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Rapport final

CENTRAL BANK INDEPENDENCE DURING THE INTERWAR PERIOD AND ITS EFFECTS ON INFLATION AND GROWTH

*Eric Dehay et Nathalie Lévy*¹

Abstract: This article recalls the central banks independence experience during the interwar period. As in Cukierman, Webb et Neyapti (1992), we built a legal index and measured the governors' turnover rate for eighteen central banks. We then tested the relation between these two indexes and the inflation or growth performances. Some results differ from those usually obtained for more recent periods. There is a significant inverse relation between independence and inflation performances only for the sub-period 1929-1938. An inverse relation between independence and growth performances is also observed for the sub-period 1923-1932, when independence level was at its highest.

JEL classification: E58 – N40

1. Introduction

The link between central bank independence and macroeconomic results has been the subject of various empirical analyses in the past ten years. Grilli, Masciandaro and Tabellini (1991), Cukierman (1992) and Eijffinger and Schaling (1993), for example, established indexes allowing the comparison between the degree of independence of central banks in different countries. These indexes were used for the econometric testing of a possible relation between independence and macroeconomic performances². The results are well established. On the one hand, the existence of an inverse relation between independence and inflation level or variability seems to be proved for the 1970-90 period (Cukierman, Webb and Neyapti 1992, De Haan and Sturm 1992 or Alesina and Summers 1993), whereas the relationship is not so clear for the fifties and sixties (Grilli, Masciandaro and Tabellini 1991, Walsh 1997). On the other hand, the absence of significant links between independence and

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economical growth is generally proved (Cukierman, Kalaitzidakis, Summers and Webb 1993, Akhand 1998, De Haan and Kooi 1999).

One of the characteristics common to these studies is indeed the period under consideration. They usually apply to the seventies, eighties or nineties or, at best, the fifties and sixties. And yet, referring to this only period contrasts with the history of central bank independence. The recognition of this type of status was quite an important feature in the financial reconstruction after the First World War and the period of high inflation. Many central bank laws of the early twenties contain an explicit clause of independence. These quite numerous experiences of autonomy are close to (and sometimes further than) the ones we experience nowadays. Thus, the interwar period provides a frame which suits well to the analysis of central bank independence and its impact on macroeconomic variables.

As far as we know, only two empirical studies concerned this period. The first one by Capie, Forrest, Mills and Wood (1994) tested the long-term relation between independence and inflation, from 1870 to 1985. Yet it adopted a different method from that of the studies quoted above. The measure of the independence degree, based on a qualitative index (allowing to classify banks into only three categories - dependent, independent, non defined), makes their results difficult to compare with others. The second empirical study, by Simmons (1996) concerns central bank independence between 1925 and 1938. It does not, however, test the relations between inflation or growth and independence, but aims at clarifying the relation between independence and the lack of monetary policies co-ordination with an international background marked by the end of the gold standard.

² See Eijffinger and De Haan (1996) and Berger, De Haan and Eijffinger (2000) for an exhaustive survey on central banks independence.

Unlike these two studies, we intend to identify the possible existence of a relation between independence and inflation or economical growth during the interwar period and we proceed according to the method used in the numerous works concerning later periods and particularly in Cukierman, Webb and Neyapti (1992). First, we recall the historical context and some characteristics of this experience of independence. Then we build two indexes allowing to rank eighteen central banks according to their degree of independence. One measures legal bank independence and its building is based on the analysis of status. The second one is an actual measure of independence based on the turnover of central bank managers. In the second part, we test the relation between these indexes and the performances concerning inflation or economical growth for the whole period (1918-38) and for three sub-periods (1918-1928, 1923-1932 and 1929-1938).

2. Measuring central bank independence during the interwar period

2.1. Central bank independence experience from 1918 to 1938

The pre and world war general trend consisted in strengthening State control upon banks of issue ³. But war and its inflationary consequences led to reorganize monetary systems. This moment is of peculiar interest in the history of central bank independence. First, it can be argued that the importance of independence was internationally recognized for the first time (Fujiki 2001). As early as 1920, the Brussels conference raised the question of the link between the monetary stability and the organization of the central bank. Resolution three of the conference asserted that “Banks and especially a Bank of Issue should be freed from political pressure”. The increase in the degree of central bank autonomy became at that stage one of the common elements to the patterns of financial

reconstruction of many countries placed under the supervision of the League of Nations or of international experts (Bulgaria, Germany or Chile for example). Secondly, probably once again for the first time, in some countries, independence is explicitly stressed in the new central bank status. In Germany, for example, the first clause of the 1924 law specifies that “the Reichsbank is independent from the Reich government”. One can also quote the case of the Chilean central bank, whose 1925 status clearly shows that “the government has to respect the bank board opinion in regards with the issue of notes” (clause 88d).

