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OF CENTRAL BANKS
BY AUTONOMY:
A COMPARATIVE
ANALYSIS

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ABSTRACT

This article analyses and compares the different indices that classify central banks on the basis of their autonomy. A number of aspects affecting central bank autonomy are listed and described. These aspects are compared with the facets of central bank independence actually included in the classifications, assessing their degree of coverage. Certain problems related to the elaboration of the indices are addressed. A comparison is also made of the results of the different classifications. Finally, the effect of the Maastricht Treaty-related institutional changes on the independence of EU central banks is estimated, showing a substantial upgrading in absolute and relative terms of this group of countries.

Key words: central banks, monetary autonomy, monetary policy, exchange-rate policy, comparative analysis.

1. Introduction

Interest in studies on the autonomy of central banks has heightened in recent years as the idea that autonomy gives better macroeconomic results has gained popularity. Numerous studies have shown empirical evidence linking greater central bank autonomy to better control of inflation. This has made it necessary to estimate a variable that is very difficult to quantify, which is the autonomy of central banks. The efforts involved in these studies are admirable and helpful, but they run up against major practical obstacles. This article reviews recent papers on the classification of central banks according to their degree of autonomy. It describes the methodology used, analyses the main problems encountered and compares the results.

The aim of this article is to try to answer the following questions. How reliable are the classifications of central banks by independence? On which aspects do they focus? How ample is their coverage? How similar -or how different- is their methodology? How sensitive are the results to changes in legislation? In particular, what may be the effect of the reforms linked to the entry into force of the Maastricht Treaty for EU countries?.

The structure of the article is as follows: the introduction indicates which studies will be discussed; Section 2 identifies and defines the relevant features determining central bank autonomy; in Section 3 the methodology and general characteristics of the studies that attempt to quantify this variable are described; Section 4 discusses the main problems encountered in the development of these indices; in Section 5, the results of the studies are compared; in Section 6, some caveats regarding the effects of changes in legislation on these indices are considered; and finally, Section 7 draws some conclusions.

Studies on central bank autonomy can be classified into four major groups.

First, purely theoretical papers in which the rationale for central bank autonomy is discussed. In general, these articles are based on observations of the problems of time inconsistency between the objectives of economic policy, which generate economic cycles linked to the political or electoral cycle. Barro and Gordon (1983), Rogoff (1985), Alesina (1989) and Cukierman (1992), among others, develop these arguments.

Second, another series of studies, which will be referred to in Section 2, focuses on the institutional aspects of central bank autonomy (in other words, they attempt to identify the characteristics of the most independent central banks).

Third, some studies focus on the development of indices or classifications of central banks according to their autonomy.

Finally, there is much empirical literature that attempts to determine whether there is an inverse relationship between central bank autonomy and the inflation rate (or its variability). Some studies of this type also link central bank autonomy with other macroeconomic variables, such as GDP growth or the public-sector deficit.

For the purposes of this article, the most interesting studies are those included in the third group (development of indices on central bank autonomy). However, many of them also fall into category four (empirical), since the purpose of the classifications is to contrast hypotheses on the macroeconomic effects of central bank autonomy.

In addition, in order to evaluate the different classifications, it is useful to consider as a point of reference studies of the second group, which refer to the institutional aspects of central bank autonomy. One of the interesting features of the literature on central bank autonomy is precisely the relative divorce between institutional papers -generally very broad, covering a wide range of questions linked to the degree of autonomy of central banks and frequently based on ample questionnaires

on national characteristics and practices- and the studies focusing on developing autonomy indices, which are generally confined to very partial considerations. The difficulties involved in obtaining, classifying, normalising and aggregating information on the statutes and practices that govern central bank actions are largely to blame for this contrast. However, it is also true that some of the studies that present indices of central bank autonomy are not very selective when it comes to identifying the most relevant features; in addition, many of these classifications simply restate earlier ones. This may be because the development of indices for central bank autonomy has generally been linked more closely to their use in empirical studies (of the fourth group) than in studies considering the different facets of that autonomy (of the second group).

2. Key features of central bank autonomy

The principal studies that identify the key features of central bank autonomy are those by Fair (1980), Skanland (1984), Swinburne and Castello-Branco (1991) and Cukierman (1992). One interesting exercise is to compare the features that could potentially be linked to central bank autonomy with those that are actually used for constructing indices.

However, when discussing the characteristics of central bank autonomy, some precautionary comments should be made. First, the concept of central bank autonomy itself is somewhat elusive: theoretical or legal autonomy may differ substantially from practical autonomy, and both can be understood as subject to the area of monetary policy or extended to other central bank functions (these questions are addressed in greater detail in Section 4). Second, the aspects of central bank autonomy can be addressed with very different degrees of detail, ranging from a general description of areas and functions to a detailed formulation of questions that could be included in a questionnaire; this hinders the objective comparison between what should be addressed to evaluate central bank autonomy and what is actually included in the indices. Third, not all features of central bank autonomy are equally important, being the simple sum of several aspects as arbitrary as their weighting according to a discretionary criterion. Fourth, the different facets

discussed below are closely interrelated, which means that greater or lesser autonomy in one area is not independent of the other institutional characteristics of the central bank.

With these cautions in mind, and based on the studies mentioned at the beginning of this section, 22 features have been chosen which affect the degree of autonomy of a central bank. These are grouped into five large areas: i) functional dependence and responsibilities; ii) governing bodies; iii) financial independence; iv) functions other than monetary policy; and v) other considerations. Underlying this approach is a notion of autonomy that is more closely related to its legal than to its practical sense, and which is initially limited to the area of monetary policy; however, autonomy in setting monetary policy is not independent from the attribution of other possible functions to the central bank, and for this reason they are incorporated into the analysis. The level of aggregation used is intermediate: an effort has been made to achieve the greatest possible separation between factors which are substantially different, within a single area, without developing concrete questions in the style of a questionnaire. Under the latter approach, the number of aspects of central bank autonomy would have been much higher.

The features considered as influencing central bank autonomy will be commented upon briefly below, although they will not be discussed in depth, since this is not the objective of this article. The aim of this section is rather to present these features, in order to evaluate afterwards the classifications under analysis.

