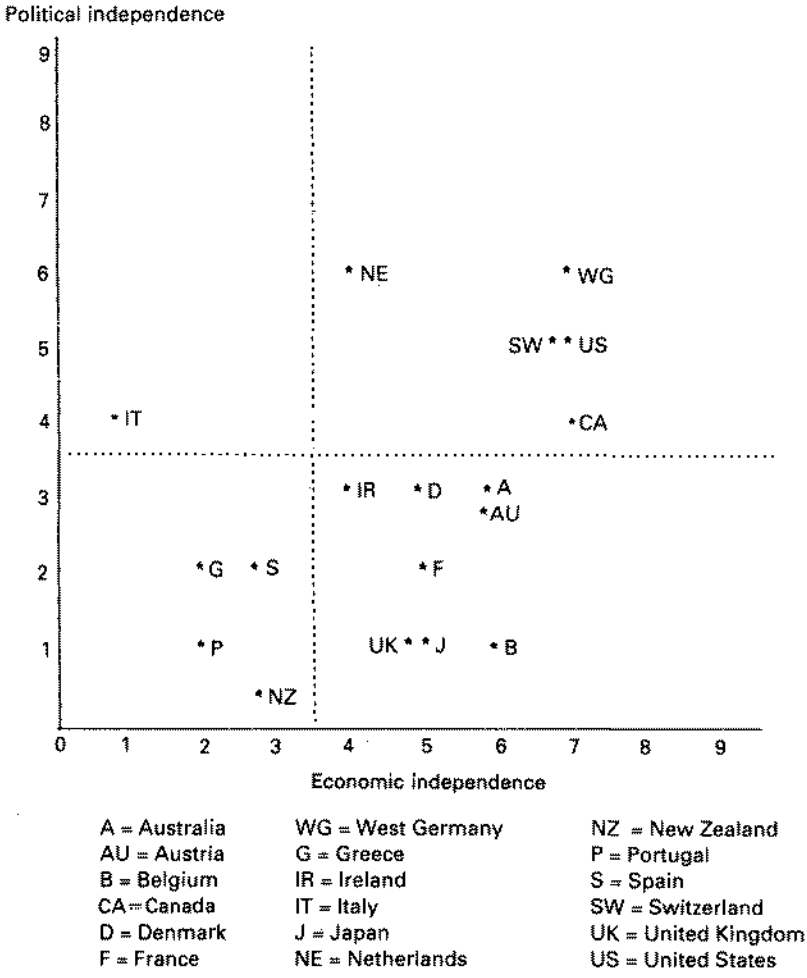

Figure 3. Political and economic independence of central banks

Source: As Tables 12 and 13.

other countries (with the exception of Italy and possibly Ireland) collect much smaller seigniorage revenues. These facts suggest that central bank independence may bring about monetary stability and low inflation even if there are political incentives towards lax budgetary policies. It also means that a European monetary union among countries with very different debt policies is feasible provided that the monetary authorities face adequate incentives and independence.

5.2. Central bank independence and economic performance

To find out whether inflation is related to central bank independence, we divide the period 1950–89 into four decades and measure the effect

Table 14. Inflation and central bank independence (Dependent variable: inflation)

Explanatory variables	1950–59	1960–69	1970–79	1980–89	1950–89
Intercept	5.288**	4.457**	17.183**	18.670**	11.637**
	(1.252)	(0.679)	(1.108)	(1.934)	(0.148)
Economic independence	−0.167	−0.135	−1.211**	−1.913**	−0.897**
	(0.261)	(0.142)	(0.231)	(0.402)	(0.148)
Political independence	−0.266	−0.101	−0.611*	−0.429	−0.0277
	(0.275)	(0.149)	(0.243)	(0.431)	(0.0163)
EMS	—	—	—	−0.685	−0.854
	—	—	—	(0.927)	(0.541)
$\bar{R}^2$	0.109	0.111	0.745	0.658	0.782
SE	2.061	1.118	1.825	3.249	1.039

Notes: Standard errors in parenthesis. A* (**) denotes significance at the 5% (1%) level. The system is estimated by seemingly unrelated regressions, except for the last column, which is estimated by OLS.

of the indicators presented in the previous section on cross-country differences in inflation rates (using seemingly unrelated regressions). An interesting question is the role played by the EMS. For high inflation countries like Italy, participation in the EMS may have strengthened the independence of the central bank *vis-a-vis* the national government because it has increased its commitment to price stability. This argument does not necessarily hold for low inflation countries, like West Germany, since the EMS has transformed a technical issue (exchange rate management) into a major political issue (whether or not to realign the EMS parities) on which the government may have more to say than the central bank. For this reason, we treat EMS participation as a separate dimension of the regime, not included in the ranking of central bank independence. This is done by including a dummy variable that takes a value of 1 for the EMS countries and 0 otherwise in the regressions for the 1980s.