In fact, this feature of independence appears to be quite similar to the one which characterizes central banks nowadays. The analysis that was done of it as early as the thirties is very close to the contemporary studies. Kish and Elkin (1928) for example listed a number of criteria to differentiate between dependent and independent central banks ⁴. The first concerns the influence of government on the procedures of appointment. It stresses for example the independence of the Reichsbank since 1924 when the President was designated by a council half part composed with foreign members (clause 14, 1924 law). The second criteria concerns the scope granted to the bank in the formulation and implementation of monetary policy. It shows for example how dependent the Japanese central bank was as the bank decisions had to be submitted to the government approval before they came into effect (clause 24, 1882 law). The third criteria concerns the capacity and conditions for the government to finance its own expenditures with central bank credits. It stresses for example the independence of the Austrian central bank since no credit operation was allowed to the government between 1922 and 1927 (clause 50, 1922 status). These criteria are now fully part of the three domains generally mentioned in contemporary studies to define the field

³ See Flandreau, Le Cacheux and Zumer (1998) for an analysis of the feature of independence before 1914.

⁴ See also Ulrich (1931) for the same kind of analysis.

covering the concept of independence (see for example Eijffinger and De Haan 1996), *ie* bank managers' independence, political independence and financial independence.

These elements underline the importance of the study of the interwar period to the knowing about central bank independence and about its impact on macroeconomic variables. They seem to show that the use of the method of studies covering more recent period is possible and can be useful to this knowing.

2.2. The index of legal independence and the turnover of central bank governors

A more accurate analysis of central bank independence during the interwar requires to measure it. We proceed according to the method used by Cukierman, Webb and Neyapti (1992). Nineteen characteristics of the status of central banks are taken into account to build an index of legal independence (see appendix 1). Each characteristic is coded on a scale ranging from 0 to 1 (0 is the lowest and 1 the highest level of independence). As far as bank managers' independence is concerned, the central banks in which the legal term of office of the governor or of the board's members is the longest and for which the government has little authority in appointing or dismissing the managers, are classified as the most independent. As far as political independence is concerned, a central bank is considered all the more independent as the term of its privilege of emission is long, the conditions of the extension of the emission beyond the cover are restricted, its target of price stability is major, its autonomy in the formulation of monetary policy and its ability to resist in the case of conflict with the government are strong. As far as financial independence is concerned, the more restricted the loan conditions to the public sector, the higher the independence of the bank. The limitation of loans that are considered concern the amount, the maturity as well as

the interest rate.

The aggregation of the codes of the 19 characteristics leads to a measure of the legal independence of each central banks. The seven characteristics concerning the bank managers' independence are aggregated by computing a simple arithmetical mean. The five characteristics concerning political independence are aggregated by computing a weighted mean aiming at increasing both the weight of the conditions of extension of monetary emission and the weight of conflict resolution. This choice can be justified by the higher degree of precision that is conferred to both characteristics by the central banks' charters. Concerning the objectives of monetary policy and its formulation, the laws are rather vague, which inevitably generates a less uniform and more subjective interpretation of the degree of independence conferred to the banks ⁵. For the financial independence, a higher weight is assigned to the limitation of the amount of loans concerning non securitized credit, whereas maturity and interest are prevailing as far as securitized credit is concerned. A weighted mean of both credits is established with a higher weight for the former. The last stage to build an aggregated index measuring legal independence consists in computing a simple arithmetical mean of the three indexes calculated before.

Next to a measure based on central bank status, we develop an index taking into account actual independence. Factors such as tradition or the personality of the governor may indeed, at least partially, alter the legal level of central bank independence. Kindleberger (1990) explains for instance how Montagu Norman broke away with tradition (only one term of office) by being regularly reelected governor of the bank of England. Building an index taking into account this kind of elements is of course quite difficult. Once

again, we follow Cukierman, Webb and Neyapti (1992) and use the turnover of central bank governors as a proxy of actual independence. This index is established by calculating the ratio between the number of presidents or governors in office and the number of years considered. In spite of its drawbacks, the presumption is that a rapid turnover can indicate a pressure on the central banker resulting in dependence.

2.3. Results of independence indexes

Figure 1 shows the results of the independence indexes for eighteen countries ⁶ (see the appendix 2 for a detailed presentation). When we look at the legal index, the least independent central banks are to be found in France and Japan. In contrast, the highest degrees of autonomy concern Austria and Switzerland. Spain and again France and Japan have a very high turnover of governors with an average of about two years' term of office. England, Norway, the Netherlands and Sweden record the lowest turnover rates with an average change of governor every 8 years.

