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Monetary Policy Committee Size and Inflation Volatility

by

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MONETARY POLICY COMMITTEE SIZE AND INFLATION VOLATILITY

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Abstract

Previous research on the optimal size of a monetary policy committee (MPC) focused on theoretical analyses and experimental studies. These studies suggest that the ideal monetary policy committee may not have many more than five members. In this paper we conduct an empirical cross-country study to explore whether there is a link between the size of an MPC and inflation volatility. The analysis for 75 countries which have adopted MPCs provides some support for the above suggestion: countries with less than five MPC members tend to have larger deviations from trend inflation than MPCs with five members; raising the number of MPC members above five does not contribute to a further reduction in volatility. JEL no. E31, E42, E58
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1. Introduction

In general, monetary policy decisions today are made by a monetary policy committee (MPC). The better the MPC decisions in terms of accuracy and timing the higher the ability of the central bank to achieve its ultimate goals.

There are many factors which may have an impact on the performance of a committee including the skills of its members, the quality of available information and last but not least the size of the committee (Hackman and Morris 1975). While larger committees have the advantage that they offer better information pooling capacities, they have the disadvantage of higher communication and coordination costs. Moreover, larger committees tend to reduce the members´ incentives to acquire the information and skills that are relevant for efficient monetary policy decisions (Sibert 2006).

The issue of the optimal size of an MPC has so far been considered in two strands of research. First, there are a number of theoretical contributions applying insights from interdisciplinary studies of optimal committee size to the issue of monetary policy (see the survey by Sibert 2006). Second, there are several experimental studies on the basis of electronic economic models (Blinder and Morgan 2005, Lombardelli and Talbot 2002), theoretical models with uncertainty (Gerlach-Kristen 2005) or optimization models (Kang 2004).

So far, however, no empirical studies exist on how MPC size affects the actual performance of monetary policy with respect to its major goals. The question which we will explore in this paper is whether MPC size has a significant effect on inflation volatility. While there are already several studies on the determinants of inflation volatility (e.g. Rother 2004, Bowdler and Malik 2005, Aisen and Veiga 2006), none of them has so far considered the impact of MPC size.

The paper is organized as follows. Section 2 gives a brief overview on previous theoretical and experimental studies of MPC size, and on earlier studies of inflation volatility. Section 3 contains the specification of our empirical model and the regression results. Section 4 concludes.

2. Literature review

Studies on MPC size

General issues of decision-making by committees (groups) were addressed in a number of early theoretical and experimental interdisciplinary studies (e.g. Bales and Borgatta (1951), Taylor and Faust (1955), Caplow (1957), Haleblian and Finkelstein (1993), Fay (2000)). Major results of these studies were the following: (a)committees perform better than individuals; (b) the optimal number of a committee size is a finite and odd number; and (c) the optimal committee size depends on the specific environment and type of task.

In recent years, several studies applied the framework which was suggested by the early interdisciplinary contributions to the issue of monetary policy decision-making. Experimental studies (Blinder and Morgan (2005) and Lombardelli and Talbot (2002)) show that groups reach monetary policy decisions faster and make better decisions. Kang (2004), on the basis of an optimisation approach, finds that the greater the cost of delaying decisions and the less diverse the information, the smaller is the optimal size of a committee. Gerlach-Kristen (2005) finds that monetary committees are better able than individuals to form a view of the appropriate policy under uncertainty. But because of coordination costs and decreasing effort of members, the number of group members should be limited. Blinder and Morgan (2007) replicated their analysis which confirmed their previous results and also gave evidence that 8 person groups do not implement monetary policy tasks better than 4 person groups.

Sibert (2006) provides a comprehensive review of the literature related to monetary policy by committees, and in particular of studies that investigate the relationship between the size and the performance of a committee. Sibert concludes from these studies that the ideal monetary policy committee may not have many more than five members. Berger (2006) develops several indicators to assess the possibility of reforming the ECB Governing Council and concludes that a reasonable upper bound for a monetary policy committee size seems to be around 10-20 for federal central bank systems such as the ECB.[1].

