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The link between transparency and independence of central banks

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Abstract

This paper, using a standard model of monetary delegation, highlights the relationship between transparency and conservativeness of central banks. Precisely, we show that a lack of transparency about the output objective of central banks positively affects the optimal degree of conservativeness of the central bank. Empirical analysis confirms the theoretical link highlighted in this study.

JEL classification numbers: E52, E58
Keywords: central bank independence, conservatism, transparency.

1 Introduction

Kydland & Prescott (1977) and Barro & Gordon (1983) enriched the economics profession with an insight that changed the thinking about monetary policy. By assuming that individuals form rational expectations and by including the behavior of government in their model, they showed that even if the government and its citizens share the same objectives, a discretionary policy causes a high average inflation (i.e., creates an inflation bias). Policy rules are clearly superior to discretionary policy but unambiguously lack in flexibility. Although removing the inflationary bias, commitment to non-state-contingent rules leads to sub-optimal stabilization. Consequently, there is a trade-off between credibility and flexibility. A large strand of the literature has considered solutions that provide an appropriate balance between credibility and flexibility. The proposed solutions can be grouped into reputational solutions and institutional solutions[2].
In this paper, we focus on institutional solutions such as central bank independence and transparency. Central banks which are politically, economically and personally independent can solve the time-inconsistency problem of monetary policy because inflation expectations are better anchored because surprise inflation generated by

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[2]For reputational solutions, see Barro and Gordon (1983) among others.

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politicians is prevented. By having witnessed a trend towards independent monetary policymaking with increasingly transparent actions, we should draw some conclusions about the desirability of central bank transparency in this specific context[3]. Theoretical models have mainly considered central bank independence by the weight placed on the objective of inflation. Precisely, when a central bank is more concerned about inflation than an elected government, then the central bank is characterized as a conservative central bank *à la* Rogoff (Rogoff, 1985). According to this view, there is a positive link between the degree of central bank independence and the degree of conservatism which increases credibility in pursuing low inflation. However, the issue of central bank independence can also be expressed by a central bank that follows its own objectives, but also takes into account the objectives of the government. Therefore, considering both central bank's and government's objectives when deciding on policy, central bank independence can be seen as the relative weight on the central bank's own objectives. In this context, the link between central bank independence and conservatism has been investigated both theoretically and empirically by Eijffinger & Hoeberichts (1998; 2008), and they found a negative relationship between these two concepts[4]. In our study, we abstract, however, from this interpretation, since we do not relate independence in terms of a specific parameter. In other words, we consider that central bank independence and conservatism are positively linked.

The existing literature characterizes central bank independence as the institutional device associated with lower inflation and no less growth[5]. However, delegating monetary policy to unelected officials creates a democratic deficit (Stiglitz, 1998) which underlines the need to have more accountable central banks[6]. Advocates of more accountability consider transparency as an important practical prerequisite for accountability (Briault et al., 1997; Buiter, 1999). In addition to the accountability arguments for a positive relationship between transparency and independence, there are also political economy arguments that support this view. Eijffinger, et al. (2000), using a simple Lucas type model with an overriding mechanism, show that central bank transparency about the preferences for inflation stabilization increases effective central bank independence[7], leading to a lower expected inflation rate and less stabilization of cost-push shocks. Geraats (2002b) presents further economic arguments in favor of a positive correlation between transparency and independence, motivated by the empirical findings of Fry *et al*. (2000). By focusing on the disclosure of information incorporated in policy decisions, Geraats (2002b) finds that higher central bank transparency is more likely to occur when central banks are

[3]For a survey on earlier studies highlighting the desirability of central bank transparency, see Eijffinger & van der Cruijsen (2010). More recent studies highlight the important role of central bank transparency on the transmission mechanism of monetary policy (Papadamou, 2013; Papadamou et al., 2014a) and financial stability (Papadamou *et al*., 2014b).

[4]A lack of central bank independence can be compensated by choosing more conservative central bankers.

[5]Theoretical and empirical studies for central bank independence can be found in Eijffinger & De Haan (1996), Cukierman (1998) and Kissmer & Wagner (1998).