Table 14 reports the estimated effects on inflation of the indicators of economic and political central bank independence plus the EMS dummy for the last decade. The indicators of central bank independence always have the expected (negative) sign. The indicator of economic independence is significant in the periods of high inflation, while the indicator of political independence is significant only in the 1970s. On the other hand, the estimated coefficient of the EMS dummy is not significantly different from zero. The results also hold for the average inflation rate throughout the whole period 1950–89, as shown in the last column. So monetary institutions matter, indirectly, through their effects on credibility, and directly, by shaping the central bank incentives. Our results also confirm previous findings obtained by other authors for a different sample of countries and a slightly different

Table 15. Inflation, political instability and central bank independence (Dependent variable: inflation)

Explanatory variables	1950–69	1960–69	1970–79	1980–89	1950–89
Intercept	8.419**	4.329**	6.76*	16.653**	10.343**
	(1.716)	(1.040)	(3.186)	(2.941)	(1.454)
FREQUENCY	1.661	−0.363	5.944**	6.008*	0.076
	(0.103)	(0.705)	(1.838)	(0.678)	(1.295)
SIGNIFICANT	4.037	−0.084	6.785*	24.592**	7.423
	(2.185)	(2.222)	(2.895)	(4.714)	(3.471)
MAJORITY	−0.018	−0.002	0.020	−0.012	−0.008
	(0.009)	(0.006)	(0.013)	(0.019)	(0.009)
Independence	−0.453**	−0.087	−0.327	−1.093**	−0.559**
	(0.146)	(0.088)	(0.208)	(0.226)	(0.108)
EMS	—	—		−1.112	−1.126
				(1.204)	(0.675)
$\bar{R}^2$	0.206	−0.186	0.796	0.760	0.748
SE	1.720	1.101	1.533	2.473	1.117

Notes: Standard errors in parenthesis. A* (**) denotes significance at the 5% (1%) level. Columns (1)–(4) are estimated by seemingly unrelated regressions. Column 5 is estimated by ordinary least squares.

ranking of independence (see Bade and Parkin, 1982 and Alesina, 1989).

Central bank independence might conceivably be related to the broad political characteristics used in the analysis of budget deficits. To check whether this is the case, we have included the variables *FREQUENCY*, *SIGNIFICANT* and *MAJORITY* as additional regressors. To save on degrees of freedom, we sum together the two measures of central bank independence to obtain a single indicator.[17] The results which appear in Table 15, show that central bank independence always has a negative estimated effect on inflation, and that is is significant half of the time. The political variables also play a role, but their coefficient is often not of the expected sign. Estimates over the whole period (last column) confirms the greater importance of central bank independence as compared to political variables.

One of the alleged benefits of an independent central bank is that it is more credible in its resolve not to engage in public financing. This may affect the Treasury's behaviour, reducing the likelihood of unsustainable debt policies (see, for instance, Tabellini, 1987a). This hypothesis

[17] The same results are obtained if we use instead a ranking of 1 to 4, corresponding to the four quadrants of Figure 3, or if we use the two indicators separately, again with economic independence being more important than political independence. Finally, similar results are obtained if some of the political variables are omitted.

Table 16. Central bank independence and real macroeconomic performance

Dependent variables/ explanatory variables	Output growth	Standard error of output growth
Intercept	0.042**	0.071*
	(0.008)	(0.025)
Economic independence	−0.0009	−0.005
	(0.001)	(0.005)
Political independence	0.002	−0.001
	(0.001)	(0.005)
EMS	−0.007	0.013
	(0.006)	(0.018)
$\bar{R}^2$	−0.070	−0.013
SE	0.012	0.035

Notes: Standard errors in parenthesis. A *(**) denotes significance at the 5% (1%) level. Each equation is separately estimated by OLS. Each observation is the average over the 1950–87 period.

receives no support from the data. In a regression of the primary deficit on the political variables *FREQUENCY*, *SIGNIFICANT* and *MAJORITY*, and the overall indicator of central bank independence, *INDEP*, the latter variable is always insignificant (though generally with a negative estimated coefficient). The coefficient of the political variables, on the other hand, are not very different from those reported in the previous section. Similar results are obtained if the primary deficit is replaced by net debt accumulation.