I. Functional dependence and attribution of responsibilities

1. Formal dependence of the central bank.

The central bank may depend upon the government (which is the most common case), upon the Parliament (as in the United States), or it may not depend formally upon any other institution (as in Germany, where the Bundesbank is accountable to public opinion).

2. Formal assignment of responsibility to develop monetary policy.

The development of the broad outlines of monetary policy may be the exclusive responsibility of the government, the exclusive responsibility of the central bank, or it may be shared by both.

3. Formal assignment of responsibility to implement monetary policy.

The central bank may be subject to government directives as regards the general objectives of monetary policy, but have autonomy for its implementation. In this case, it is important to know how the dividing line is drawn between these two areas of responsibility, whether the central bank is required or is not required to follow government directives, etc.

4. Provisions for resolution of conflicts.

In some cases, certain mechanisms have been established for situations of conflict, such as the following: the government may suspend the application of certain measures adopted by the central bank for a limited period of time; the discrepancies and arguments of the government and the central bank may become public; the Parliament may play the role of an arbiter in the dispute; etc. It is not clear whether these provisions increase or decrease the autonomy of the central bank. Eizenga (1987) argues that in the case of the Netherlands, they enhance the bank's autonomy, while in the case of Canada it is generally accepted that the reform of the 1967 statute -which arose from a conflict between the government and the central bank, and which included provisions for the resolution of these conflicts- reduced the de facto autonomy of the central bank (Fair, 1980 and Swinburne and Castello-Branco, 1991). Doyle and Weale (1994) conclude that override provisions are necessary and that, therefore, the optimal institutional arrangement is partial instead of full independence of the central bank.

5. Statutory objectives.

In general, central banks with clear, hierarchical and non-conflicting objectives are more independent. The inclusion of a price stability

objective, which is pre-eminent over all others, confers greater autonomy on a central bank.

6. Democratic accountability and supervision of monetary policy.

The degree of autonomy of a central bank also depends on the mechanisms by which it is accountable for its activities and its policies, and on which institutions have democratic control over it: the government, the Parliament, the judiciary.... It is not true that central banks with less democratic responsibility are necessarily more independent; there are many arguments to the contrary (CEPR, 1994).

7. Mechanisms for reform of legislation governing the central bank.

Given a degree of central bank autonomy, its greater or lesser de facto autonomy also depends on how difficult it is to change the legislation governing its independence. For instance, the need for a constitutional amendment to reform the central bank statute in some countries means that existing legislation is more stable than in other countries, where the statute could be changed through normal legislative processes. From this point of view, the link between central bank independence and an international Treaty (as in the case of the Maastricht Treaty-related legislation in EU countries) establishes an additional constraint on the process to reform this legislation. This question will be addressed in Section 6.

II. **Governing bodies**

8. Composition of the governing bodies.

The number, characteristics and functions of the governing bodies and their components have an impact on the institution's autonomy.

Among the factors which affect the degree of central bank autonomy are the following: whether members are appointed or ex-officio; whether there are government representatives; the presence of members with or

without a voting right; the existence of executive and non-executive members of the Council; whether there are regional¹ or sectoral representatives on the Board, as well as representatives of the private shareholders, when relevant.

9. Election of senior officials.

The autonomy of senior central bank officials depends not only on who appoints them, but also on the mechanisms for nomination, recommendation, approval, etc., in procedures that may be very complex².

10. Mandate of senior officials.

The length of the mandates of the members of the governing bodies, their overlapping with one another, and their overlapping with the mandates of the government or the members of the Parliament condition the degree of autonomy of the central bank. It should be noted,

¹ In this respect, it should be noted that the central banks that are generally considered to be the most independent (those of Germany, Switzerland and the United States) correspond to countries with a federal structure of government, where states or regions are represented in the governing bodies of the central bank. One possible interpretation of this fact is that federal states have a traditional aversion to concentration of power in the central government, and have developed central bank autonomy as a means of keeping monetary policy in the hands of an institution in whose governing bodies the interests of the central and peripheral authorities can be counterbalanced.

² In the German case, for example, some Board members are elected by the President of the Republic, after being nominated by the Federal Parliament (Bundesrat), based on regional government recommendations, and following consultation with the Bundesbank Board (Eijffinger and Schaling, 1993). In the new Bank of France statute, which was approved in 1993, the six board members on the Monetary Policy Council are appointed by the Council of Ministers from a list presented jointly by the presidents of the Senate, the National Assembly and the Economic and Social Council (Cardenal, 1993).

however, that the legal duration of the mandate may not be the same as its effective duration³.

11. Renewal of mandates.

It is generally assumed that very long and non-renewable mandates mean greater autonomy than shorter, renewable mandates. Longer mandates enhance autonomy because they guarantee a certain separation between central bank management and the political cycle. When combined with overlapping mandates, long tenures tend to favour the coincidence on the Board of members chosen by different governments, thus increasing its autonomy. The fact that a mandate is non-renewable means that decisions will not be made with the intention of gaining re-election.

12. Dismissal of senior officials.

Obviously, a central bank is less independent when it is easy for the government to dismiss its senior officials.

III. Economic independence

13. Limits on government financing.

It is generally accepted that an indispensable complement to formal central bank autonomy is a limit on lending to the government (or its total prohibition). Holtfrerich (1988) concludes that in the inter-war period of German Hyperinflation the autonomy of the Reichsbank, in May 1922, was meaningless until it was accompanied by limits on government

³ Cukierman (1992) cites the case of Argentina before the recent reform, where, although the legal mandate was for four years, informal tradition dictated that the Governor was forced to tender his resignation each time there was a change of government and even every time a new Finance minister was appointed. As a result, the average effective length of the mandate of Argentine central bank Governors over the 1950-1990 period was only 13 months. The same study develops an indicator for observance of the legislation on central bank independence, based on the comparison between the legal and effective length of the mandate of the Governor.

borrowing, in November 1923. A conflicting view is given in Swinburne and Castello-Branco (1991): "Statutory limits on credit to government may not be particularly effective when the central bank is not independent, and may not be necessary when the central bank is independent, with a clear responsibility for monetary stability" (page 34). However, the authors acknowledge that these limits might be useful "when a central bank is first made independent and needs to establish its credibility" (page 35).