Two remarks can be made about these two indexes of independence. The first one concerns the average turnover rate for the sub-periods 1918-1928 and 1929-1938, which is respectively of 0,26 and 0,27 a year. These results are quite similar to those calculated by for the same countries for the period 1950-89 from Cukierman, Webb and Neyapti (1992) data. The second remark concerns the particular position of Spain and England. The Spanish bank appears to have a rather high degree of legal independence but the turnover of governors is very high too. In England, it is the opposite: the difference between the two indexes can find

⁵ Status dating from the beginning of the century can be difficult to codify because they were sometime not precise enough about the instruments and objectives of the monetary policy. So, our work is fully concern by criticisms who deal with the fact that building such an index is partly based on subjective interpretations.

an explanation in the fact that the independence comes more from a customary right than from a written right. The banking law ruling the banking activity between 1918 and 1938 is very old (Bank Acts of 1694 and 1844) and often includes too vague information to be easily coded. That is why its actual degree of independence is more a result of practice than law. More generally, the differences as to the ranking of the degree of central bank autonomy confirm the importance of using at the same time both independence indexes.

Figure 1 : Legal independence indexes and turnover rate of governors (1918-38)

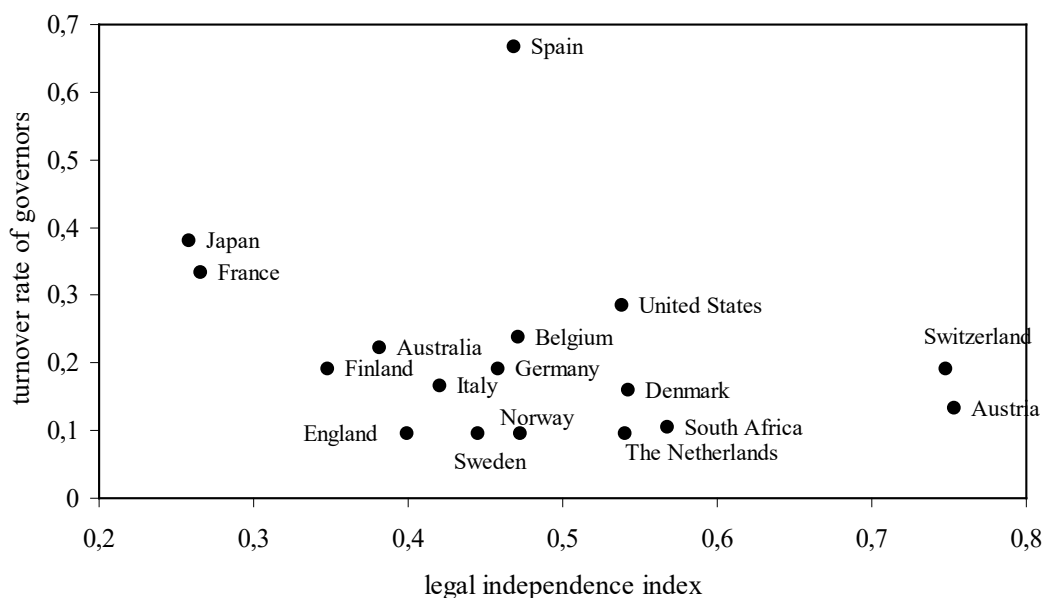


Figure 2 : Average of the 18 legal independence indexes between 1918 and 1938

6 Cargill (1995) shows the statistical relation between independence and inflation is subject to variation depending on the number of countries included in the sample. This is another limit to our work as finding available information about many central bank laws in force between 1918 and 1938 is rather difficult.

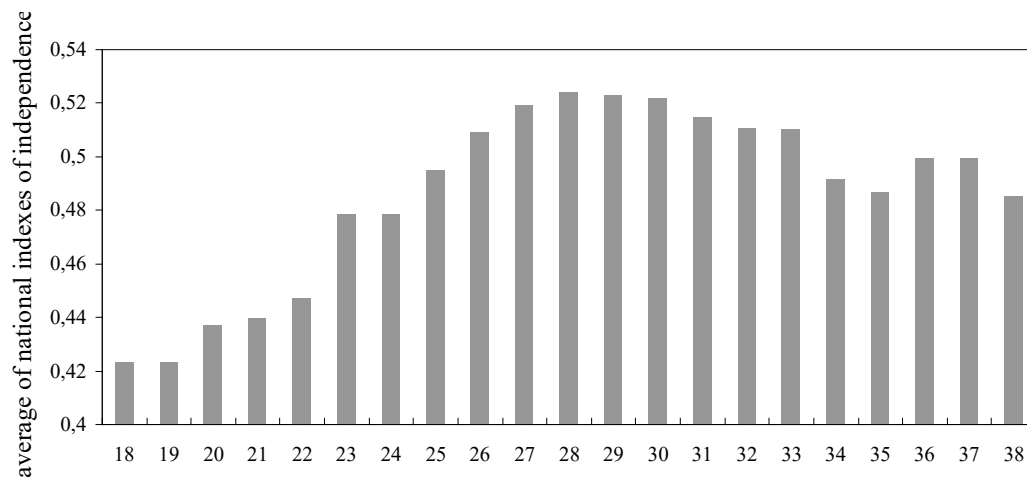


Figure 2 shows the evolution of the average of the 18 national legal independence indexes. It confirms a trend to more independence between 1918 and 1928 with an acceleration from 1923 to 1928. After that date, the average of the indexes remains higher than in 1922 in spite of a return to less independence.