Finally, does central bank independence come with a cost in overall macroeconomic performance? For the whole period, we find no systematic effect of the two indicators of central bank independence on the real growth rate of real output. In Table 16, even though central bank independence seems to be associated with lower output growth, the estimated effect is generally insignificant. The same results are obtained if the regressions are estimated by averaging the data over the four decades, if the political variables are added as regressors, or if we replace the growth rate with the rate of unemployment (in this last case, the EMS dummy has a positive and significant estimated coefficient).[18] Hence, it does not seem that there is a sharp tradeoff in the design of monetary institutions. A more independent central bank brings

[18] Alesina and Summers (1990) independently obtained similar results based on a different sample of countries and a central bank ranking analogous to our political independence index.

about low inflation, but not necessarily worse real macroeconomic performance.

6. Summary and conclusions

The striking differences in the puhlic financial policies of the industrialized countries throughout the post-war period cannot be explained as the optimal government response to different shocks or to different initial conditions. A more convicing explanation is that the governments of these countries were subject to different political or economic incentives, and as a result they enacted different policies. Four main results emerge.

First, the accumulation of large public debts is concentrated among countries characterized by (i) representational democracies (as opposed to majoritarian parliamentary democracies and presidential democracies); and (ii) fractionalized party systems. These institutional features induce budget deficits because they lead to short-lived governments.

Second, while countries that extensively rely on seigniorage also have high public debt, the converse is not true. In some high debt countries seigniorage is a trivial source of revenue. These countries share the characteristic of having an independent central bank. In general, central bank independence leads to low inflation, irrespective of political institutions and budgetary problems. At the same time, monetary independence does not discourage budget deficits. Monetary and fiscal discipline thus seem to be orthogonal to each other: a country can have either, both or neither of them, depending on its monetary and political institutions.

Third, if central bank independence is on average associated with lower inflation, there is no systematic impact on real output growth, nor on its variability. Thus having an independent central bank is almost like having a free lunch; there are benefits but no apparent costs in terms of macroeconomic performance.

Fourth, there is very little evidence that over time the inflation tax is caused by lax budgetary policies or that it is used efficiently. Few countries use seigniorage and regular taxes as complementary sources of revenues. And in most countries changes in government spending are absorbed by changes in regular taxes rather than by changes in the inflation tax.

These findings have some important implications for the ongoing debate over the feasibility and appropriate sequencing of the European monetary integration. On the one hand, they suggest that there is no need to subordinate monetary integration to having first achieved fiscal convergence. The future European Central Bank has been designed

to be very independent from the national governments and from the European Commission. On our criteria, it would be one of the most – if not the most – independent of all OECD central banks. Our results suggest that this should be sufficient to insulate the common European monetary policy from the accommodating pressure coming from the budget deficits of some countries.

On the other hand, there is a case for accompanying monetary integration with some budgetary rules binding on the national governments. Such rules may be in the interest of the high debt countries. Because debt accumulation in the representational democracies is probably due to some domestic political distortion, binding external rules – such as a balanced budget on current expenditures and revenues – may act as an offsetting force and hence be welfare improving. As for monetary policy, one of the advantages of joining an international agreement may consist in 'tying one's hands', in this case, the hands of the fiscal authorities.

There is one additional, historical, argument in favour of fiscal rules in a new European monetary constitution. Our finding that the lack of fiscal discipline does not necessarily lead to monetary instability only relates to the post-war period. This period, however, may be too short and, as recently argued by Giovannini and Spaventa (1991), the real challenges for the European monetary union are more likely to come from the management of the high stocks of public debt. Furthermore, the pre-war experience indicates that fiscal crises and public debt runs did occur, and were often accompanied by monetary instability. For this reason, the credibility of a unified European monetary system would be enhanced by fiscal rules that guaranteed the long-run solvency of the high debt countries.

Discussion

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Since it is well recognized that the institutions of a country play a role in the choice and efficiency of its economic policy, one can only be pleased when witnessing the recent trend toward serious studies of this role. The present paper adds to the flow of such studies, to which the authors have already contributed on other occasions.

Before addressing the paper itself, I shall make a general comment. When discussing the politics or the institutional conditions of economic policy, we are entering a field in which scientific experience is definitely still less advanced than in economics *stricto sensu*. We must then be particularly careful not to rush too quickly to the type of supposedly

hard theory and econometrics that our professional journals like; there is a serious danger that the hypotheses of our theories and econometric tests miss important points. I cannot help remembering in this respect what Sir John Hicks used to say, namely that economists should pay more attention to history. Indeed, historical research shows that the relevant aspects of institutions are multifarious; moreover a knowledge of history is required for the proper identification of institutional changes.

The challenge to research workers is all the greater as the most relevant empirical proofs about the role of institutions in the modern world will come from intercountry comparisons. If they are to be at all rigorous, these comparisons require good data bases, which moreover have to include a large number of countries so as to reduce the risk of inferring unwarranted conclusions from particular cases. But new research hardly ever finds available the reliable data base it needs; some work has to be devoted to data collection. A difficulty then comes from the fact that one cannot expect any author, or even any team of authors, to know all the historical circumstances that mattered for each of the countries considered. This is why attention should be devoted to improving the data bases and to put on record any hidden national specificity that may exist or have occurred.

