Central Bank independence - Only part of the inflation story

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investments offers the possibility of spreading one's risks and augmenting return. This does not necessarily mean, however, that the decision to purchase works of art – like enrolling in school – is mainly motivated by financial considerations. The calculation of returns on investments in art – as considering other aesthetic or intellectual activities – provides a means to measure the psychic of intellectual value of such enterprises and seems to suggest that purchasing art is also a consumption activity.

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CENTRAL BANK INDEPENDENCE – ONLY PART OF THE INFLATION STORY: A COMMENT

1 INTRODUCTION

In a recent article published in this journal, Heylen and Van Poeck (1996) pose that central bank independence is only part of the inflation story. They argue that most empirical studies only consider central bank independence as related to inflation, without taking into account other factors that may influence the price level. According to Heylen and Van Poeck (HVP, hereafter), this is an important weakness of the empirical literature on central bank independence. They claim to have dealt with this weakness by including political variables to explain inflation as well as other factors relating to structural characteristics of the labour market. In their theoretical framework, HVP present an analysis of equilibrium inflation, taking the standard Barro-Gordon (1983) model as a starting point, and emphasize that they are dealing with '... the *interplay* of central bank independence and these political variables' (p. 45). The conclusion of HVP's empirical analysis is that increasing central bank independence would have the smallest effect on inflation in countries with a low natural rate of unemployment, a steep short-term Phillips curve, a weak position of left-wing parties in government and parliament, a high commitment of the government to shadow the German Mark, and a stable government.

In this comment, we will show that the theoretical framework of HVP is not adequate to analyse the issue at hand. Earlier research on the determinants of central bank independence, surveyed in De Haan and Eijffinger (1994) and Eijffinger and De Haan (1996), provides a superior method to model the interplay of central bank independence and other political and institutional variables. Also, we will argue that the empirical analysis of HVP is not very convincing. Finally, we

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will discuss the robustness of the empirical results reported by HVP and present our conclusion.

2 THEORETICAL FRAMEWORK

The authors use a textbook Barro-Gordon model to analyse the impact of central bank independence, political variables and structural characteristics on the inflation performance of a country. On the basis of various assumptions, HVP simply plug variables like (the degree of) central bank independence (*CBI*) and government instability (*GINS*) into the equation describing the equilibrium rate of inflation. Furthermore, they assume that the relative aversion to unemployment (θ) is positively related to the relative strength of left-wing parties in government and parliament (*LEFT*) and negatively to the degree of government commitment to shadow the German Mark (*SGM*). Although HVP emphasize the interplay of central bank independence and political variables, it is a bit amazing that they do not analyse the interaction of these variables within a game-theoretic framework going beyond the standard Barro-Gordon model. Nowadays, the interaction between central bank independence and other political-institutional factors is generally analysed within the context of the credibility-flexibility trade-off which is already apparent in the Rogoff (1985) model and is extended by Lohmann (1992), Cukierman (1994) and Eijffinger and Schaling (1996). In the Rogoff model, society can sometimes make itself better off by appointing a central banker who does not share the social objective function, but instead places 'too much' weight on price stability relative to output stabilization. Rogoff has shown that it is optimal for society to choose a 'conservative' central banker who assigns an additional weight to inflation stabilization. To show this outcome of the Rogoff model one has to introduce a *second* quadratic loss function for the 'conservative' central banker:

$$L' = 1 + \epsilon/2.p^2 + \theta/2.u^2 \quad \theta \geq 0 \quad \epsilon > 0. \tag{2'}$$

The degree of conservativeness (ϵ) is, according to Rogoff (1985), positive and finite. It can also be shown that the appointment of a 'conservative' central banker ($\epsilon > 0$) leads to a smaller inflationary bias and a narrower variance of inflation (p).[17] The variance of output is, however, an increasing function of the conservativeness of the central banker. Thus, the variance of actual unemployment (u) is a decreasing function of the central banker's conservativeness. This is the trade-off between credibility (an independent central bank increases inflation stabilization) and flexibility (an independent central bank decreases output stabilization). Rogoff makes the crucial assumption that the central banker is completely inde-

17 This can be shown in a similar fashion as in HVP, minimizing the loss function of the central banker (instead of equation (2) in HVP) after substitution of equation (1) into equation (2').

pendent and cannot be overridden *ex post*, when inflationary expectations have been set and monetary policy is carried out. This can lead to heavy losses for society when extreme productivity shocks occur. Lohmann (1992) introduces the possibility to override the central banker at a strictly positive but finite cost. So, the loss function of society and, thus, of the policymakers (equation (2) in HVP) changes to:

$$L'' = 1/2.p^2 + \theta/2.u^2 + \delta.c \quad \theta \geq 0. \tag{2''}$$

where δ is a dummy with value 1 when the central bank is overridden and 0 otherwise, and c is the cost that society incurs when the central bank is overridden. The loss function of the 'conservative' central banker (2′) stays the same as in the Rogoff model. This implies that Rogoff's model is a special case of the Lohmann model where the cost of overriding is infinite.