It is generally accepted that the existence or non-existence of limits on government borrowing, their definition, and the forms and characteristics, when applicable, of credit facilities, etc., are critical determinants of the autonomy of central banks in practice, at least in the great majority of cases, in which central bank autonomy is a question of degree. A thorough analysis of limits on central bank lending to the government can be found in Cotarelli (1993).

14. Budgetary autonomy.

A less evident feature of the degree of autonomy of a central bank, but one which can be important, has to do with the budget mechanisms of the central bank itself: who determines its income and expenditures, how they are distributed, how the salaries of its employees are established (including those of senior officials), etc.

15. Distribution of profits.

This feature -who decides how central bank profits are to be distributed, and how this decision is made- is closely linked to the previous point and is also important in evaluating central bank autonomy.

IV. Other central bank functions other than monetary policy.

16. Banking supervision.

An important but controversial feature of central bank autonomy is whether or not this institution has the responsibility over areas that could

conflict with monetary policy, in particular banking supervision. In Germany, the fact that the Bundesbank does not have responsibility for overseeing the banking system is generally seen as a complement to its independence. Jenkins (1995) finds a positive correlation between the regulatory burden of the central banks as regards the banking industry and the inflation rate, which seems to support this view. The European Central Bank statute is largely inspired by the German model. Folkerts-Landau and Garber (1992) present a critique to this approach, arguing that a central bank that must act as a Lender of Last Resort must have the capacity to distinguish between liquidity and solvency problems, and this is best done when it is assigned the task of banking supervision.

17. Exchange-rate policy.

Exchange-rate policy functions are normally shared between the government and the central bank. Even in the cases of the most independent central banks (such as Germany), the government is responsible for the election of the exchange-rate system and the broad design of exchange-rate policy⁴. In practice, the way conflicts between an independent monetary policy and an exchange-rate policy subordinated to political power are resolved depends mainly on the existing exchange-rate regime. Central bank autonomy is very significant and effective under floating, but it becomes subordinated in practice to exogenous elements in a fixed exchange-rate system (Fernández de Lis, 1993)⁵.

⁴ In a few cases, the central bank has sole responsibility for exchange-rate policy, even as regards the election of the exchange-rate regime. Sweden is the most conspicuous example.

⁵ One interesting aspect of this problem is the idea that the central bank of a country under some kind of exchange-rate constraint (like the ERM) is, *ceteris paribus*, more independent the wider the fluctuation band (see Cukierman -1992). This is because the government is normally responsible for setting central parities and establishing the parity-grid, whereas the central bank has a greater influence on the decision about the position of the exchange-rate within the fluctuation band. One interesting implication of this idea is that the widening of ERM bands to $\pm 15\%$ in August 1993 meant a certain increase in the *de facto* autonomy of participating central banks. However, it should also be kept in mind that greater or lesser recourse to realignments in central parities, instead of movements of the exchange rate within the bands, and the degree of central bank participation in these decisions will depend not only on the width of the band but mainly on numerous additional factors.

Most central banks have exclusive responsibility to implement exchange-rate policy. An exception is in the United States, where the Treasury may also intervene on foreign currency markets. Ownership of reserves is also a consideration which may condition the degree of autonomy of the central bank in carrying out its monetary and exchange rate policies.

18. Other functions.

The scope of the central bank's functions may have an impact on its independence. Possible functions of a central bank, apart from monetary and exchange rate policies and banking supervision, include: banker of the government (referred to in point 13); note-issuing bank; bankers' bank and Lender of Last Resort; payments system and organization of markets; intervention in ailing financial institutions; centralized system for registry of credits; statistics and central balance-sheet office; consumer protection for banking services and deposit insurance (see Pellicer, 1993). An important aspect in the performance of these functions is whether the central bank has regulatory powers, in particular over financial institutions. If the central bank can issue regulations -at some level- that commit financial institutions, its degree of autonomy seems, in principle, higher than if this regulatory power were to belong completely to the Parliament and/or to the Government (see Lastra, 1995).

The relationship between central bank autonomy and the exercise of some of these functions is not obvious. The fact that a central bank is responsible for some of these functions may enhance its independence; in other cases, it may reduce it; and in others it will depend on many other factors. In any case, it is clear that the area of responsibilities assigned to the central bank may be a very important factor in determining its degree of autonomy.

Other considerations

19. Transparency (including publication of discussions and deliberations of governing bodies).

Although this question has not even been considered in most countries, a serious debate has existed for some years in the United States over whether the minutes of the main governing body of the central bank, the Federal Open Market Committee (FOMC), should be published either immediately after its meetings or with some time lag. Proponents of greater transparency argue that the publication of minutes is necessary for the correct formation of expectations; opponents of immediate publication say that total transparency would render ineffective some of the measures adopted or announced. This debate has given rise to a series of studies on central bank transparency and secrecy (see, for example, Goodfriend, 1986)⁶.

20. Central bank ownership.

Whether a central bank is publicly or privately owned may affect its autonomy. However, the different situations, in this regard, of the three central banks that are generally considered to be the most independent may be seen as evidence to the contrary: in Germany, the Bundesbank is 100% government owned; in the United States, the Federal Reserve Banks are owned by the commercial banks that are members of the System, but the Federal Reserve System is a government agency; and in Switzerland 100% of the bank's capital is in private hands. All three of these cases are compatible with a degree of independence that is generally considered to be relatively high.

21. Limits on the use of monetary policy instruments.

No matter what the situation of a central bank is as regards the design and implementation of monetary policy, there may be obstacles to the use

⁶ The British government recently decided to publish the minutes of the meetings between the governor of the Bank of England and the Chancellor of the Exchequer, to make decision-making over monetary policy more transparent.

of some instruments -such as the reserve requirements, open-market operations or, when applicable, direct credit control mechanisms- in the form of legal or administrative limitations, requirements for prior authorization or consultation, etc.

22. Autonomy in preparing and publishing reports and public statements on economic policy questions.

One critical feature of central bank autonomy, but which is difficult to measure in practice, is its ability to affect the general direction of economic policy. One of the clearest ways to influence economic policy is the publication of reports and studies and the release of public statements on these topics, which may help guide policy in the desired direction, especially if they are backed by a certain degree of technical prestige.

