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SUMMARY

By joining the European Union in May 2004, the ten new Member states (NMS) have committed themselves to also join the Eurozone when appropriate. The opting-out clause that allows the United Kingdom, Denmark and Sweden to stay away from the monetary union does not apply to them. In June 2004, three NMS (Estonia, Lithuania and Slovenia) joined the ERM2; in April 2005, three other NMS (Latvia, Malta and Cyprus) joined; in November 2005, Slovakia joined. These countries are likely to be part of the Eurozone by 2007-2008. Poland, Hungary and the Czech Republic, which are not yet part of ERM2, generally mention 2009-2010 as the target date for joining the Eurozone.

The question of monetary policy-making in an enlarged Eurozone was tackled by the European council of March 21 2003, which modified Article 10.2 of the Eurosystem's statutes. A system of rotation was adopted in order to limit to 21 the number of votes at the Governing council which is the decision body of the Eurosystem concerning monetary policy. With six members of the Executive board still being always entitled with a vote, this would leave 15 votes to be distributed amongst the governors of national central banks, hence amongst 25 governors when the Eurozone meets the frontiers of the present European union. The Council adopted a system of rotation of the votes within two or three groups of countries, depending on the total number of the Euro members.

This limitation in the number of national votes when a decision is under way aims at (i) allowing tractability of the decision-making despite the growing number of Member states, and (ii) guarantee that the decision meets the interest of the Eurozone as a whole despite the growing proportion of "small" member states which by construction have a small contribution in aggregate inflation of the zone.

The present paper aims at assessing the advantages of the new rules as far as the latter point is concerned. It also studies the implications of EMU enlargement for "old" EMU members under various decision rules, assuming national central banks adopt a nationalistic view of monetary policy. Although national governors are asked to embrace a euro-wide view of monetary policy, there is no guarantee that this is indeed the case (the minutes of the meetings are not published), and EMU enlargement will likely increase the risk of nationalistic views being represented within the Governing council.

To do so, we calculate "desired" interest rates for each member of the Governing council, on the basis of a 30-year long convergence process of both GDP per capita and price levels. Three different interest-rate rules are successively used to calculated "desired" rates: a Fisher rule, a truncated Taylor rule and a Taylor rule. Then the decision of the Governing council is provided by the median of desired rates amongst the voters entitled with a vote.

Our main result is that changing the decisional rule of the Governing council yields little impact on the outcome of the council. Indeed, the decided interest rate is generally the choice of the Executive board, whatever the number of national central bankers who are entitled to vote. After enlargement, however, the desired rate of the Executive board tends to be higher, leading to a loss for "old" Euro members on average. A second difference between the old decision rule and the new one is the possibility that the NCBs entitled to vote happening to be those asking for the lowest rates of the EU25. In this case, a majority of "old" Euro members can be better off with the new decisional system. However the probability for such scenario is very low. On the whole, the cost of enlargement for Euro12 countries will essentially lie in the higher interest rate desired by the Executive board. This cost is more pronounced if the UK, Sweden and Denmark stay out of the Eurozone, because these three countries have relatively low desired rates while the UK has a relatively high share in the Euro25 aggregates.

The frequency of the rotations needs still to be decided. Should rotations be relatively infrequent (say once a year), we argue that the system could end up close to a system of constituencies where the decision of the Governing council would result from a two-tier vote, first within each constituency and then between all constituencies and the Executive board. In such scenario, we show that the new rule could have a sizable impact on decided rates. In the case of a Euro25, the decided rate could be closer to the desired rate of core Euro12 members, whereas in the case of a Euro22 (without the UK, Sweden and Denmark), the choice of the Governing council could be titled towards smaller countries with higher inflation. This underlines the importance, for core Euro12 countries, of the UK, Denmark and Sweden joining the Eurozone before large NMS join.

Finally, in a Euro25, the (fast) rotation system which was decided by the European council appears acceptable by all Euro members because it is never the worse system. However, full centralisation (where the choice of the interest rate is left to the Executive board) would deliver the same results, with much lower transaction costs.

The results are shown to be robust to various types of interest-rate rules and various shocks on output gaps. They contrast with pure probabilistic analyses highlighting the loss of influence of the Executive board and of large Eurozone countries after EMU enlargement. This is because of the median position of the Board in terms of desired interest rates: the Board never asks for extremely low or extremely high interest rates, which ensure his influence within the Governing council despite declining voting power.

ABSTRACT

In this paper, we provide an assessment of the rotation rule decided by the European Council for the functioning of the ECB Governing council after EMU enlargement. Desired interest rates by each member of the Governing council are calculated on the basis of Fisher, truncated Taylor and Taylor rules successively, and on the basis of a convergence of both GDP per capita and price levels within the EU in 30 years. Then, various decision

rules are simulated. We show that moving from the "old" rule (where each member of the Governing council has a vote at each meeting) to the "new" one (where, at a given meeting, only 15 national governors have a vote) does not have much impact on the decisions made by the Governing council in an enlarged Eurozone. However, should rotations be relatively infrequent, the system could end up close to a constituency system. In this case, core Euro12 countries could be better off in a Euro25 than in the Euro12, because they would be in the position of imposing lower interest rates. However, core Euro12 would be worse off in a Euro22 compared to a Euro12 because high inflation countries would be able to impose higher interest rates. On the whole, in a Euro25, the (fast) rotation system which was decided by the European Council appears acceptable by all Euro members because it is never the worst system. However, full centralisation (where the choice of the interest rate is left to the Executive board) would deliver the same results, with much lower transaction costs.