[6]Although some aspects of accountability enhances independence, it seems that there is a negative relationship between independence and accountability of central banks as highlighted in Briault *et al*. (1997) and De Haan *et al*.(2013).

[7] See Geraats (2002a) for a distinction between political, economic, procedural, policy and operational transparency.

completely independent. However, if monetary policy is delegated to a conservative central bank that is subject to political pressures, central bank's effective independence is negatively affected and therefore greater economic transparency is not beneficial.
Walsh (2003) highlights the trade-off between accountability and stabilization which depends on the degree of transparency about the output target. It is shown that uncertainty about central bank preferences increases the optimal penalty to place on achieving an inflation target.
Another more recent study (Hughes Hallett & Liebich, 2006) shows that there is an important interaction between the optimal degree of transparency and the institutional setting. Using a standard Kydland & Prescott (1977) and Barro & Gordon (1983) non-cooperative game framework and allowing for monitoring and punishments costs, the relationship between goal independence and goal transparency is examined[8].They show that goal independence will be negatively related to accountability and goal transparency. It is also shown that goal-independence and goal transparency desirability varies across players. In particular, policymakers are in favor of goal independence, while the private sector will prefer goal transparency.

This paper can be related to the literature highlighting the relationship between transparency and independence. Precisely, our study is closely linked to the study of Walsh (2003), however we use a different framework and our objective is to find the way that central bank conservativeness *à la* Rogoff may be affected by the lack of transparency about the output target without focusing on incentive systems, monitoring, and accountability issues. We also provide empirical evidence of the relationship investigated.
Our paper is organized as follows. Section 2 investigates the relationship between central bank transparency and independence using a standard model of monetary delegation and presents the theoretical results. Section 3 presents the empirical results and section 4 concludes.

2 The Model

Following the time-inconsistency literature, we assume that policy makers and/or governments (society) have over-ambitious output targets to compensate for market imperfections, tax distortions, or for political economy reasons. The central banker is also assumed to be optimally conservative à la Rogoff (1985) and cares both about inflation stabilization and output stabilization. Furthermore, we suppose that central bank transparency issues arise from asymmetric information about the output target (i.e., an unknown output objective).
The production function without supply shocks can be written as[9]:

$$y_t = \pi_t - \pi_t^e, \qquad (1)$$

[8]In this study transparency emerges from the fact that the central bank has an explicit inflation target.
[9]An important reason for not including supply shocks in the production function is to separate the uncertainty related to game behavior from the uncertainty in the economy's responses.

where y_t is the log of output, π_t the actual rate of inflation, and π_t^e the expected current inflation.
We consider that both government and society do not like inflation and output to deviate from their desired levels (we normalize the desired level of inflation at zero). The loss function for the government (society) is given by:

$$L_t = [(y_t - y^*)^2 + \pi_t^2], \quad (2)$$

where the output objective y^* reflects the government's will to offset the distortions affecting the labour market. The loss function of the conservative central bank is described by the following equation:

$$L_t^{cb} = [(y_t - y^{cb})^2 + I\pi_t^2], I > 1 \quad (3)$$

where y^{cb} is the stochastic output objective of the central bank and I the degree of inflation aversion or the degree of conservatism of the central bank which is superior to that of the society. The public anticipates that central bank will choose y^*as its objective. In this respect, $y^* = y^{cb} + \theta$, where θ is an error with $E(\theta) = 0$ and $V(\theta) = \sigma_\theta^2$. Consequently, $E(y^{cb}) = E(y^*) = y^*$. Then, using the taxonomy of Geraats (2002a), full political transparency occurs when both conditions $E(\theta) = 0$ and $\sigma_\theta^2 = 0$ hold. In this case, the lack of transparency is explained by the variability of θ, σ_θ^2. An increase (decrease) in the variability of θ is associated with a decrease (increase) in the transparency of the central bank respectively.