3. Main characteristics of the different indices of central bank autonomy.

The main studies that have developed indices to measure the degree of central bank autonomy are Bade and Parkin (1988), Alesina (1989), Grilli, Masciandaro and Tabellini (1991), Capie and Wood (1991), de Haan and Sturm (1992), Cukierman (1992), Eijffinger and Schaling (1993) and Alesina and Summers (1993).

Some of these indices simply re-build or broaden previous indices. Alesina's classification (1989) is quite similar to that of Bade and Parkin (1988), adding five more countries and considering one additional criterion. Eijffinger and Schaling's classification (1993) is based to a large degree on that of Bade and Parkin as well. The classification of de Haan and Sturm (1992) is the result of adding the two classifications of Grilli, Masciandaro and Tabellini (1991) -political and economic-, excluding the features linked to banking supervision. Alesina and Summers' index (1993) is simply an average of those of Bade and Parkin, on one hand, and Grilli, Masciandaro and Tabellini, on the other, using a homogeneous scale.

These eight studies include in total eleven classifications, since Grilli, et. al. present two classifications⁷ and Cukierman presents three⁸. Nevertheless, for the reasons mentioned above, only four studies - including seven classifications- can be considered as "original": Bade and Parkin (1988), Grilli, Masciandaro and Tabellini (1991), Capie and Wood (1991) and Cukierman (1992). Excluding the study by Capie and Wood -which is very limited and simple- the number of "original" classifications is reduced to six.

Most of the classifications mentioned attempt to reflect the concept of "legal independence", except for the "practical independence" classification of Cukierman and the one that is based on the turnover of Governors, which is included in the same study. It should be noted that the interpretation of the last classification is not linear: the "longevity" of governors -in the sense of their period in office- does not necessarily indicate a high degree of autonomy, but may instead reflect a complacent attitude towards political power, while a very high degree of turnover seems to be a clear sign of reduced independence. This index, therefore, should be seen as a useful indicator only below a certain threshold. Cukierman's study itself concludes that this threshold is significant for developing countries, but not for industrialised countries.

Table 1 summarizes the main characteristics of the studies cited, which are identified by the authors' initials and the year of publication. The number of countries included in the studies ranges from a minimum of 11 [in C (92), index based on questionnaires] and a maximum of 22 [C (92), legal index]. For the purpose of this article, only industrialised

⁷ One on "political independence" and the other on "economic independence".

⁸ One is based on "legal independence", another on "governor turnover" and another on the replies to a questionnaire which was aimed at determining the de facto independence of central banks. Cukierman's study presents a synthetic classification that combines these three, but it has not been considered in this article for the reason that since weightings are set according to the coefficients of a regression with respect to the inflation rate, it has a certain bias, in the sense that the central banks of the best performing countries in terms of inflation tend to be considered the most independent.

countries are considered, although some studies also include developing countries [especially C (92), whose legal index covers 69 countries, and CW (91)]. Only three countries appear in all 11 classifications: Germany, France and the United Kingdom.

The period referred to in the studies is very important, since there are from time to time significant legal changes that modify central bank autonomy in the different countries. BP (88) and A (89) both cover the period following general floating (1972-1986). GMT (91) refers to the period 1950-89, as do HS (92) and ES (93), with the latter two being based on the former. C (92) refers to the same period (1950-1989) both for the legal autonomy index and that based on governor turnover. The former, however, is calculated for four sub-periods: 1950-59 (dollar standard), 1960-71 (convertible dollar), 1972-79 (oil shocks) and 1980-1989 (disinflation and debt crisis). This breakdown permits the analysis of changes in the degree of legal autonomy of each central bank. The C (92) index, based on a questionnaire which attempts to gauge practical independence, refers to the decade of the 1980s. The AS (93) index is ambiguous in terms of chronological coverage, since it is based on an average of the BP (89) and GMT (91) indices, which cover different periods. A case apart is the CW (91) classification, which attempts to offer a historical perspective by analyzing the 1871-1989 period.

The systems classifying central banks by their degree of independence can be divided into three types:

a) Binary: Central banks are classified as either independent or dependent [CW (91)].

b) Discreet: these present a limited number of possibilities: BP (88), A (89) and AS (93) use a scale of 1 to 4; ES (93) from 1 to 5; GMT (91) from 0 to 7 in the political independence classification and 0 to 8 for economic independence; HS (92) from 0 to 14.

c) Continuous: the three classifications of C (92) are continuous, from 0 to 1. This is one of the main advantages of these classifications: in the features analyzed, they consider different possible levels of response

and, therefore, of central bank independence. The other studies are more simplistic from a methodological point of view, since they only accept "yes" or "no" answers to the questions.

4. Main problems of the indices of central bank autonomy

2.1. The concept of autonomy

Most of these studies do not specify what they mean by independence or autonomy. Without an explicit concept of independence, it could be concluded that a central bank is more independent when it enjoys greater discretion and is subject to the least possible restrictions. But this approach raises some questions: is a central bank which is not assigned specific objectives more independent than one whose statutes assign it responsibility for maintaining price stability? Is a central bank that must pursue multiple objectives more independent than one that is required to focus on a single objective (such as inflation control)? In the case of a central bank with various functions, should independence be limited to the area of monetary policy, or should it be extended to other tasks? What are the effects of either solution on central bank independence? Is a central bank that is required to pursue a "zero inflation" objective more or less independent than another bank that must pursue the less precise objective of price stability? Is a central bank that is not subject to democratic control more independent? Is central bank independence compatible with transparency in its activities? Are both concepts complementary?

The answers to some of these questions are not obvious and they affect the evaluation of the independence of a central bank under any institutional setting. Most studies that evaluate the independence of central banks, however, overlook these considerations. The outstanding exception is C (92), which explains the notion of independence that is being used: "The development of an independent monetary policy to achieve the objective of price stability in the medium term". Other recent studies that make an effort to clarify the concept of central bank

autonomy are the Roll Report (1993) and Fisher (1995), who distinguishes between "instrumental independence" and "goal independence".