3. Empirical evidence of the consequences of independence

In this section, we investigate the empirical relationship between independence and inflation or growth performances during the interwar years. Most of the studies on the subject for the period 1970-90 support the hypothesis of better inflation performances without effect on growth for countries with an independent central bank. This proposition is tested for the whole interwar period and for three sub-periods. First, when we look at stylized facts, the interwar years can be divided into two sub-periods with 1929 as a breaking point ⁷. 1918-28 is a sub-period of inflation and then of stabilization whereas 1929-38 is a sub-period of depression and then of recovery in some countries. We also consider the 1923-32 sub-period as it represents the decade of the higher degree of legal independence during interwar (see figure 2).

We use cross sectional regression analysis (OLS method) with the two indexes of central bank independence (legal independence index or turnover rate) as explanatory variables of average or standard deviation of inflation or growth. Whenever the central bank law changed in a country in the course of a period, we consider the index corresponding to the law that was in force during the longest period, provided that it is longer or equal to half of the decade. If it is not, we consider the weighted average of the indexes corresponding to the different laws that were in force during the decade. To calculate averages or standard deviations of annual inflation and growth rates, we use consumer prices and gross or net national product indexes proposed by Mitchell (1992a, 1992b, 1995). A country is taken into account only if the data are available for more than half of the period. As commitment to an exchange rate mechanism can reduce the ability to conduct an autonomous domestic monetary policy, a dummy variable is added into the regressions in order to make a distinction among countries depending on whether or not they were on gold for at least half of a period ⁸.

3.1. *Independence and inflation*

We first check whether, for the interwar years, an inverse relationship between independence and inflation performances can be found. The expected signs are negative for the relation between legal independence index and inflation performances, positive for the relation between turnover rate and inflation performances. Table 1 presents the regressions of the following equations for the whole period and the three sub-periods:

⁷ See, for example, Kindleberger (1984).

⁸ See Eichengreen (1992) for a list of nations on gold between 1919 and 1937.

$$\text{inflation rate average} = a_0 + a_1 \cdot \text{legal independence index} + a_2 \cdot \text{dummy} + \varepsilon \quad (\text{I}),$$

$$\text{inflation rate average} = a_0 + a_1 \cdot \text{turnover rate} + a_2 \cdot \text{dummy} + \varepsilon \quad (\text{II}),$$

$$\text{inflation rate standard deviation} = a_0 + a_1 \cdot \text{legal independence index} + a_2 \cdot \text{dummy} + \varepsilon \quad (\text{III}),$$

$$\text{inflation rate standard deviation} = a_0 + a_1 \cdot \text{turnover rate} + a_2 \cdot \text{dummy} + \varepsilon \quad (\text{IV}).$$

*Table 1: Independence and inflation*⁹

Dependent variables	Explanatory Variables	1918-28	1923-32	1929-38	1918-38
Inflation level	Constant	10.61 (1.72)	0.68 (0.22)	2.07 (1.83)*	0.07 (2.04)*
	Legal independence index	- 11.5 (- 0.9)	- 6.94 (- 1.21)	- 5.90 (- 2.65)**	- 0.10 (- 1.48)
	Dummy	- 2.99 (- 0.6)	2.0 (1.03)	0.54 (0.83)	0.01 (0.60)
	Adjusted R ²	- 0.06	0.02	0.24	0.01
	Number of observations	15	17	18	16
	<hr/>				
Inflation variability	Constant	3.83 (0.77)	- 8.03 (- 2.19)**	- 0.85 (- 1.48)	0.01 (0.73)
	Turnover rate	3.34 (0.21)	15.32 (1.65)	2.02 (1.28)	0.03 (0.50)
	Dummy	- 2.33 (- 0.41)	3.86 (1.61)	- 0.09 (- 0.13)	0.001 (0.07)
	Adjusted R ²	- 0.17	0.12	- 0.02	- 0.15
	Number of observations	13	15	16	14
	<hr/>				
Inflation variability	Constant	0.18 (1.79)*	0.09 (2.17)**	0.1 (4.08)***	0.16 (2.16)*
	Legal independence index	- 0.08 (- 0.39)	- 0.06 (- 0.79)	- 0.11 (- 2.37)**	- 0.09 (- 0.55)
	Dummy	- 0.03 (- 0.35)	- 0.003 (- 0.14)	0.03 (2.39)**	- 0.02 (- 0.5)
	Adjusted R ²	- 0.14	- 0.1	0.33	- 0.08
	Number of observations	15	16	18	16
	<hr/>				
Inflation variability	Constant	0.14 (1.63)	0.07 (0.8)	0.04 (2.58)**	0.13 (3.23)***
	Turnover rate	- 0.001 (- 0.002)	- 0.06 (- 0.25)	0.01 (0.24)	- 0.06 (- 0.41)
	Dummy	- 0.022 (- 0.23)	0.02 (0.37)	0.031 (1.75)	- 0.02 (- 0.55)
	<hr/>				