Studies on inflation volatility

While empirical work on inflation volatility goes back to early studies by Okun (1971), Logue and Willett (1976) and Taylor (1981) who emphasized the positive association between

[1] In addition to these studies with their focus on optimal committee size, there have been studies which seek to explain the actual size of MPCs (Berger et al. (2006), Erhart and Vasquez (2007)) . They find that board size is strongly associated with country characteristics: country size, institutions and central bank features, including autonomy, history, staff size and the term length of members.

inflation volatility and the level of inflation, there have been a number of recent studies providing additional explanations of inflation volatility[2].

Bowdler and Malik (2005) find that inflation volatility is reduced when trade openness increases. They argue that this result may be explained by two considerations. First, openness reduces the recourse to seignorage during periods of temporary deficits and, second, openness shifts consumption and production towards goods for which the terms of trade are relatively stable. They find this relationship to be particularly strong for developing and emerging markets.

Rother (2004) emphasizes the link between fiscal policy and inflation volatility. He finds that activist fiscal policies, measured as the volatility of discretionary fiscal policies, have contributed to inflation volatility in a panel of 15 OECD countries during the period 1967 to 2001.

Aisen and Veiga (2006) provide evidence for a link between political instability and inflation volatility. On the basis of a panel data set covering around 100 countries in the period 1975-1999 they find that greater political instability, lower economic freedom and higher degrees of ideological polarization and political fragmentation contribute to higher inflation volatility.

3. Empirical Approach and Results

Inefficient information pooling in case of small MPCs, or coordination problems in case of large MPCs tend to worsen the performance of monetary policy. The loss in performance is likely to be reflected not so much in the average inflation level but primarily in a higher volatility of inflation. This point is particularly apparent when referring to central banks that pursue an inflation targeting strategy. As a rule, one would not expect that the number of committee members will have a systematic effect on the inflation target itself, whereas a number of members that deviates from the optimum and produces inefficient responses to external shocks tends to be reflected in larger deviations of inflation from the target rate.

Concerning the measure of inflation volatility, there are different approaches in the literature. One approach is to measure volatility by the standard deviation of inflation, or a log transform of the standard deviation (e.g. Bowdler and Malik (2005)). A problem of using standard deviations as measure of inflation volatility, however, exists when the mean of inflation is not constant over the period for which it is calculated and when the data exhibit a secular trend (Bowdler and Malik 2005, p. 10). A second approach which has been suggested by Judson and Orphanides (1999) measures volatility by the intra-year standard deviation of inflation instead of the inter-year standard deviation. Since the mean of inflation tends to change less

[2] Another strand of the empirical literature has been concerned with the effects of inflation volatility. This literature builds on Friedman´s (1977) hypothesis that inflation volatility has a negative impact on real variables. Levi and Makin (1980) find support for the proposition that inflation variability reduces employment; Judson and Orphanides (1999) show that inflation volatility is negatively correlated with economic growth.

within a year than within a multi-year reference period, related distortions are likely to be reduced although not fully removed. In order to further remove the distortions that result from trend effects, the approach taken in this paper is to measure volatility by the standard deviation of trend-adjusted inflation rates where the trend is calculated using a Hodrick-Prescott filter. As in the previous studies mentioned above, we use quarterly year-over-year inflation rates.

Empirical studies of inflation volatility mostly do not use straight standard deviations, but their logarithmic transformation, the main reason being that this helps to down-weight the impact of extraordinary inflation shocks and hyperinflation episodes. Bowdler and Malik (2005) propose to add a constant of 1 to the standard deviation before taking the log to avoid the disadvantage of the simple log form which tends to overweight observations close to zero. In the subsequent empirical analysis we follow these authors and measure inflation volatility VOLINF as: ln (1 + SD (INFTA)), where SD (INFTA) denotes the standard deviation of trend adjusted inflation rates .

Table 1 shows the volatility of consumer price inflation in the period 2000 - 2005 for 75 countries with a monetary policy committee. As can be seen, volatility is lowest for the Euro Area, followed by Japan and Switzerland, while the highest levels are obtained for Lesotho, Ecuador and Belarus.