Cukierman (1994) presumes that the delegation of monetary policy to (partly) independent central banks is used as a '(partial) commitment device.' By specifying the objectives of the central bank more or less tightly and by giving it broader or narrower powers, politicians determine the extent of their commitment to a given policy rule. Such policy action leads to more credibility of monetary policy which, in turn, is reflected in diminished inflationary expectations and, thereby, lower (capital market) interest rates and more moderate wage demands. From the politician's viewpoint, the costs of an independent central bank mainly consists of the loss of flexibility in monetary policymaking. The balance between flexibility and credibility, depending on the relevance of various economic and political factors to delegate authority, determines the optimal degree of central bank autonomy in a country. Based on this game-theoretic analysis, Cukierman predicts that central bank independence will be greater, the stronger the employment-motivated inflationary bias, the higher political instability and the larger the government debt. These predictions were tested and, subsequently, rejected by De Haan and Van 't Hag (1995). In testing Cukierman's model, they employ various legal measures of central bank independence reflecting the strenght of the 'conservative bias' of the central bank as embodied in the central bank law.

Eijffinger and Schaling (1996) also use a game-theoretic analysis. They assume two types of agents, *i.e.* wage-setters (labour union) and the central bank. Wage-setters unilaterally choose the nominal wage rate, whereas the central bank controls the inflation rate. Eijffinger and Schaling derive a number of propositions with respect to the economic and political determinants of central bank independence and, thereby, of the inflation rate in a country. They conclude that the (optimal) degree of central bank independence will be higher if the natural rate of unemployment is higher, the preferences of society for unemployment is higher, the preferences of society for unemployment stabilization relative to inflation stabilization are stronger, the variance of productivity shocks is smaller, and the slope of the Phillips curve is steeper. Eijffinger and Schaling tested these

propositions employing a latent variables method in order to distinghuish between the actual (legal) and optimal degree of central bank independence. They found a significant positive relationship for the slope of the Phillips curve and insignificant coefficients for the other determinants.

Because HVP say that they want to analyse the 'interplay' between central bank independence, political variables and structural characteristics of the labour market, one would expect a game-theoretic analysis of the strategic interaction of the wage-setters (labour union) and the central bank. As described earlier, there is a new offshoot of the literature on central bank independence which specifically analyses the 'interplay' of central bank independence and the other factors, both theoretically and empirically. Instead of using and extending this theoretical framework, HVP simply plug political and other variables into the equation for equilibrium inflation on the basis of various and not necessarily consistent *assumptions*. Variables like (the degree of) central bank independence (CBI), government instability (GINS), and the relative strenght of left-wing parties in government and parliament (LEFT) are plugged in on a completely *ad hoc* basis. Their specification is not founded on a consistent (game-)theoretic model which formulates the strategic interaction between the central bank and other economic agents, in particular the wage-setters.

The relationship between the exchange rate regime and central bank independence has also been analysed before. Whereas HVP just plug the degree of government commitment to shadow the German Mark (SGM) into their model, others have analysed this issue more thoroughly. Cukierman, Rodriguez, and Webb (1996) investigate how monetary policy is conducted in the face of a variety of macroeconomic shocks. From an open-economy macroeconomic model, they derive the optimal monetary reaction functions that indicate how monetary instruments (*i.e.* monetary aggregates or interest rates) are to be adjusted to economic disturbances under four different exchange rate systems. Exchange rates can be either fixed or flexible, and countries' financial assets may or may not be perfect substitutes in private portfolios. The resulting monetary reaction functions have been estimated for a pooled data set of 17 industrial countries. The authors are specifically interested in how adjustment of monetary instruments to economic shocks depends on the degree of central bank independence and on the nature of the exchange rate system. They concluded, among other things, that wage inflation is less accommodated in countries with more independent central banks and in countries with unilateral pegs.

In conclusion, HVP have ignored a large and growing body of the literature in which the interplay between central bank independence and other political-institutional variables is analysed more properly than in HVP's *ad hoc* way.