The article contains very interesting new material on the institutions of the industrialized OECD countries. In Tables 4 to 6 and Appendix B the authors have collected a quantity of data concerning the political conditions of budgetary policy decisions. Similarly Tables 12 and 13, supported by Appendix C, present indicators of central bank independence. Motivated by the above considerations and of course not meaning to downgrade the usefulness of the material, I carefully looked at the part concerning my country about which my life gave me opportunities to be directly informed. Here is what I find worth reporting.

I am surprised to see in Table B1 three 'significant government changes' in the decade 1960–69, while de Gaulle had consistently strong power up to the spring of 1969 (a change of the party of the prime minister had really no significant consequence). But my main comment is for saying that the Banque de France is given a higher degree of independence than it really has. In particular one reads in Table C1 that the term of the governor is 'indefinite' and this gives a star to France in column 2 of Table 12; the adjective 'indefinite' is confusing since in fact the governor can be removed any time by decision of the French President: governor Wormser was immediately dismissed in 1974 after an article he had published in a widely read daily newspaper and governor de la Geniere was replaced in 1984 exactly five years after his appointment; in neither case was the political decision welcomed

by the outgoing governor. Similarly, the double star granted to France in column 7 of Table 13 is explained in Table C4 by the fact that banking supervision is not entrusted to the central bank but to the 'Banking Commission'; everybody in France considers this commission, chaired by the governor, as belonging to Banque de France where it has its quarters.

I repeat: these comments should not be seen as negative but as constructive. They are meant to induce others to check how the particular features of their own countries are translated into simple numerical scores. The translation has to be made in order to serve as input for international comparison; but a margin of more or less subjective appreciation cannot be avoided and should be as enlightened as possible.

This also means an additional source of possible inaccuracy in the cross-section regressions from which conclusions are drawn. International cross-sections are notoriously exposed to errors due to omission of variables that have not been identified as potential explanatory factors (and there are many). Measurement fuzziness on the variables taken as regressors uncomfortably adds to the problem.

The authors convincingly argue when they identify five to seven countries 'that are most likely to be on an unsustainable debt path' if no major step is taken for jumping out of this path. The conclusion naturally emerges from Table 3 and Figure 1. Footnote 3 and Appendix A are meant to support the conclusion; but the support is weak both because of the overly simple nature of the intertemporal model in which the question is being placed and because of the still uncertain validity of the econometric technique.

Experts in econometric methodology have not yet reached the point where they will agree as to the proper way of selecting between two models for the representation of a given time series: a model involving a deterministic trend perturbed by a stationary shock process and a model in which the shock process would have a unit root. (The now standard theory of testing for unit root applies when the maintained hypothesis is a pure autoregressive process.) One thing is sure, however: the procedure that will eventually be recommended will have poor power unless the autoregressive representation of the underlying stochastic process involves only few important coefficients, these coefficients concerning small lags. Power and robustness will *a fortiori* be weak when similar but more complex tests are generally accepted for dealing with such questions as the long-run sustainability of public finance patterns.

Part 3 of the article studies whether different political incentives provide the proper explanation for different public finance patterns. It indeed finds that high public deficits occur in representational

democracies and are the direct consequence of the weakness of the executive or of government instahility. This looks like a sensihle conclusion, which many people had accepted hefore, General de Gaulle being one notahle example: his 1959 constitution was aimed at eradicating political instability from France; for so doing it replaced a representational demiocracy hy a strong presidential democratic regime. But one may be pleased to see that what may have looked to be a purely intuitive idea now passes the test of scientific examination.

In this respect the paper, however, leaves us with a puzzle. The regressions tell us that the frequency of any kind of government change is what really matters: signihcant government changes do not emerge as playing a significantly higher role than insignihcant ones. Since the conclusion is hard to fit within any sensible prior set of ideas, I am tempted to he a Bayesian econometrican on this occasion and to say that this particular conclusion does not appear in my posterior for beliefs.

Finally, the authors identify as an important finding of their article that the inflation tax (seigniorage) and regular taxes do not appear as being complementary sources of government revenues. This finding seems to hother them because it is hard to reconcile with the principle of optimal taxation. Is there anyone seriously claiming that optimal taxation theory can explain everything? Can it explain inflation in particular? For accepting the idea one has to assume first that the government decides the speed of inflation and second that it chooses it such as to generate the proper amount of seigniorage. Eacb one of these two assumptions appears so unrealistic that a formal test on their joint result has little interest. It could hardly change the views of those who believe that regular distorting taxes tend to be positively correlated, as predicted hy optimal taxation theory. It teaches us nothing about actual monetary policy.