Substituting (1) into (3) and assuming that the central bank knows what the public's perceptions are, it will minimize the following loss function:

$$\min_{\pi} L_t^{cb} = E[(\pi_t - \pi_t^e - y^{cb})^2 + I\pi_t^2], \; I > 1. \quad (4)$$

Minimizing (4) with respect to π_t, it yields:

$$\pi_t = \frac{1}{(1+I)}(\pi_t^e + y^{cb}) \quad (5)$$

and solving for the expected current inflation π_t^e, we get

$$\pi_t^e = \frac{1}{I} y^*. \quad (6)$$

Thus, the equilibrium solutions for inflation and output are:

$$\pi_t = \frac{y^*}{I(1+I)} + \frac{y^{cb}}{(1+I)} \quad , \quad (7)$$

$$\boldsymbol{y_t = \frac{-\theta}{(1+I)}}. \quad (8)$$

Substituting (7) and (8) into (2), the expected government's loss can be expressed as a function of the degree of conservatism I and of the variability ofθ, σ_θ^2. It follows:

$$\boldsymbol{E[L_t] = \left[y^{*2} + \frac{\left(\sigma_\theta^2 + y^{*2}\right)}{(1+I)^2} + \frac{y^{*2}}{I^2(1+I)^2} + \frac{2y^{*2}}{I(1+I)^2} \right]}. \quad (9)$$

From the above equation, it is straightforward that the expected loss of the government is decreasing with the degree of central bank's conservatism. This latter negatively affects the inflation bias arising from an output that exceeds the socially optimal value. We can observe that σ_θ^2 increases the losses since this uncertainty has a positive impact on inflation bias. From (9), we establish the following proposition.

Proposition

Under the hypothesis that $\sigma_\theta^2 > 0$, *central bank opacity positively affects the optimal degree of central bank conservativeness. In other terms:* $\partial I / \partial \sigma_\theta^2 > 0$.

Proof:

Differentiating now (9) with respect to I, to determine the optimal degree of conservativeness. This first order condition can be written as:

$$F\left(I; \sigma_\theta^2\right) = -2\frac{3y^{*2}I + y^{*2}I^3 + 2\sigma_\theta^2 I^3 + 3y^{*2}I^2 + y^{*2}}{(1+I)^3 I^3} = 0\,.$$

It can be demonstrated that

$$\frac{\partial F(I; \sigma_\theta^2)}{\partial \sigma_\theta^2} = -4\frac{1}{(1+I)^3} < 0$$

and

$$\frac{\partial F(I;\sigma_\theta^2)}{\partial I} = 6\frac{4y^{*2}I + 6y^{*2}I^2 + 4y^{*2}I^3 + y^{*2}I^4 + 2\sigma_\theta^2 I^4 + y^{*2}}{(1+I)^4 I^4} > 0\,.$$

Making use of the implicit function theorem, it yields that

$$\frac{\partial I}{\partial \sigma_\theta^2} = -\frac{\partial F(I; \sigma_\theta^2)/\,\partial \sigma_\theta^2}{\partial F(I; \sigma_\theta^2)/\,\partial I} > 0.$$

The intuition behind this result is that greater opacity of the central bank (a higher σ_θ^2) increases the losses of the government, inducing a higher inflation bias. In this context, the optimal response of the central bank will be to increase the degree of conservativeness of the central bank. In fact, a highly inflation averse central bank will reduce the losses of the government, diminishing thus the inflation bias.

3 Empirical Investigation

The objective of this section is to investigate empirically the relation between transparency and independence of central banks over the period 1998-2005 using a sample of 29 countries[10]. In order to relate macroeconomic performance and policy efficiency to central bank features, we require quantitative measures of these institutional characteristics of the central bank. We first describe these characteristics and then we focus on the linkage between these two measures.

In the literature several methods to construct central bank independence index are proposed (Bade and Parkin, 1982; Cukierman *et al.*, 1992,Fry *et al.* 2000, Polillo & Guillén, 2005; Arnone *et al.* 2006)[11]. The most widely employed index is due to Cukierman *et al.* (1992). This index reflects the legal independence of central banks ranging from zero to one. Recently, Dincer & Eichengreen (2014) create an index of independence for a large number of countries and an extended period of time. In our study, we consider this latter index of central bank independence.