⁹ Tables 1 and 2 indicate the t-statistics in parentheses under estimated coefficients. One asterisk indicates that the coefficient is significantly different from zero at a 90 % confidence level, two asterisks at a 95 % confidence level and three asterisks at a 99 % confidence level.

Adjusted R ²	- 0.19	- 0.14	0.07	- 0.13
Number of observations	13	15	16	14

Table 2: Output growth and independence

Dependent variables	Explanatory Variables	1918-28	1923-32	1929-38	1918-38
Growth level	Constant	0.03 (1.57)	0.04 (4.32)***	0.03 (1.53)	0.04 (2.88)**
	Legal independence index	0.01 (0.35)	- 0.04 (- 2.3)**	- 0.0005 (- 0.01)	- 0.01 (- 0.38)
	Dummy	0.01 (0.58)	- 0.01 (- 1.26)	- 0.01 (- 0.83)	- 0.008 (- 0.97)
	Adjusted R ²	- 0.12	0.26	- 0.09	- 0.07
	Number of observations	13	16	17	16
	Constant	0.04 (2.95)**	0.04 (2.5)**	0.03 (2.98)**	0.03 (5.46)***
	Turnover rate	- 0.02 (- 0.56)	- 0.03 (- 0.77)	- 0.02 (- 0.6)	- 0.01 (- 0.52)
	Dummy	0.01 (0.58)	- 0.01 (- 1.48)	- 0.007 (- 0.56)	- 0.005 (- 0.65)
	Adjusted R ²	- 0.09	0.02	- 0.1	- 0.11
	Number of observations	12	14	15	14
Growth variability	Constant	0.06 (2.89)**	0.02 (1.65)	- 0.08 (- 1.12)	0.05 (2.52)**
	Legal independence index	0.02 (0.59)	0.05 (1.78)*	0.28 (2.01)*	0.03 (0.73)
	Dummy	- 0.02 (- 1.28)	0.01 (0.82)	0.07 (1.6)	0.01 (1.17)
	Adjusted R ²	- 0.03	0.12	0.24	- 0.01
	Number of observations	13	16	17	16
	Constant	0.07 (5.44)***	0.03 (1.8)*	0.06 (1.43)	0.06 (7.9)***
	Turnover rate	- 0.02 (- 0.61)	0.02 (0.38)	- 0.06 (- 0.46)	- 0.02 (- 0.7)
	Dummy	- 0.01 (- 1.12)	0.01 (1.19)	0.08 (1.56)	0.02 (1.79)
	Adjusted R ²	- 0.07	- 0.05	0.04	0.1
	Number of observations	12	14	15	14

When the dependent variable is inflation level, the coefficients associated with legal independence index or turnover rate have the expected sign for the whole period and the three sub-periods. However the coefficient associated with the legal index for the last sub-period is the only one to be statistically significant. Similar results are obtained when the dependent variable is inflation variability. Coefficients associated with legal index have the expected sign for the whole period and the three sub-periods. Those associated with turnover rate have the expected sign only for the last sub-period. Here again however no coefficient is statistically significant except the one associated with the legal index for the last sub-period. To sum it up, central bank independence can have helped to improve inflation performances between 1929 and 1938 but not during the whole interwar years.

The comparison between these results and those of studies covering more recent periods suggests three remarks.

- The lack of a significant relation between legal independence and inflation performances for the sub-periods 1918-28 and 1923-32 makes our results close to those of Grilli, Masciandaro and Tabellini (1991) or De Haan and Sturm (1992) for the 1950s or 1960s but different from those usually obtained for the 1970s, 1980s or 1990s.
- This lack of a significant relation makes our results close to those of Eijffinger and Van Keulen (1995). They find no clear association between inflation and legal independence for a sample of countries which introduced new central bank laws at the beginning of the 1980s thus carrying on the transformation process from a dependent central bank regime into a less dependent one. As noted before, the first laws with explicit independence for central banks came into force between 1918 and 1928.
- The lack of a significant relation between turnover of governors and inflation level or variability makes our results close to those of Cukierman, Webb and Neyapti (1992) for

industrial countries between 1959 and 1989 but different from those obtained in the same study for developing countries. As indicated above, our sample turnover rates average for 1918-38 is close to that calculated for the same countries from Cukierman, Webb and Neyapti 's (1992) data.