4.2. Theoretical and practical independence

Obviously, there may be discrepancies between the level of independence legally granted to a central bank and its degree of practical autonomy. The latter depends on many informal features, traditions⁹ and non-quantifiable elements which are difficult to compare objectively across countries. These qualitative and informal factors include the personalities of the central bank's top officials, their prestige and technical expertise, the informal relationships between the central bank and the government, its links with financial institutions and markets, etc. Cukierman mentions, as a non-quantifiable element of central bank autonomy, the quality of its research department, since the task of advising the government rests on its expertise. Of all the studies analysed, only Cukierman's attempts to deal with some of these features, with a classification based on replies to a questionnaire.

4.3. Subjective interpretation

All of the indices are based on the interpretation and standardisation of legal questions which require in many cases some subjective assessment. For example, the interpretation of central bank statutes in ES (93) is different in some aspects from that of BP (88) for five of the countries under analysis. The latter also differs from GMT (91) in five of the 12 cases. All of these differences are exclusively a matter of interpretation, since the questions asked and the periods under analysis are the same.

⁹ An excellent analysis of the importance of historical factors in the development of central bank functions and their level of autonomy can be found in Goodhart (1988).

4.4. Coverage of the indices

Section 2 reviewed the features that may influence central bank autonomy, giving 22 categories grouped into five large areas. Table 3 presents a comparison of how the 11 classifications cover these 22 categories. The letter T is used for the cases where the feature mentioned is totally considered in constructing the independence index; the letter P is used when it is only partially covered. On the last line a very rudimentary indicator is presented for the "coverage" of the various classifications, which is calculated by assigning a value of 1 to each letter T and a value of 0.5 to each letter P in each column of the table. This exercise -which is rather simplistic- leads to the conclusion that the highest coverage index (5.5 corresponding to Cukierman's classification based on a questionnaire), represents only 25% of a potential total of 22 points and the lowest 5% [CW (91)]. In other words, the most complete classification only covers one-quarter of the features that have been considered as possible.

Table 3 shows that most of the studies focus on areas i) (functional independence and designation of responsibilities) and (ii) (governing bodies), while paying little or no attention to economic independence (iii)¹⁰, other functions besides monetary policy (iv) and other considerations (v).

4.5. Aggregation of features under consideration

The features used to develop each index are obviously aggregated in a subjective way. Most classifications involve a simple sum of the characteristics under consideration. For example, in GMT (91) in the political independence index, the fact that the governor is not appointed by the government has the same weight as the fact that his mandate is longer than five years, or that price stability is included among the central bank's objectives. Only C (92) considers a weighting of characteristics, both in its legal index and in the one based on the

¹⁰ The "economic independence" index of Grilli, Masciandaro and Tabellini focuses on features different from those of the economic independence concept defined in Section 2 of this article.

questionnaires. In both cases, weighted and unweighted indices are developed¹¹; in the weighted index, the weightings are determined subjectively.

4.6. Periods under consideration

The period under analysis is very important in quantifying the autonomy of central banks. On the one hand, the period should be short enough to rule out major changes in legislation regarding the central bank [or alternatively, sub-periods could be used, as in C(92)]; on the other hand, if the objective is to compare the independence indices and inflation performance, the period must be long enough for these variables to be representative, and for the relationship between the former and the latter to stabilise (since the credibility associated with central bank autonomy takes time to establish). The length of the period under study ranges from 14 to 39 years, with the exception of CW (91), whose study covers 118 years. The question of the effect of legal reforms is addressed in section 6.

5. Comparison of the results

Table 4 presents the independence rankings of central banks according to the different studies. The table presents the 15 countries that are included in at least two-thirds of the classifications. Table 5 compares the geographic coverage of industrialised countries in the different studies. Since the classifications have different criteria and scales, the concrete numerical value assigned to each central bank has not been considered, but rather their ranking in the classification. One implication of this approach is that only the order of the countries in each classification is considered, but not the relative distance between them. In cases where various countries receive the same classification -which is quite frequent-

¹¹ However, the unweighted indices calculated in C (92) also have some element of weighting, since they group several questions in broader categories, which are simply added later: in the legal index, the 16 initial categories are grouped into 8 (see notes to Table 6, where the aggregation procedure is explained); in the index based on questionnaires, the 9 initial questions are grouped into 7.

all have been assigned the value of the median of the interval which they form in the classification¹².

The following conclusions can be made based on this table:

- Germany, Switzerland and the United States, generally in that order, are the countries whose central banks appear in the first places (as most independent).

- The countries ranked last (least independent) show greater variation. Belgium, Spain, New Zealand and Sweden frequently appear in the last places.

- In the group of intermediate countries, two groups can be established: the countries whose central banks are more independent (Canada, Denmark and the Netherlands) and those whose central banks are less independent (Australia, France, Italy, Japan and the United Kingdom).

- The Japanese case is interesting, since it appears as one of the most independent central banks in the first classifications [BP (88) and A (89)] and as one of the least in the latest ones.

From the analysis of the results of Table 4 one may conclude that the classifications, although using different methodology, covering diverse periods and addressing aspects of central bank autonomy to some extent separate, tend to convey a broadly similar message about which central banks are more and which are less independent. The dispersion measures calculated in the last columns of Table 4 also tend to support this view, and to confirm therefore to some extent the "traditional wisdom" on central bank independence rankings. Nevertheless, it is true at the same time that some classifications seem to present a distorted view of the autonomy of some central banks, when compared with the others, as shown by the very high range of positions for each country (7.9 as the

¹² For example, if five countries are tied in fourth to eighth place, they have all been assigned the sixth place.

average distance between the maximum and the minimum position for the 15 countries, which seems rather high). If "outliers" are eliminated, the average range is reduced to 6.3, with most countries moving in a much lower interval (the "high-range countries", excluding outliers, are Australia, Belgium, the Netherlands, Italy and Japan).

6. The effects of changes in legislation.

In estimating central bank independence, a particularly difficult question is how to treat possible changes in the legislation concerning central banks. If the final purpose of the measurement of central bank independence is to evaluate its effect on price stability, such an empirical test requires a sufficiently long period of comparison between both variables. However, relevant changes in central bank legislation have to be taken into account and, ideally, their effect on inflation performance should be evaluated. The problem is that these changes only affect macroeconomic performance with what can be a substantial delay. Intuitively, some of the possible changes -for instance, the prohibition of monetary financing- may have an immediate impact on the behaviour of economic agents and authorities, whereas others -for example, setting a clear objective of price stability- may take longer becoming incorporated into agents' expectations.