There are various types of methods to measure central bank transparency. The first one is proposed by Fry *et al.(*2000). They measure central bank transparency using a survey on the information revealed by central banks that improves the public understanding about central bank's actions. Alternatively, several authors construct an index of central bank transparency, independently from central bankers opinions, based on actual information disclosed by central banks (Bini-Smaghi & Gros, 2001; Siklos, 2002; De Haan *et al.* 2004; Eijffinger & Geraats, 2006). Most of the above studies constructed an index of transparency for few central banks or a single point in time. Notable exception is the index of Eijffinger & Geraats (2006) which is time varying. In this paper, we are particularly interested in the index constructed by Dincer & Eichengreen (2007) which extends Eijffinger and Geraats' index for a larger number of central banks.

[10]Argentina, Australia, Canada, Chile, Croatia, Denmark, Estonia, Hungary, Iceland, Indonesia, India, Israel, Jamaica, Jordan, Japan, Korea, Malaysia, Mexico, Norway, New Zealand, Philipines, Romania, Russia, South Africa, Sweden, Thailand, Turkey, United Kingdom and United States of America.

[11]See Eijffinger and De Haan (1996), De Haan (1997), de Haan et al. (2003) for a literature review on measures of independence.

This study, by using panel data analysis[12], empirically investigates the theoretical relationship examined in this paper concerning the role of transparency in the delegation of monetary policy to a conservative and independent central bank.

To do so, we use the following general form:

$$y_{j,t} = a_0 + a_1 Tr_{j,t} + \sum_{k=1}^{\lambda} \beta_k x_{j,t}^k + \mu_j + e_{j,t} \quad (10)$$

where central bank independence is the dependent variable $y_{j,t}$. The transparency index $Tr_{j,t}$ is the regress or proposed based on the analytical model of section two. A set of control variables $X_{j,t}$ as important determinants of central bank independence are also considered. Financial strength is captured through the ratio of the total value of shares traded over the average market capitalization on an annual basis (Tro). In effect, an increase in financial strength could be negatively related with central bank independence because independence is consistent with less output stabilization and therefore more volatile stock markets. Moreover, inflation variability is also taken into account as an important determinant affecting the choice of central bank independence (s2inf). An increase in inflation variability should make more pertinent the appointment of a conservative and independent central bank. The $e_{j,t}$ are the error terms for j=1,2, …,M cross-sectional units, observed for t=1,2,…,T dated periods. The parameter a_0 represents the overall constant in the model, while the μ_j represents cross section specific effects (random or fixed).

We first discuss the specification of the model used in our analysis as follows: The F-tests indicate that the FE model outperforms the pooled OLS. The Hausman test generally suggests that the FE model is superior to the RE model. The specification tests suggested by Frees (1995) and by Pesaran (2004) prove the existence of contemporaneous correlations of errors, and the Wald test provides evidence for group-wise heteroskedasticity. Therefore, in order to correct for any correlation within panels, our regression is estimated with PCSEs.

[12] The unit root tests suggest that all series are stationary.

Table 1: Panel data estimation results for Independence vs. Transparency

Independent Variables	Expected Sign	PCSE
Constant	+	0,500
		(0.00)***
Transparency Index	-	-0,006
		(0.01)***
Tro	-	-0,080
		(0.00)***
s2inf	+	1,024
		(0.09)*
R^2		8,7%
N =(ixT)		232
Specification tests		
F-test (pooled OLS vs. FEM)		82.36***
Hausman test (FEM vs REM)		16,40***
Test of cross-sectional independence by Frees		6.079***
Test of cross-sectional independence by Pesaran		10.472***
Modified Wald test for group wise heteroskedasticity		2.70E+07***

Note: *,** and *** indicate statistical significance at the 10%, 5%, and 1% level respectively.

The empirical result confirms the theoretical linkage described above. It is shown that central bank independence is negatively correlated to central bank transparency. Moreover, all expected signs are confirmed for all the control variables.

4 Conclusion

In this study, using a stylized monetary framework, we examine both theoretically and empirically the effects of transparency about central bank's output objectives on central bank independence as defined by Rogoff (1985). As it is pointed out from our analysis, the impact of transparency on conservativeness and therefore independence is negative.

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