3 EMPIRICAL RESULTS

HVP claim that their empirical results are 'favourable to the hypothesis that the role of central bank independence for price stability should not be analysed independently of the political and structural characteristics of the countries involved (and *vice versa*)' (p. 54).[18] Evidence for this conclusion is that the results of simple OLS regressions, in which the interrelationship between central bank independence and the other political and structural variables is not taken up, are 'clearly inferior' in comparison with the regression outcomes in which this 'interplay' is taken into account. This latter regression goes as follows:

$$p = a_0 + (1 - CBI/13)(a_1 + a_2 u_n + a_3 \gamma + a_4 LEFT + a_5 SGM + a_6 GINS) \quad (11)$$

with $a_0 \geq 0$; a_2, a_4, $a_6 > 0$; and a_3, $a_5 < 0$.

where p denotes inflation, *CBI* is the Grilli, Masciandaro, and Tabellini (1991) index for central bank independence, u_n is the equilibrium rate of unemployment, γ is the short-run responsiveness of wages to unemployment, and *LEFT* is an indicator reflecting the relative strength of left-wing parties in government and parliament. *SGM* is an indicator of the degree of government commitment to shadow the German Mark, while *GINS* reflects the number of significant government changes in the period under consideration.

In this comment we will focus on the empirical results for the entire 1970–1989 period, using the data of HVP as presented in their Table 1. Rows (1a) and (1b) in Table 1 present our replication of HVP's simple OLS and interplay regressions.[19] The results almost exactly match those of HVP. At first sight they seem to confirm their conclusion. One may wonder, however, whether HVP's variables are very convincing.[20] Take, for instance, the variable *SGM*, which ranges between 0.25 (for Sweden) and 1.5 (for Austria and The Netherlands). It should be pointed out that this variable is not a dummy variable as usually applied in the literature to examine the impact of ERM-membership on inflation performance (see, *e.g.* Collins, 1988). In fact it is constructed in an *ad hoc* manner which implies various restrictions. One way to examine how sensitive the results are for

18 It should be pointed out that various studies to which HVP do not refer, also take other political-institutional factors into account in explaining cross-country inflation differentials; see *e.g.* Havrilesky and Granato (1993).

19 They correspond to the results presented on p. 54 and in the third column of Table 2, respectively. Note that the ordering of the variables in row (1a) of Table 1 is somewhat different from that of HVP's regression as reported on p. 54. The regression on p. 54 probably contains one typing error: the reported coefficient for *SGM* of 2.5 should be 2.05.

20 We criticize various variables used, including the indicator for central bank independence. Apart from issues raised in the main text, we think it is incorrect to simply *assume* certain values for those countries for which Grilli, Masciandaro, and Tabellini (1991) do not provide data (Sweden, Norway, and Finland).

TABLE 1 – ESTIMATION RESULTS FOR EQUATION (11), 1970–1989

Row:	a_0	a_1	a_2	a_3	a_4	a_5	a_6	R^2 (adj)
(1a)	12.20	−0.57	0.17	−0.67	0.82	−2.04	0.60	0.84
	(5.75)	(−4.17)	(1.28)	(−1.49)	(1.99)	(−4.01)	(1.64)	
(1b)	4.98	7.74	0.23	−1.83	1.59	−6.20	1.68	0.91
	(11.38)	(3.02)	(1.23)	(−2.68)	(2.34)	(−5.44)	(2.69)	
(2a)	11.37	−0.60	0.24	−0.49	0.51		0.42	0.64
	(3.58)	(−2.90)	(1.23)	(−0.73)	(0.84)		(0.77)	
(2b)	4.43	5.13	0.48	−1.03	1.36		0.73	0.70
	(5.65)	(1.11)	(1.41)	(−0.84)	(1.09)		(1.26)	
(3a)	11.86	−0.59	0.26	−0.65	0.66	−2.03	0.55	0.80
	(5.02)	(−3.87)	(1.80)	(−1.30)	(1.47)	(−3.27)	(1.35)	
(3b)	4.75	6.01	0.48	−1.57	1.13	−4.51	0.85	0.82
	(7.78)	(1.68)	(1.87)	(−1.64)	(1.17)	(−3.07)	(1.92)	
(4a)	5.50	−0.26	0.38	0.24	1.35	−1.92	1.05	0.40
	(1.09)	(−0.40)	(0.68)	(0.22)	(1.32)	(−1.86)	(1.39)	
(4b)	5.67	9.49	−0.63	−2.37	2.22	−5.33	0.39	0.42
	(5.31)	(1.14)	(−0.61)	(−1.10)	(1.15)	(−1.91)	(0.52)	