A very interesting example of legislative changes currently taking place is the adaptation of EU countries to the requirements of the Maastricht Treaty. As is widely known, the Monetary Union requires, according to the Treaty, an independent European System of Central Banks, each of whose components -national central banks- should be independent before the irrevocable locking of parities (in the Maastricht jargon, the start of Stage Three). Furthermore, as the Treaty rules out any monetary or privileged financing to the public sector, it includes a provision (articles 104 and 104 a) whereby central bank credit to the government or any other financing off-market shall be prohibited at the beginning of Stage Two (January 1st, 1994). Therefore, this prohibition has affected all EU countries since that date.

As a case study of the effect of institutional changes on central bank autonomy, it is interesting to evaluate the impact of these articles of the Maastricht Treaty on the legal independence of this group of central banks. Table 6 shows the changes in the legal independence index of these countries, as defined in C (92), after the entry into force of these prohibitions. Note that the table does not consider the recent reforms of the central banks in countries such as France (1993) and Spain (1994), which granted them a high degree of independence, but only the automatic effect of the prohibition of central bank credit to the government in all EU countries. The results of this Table show a substantial increase in the absolute and relative level of independence of EU central banks after the entry into force of this provision of the Maastricht Treaty¹³. The average value of the legal independence index of these 14 countries increased twofold, from 0.37 to 0.77 (the maximum theoretical value is 1.00). As can be seen in Chart 1, the EU central banks included in Table 4, which were more or less evenly distributed in the spectrum from more independent to less independent central banks before the "Maastricht effect", tend to concentrate among the most independent banks after this effect is considered. From the top 10 on the right-hand side of Chart 1, only Switzerland does not belong to the EU, and it is ranked 9th.

These radical changes are partly a consequence of the sizable weight attributed to the monetary financing aspects of the legal independence index developed by Cukierman (1992), which represents 62.5% of the unweighted index and 50% of the weighted index. With a lower weight for these aspects, the "upgrading" of the EU countries since January 1994 would have been less impressive.

The effect analysed above is only an initial one due to the ban on monetary financing. The full effect of the Maastricht Treaty in this

¹³ The trend towards greater central bank independence is not confined to the European area. Outstanding examples of recent central bank reforms are New Zealand, Chile and Argentina. Nevertheless, the indices of independence referred to in this article only cover the period until 1990. For the purpose of this section it is assumed that the legislation of non-EU central banks has not been changed. For an analysis of recent central banks' reforms in a broader geographical context see Lastra (1995).

respect will imply a substantial additional increase in these legal independence indices, as the statutes are progressively reformed according to Treaty requirements. This process has recently begun with the new Laws approved in France in 1993 and Spain in 1994. As an example, Table 7 presents the results of the legal independence index of C (92) with the new Law of Autonomy of the Banco de España. From a value of 0.21 in the 1980's, this Bank's autonomy rose to 0.75 after the prohibition of monetary financing (see Table 6) and to 0.94 after the full reform of the statutes, close to the theoretical maximum¹⁴.

Another interesting particularity of the Maastricht framework is the supranational dimension of its approach to central bank autonomy. In the case of these countries, this autonomy is enforced by an international agreement, which can only be reformed with the unanimity of the member states. This fact confers upon the legislation on central bank autonomy a stability that probably exceeds the requirement of a constitutional reform in some other countries, because the abolition of central bank autonomy cannot be done at a national level, and requires the consent of the remaining members of the Union (unless a country is prepared to opt-out of the European Union). By making the reform of the statutes of central banks more costly, this approach probably strengthens the commitment to central bank autonomy and enhances its effects.

7. Conclusions

1- The elaboration of indices or classifications of central bank autonomy is a difficult task. The very concept of independence is elusive and subject to a number of nuances. International comparison requires the standardisation, interpretation and measurement of complex and distant legal and institutional situations. Furthermore, these situations evolve overtime, due to changes in the legislation affecting central banks. For this reason, the choice of the period of analysis may critically affect the results.

¹⁴ According to own estimates, legal independence following the new statutes would be slightly above that of Germany in the case of Spain and slightly below in the case of France [using the methodology of Cukierman].

2- A particularly important question is the difference between theoretical and practical independence. The latter may be more relevant than the former, but at the same time is even more difficult to define objectively, which is an important drawback from the standpoint of international comparisons.

3- The comparison between the indices of central bank autonomy and the aspects potentially affecting this independence shows -not surprisingly, given the above-mentioned difficulties- that in general they only consider a relatively small part of the features potentially affecting central bank autonomy. A very rudimentary "coverage index" is developed and applied to the different classifications, showing that only between 5% and 25% of the aspects identified as affecting independence are considered.

4- Some classifications are re-elaborations of earlier ones. In order to assess the consistency of the results, the relevant comparison to be made is between classifications using different methodologies. This shows that the results -in terms of the rating of the countries- do not differ substantially among the "original" classifications, which can be interpreted as evidence of the relative reliability of the "traditional wisdom" on central banks' rankings by independence, despite the numerous problems referred to above.

5- A particularly delicate problem is to find a trade-off between, on the one hand, analysing a period that is long enough to permit the effect of central bank autonomy on inflation to stabilise, and, on the other hand, an adequate updating of the independence indices to legislative changes. A major and recent reform -the prohibition of monetary financing of the Maastricht Treaty- implied a radical change in the classification of central banks by autonomy, with a substantial upgrading of EU countries. Only time will tell whether a similar change in relative inflation performance will follow, whether other countries will implement similar reforms -a process which seems to be already starting- or whether the apparent relationship between central bank independence and inflation will fade away.