3.2. *Independence and output growth*

We now turn to the relationship between central bank independence and growth. The question is to know whether independence had negative consequences on growth during the interwar period. Table 2 presents regressions of the following equations for the whole period and the three sub-periods:

$$\text{growth rate average} = a_0 + a_1 \cdot \text{legal independence index} + a_2 \cdot \text{dummy} + \varepsilon \quad (\text{V}),$$

$$\text{growth rate average} = a_0 + a_1 \cdot \text{turnover rate} + a_2 \cdot \text{dummy} + \varepsilon \quad (\text{VI}),$$

$$\text{growth rate standard deviation} = a_0 + a_1 \cdot \text{legal independence index} + a_2 \cdot \text{dummy} + \varepsilon \quad (\text{VII}),$$

$$\text{growth rate standard deviation} = a_0 + a_1 \cdot \text{turnover rate} + a_2 \cdot \text{dummy} + \varepsilon \quad (\text{VIII}).$$

For the whole period and whatever the dependent variable, the coefficients associated with legal index or turnover rate are not statistically significant. Neither are nine of the twelve estimated coefficients for the three sub-periods. So, as a whole, these results agree with those obtained in most of the empirical studies covering more recent periods. It seems to confirm that central bank independence has no effect on economic growth (see, for example, De Haan and Sturm 1992). Estimations of equation V for the second sub-period and of equation VII for the second and third sub-periods can however be seen as rather important exceptions. Coefficients associated with legal index are statistically significant for

the sub-period 1923-32 and indicate that independence is negatively associated with growth level and positively with growth variability. This last relation also appears for the sub-period 1929-38. This relation, added to the fact that independence was precisely at the top between 1923 and 1932, leads us to put forward the hypothesis that it had costs in terms of economic growth. In brief, as independence was precisely at the top between 1923 and 1932, the hypothesis that it had costs in terms of economic growth can be put forward.

The comparison between these results and other results on the subject leads to three remarks.

- Studies covering more recent periods do not usually lead to a possible negative effect of independence upon growth, with the exception of some results obtained by Schaling (1995). He finds a significant inverse relation between the legal independence indexes built by Eijffinger and Schaling (1993) or Cukierman (1992) and the growth level for the period 1972-81 in industrial countries (but no significant relation with growth variability). According to Schaling (1995), during this period the most independent central banks began to use monetary targeting in response to their difficulties in tackling inflation following thus rather more restrictive policies compared to the other banks. Concerning interwar years, some explanation of the inverse relation between independence and growth performances might be provided with the case of countries like Germany, Austria or Bulgaria during the sub-period 1923-32. These countries influence the results of the regressions. They experienced hyperinflation at the beginning of the sub-period, and in reaction conferred high independence to their central banks with consequently very restrictive policies and a negative effect on growth.
- Among the studies that analyze the relationship between independence and growth for the 70s, 80s or 90s, Cukierman, Kalaitzidakis, Summer and Webb's (1993) results stand

out as another exception. They observe that in the developing countries, independence as proxied by turnover of governors is positively correlated with growth. As average turnover rate is lower in industrial countries, they concluded that dependence has a detectable effect only beyond a sufficiently high threshold. Thus our results - the lack of significant relation between turnover and growth - are consistent with their view, especially because our sample turnover rates average for 1918-38 is nearly equal to that observed for the more recent period. Nevertheless, our results are in sharp contrast with Cukierman, Kalaitzidakis, Summer and Webb's (1993) observations as we find a significant inverse relation between legal index and growth performances, for the higher independence level sub-period.

- The latter relationship seems to be consistent with Simmons's (1996) analysis of bank rate or money supply determinants between 1925 and 1938. She concludes that gold exchange standard was fragile, not so much because of its rules by themselves but because central banks, especially the most independent ones implemented policies that were more deflationary than required for external adjustments thus contributing to the deflationary bias of the interwar monetary regime.

4. Conclusion

Empirical analyses that test the relation between central bank independence and macroeconomic performances apply to the post-1950 period even though the first experiences of explicit independence took place during the interwar period. So we construct an index to measure the degree of independence of eighteen central banks between 1918 and 1938. This index is then used to analyze the relation between autonomy and inflation or output growth. Our results differ from the conclusion of most of the studies covering recent

periods. We find rather unclear effects of central bank independence on economical performances. As a matter of fact, the significant observations we obtained indicate, according to the period under consideration, either the existence of a positive relation between legal independence and inflation performances (for the sub-period 1929-38) or the existence of a negative relation between legal independence and growth performances (for the sub-period 1923-32). In summary, those results do not seem to support the well known hypothesis that having an independent central bank is a “free lunch”, i.e. an institutional solution with benefits but no costs.