All in all, it is refreshing to read an article showing that General de Gaulle was right and that scholastic applications of optimal taxation theory are wrong.

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Grilli, Masciandaro and Tabellini have provided an original and valuahle contribution to the fast-growing literature on politics and macroeconomic policy. Fairness requires that I dwell first on the numerous merits of their paper, and leave my few complaints to the end.

One virtue of this paper is that, being an empirical study, it goes some way towards filling a vacuum in the political economy literature, that has so far produced a wealth of theoretical models, hut few tests of their predictions. After reading this paper, even the skeptical reader

is left with the impression that this literature can provide important insights into the actual determinants of policy-making, and in some cases may help in predicting future policy choices.

A second merit of this paper is its wide scope. The predictions subjected to scrutiny concern the choice between debt and taxes as well as that between taxes and seigniorage, and relate each of these choices to several features of political and monetary institutions, for as many as 18 OECD countries.

Thirdly, the authors are to be praised for the impressive data-gathering effort that is behind their empirical work. I know of no previous study that assembles and exploits such a vast array of data and indicators on political and monetary institutions for so many countries. I expect the data appendices of this paper to make as lasting a contribution to future research as the work reported in the rest of the study.

Fourthly, as one would expect from successful applied work, the paper does indeed reject some models in favour of others, and points to useful directions for further theoretical research, especially in the area of fiscal policy. This 'weeding out' exercise is especially important in an area that has witnessed a proliferation of theoretical models in recent years.

The most interesting empirical result in this sense is that over-accumulation of public debt is associated not with political instability and polarization (as in the models of Alesina and Tabellini, 1990, Persson and Sevensson, 1989 and Tabellini and Alesina, 1990) but rather with frequent changes of government, irrespective of whether they involve significant changes in political leadership or not. To understand the importance of this distinction, consider the case of Italy: the Italian political leadership has been extraordinarily stable in the post-war period, while the average life span of governments in Rome has been less than a year – shorter than in any other country analysed in this study. More generally, the distinction between instability and frequency of government changes is important in all the countries typically ruled by coalition governments, where changes of government are rarely due to a total breakdown of the underlying coalition.

Insofar as frequent changes of government simply reflect conflict between different power groups within the ruling coalition, its association with over-accumulation of debt can be read as providing support for another group of models that attribute postponement of unpopular choices to the 'war of attrition' between policy-makers (Tabellini, 1986, Alesina and Drazen, 1989, Drazen and Grilli, 1990 and Sanguinetti, 1990). In this view, governments are 'weak' because they are torn by internal conflict. To my knowledge, however, a model showing explicitly that power struggles within ruling coalitions lead

hoth to frequent government changes and to over-accumulation of debt has not yet been proposed in the literature. Such a model would he a good description of Italian politics, where each coalition member constantly attempts to extend its power base at the expense of the others, by channeling public spending towards its own constitutency or by preserving the latter's 'de facto' tax privileges. This competition leads on tbe one hand to frequent government break-ups, and on the other to a bias towards deficit financing to pay for the fiscal privileges of special interest groups.

Apart from its descriptive value (which would go well beyond the case of Italy), such a model could perhaps tell us when to expect this disruptive rivalry between ruling parties to arise. It could, for instance, explain whether it is made more likely by the fractionalization of the party system or by the absence of alternative coalitions (whereby some of the ruling parties could be replaced by opposition parties).

Before concluding, I want to mention a couple of aspects of the paper that I find questionable. One relates to the criterion used to select the countries that place 'excessive' reliance on debt as a source of financing. The authors use 'solvency tests' to identify these countries. Tbey argue that a government whose current policies are not sustainable is not using debt efficiently, since it will eventually have to increase taxes – and tax distortions – by more than if it had pursued sustainable policies from the start. However, leaving aside the many criticisms that could be levelled against solvency tests (some of which are acknowledged by the authors), in tbe present context they are simply unnecessary: the analysis conducted in the rest of the paper purports to show that some institutional features are more conductive to a greater bias towards deficit financing than others, but not that they necessarily lead to insolvency. Another objectionable aspect of the paper is the authors' disregard for non-political factors in shaping choices about fiscal or monetary policy. In their effort to make a case for the importance of political factors, the authors neglect other likely sources of international differences in debt accumulation and inflation rates. Even granting that the 18 OECD countries they examine have been hit by the same exogenous shocks in the post-war period, structural differences among these economies can go a long way towards explaining different responses to these shocks. For instance, the cross-country variation in inflation rates may be explained by international differences in labour relations systems, wage indexation mechanisms, degree of vulnerability to oil or materials price shocks and preferences for inflation versus unemployment. The role played by these factors can be as important as that played by the political and economic independence of the central bank.