Table 1: Volatility of inflation (standard deviation of quarterly year-over-year inflation rates, trend adjusted) 2000-2005.

Low volatility		Medium volatility		High volatility	
Country	**Standard deviation**	**Country**	**Standard deviation**	**Country**	**Standard deviation**
Euro Area	0.22	Latvia	0.76	Israel	1.21
Japan	0.27	Trinidad and	0.77	Seychelles	1.26
Switzerland	0.31	Malta	0.79	Egypt	1.26
Denmark	0.35	Croatia	0.83	Armenia	1.30
Saudi Arabia	0.39	Czech Republic	0.84	Slovak Republic	1.33
Malaysia	0.41	Lithuania	0.85	South Africa	1.34
Slovenia	0.45	Peru	0.85	Brazil	1.36
Colombia	0.45	Hungary	0.88	Romania	1.38
Belize	0.49	Tonga	0.90	Uganda	1.45
United Kingdom	0.49	Estonia	0.91	Solomon Islands	1.45
New Zealand	0.50	Tanzania	0.91	Indonesia	1.56
United States	0.50	Guyana	0.92	Sri Lanka	1.59
Sweden	0.54	Nepal	0.93	Malawi	1.63
Bhutan	0.55	Pakistan	0.95	Papua New Guinea	1.73
Aruba	0.57	Macedonia	0.95	Kyrgyz Republic	1.86
Singapore	0.58	Albania	0.96	Sierra Leone	1.87
Canada	0.59	Barbados	0.99	Venezuela	1.94
Mexico	0.62	Iceland	1.01	Nigeria	1.97
Honduras	0.66	Poland	1.06	Moldova	2.07
Chile	0.68	Botswana	1.09	Madagascar	2.27
Cyprus	0.69	Russian Federation	1.09	Turkey	2.40
Australia	0.69	Mauritius	1.11	Argentina	2.51
Norway	0.72	Kazakhstan	1.15	Lesotho	2.62
Vanuatu	0.74	Philippines	1.15	Ecuador	2.80
Kuwait	0.74	Bulgaria	1.16	Belarus	3.35

To assess the impact of MPC size on inflation volatility in the period 2000:1 to 2005:4 we specify a equation for a cross-section regression analysis that links the volatility of inflation to a basic set of control variables (X) and a vector of variables related to the size of the monetary policy committee (MPC)

$$VOLINF = \alpha + \beta X + \lambda MPC + \varepsilon$$

With respect to the control variables we follow the previous literature and use a set of macroeconomic variables as well as variables for the exchange rate regime. The set of macroeconomic variables includes

- the level of the CPI inflation rate, which has been found to be a significant explanatory variable in previous studies (Bowdler and Malik 2005, Rother 2004)[3],
- the degree of openness, measured as the ratio of imports plus exports over GDP, which had a significant impact in the study by Bowdler and Malik (2005), and
- per capita GDP to cover effects related to the level of development; to exclude feedback effects of volatility on per capita GDP in the observation period 2000 -2005, we used per capita GDP levels of 1999. Developing countries may be subject to higher inflation volatility due to less developed fiscal systems (Rother 2004)[4]; another reason may be the relatively high share of (particularly volatile) food prices in the consumer price index of low-income countries.

With respect to the effect of MPC size we start from Sibert´s (2006) review of previous theoretical and experimental studies which suggests that the ideal monetary policy committee may not have many more than five members. In the regression we use two dummy variables to assess the effect of a downward or upward deviation from this benchmark (FIVEMINUS and FIVEPLUS, taking respectively a value of 1 if the number of members is below 5 or above 5). Moreover, we consider a dummy variable ODD which takes a value of 1 if the committee size is an odd number, and 0 otherwise, to test whether the higher decision efficiency of committees with an odd number of members – which is found in theoretical and experimental studies (e.g. Bales and Borgatta 1955) - is reflected in lower

[3] For a discussion of the theoretical link between inflation levels and inflation volatility see Taylor (1981) and Devereux (1989).

[4] We considered also fiscal indicators, but found that variables used by Rother (2004) for OECD countries were not available for a large number of developing countries which appear in our sample.

inflation volatility. Data on MPC size are obtained from Erhart and Vasquez (2007) and are shown in Annex 2.