It is nevertheless very important to put this conclusion in the interwar context. Indeed, one generally agrees with the fact that establishing an independent central bank is not a sufficient condition to improve monetary policy results. Integrating independence in the national political structure and developing a tradition or a culture of stability are the determinants of its practical efficiency. These conditions did not exist at the early beginning of independence history which is the frame of our work. This lack can account for the unclear effects of independence we put to light. On another side, let us recall that we find an inverse relation between legal independence and growth for the period 1923-32 and that, at the end of this period, the average level of independence began to decrease whereas it had strongly increased until then. During the thirties, many countries chose to amend their central bank law in order to favor closer links to government. The U.S is a good case in point. Without asserting the existence of a causal relation between the independence effect on growth from 1923 to 1932 and the coming back to less independence, it is interesting to overview these two elements in one glance. The first experiences of explicit independence we analyzed in this paper were not continued after the Second World War and, except for a few cases, central banks were weakly independent until the eighties. The question remains as

to whether the institutional choices made after 1945 can be explained by the relative failure of interwar independence experiences.

Appendix 1: Characteristics of legal independence

Characteristics	Weight	Code
1/ Bank management: governor and board	1	
<i>a) term of office</i>		
- ≥ 8 years		1
- 6 to 8 years		0.75
- 5 years		0.5
- 4 years		0.25
- < 4 years or at the discretion of appointer		0
<i>b) who appoints the governor?</i>		
- board of central bank		1
- collective decision of the bank, the executive and legislative branches		0.75
- legislative branch		0.5
- executive collectively (i.e., council of ministers)		0.25
- one member of the executive branch		0
<i>c) who appoints board?</i>		
- all members are appointed by external bodies (international authorities, shareholders)		1
- some members are appointed by external bodies (international authorities, shareholders)		0.8
- collective decision of the bank, of the executive and legislative branch		0.6
- legislative branch		0.4
- executive collectively (i.e., council of ministers)		0.2
- one member of the executive branch		0
<i>d) conditions to dismiss the governor or members of the board</i>		
- no legal provision		1
- for reasons not related to monetary policy (e.g., physical disability)		0.83
- at the discretion of central bank board		0.67
- at legislature's discretion for reasons related to monetary policy		0.5
- unconditional dismissal possible by legislature		0.33
- at the executive's discretion		0.17
- unconditional dismissal possible by executive		0
<i>e) can governor or members of the board exercise another office?</i>		
- forbidden by the law		1
- under conditions (e.g., with the executive's permission)		0.5
- no interdiction in the law		0
<i>f) do the board include members of government?</i>		
- no		1
- yes		0
<i>g) do the board include foreign members?</i>		
- yes		1
- no		0
2/ Policy formulation		
<i>a) Term of the privilege of emission</i>	0.15	
- perpetual		1
- ≥ 50 years		0.75
- from 25 (included) to 50 years		0.5
- from 10 (included) to 25 years		0.25
- < 10 years or at the discretion of government		0
<i>b) Conditions of extension of the emission beyond the cover</i>	0.275	
- there is no provision allowing to suspend the cover rules		1
- the extension of emission is related to an automatic increase of discount rate		0.66
- opportunities are strictly limited by the law (e.g. for the term or the renewal)		0.33
- opportunities are strictly limited by law but conditions of renewal are rather loose		0
<i>c) Objectives conferred on the central bank</i>	0.15	
- price stability is the major or only objective in the charter		1