General discussion

A number of panel members wondered about theoretical underpinnings to the presumption that government weakness could he captured by attributes such as single party majority, durability and stability. Damien Neven argued that counter-examples could certainly be found to the presumption that large coalitions are weaker than smaller ones; in Belgium, coalitions which include: a large number of memhers tend to be rather more stable and durable than small ones. Some more refined measure of the power enjoyed by any particular party, like its Shapley value, might therefore prove useful in the analysis.

John Vickers felt that a hetter theory of government would he useful to explore the link between deficits and government weakness, however measured. He suggested that the theory of delegation, developed in industrial organization, could find a useful application in this regard. There is indeed a parallel between the principles which guide the choice of a manager by shareholders and the choice and representatives by the electorate. Paul Seabright added that the well known problem of aggregating the diversity of people's political preferences should be carefully considered. When these problems are severe, a sequence of seemingly irrational decions can result from independently rational moves.

Sweder van Wijnbergen indicated that the authors should not be apologetic regarding their inability to distinguish between current and capital expenditure in testing for the sustainability of debt accumulation. given that government investments have by and large fallen over the last decade, the authors' results would probably be strengthened if a proper distinction could be made.

Richard Baldwin suggested that the cross-section evidence presented by the authors could be supplemented by careful case studies of regime changes. For example, a study of France, Spain and Portugal could provide useful insights.

Axel Weber finally noticed that the lack of economic independence of the central bank took a particular form in Germany, which is not captured by the data. The Bundesbank's profits, which are suhstantial, accrue to the treasury; the treasury anticipates this income from the bank in budget planning and the Bundeshank is under pressure to distribute its profits even though such distribution might conflict with its primary objectives insofar as it has inflationary consequences.

Appendix A. Tests of debt sustainability

There is a large literature on how to test Equation (3) in footnote 3. The literature originates with Hamilton and Flavin (1986) with more recent contributions from Wilcox (1989), Trehan and Walsh (1988) and Grilli (1989). A problem with all of this literature, which is present also in our paper, is the failure to distinguish between current and capital public expenditure, for lack of consistent data. This distinction matters because capital expenditures are presumably self-financing, since they generate future revenues. Hence treating all expenditures as current amounts to underestimating future revenues. On the other hand, the probability of a war – and high military spending – is positive even during peacetime, so there is a risk that future expenditures are likely to exceed actually observed expenditures. These two effects tend to offset each other.

The idea is to check for the stationarity of the (appropriately discounted) debt or of the total (i.e. inclusive of interest payments) deficit. One critical problem of this approach is that the appropriate discount factor, q, is not observable. Bohn (1990) shows that the discount factor varies across states of nature and time, depending on the stochastic properties of output and government spending, and does not necessarily bear any relationship with the expected or realized rate of return on government debt. These tests, therefore, are really joint tests of the stationarity hypothesis and of the assumption made about q. Here we present results obtained using the technique suggested by Trehan and Walsh (1988). Their method tests Equation (3) under the assumption that q, even if not observable, is approximately constant over time.[19] Trehan and Walsh (1988) show that, under this assumption, and if the underlying expenditure and revenue series are stationary in first differences, a necessary and sufficient condition for (3) to hold is that the deficit inclusive of interest (as a percentage of GNP) is a stationary variable with zero drift.[20] To test the null hypothesis that the deficit is non-stationary, we proceed as follows (see also Perron, 1988). First we test the existence of a unit root against the more general alternative of a stationary autoregressive model with drift and time trend. This is the $Z(\tau\tau)$ test. If rejection of the unit root is not possible, we test the existence

[19] We also tried other tests of (3), along the lines of Wilcox (1989). But they were unable to discriminate across countries; we could not reject the hypothesis that all countries were on an unsustainable path. This test presupposes that the correct rate of return with which to discount the budget constraint coincides with the realized real rate on government debt. As noted by Bohn (1990), however, this presumption is very likely to be incorrect.

[20] Since we did not subtract seigniorage from the deficit, we are not consolidating the balance sheets of the Treasury and the central bank together. Thus our test of the transversality condition (3) applies to the sum of the debt held by the private sector and by the central bank.