Estimation results are reported in table 2, column (1) [5]. Turning first to the control variables, we find that the level of inflation (INF) has a significant positive effect on inflation volatility, thus confirming the result of previous studies. The effect of GDP per head is also significant and in line with the hypothesis that inflation volatility tends to be lower in more developed countries. The effect of openness is not significant, in contrast to the findings by Bowdler and Malik (2005) for the period up to 2000[6]. This observation can be related to a study by Bleaney (1999) according to which the robust negative correlation between openness and the level of inflation which was found in cross-country data for the 1970s and 1980s has disappeared in the 1990s. Our results suggest that the formerly robust correlation between openness and inflation volatility which was found by Bowdler and Malik, has disappeared as well in the recent years.

Table 2: Estimation Results

	(1)	(2)	(3)	(4)	(5)	(6)
CONSTANT	0.733 ***	0.726 ***	0.761 ***	0.721 ***	0.896 ***	0.866 ***
	(3.152)	(3.062)	(3.789)	(3.568)	(1.973)	(5.469)
FIVEMINUS	0.376 **	0.378 **	0.360 **	0.351 **		
	(1.948)	(1.940)	(1.905)	(1.875)		
FIVEPLUS	0.218		0.217	0.221		
	(1.392)		(1.388)	(1.434)		
SIXNINE		0.214				
		(1.349)				
NINEPLUS		0.235				
		(1.204)				
ODD	-0.054	-0.046	-0.065	-0.051		
	(-0.486)	(-0.380)	(-0.598)	(-0.474)		
GDPCAP99	-0.020 ***	-0.020 ***	-0.020 ***	-0.022 ***	-0.016 ***	-0.016 ***
	(-3.086)	(-3.067)	(-2.962)	(-3.411)	(2.596)	(2.609)
INF	5.760 ***	5.742 ***	5.701 ***	5.402 ***	5.889 ***	5.784 ***
	(4.517)	(4.451)	(4.576)	(4.270)	(4.520)	(4.493)
OPENNESS	0.018	0.017			0.057	0.062
	(0.159)	(0.155)			(0.505)	(0.572)
DUMFLOAT1			-0.002			
			(-0.016)			
DUMFLOAT2				0.104		
				(1.087)		
LNPOP					-0.003	
					(-0.127)	
DUMPOP						-0.129
						(-1.006)
Sample size	74	74	75	75	74	74
Adjusted R-squared	0.44	0.43	0.44	0.45	0.45	0.45

t-statistics are shown in parentheses.
**** (***) indicates significance at the five (one) percent level.**

[5] Honduras is excluded here since there are no IMF data on openness provided for this country.
[6] This result was also obtained when measuring inflation volatility on the basis of standard deviations of inflation rates (as in their study) rather than of trend adjusted inflation rates.

Turning to the variables for MPC size, we find that the effect of FIVEMINUS is significant and positive. This implies that countries with less than five MPC members tend to have higher inflation volatility. The coefficient of FIVEPLUS is positive, but not significant; this means that countries with more than five MPC members do not have a systematically higher inflation volatility. This results also applies when one splits the sample of countries with more than five MPC members into two groups: the first with six to nine members (SIXNINE) and the second with more than nine members (NINEPLUS). As can be seen in column 2 none of the two dummy variables proved to be significant in the respective regression. The insignificant (and positive) sign of SIXNINE also implies that there is no indication that countries with a few more that five MPC members have lower inflation volatility than countries with five members. The coefficient of ODD is insignificant in all regressions. Thus, while theory suggests an odd size for committees, we do not find that committees with an even number of members perform worse in respect to stabilizing the inflation rate.

In columns (3) and (4) we control additionally for the effects of the exchange rate regime on volatility. We introduce dummies for countries whose exchange rate system is classified as Floating (DUMFLOAT1), or as either Floating or Managed Floating (DUMFLOAT2). Theoretically, the effect of floating on the volatility of inflation is ambiguous: on the one hand, floating permits an autonomous monetary policy which tends to be conducive for the task of stabilizing inflation; on the other hand, floating tends to result in larger real exchange-rate fluctuations and thereby, to raise inflation volatility (Mussa 1983). As can be seen in columns (3) and (4), the two dummies for floating have no significant impact on inflation volatility, suggesting that both effects approximately offset each other.