- price stability is one goal among other objectives excluding considerations on the development of economy or credit supply		0.66
- not defined or, beside price stability, including other objectives such as development of the economy or credit supply		0.33
- only aiming at development of the economy or credit supply		0
d) <i>who formulates the monetary policy ?</i>	0.15	
- bank alone		1
- bank but a government's member is present at the council without a right of vote		0.75
- consultation between bank and government or not defined		0.5
- bank only advises government		0.25
- government alone		0
e) <i>government's directives and resolution of conflicts?</i>	0.275	
- the bank has the final decision on issues clearly stated in the law as its objectives		1
- a tripartite council (central bank, executive and legislative branches) settles conflicts		0.8
- not defined		0.6
- legislative branch has final authority on conflicts related to monetary policy		0.4
- executive branch has final authority on conflicts related to monetary policy but according to a process defined in the law and with possible protest by the bank		0.2
- executive branch has final authority without condition		0
3/ <u>Limitations on lending to the government</u>		
a) non securitized advances to the government	0.6	
a1) <i>advance amounts</i>	0.4	
- no advances permitted		1
- permitted but with strict limits (defined in absolute amount)		0.75
- permitted but with strict limits (defined in relative amount)		0.5
- permitted but with rather loose limits (e. g. modifiable or negotiable)		0.25
- no legal limits on lending		0
a2) <i>Must the destination of granted advances be determined ?</i>	0.2	
- yes (e.g. only for expenses provided for in the budget)		1
- no		0
a3) <i>maturity of advances</i>	0.2	
- defined by the bank		1
- within 1 year (planned in the law)		0.66
- more than 1 year (planned in the law)		0.33
- no mention or defined by government		0
a4) <i>interest rates on advances</i>	0.2	
- defined by the bank		1
- defined according to a strict rule planned by the law		0.66
- defined according to a negotiation according to a process planned by the law		0.33
- no mention or defined by government		0
b) securitised advances to the government	0.4	
b1) <i>advance amounts</i>	0.2	
- no advances permitted		1
- permitted but within strict limits (defined in absolute amount)		0.75
- permitted but within strict limits (defined in relative amount)		0.5
- permitted but within quite loose limits (e. g. modifiable or negotiable)		0.25
- no legal limits on lending		0
b2) <i>maturity of advances</i>	0.4	
- defined by the bank		1
- within 1 year (planned in the law)		0.66
- more than 1 year (planned in the law)		0.33
- no mention or defined by government		0
b3) <i>interest rates on advances</i>	0.4	
- defined by the bank		1
- defined according to a strict rule planned by the law		0.66
- defined according to a negotiation the process of which is planned by the law		0.33
- no mention or defined by government		0

Appendix 2: Legal independence indexes and turnover rates of governors

		Bank management	Policy formulation	Limitations on lending	Aggregated index	Turnover rate 1918-38
Australia	1921-24	0.6000	0.7895	0.0000	0.4632	0.2222
	1925-38	0.2857	0.7895	0.0000	0.3584	
Austria	1923-27	0.7643	0.5200	1.0000	0.7614	0.1333
	1928-31	0.7643	0.5200	0.9800	0.7548	
	1932	0.7643	0.5200	0.8184	0.7009	
	1933-37	0.7643	0.5200	0.9800	0.7548	
Belgium	1918-26	0.5000	0.2370	0.4576	0.3982	0.2381
	1927-38	0.5000	0.5120	0.5648	0.5256	
Bulgaria	1918-22	0.5500	0.5145	0.2652	0.4432	-
	1923-26	0.5500	0.6053	0.3852	0.5135	
	1927-28	0.6143	0.7040	0.7856	0.7013	
	1929-38	0.6143	0.8140	0.7112	0.7132	
Denmark	1918-35	0.5071	0.5120	0.6000	0.5397	0.16
	1936-38	0.3643	0.6125	0.7056	0.5608	
England	1918-28	0.5714	0.5303	0.1392	0.4136	0.0952
	1929-38	0.5714	0.4395	0.1392	0.3834	
Finland	1918-25	0.2071	0.2250	0.6000	0.3440	0.195
	1926-38	0.1714	0.2783	0.6000	0.3499	
France	1918-20	0.2571	0.3645	0.0000	0.2072	0.333
	1921-27	0.2571	0.4020	0.0000	0.2197	
	1928-38	0.2571	0.6770	0.0000	0.3114	
Germany	1918-21	0.6214	0.1245	0.0000	0.2486	0.1904
	1922-24	0.6214	0.4745	0.0000	0.3653	
	1925-33	0.8457	0.8690	0.5304	0.7484	
	1934	0.2857	0.1620	0.2592	0.2356	
	1935-38	0.0000	0.1620	0.2592	0.1404	
Italy	1927-35	0.6029	0.2370	0.3120	0.3840	0.1667
	1936-38	0.6671	0.3270	0.6000	0.5314	
Japan	1918-38	0.5743	0.1995	0.0000	0.2579	0.381
The Netherlands	1918-38	0.5957	0.3645	0.6600	0.5401	0.0952
Norway	1918-38	0.3786	0.4395	0.6000	0.4727	0.0952
South Africa	1920-29	0.6143	0.5460	0.7456	0.6353	0.1053
	1930	0.6143	0.5460	0.6928	0.6177	
	1931-38	0.6143	0.1245	0.6928	0.4772	
Spain	1918-22	0.2286	0.3645	0.4656	0.3529	0.6667
	1923-38	0.2643	0.3645	0.8856	0.5048	
Sweden	1918-33	0.3429	0.3803	0.5000	0.4077	0.0952
	1934-38	0.3429	0.4903	0.8656	0.5662	
Switzerland	1918-38	0.6000	0.7775	0.8656	0.7477	0.1905
USA	1918-31	0.4929	0.4560	0.7056	0.5515	0.2857
	1932	0.4929	0.4560	0.6528	0.5339	
	1933-35	0.4929	0.2745	0.6528	0.4734	
	1936-38	0.5286	0.3495	0.7584	0.5455	

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