Table A1. Unit root tests (total deficit/GNP)

	$Z(\tau\tau)$	$Z(\Phi_2)$	$Z(\tau\mu)$	$Z(\tau)$
US	99%			
UK	—	—	—	—
Austria	—	—	—	—
Belgium	—	—	—	—
Denmark	—	—	—	97.5%
France	—	—	—	95%
Germany	99%			
Italy	—	—	—	—
Netherlands	90%			
Switzerland	99%			
Canada	99%			
Japan	na	na	na	na
Greece	—	—	—	—
Ireland	—	—	—	—
Portugal	—	—	—	—
Spain	—	—	—	—
Australia	—	—	—	90%
New Zealand	95%			

Notes: $Z(\tau\tau)$ – H1: autoregressive model with drift and time trend; $Z(\Phi_2)$ – joint hypothesis of unit root and no drift; $Z(\tau\mu)$ – H1: autoregressive model with drift; $Z(\tau)$ – H1: pure autoregressive model; $x\%$ = confidence level for rejection of unit root; — = rejection of unit root is not possible at conventional confidence levels.

Table B1. Government instability and political instability

	Frequency				Significant			
Country	1950–59	1960–69	1970–79	1980–89	1950–59	1960–69	1970–79	1980–89
Australia	0	3	5	1	1	0	2	1
Austria	5	5	3	2	0	0	1	0
Belgium	8	4	8	8	2	0	2	0
Canada	1	3	3	3	1	1	1	2
Denmark	4	5	6	4	2	1	3	1
France	15	5	5	6	9	3	1	3
Germany	5	9	3	3	0	1	0	1
Greece	15	16	7	3	3	4	1	2
Ireland	5	2	8	6	3	0	2	3
Italy	8	10	11	13	0	0	0	4
Japan	8	4	5	7	1	0	0	0
Netherlands	2	4	3	3	1	2	3	0
New Zealand	2	1	5	1	1	1	2	1
Portugal	3	1	15	8	0	0	4	4
Spain	0	2	12	6	0	0	1	1
Switzerland	10	8	6	1	2	0	0	0
UK	4	2	4	0	1	1	3	0
US	1	3	2	2	1	2	1	1

Sources: Jodice and Taylor (1982), Banks (1987), Keasing Archives, various years.
Notes: Frequency = Number of government changes for the decade; Significant = Number of 'significant' government changes for the decade.

Table C1. Central bank governor

Country	Governor appointed by	Term (years)	Reappointability
Belgium	Sovereign (i.e. Government)	Five	Yes
Denmark	Sovereign	Indefinite	—
France	President	Indefinite	—
Germany	President proposal of the Government	Eight	—
Greece	Government proposal of the bank	Four	Yes
Ireland	President proposal of the Government	Seven	Yes
Italy	Bank Board approval of the Government	Indefinite	—
Netherlands	Sovereign (i.e. Government) proposal of the bank	Seven	Yes
Portugal	Government	Five	Yes
UK	Sovereign proposal of the Government	Five	Yes
Spain	Sovereign proposal of the Government	Four	Yes
Switzerland	Government	Six	Yes
Australia	Government	Seven	Yes
Canada	Board	Seven	Yes
Japan	Government	Five	Yes
New Zealand	Government	Five	Yes
US	President	Four	Yes
Austria	President	Five	Yes

Sources: Aufricht (1967) and national legislation.

of the unit root against more restrictive alternatives i.e. a stationary autoregression model with drift ($Z(\tau\mu)$) and a pure autoregressive model ($Z(\tau)$). However, in order to be able to apply these two tests, we first check for the existence of drift which is done by testing the joint hypothesis of unit root and no drift ($Z(\Phi_2)$). If the hypothesis of no drift is rejected, in fact, the more specialized tests cannot be used. The results are shown in Table A1. Note that for the UK the evidence of non-stationarity is clearly due to the implosive path of the debt to GNP ratio, and hence it cannot be taken as evidence of unsustainability.

Appendix B. Indicators of government attributes

The political event data used to construct the variables *FREQUENCY* and *SIGNIFICANT* of Table 8 are reported in Table B1.

Appendix C. Indicators of central bank independence

The institutional information used to construct our indicators of central bank independence is summarized in Tables C1–C4.

Table C2. Central bank board

Country	Board appointed by	Members (*)	Term (years)	Reappointment	Government inst. representatives
Belgium	Sovereign (i.e. Government)	3–6	Six	Yes	Yes Government Commissioner (advisory/suspensive rights)
Denmark	Parliament (8); Trade Min. (2); Bank Board (15)	25	Five	Yes	Yes Minister of Trade (supervisory right)
France	Minister of Finance (9) Bank (1)	10	Six	Yes	Yes Director Minister of Finance (advisory/suspensive right)
Germany	President proposal Government	8	Eight	—	No
Greece	Shareholders General Meeting	9	Three	Yes	Yes Government Commissioner (suspensive right)