TABLE 1 GENERAL CHARACTERISTICS OF THE MAIN CENTRAL BANK INDEPENDENCE INDICES											
	Bade and Parkin BP (88)	Alesina A (89)	Grilli, Masciandro and Tobellini GME (91)		Cepic and Wood CW (91)	de Haan and Stura HS (92)	Cukierman C (92)			Kijffinger and Schaling KS (93)	Alesina and Sumera AS (93)
			Political	Economic			Legal	Turnover	Questionnaire		
1.- Number of countries (1)	12	17	18	18	13	18	22	19	10		16
2. Period	1972-86	1972-86	1950-89	1950-89	1971-1985	1959-89	1950-89*	1950-89	1980-89	1950-89	?
3.- Coverage Index (2)	9%	11%	18%	9%	4.5%	23%	23%	2%	25%	9%	10%
4. Classification system (interval)	Discret (1-4)	Discret (1-4)	Discret (0-8)	Discret (0-7)	Binary (0-1)	Discret (0-14)	Continuous (0.00-1.00)	Continuous (0-1)	Continuous (0.00- 1.00)	Discret (1-5)	Discret (1-6)

(1) Only within area of industrial countries (OECD).

(2) See Table 3 for calculation.

* Divided into four sub-periods: 1950-59, 1960-71, 1972-79 y 1980-89.

Source: Own calculations.

TABLE 2
RELEVANT ASPECTS OF CENTRAL BANK INDEPENDENCE

1	Formal dependence of the central bank.
2	Formal assignment of responsibility to develop monetary policy.
3	Formal assignment of responsibility to implement monetary policy.
4	Provisions for resolution of conflicts.
5	Statutory objectives.
6	Democratic accountability and supervision of monetary policy.
7	Mechanisms for reform of legislation governing the central bank.
8	Composition of governing bodies.
9	Election of top officials.
10	Mandate of top officials.
11	Renewal of mandates
12	Dismissal of top officials.
13	Limits on government financing.
14	Budgetary independence
15	Distribution of profits.
16	Banking supervision.
17	Exchange-rate policy.
18	Other functions
19	Transparency (including publication of discussions and deliberations of governing bodies).
20	Central bank ownership.
21	Limits on the use of monetary policy instruments.
22	Independence in preparing and publishing reports and public statements on economic policy questions.

TABLE 3
COVERAGES OF THE CENTRAL BANK INDEPENDENCE INDICES

Aspects of central bank independence (1)	P(88)	A(89)	G. M. T. (91)		C. W. (91)	H. S. (92)	C. (92)			E. S. (93)	A. S. (93)
			P	E			L	T	Q		
1)											
1											
2	T	T	T		T	T	T		P	T	T
3				P		P					
4			T			T	T		T		T
5			P			P	T		P		P
6											
7											
11)	P	P	P			P				P	P
8											
9	P	P	P			P	P			P	P
10			P			P	P	P	P		P
11											
12							P				
111)		P		P		P	P		P		
13											
14									T		
15									T		
1v)				P							
16											
17											
18											
v)											
19											
20											
21				P					P		
22											
Coverage (%) (2)	2.00 (9%)	2.50 (11%)	4.00 (18%)	2.0 (9%)	1.0 (4.5%)	5.0 (23%)	5.0 (23%)	0.5 (2%)	5.5 (25%)	2.0 (9%)	4.0 (18%)

P = partial

T = total

(1) See Table 2 for an explanation of each concept.

(2) Calculated over a total of 22 possible points, assigning 0.5 points to each "P" letter and 1 point to each "T" letter.

TABLE 4
CLASSIFICATION OF INDUSTRIALIZED COUNTRIES ACCORDING TO CENTRAL BANK INDEPENDENCE IN DIFFERENT STUDIES

	BE(68) (**)	A(69)	GM(91)		CW(91)	ES(92)	C (92)			AS(93)	Sample average	Ranking by simple average	Coefficient of variation	Range (eliminating outliers)
			P(**)	R(**)			L(**)	T(**)	Q(**)					
Germany	1.5	1.5	1.5	2.5	1.5	1	2	5	1	1.5	1.9	1	0.40	1.5
Australia	12	14	7.5	5.5		5.5	7.5		3	11.5	8.5	9	0.42	11
Belgium	8	8	12	5.5		10.5	14	8	8	5	8.9	13	0.31	8.5
Canada	8	8	5.5	2.5	6	5.5	5	5		11.5	6.3	6	0.39	5.5
Denmark		8	7.5	8.5		7.5	4	1.5	5		5.9	5	0.40	4.5
Spain		14	9.5	12.5	6	13	13	13.5			11.9	14	0.23	4.5
United States	3.5	3.5	3.5	2.5	1.5	2	3	8		5	3.6	3	0.52	3.5
France	8	8	9.5	8.5	6	10.5	9	11	6	8.5	8.6	10	0.19	5
Netherlands	8	8	1.5	11		3.5	6	1.5		3	5.3	4	0.61	9.5
Italy	8	12	5.5	14		10.5	12	3	2	8.5	8.9	11	0.48	12
Japan	3.5	3.5	12	8.5	6	10.5	15	13.5		5	8.3	8	0.51	11.5
New Zealand		14	14	12.5	6	14	10.5	11			12.1	15	0.24	3.5
Sweden	8	8			6		10.5	11		8.5	8.9	12	0.45	5
Switzerland	1.5	1.5	3.5	2.5		3.5	1	8		1.5	2.7	2	0.60	2.5
United Kingdom	8	8	12	8.5	6	7.5	7.5	5	7	8.5	8.0	7	0.23	7

(*) Own estimate.

(**) Classifications considered among the "original" six.

Source: Own calculations.

TABLE 5 GEOGRAPHICAL COVERAGE OF THE DIFFERENT STUDIES											
	BP(88)	A(89)	GMC(91)		CH(91)	HS(92)	C(92)		RS(93)	Ad(93)	Totals (1)
			Political	Economic			Legal	Turnover			
Germany	*	*	*	*	*	*	*	*	*	*	12
Australia	*	*	*	*	*	*	*	*	*	*	10
Austria			*	*	*	*	*	*	*	*	6
Belgium	*	*	*	*	*	*	*	*	*	*	11
Canada	*	*	*	*	*	*	*	*	*	*	11
Denmark	*	*	*	*	*	*	*	*	*	*	8
Spain	*	*	*	*	*	*	*	*	*	*	10
United States	*	*	*	*	*	*	*	*	*	*	11
Finland	*	*	*	*	*	*	*	*	*	*	5
France	*	*	*	*	*	*	*	*	*	*	12
Greece			*	*	*	*	*	*	*	*	4
Netherlands	*	*	*	*	*	*	*	*	*	*	10
Ireland			*	*	*	*	*	*	*	*	6
Italy	*	*	*	*	*	*	*	*	*	*	11
Iceland			*	*	*	*	*	*	*	*	2
Japan	*	*	*	*	*	*	*	*	*	*	11
Luxembourg			*	*	*	*	*	*	*	*	3
Norway			*	*	*	*	*	*	*	*	5
New Zealand	*	*	*	*	*	*	*	*	*	*	8
Portugal			*	*	*	*	*	*	*	*	3
Sweden	*	*	*	*	*	*	*	*	*	*	8
Switzerland	*	*	*	*	*	*	*	*	*	*	10
United Kingdom	*	*	*	*	*	*	*	*	*	*	12

(1) Number of studies in which each country is included.