Notes: Rows (a) are simple OLS regressions, whereas rows (b) present the so-called interplay regressions (see main text). Rows (1a) and (1b) represent the replications of the HVP regressions. In rows (2a, b) the variable *SGM* is left out, while in rows (3a, b) a dichotomous variable for the exchange rate regime is included. In rows (4a, b) the Eijffinger-Schaling indicator is used instead of the Grilli-Masciandaro-Tabellini index. In all regressions *t*-statistics are in parentheses.

this somewhat peculiar variable, is simply to drop it from the regressions. Rows (2a) and (2b) in Table 1 show the outcomes if this variable is left out. Rows (3a) and (3b) present the outcomes if this variable is redefined as a dichotomous variable, that takes the value 1 in case a country has been a (shadow) member of the ERM or its predecessor most of the time, and which is 0 otherwise.[21]

We observe that the results change quite drastically. If the variable *SGM* is not included, none of the other variables is significant in the interplay regression, whereas in the simple OLS regression only the coefficient indicating central bank independence is significant. So it is clear that the empirical model of HVP is not robust. If the dichotomous indicator for the exchange rate regime is included, the outcomes of the interplay regression are not superior to those of the simple OLS

21 The variable is 1 for Austria, Belgium, Denmark, France, Ireland, and The Netherlands.

regression. So minor changes in the model lead to conclusions which are very different from those of HVP.[22]

Finally, we would like to address the question of how to measure central bank independence. It is rather difficult to measure the degree of legal independence of various central banks, let alone the degree of their actual independence of the government. Actual, as opposed to formal independence, not only hinges on legislation, but also on a myriad of other factors such as informal arrangements with government, the quality of bank personnel, and the personal characteristics of key individuals in the bank. Obviously, these other factors are virtually impossible to quantify. Most of the existing research has, therefore, focused on legal independence and is restricted to industrial countries. As pointed out in our survey (Eijffingerand De Haan, 1996), most indicators for central bank independence have been criticized on various grounds. HVP therefore rightly apply various measures of central bank independence in their empirical analysis. Although they claim that their results are very similar if other indicators for central bank independence are used, a closer inspection of the results reported in their Appendix B shows that this is not the case. In Table B1, for instance, in which Cukierman's index is used, only the coefficient of *GSM* is significant in the estimates for the entire sample period. As a further check on the robustness of their results we have re-estimated the equations, using the Eijffinger-Schaling index for central bank independence.[23] The outcomes are presented in rows (4a) and (4b) of Table 1. The differences with the outcomes of HVP are striking. In both regressions none of the coefficients is significantly different from 0.

4 CONCLUSIONS

In this comment we have argued that the theoretical framework of HVP is not adequate to analyse the 'interplay' of central bank independence and other political and institutional variables. Instead of using a game-theoretic analysis of the strategic interaction of the wage-setters (labour union) and the central bank, HVP simply plug the political and other variables into the equation for equilibrium inflation on the basis of various and not necessarily consistent assumptions on a

22 Of course, one could argue that intuitively it makes sense to include a variable that takes differences in the degree of shadowing the German Mark into account. However, the construction of HVP's variable *SGM* is very *ad hoc*. We have therefore also re-estimated the models, redefining *SGM* in another way, namely as the ratio between the number of years in which the currency participated (as a member or, in the case of Austria, as a shadow member) in the snake arrangement and/or the ERM and the cumulative depreciation relative to the German Mark. This variable is a better proxy for the commitment to shadow the German Mark than HVP's variable *SGM*. The qualitative results of the regressions with this alternative proxy are very similar to the regressions reported in rows 3a and 3b of Table 1 (not shown).

23 The indicator is discussed in Eijffinger and De Haan (1996). Two countries are not included: Ireland, for which this indicator is not available, and Spain, since for this country the Eijffinger-Schaling index is based on the central bank law, which was only very recently introduced.

completely *ad hoc* basis. Thereby, they ignore a large and growing body of the literature in which the 'interplay' between central bank independence and other political-institutional variables is analysed more properly.

Furthermore, the claim of HVP that their empirical results are favourable to the hypothesis that central bank independence should not be analysed independently of the political and structural characteristics of the countries involved (and *vice versa*) is not very convincing. HVP's simple OLS and interplay regressions do not prove to be very robust. When the variable *SGM* is left out or redefined as a dichotomous variable, the empirical results change quite drastically. Also, their claim that their results are very similar if other measures of central bank independence are used does not hold in the case of the Cukierman and Eijffinger-Schaling index for central bank independence.

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REFERENCES

Barro, R.J. and D. Gordon, 1983, 'A Positive Theory of Monetary Policy in a Natural Rate Model,' *Journal of Political Economy*, 91, pp. 589–610.