Table C2—continued

Country	Board appointed by	Members (*)	Term (years)	Reappointment	Government inst. representatives
Ireland	Government	3–8	Five	—	Yes Permanent Secretary Minister of Finance ?
Italy	Shareholders Regional Meetings	13	Three	Yes	No
Netherlands	Sovereign (i.e. Government)	3–5	Seven	Yes	No (yes in the Bank Council: Royal Commissioner)
Portugal	Government	7–9	Five	Yes	No (yes in the General Council)
UK	Sovereign (i.e. Government)	16	Four	—	No
Spain	Government (6); Min. Fin. (2) Governor (1–4); Bank (1)	10–14	Two	—	No
Switzerland	Government (25) Bank (15)	40	Four	Yes	No
Australia	Government	7	Five	Yes	Yes Secretary of Treasury (voting right)
Canada	Government	12	Three	Yes	Yes Deputy Minister of Finance (advisory right)
Japan	Government (4); Econ. Ag. & Min. Fin. (2)	6	Four	Yes	Yes Representatives Min. of Finance Min. Ec. Planning (advisory right)
New Zealand	Government	5	Five	Yes	Yes Secretary of the Treasury (casting vote)
US	President	5	Fourteen	No	No
Austria	Government (5) Sh. Gen. Meeting (6)	11	Five	Yes	Yes Government Commissioner (advisory and suspensive right)

Source: Aufricht (1967) and national legislation.
Note: (*) except Governor and Vice-Governor(s), government representative(s).

Table C3. Government financing accommodation: monetary and regulatory framework

	Monetary framework		Regulatory framework		
Country	Direct Cred. (characters)	Primary Issue	Central Bank	Other institutions	Government
Belgium	OVERDRAFT * limited * automatic * disc. rate * no terms	No	—	Banking Commission	—
Denmark	OVERDRAFT * unlimited * automatic * disc. rate * no terms	No	—	Supervisor of Comm. Banks & Savings Bank	—
France	OVERDRAFT * limited * automatic * no rate * no terms	No	—	Banking commission	—
Germany	ADVANCES * limited * discretion * disc. rate * terms (3 m)	No	Yes	Federal Banking Supervisory Office	—
Greece	ADVANCES * limited * automatic * symbolic rate * terms	Yes	Yes	—	—
Ireland	OVERDRAFT * limited * automatic * terms (m) * market rate	Yes	Yes	—	—
Italy	OVERDRAFT * limited * automatic * symbolic rate * no terms	Yes	Yes	—	—
Netherlands	OVERDRAFT * limited * automatic * no rate * terms	No	Yes	—	—
Portugal	OVERDRAFT * limited * automatic *no rate * terms (1 y)	Yes	Yes	—	—
UK	No	Yes	Yes	—	—

Table C3—continued

Country	Monetary framework		Regulatory framework		
	Direct Cred. (characters)	Primary Issue	Central Bank	Other institutions	Government
Spain	OVERDRAFT * limited * automatic * no rate *terms (1 y)	Yes	Yes	—	Ministry of finance
Switzerland	OVERDRAFT * limited * automatic * market rate * terms (m)	No	—	Federal Banking Commission	—
Australia	OVERDRAFT * limited * discretion * m. rate * terms	No	Yes	—	—
Canada	ADVANCES * limited * discretion * bank rate * terms	Yes	—	General Inspector of Banks	—
Japan	ADVANCES * limited * discretion * no m. rate * terms	No	Yes	—	Ministry of Finance
US	No	No	Yes	Comptroller of the Currency FDIC FHLB	
Austria	Advances * limited * automatic * no m. rate * terms (d)	No	—	—	Ministry of Finance

Sources: Aufricht (1967) and national legislation.

Table C4. Central bank, government and accountability

Country	Relation with Government	Relation with Parliament	Monetary stability objective	Provisions in case of disagreement Central Bank-Gov't
Belgium	Approval	Through Government	No	Yes Government directives
Denmark	Consultation	Annual report	Yes	No
France	Approval	Through Government	No	No
Germany	Consultation	Not accountable	Yes	Yes temporary post-position
Greece	Consultation		No	Yes Arbitration Commission
Ireland	Consultation	Annual report	Yes	No
Italy	Approval	On Call	No	Yes Government directives
Netherlands	Consultation	Through Government	Yes	Yes Government directives
Portugal	Approval	Through Government	No	Yes Government directives
UK	Approval	Through Government Annual report	No	No
Spain	Approval	Through Government	Yes	No
Switzerland	Consultation	Annual report	Yes	No (independence guarantee)
Australia	Approval	Annual report	Yes	Yes Government directives informing Parliament
Canada	Approval	On call	Yes	Yes Government directives informing Parliament
Japan	Approval	Approval	Yes	No
New Zealand	Approval	Annual report	No	No
US	Consultation	Approval	Yes	Yes Parliament directives
Austria	Consultation	Not accountable	Yes	Yes Arbitration tribunal

Source: Aufricht (1967) and national legislation.

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