As countries with less than five MPC members include some very small states (see annex 2), this may raise the question, whether the positive effect of the variable FIVEMINUS represents the effect of small country size on inflation volatility, rather than small MPC size. To account for this consideration, we ran additional regressions in which we replaced the MPC size variables by variables for population size, using two measures (a) the log of population LNPOP, and (b) a dummy DUMPOP for very small countries (less than 1 million inhabitants). The results are shown in columns (5) and (6). As can be seen, neither of the variables is significant. Small country size does not affect inflation volatility, whereas small MPC size does.

4. Conclusion

In this paper we went beyond the standard theoretical and experimental approaches to the determination of optimal monetary policy committee (MPC) size and analysed the empirical link between MPC size and inflation volatility. We find some support for the hypothesis that an MPC should not have less than five members: our regressions showed that countries with less than five MPC members tend to have larger deviations of inflation rates from their trend

than MPCs with five members. There is also some support for the earlier suggestion (Sibert 2006) that the ideal monetary policy committee may not have more than five members, since our results show that raising the number of MPC members above five does not contribute to a further reduction in inflation volatility.

Considering actual MPC size across countries, one finds that it is mostly above the number of five, and in some cases substantially above this number. Reducing the number towards five could bring benefits in form of reduced administrative costs, but one cannot expect that it would also provide more inflation stability. The empirical analysis in this paper suggests that central banks with more than five members do not show systematically different inflation volatility if compared to central banks with a five member committee.

This also suggests that in the range of MPC size which we see today, costs of coordinating decisions within an committee have not reached a level where they lead to an actual worsening of inflation performance. The most notable case is the European Central Bank which has the highest number of board members but also the lowest inflation volatility of the countries under consideration. The results of the present study, however, suggest that large MPCs could be reduced in size without negative consequences for the task of keeping inflation volatility low.

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Annex 1: Data source

Variable	Name	Source
GDP per capita	GDPCAP99	IFS.
Inflation	INF	IFS.
Openness	OPENNESS	IFS, OECD (2002).
Exchange rate regime	DUMFLOAT1 DUMFLOAT2	IFS.
MPC measures	FIVEMINUS FIVEPLUS ODD	Erhart and Vasquez (2007).
Population	POP	IFS.

Annex 2: MPC size

	Size "de jure"		Size "de jure"		Size "de jure"
Albania	9	Hungary	13	Pakistan	9
Argentina	10	Iceland	3	Papua New Guinea	1
Armenia	7	Indonesia	9	Peru	7
Aruba	1	Israel	1	Philippines	7
Australia	9	Japan	9	Poland	10
Barbados	7	Kazakhstan	9	Romania	9
Belarus	9	Kuwait	8	Russian Federation	13
Belize	7	Kyrgyz Republic	9	Saudi Arabia	5
Bhutan	5	Latvia	8	Seychelles	6
Botswana	9	Lesotho	8	Sierra Leone	7
Brazil	9	Libya	7	Slovak Republic	11
Bulgaria	7	Lithuania	5	Slovenia	9
Canada	6	Macedonia	9	Solomon Islands	9
Chile	5	Madagascar	1	Sri Lanka	5
Colombia	7	Malawi	7	Sweden	6
Croatia	14	Malaysia	12	Switzerland	3
Cyprus	7	Malta	1	Tanzania	10
Czech Republic	7	Mauritius	10	Tonga	7
Denmark	3	Mexico	5	Trinidad and Tobago	9
EuroArea	18	Moldova	5	Turkey	7
Ecuador	5	Nepal	7	United Kingdom	9
Egypt	15	New Zealand	1	United States	12
Estonia	10	Nigeria	11	Vanuatu	4
Guyana	6	Norway	7	Venezuela	7
Honduras	5	Oman	7		

Source: Erhart and Vasquez (2007).