Collins, S., 1988, 'Inflation and the European Monetary System,' in: F. Giavazzi, S. Micossi, and M. Miller (eds.), *The European Monetary System*, Cambridge, Cambridge University Press, pp. 112–136.

Cukierman, A., 1992, *Central Bank Strategy, Credibility, and Independence*, Cambridge (Mass), MIT Press.

Cukierman, A., 1994, 'Commitment through Delegation, Political Influence and Central bank Independence,' in: J.A.H. de Beaufort Wijnholds, S.C.W. Eijffinger, and L.H. Hoogduin (eds.), *A Framework for Monetary Stability*, Dordrecht/Boston/London, Kluwer Academic Publishers, pp. 55–74.

Cukierman, A., P. Rodriguez, and S.B. Webb, 1996, 'Central Bank Autonomy and Exchange Rate Regimes: Their Effects on Monetary Accommodation and Activism,' Paper for the CentER Conference on 'Positive Political Economy: Theory and Evidence,' forthcoming in: S.C.W. Eijffinger and H. Huizinga (eds.), *Positive Political Economy: Theory and Evidence*, Cambridge, Cambridge University Press.

Eijffinger, S.C.W. and J. de Haan, 1996, 'The Political Economy of Central Bank Independence,' *Princeton Special Papers in International Economics*, No. 19.

Eijffinger, S.C.W. and E. Schaling, 1993, 'Central Bank Independence in Twelve Industrial Countries,' *Banca Nazionale del Lavoro Quarterly Review*, No. 184, pp. 1–41.

Eijffinger, S.C.W. and E. Schaling, 1996, 'The Ultimate Determinants of Central Bank Independence,' Paper for the CentER Conference on 'Positive Political Economy: Theory

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and Evidence,' forthcoming in: S.C.W. Eijffinger and H. Huizinga (eds.), *Positive Political Economy: Theory and Evidence*, Cambridge, Cambridge University Press.

Grilli, V., D. Masciandaro, and G. Tabellini, 1991, 'Political and Monetary Institutions and Public Financial Policies in the Industrial Countries,' *Economic Policy*, No. 13, pp. 341–392.

Haan, J. de and S.C.W. Eijffinger, 1994, 'De politieke economie van centrale bank onafhankelijkheid: theorie en praktijk van centrale bank autonomie,' *Rotterdamse Monetaire Studies*, 13, No. 2.

Haan, J. de and G.J. van 't Hag, 1995, 'Variation in Central Bank Independence across Countries: Some Provisional Empirical Evidence,' *Public Choice*, 85, pp. 335–351.

Havrilesky, T. and J. Granato, 1993, 'Determinants of Inflationary Performance: Corporatist Structures *vs* Central Bank Autonomy,' *Public Choice*, 76, pp. 249–261.

Heylen, F. and A. van Poeck, 1996, 'Central Bank Independence: Only Part of the Inflation Story,' *De Economist*, 144, pp. 46–61.

Lohmann, S., 1992, 'Optimal Commitment in Monetary Policy: Credibility *versus* Flexibility,' *American Economic Review*, 82, pp. 273–286.

Rogoff, K., 1985, 'The Optimal Degree of Commitment to an Intermediate Monetary Target,' *Quarterly Journal of Economics*, 110, pp. 1169–1190.

REPLY

In their comment on our paper Eijffinger and de Haan (EDH) put forward that (1) our theoretical framework is not adequate to analyze the issue at hand and (2) our empirical analysis is not convincing. In this reply we will show that EDH misinterpret our theoretical framework and that their evaluation of our empirical results is weak.

To start with, it should be made clear that our paper does not deal with the *normative* issue of the optimal degree of central bank independence (CBI), as EDH wrongly suggest. The well-known trade-off problem between credibility and flexibility, which makes up the greater part of EDH's theoretical comments, is not relevant to our study. Our paper focuses on the *positive* issue of the relationship between CBI and inflation performance. It is an extension of earlier work by *e.g.* Grilli *et al.* (1991) and Alesina and Summers (1993). More precisely, we show that the effect of CBI on inflation is not given (as in these earlier studies), but depends on the political and labour market characteristics of the economy.[24] Simultaneously, we show that the effect of political and labour market characteristics on inflation depends on the degree of CBI. For the regression equation this 'interplay' means that instead of merely adding CBI and political and labour mar-

24 Recently we ran into an interesting paper by Jonsson (1995) who also discusses the effect of CBI on inflation as a function of political and other institutional characteristics. Havrilesky and Granato (1993) to whom EDH refer, do not, however.