Table 6

CUKIERMAN'S LEGAL INDEPENDENCE INDEX: THE EFFECT OF CONSIDERING THE PROHIBITION OF MONETARY FINANCING IN EU COUNTRIES, AFTER THE MAASTRICHT TREATY				
	Legal independence in the 1980s	Position in the ranking of 15 countries (1)	Legal independence after Maastricht (2)	New Position in the ranking (3)
Germany	0.66	2	0.91	1
Austria	0.58	-	0.84	-
Greece	0.51	-	0.83	-
Denmark	0.47	4	0.77	3
Netherlands	0.42	6	0.81	2
Ireland	0.39	-	0.82	-
Luxembourg	0.37	-	0.77	-
United Kingdom	0.31	7(*)	0.72	7
France	0.28	9	0.73	5(*)
Sweden	0.27	10(*)	0.70	8
Finland	0.27	-	0.76	-
Italy	0.22	12	0.73	5(*)
Spain	0.21	13	0.75	4
Belgium	0.19	14	0.67	10
Average of countries listed above	0,37		0,77	

(*) Ex-aequo

(1) See table 4 for the ranking of the 15 countries considered.

(2) Own calculation, following Cukierman (1992). Items 9 to 16 of the legal independence index of this study take a value of 1.0 after Maastricht. The answer to some of this questions is ambiguous, because they concern the terms of the financing and, after Maastricht, the financing itself is prohibited (this applies in particular to questions 11 and 12; see table 7). It was decided to assign this countries the qualification coherent with maximum independence.

(3) Only the effect of the prohibition of monetary financing on EU countries has been considered. Other recent changes in legislation in non-EU countries have not been taken into account.

TABLE 7
CUKIERMAN'S LEGAL INDEPENDENCE INDEX: ESTIMATE OF THE
EFFECTS OF THE NEW STATUTE ON THE INDEX FOR SPAIN

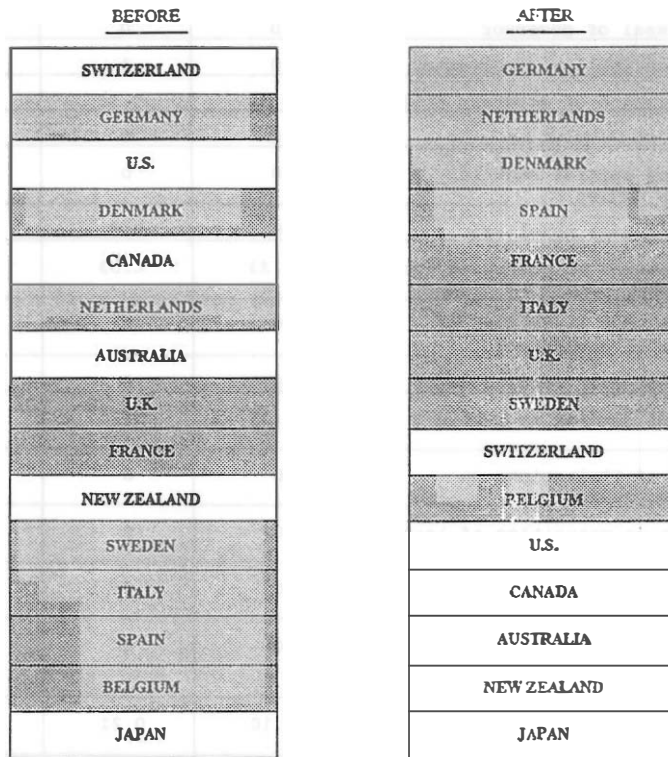
Characteristics	Spain		
	To 1980	1980-89	1994 Statute(*)
1. Governor's mandate	0	0.25	0.75
2. Election of governor	0.25	0	0
3. Dismissal of governor	0	0	0.83
4. Incompatibility of governor	0	1	1
5. Formulation of monetary policy	0.33	0.33	1
6. Conflict resolution	0	0	1
7. Role of central bank in Government budget	0	0	0
8. Central bank objectives	0	0.6	1
9. Limitations on borrowing from central bank	0.33	0.33	1
10. Limitations on lending of securities to government	0	0	1
11. Decision over lending terms	0	0	1
12. Size of lending to public sector	0.33	0.33	1
13. Types of limitations on Treasury borrowing	0	0	1
14. Limits on maturities of loans to Treasury	0	0	1
15. Interest rate on loans to Treasury	0	0	1
16. Limits on purchase of debt by central bank in primary market	0	0	1
TOTAL (**)	0.10	0.21	0.94



(*) Own calculations.

(**) The total is calculated as a simple average of 8 items:

- 1 = Simple average of items 1 to 4
- 2 = Simple average of items 5 to 7
- 3 = Item 8
- 4 = Item 9
- 5 = Item 10
- 6 = Item 11
- 7 = Item 12
- 8 = Simple average of items 13 to 16

**RANKING OF COUNTRIES BY
CENTRAL BANK INDEPENDENCE**
(Before and after the monetary financing
prohibition of the Maastricht Treaty)*



 EU
 non-EU

(*) The comparison only takes into account the prohibition of monetary financing, but not other measures or legislation to increase central bank independence. According to own estimates, if the new statutes of the central banks of Spain and France are considered, their ranking will increase to 1st. and 3rd., respectively.

Sources:
 Before: Cukierman (1992).
 After: own estimates based on Cukierman's methodology.

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