Classification JEL: E58
Keywords: ECB Governing council, EMU enlargement, monetary policy, voting.

GOUVERNANCE DE LA BANQUE CENTRALE EUROPEENNE DANS UNE ZONE EURO ELARGIE

RÉSUMÉ

En rejoignant l'Union Européenne en mai 2004, les dix nouveaux Etats membres se sont engagés à entrer dans la zone Euro à plus long terme. La clause d'exemption, qui permet au Royaume-Uni, au Danemark et à la Suède de rester en dehors de l'Union Monétaire, ne s'applique pas à eux. En juin 2004, trois nouveaux Etats membres (l'Estonie, la Lituanie et la Slovénie) ont rejoint le SME bis; en avril 2005, trois autres pays membres (la Lettonie, Malte et Chypre) l'ont également rejoint, et la Slovaquie en novembre 2005. Ces pays sont susceptibles d'intégrer la zone Euro en 2007-2008. La Pologne, la Hongrie et la République tchèque, qui ne font pas encore partie du SME bis, mentionnent généralement l'horizon 2009-2010 pour intégrer la zone Euro.

La question du processus de décision de la politique monétaire dans une union monétaire élargie a été abordée au Conseil européen du 21 mars 2003, qui a modifié l'article 10.2 des statuts de l'Eurosystème. Un système de rotation a ainsi été adopté, dans le but de limiter à 21 le nombre de votes au Conseil des gouverneurs – l'instance de décision de l'Eurosystème en ce qui concerne la politique monétaire. Avec six membres du Directoire disposant chacun en permanence d'un droit de vote, il reste quinze votes à répartir entre les gouverneurs des banques centrales nationales, c'est-à-dire parmi 25 gouverneurs si la zone euro atteint les frontières actuelles de l'Union Européenne. Le Conseil a adopté un système de rotation des votes entre deux ou trois groupes de pays, selon le nombre de pays dans la zone euro.

Cette limitation du nombre de votes lors d'une décision vise à : (1) faciliter la prise de décision, malgré le nombre croissant de pays membres, et (2) garantir que la décision est compatible avec l'intérêt de la zone euro agrégée, et ce malgré la proportion croissante de "petits" états membres qui, par construction, contribuent peu à l'inflation agrégée de la zone.

On évalue ici les avantages et inconvénients de la nouvelle règle de décision au regard de ce second objectif. On étudie en outre les conséquences d'un élargissement de l'Union monétaire pour les anciens pays membres, avec différentes règles de décision, en supposant que les gouverneurs nationaux adoptent une vision « nationaliste » de la politique monétaire unique. Même si les gouverneurs nationaux sont supposés chacun agir en fonction de l'intérêt de la zone dans son ensemble, on ne peut pas prouver que tel est le cas aujourd'hui (les minutes des réunions ne sont pas publiques), et de toutes façons le risque que certains gouverneurs défendent l'intérêt de leur pays ne pourra qu'augmenter avec l'élargissement.

A cette fin, nous calculons des taux d'intérêt "souhaités" pour chacun des membres du Conseil des gouverneurs, avec pour hypothèse une convergence en 30 ans du PIB par habitant et des niveaux de prix au sein de l'Union européenne. Trois différentes règles sont successivement utilisées pour calculer les taux souhaités : une règle de Fisher, une règle de

Taylor tronquée et une règle de Taylor. La décision du Conseil des gouverneurs est alors prise à la médiane des taux souhaités parmi les membres disposant d'un vote.

Notre principale conclusion est que la modification de la règle de décision au Conseil des gouverneurs aura peu d'impact sur les décisions de politique monétaire. Le taux d'intérêt décidé est en général proche du taux souhaité par le Directoire, quelque soit le nombre de gouverneurs de banques centrales nationales disposant d'un vote. Avec l'élargissement, cependant, le taux souhaité par le Directoire est plus élevé, conduisant à une perte moyenne pour les anciens pays de la zone euro. Une seconde différence entre l'ancienne règle et la nouvelle tient à la possibilité que les banques centrales nationales disposant d'un vote soient celles ayant des taux souhaités les plus bas. Dans ce cas, la majorité des anciens pays membres peut gagner à ce nouveau système de votes, par rapport à l'ancienne règle. Cependant, la probabilité d'un tel scénario est très faible. Au total, le coût de l'élargissement, pour les anciens membres de la zone euro, tient essentiellement à la hausse du taux d'intérêt désiré par le Directoire. Ce coût est plus élevé si le Royaume-Uni, la Suède et le Danemark restent à l'extérieur de la zone, parce que ces pays souhaitent des taux d'intérêt relativement bas et parce que le Royaume-Uni pèse relativement lourd dans les agrégats de la zone.

La fréquence des rotations n'a pas encore été décidée. Avec une fréquence relativement faible (par exemple une fois par an), le système pourrait évoluer vers un système de circonscriptions où la décision du Conseil des gouverneurs se fait en deux étapes, d'abord par concertation à l'intérieur de chaque circonscription, puis par vote entre les circonscriptions. Dans un tel scénario, nous montrons que la nouvelle règle pourrait avoir un impact considérable sur les taux d'intérêt décidés. Dans le cas d'une zone euro à 25, le taux décidé pourrait être plus proche du taux désiré par les pays du coeur de l'Euro12, alors que dans le cas d'une zone euro à 22 (sans le Royaume-Uni, le Danemark et la Suède), le choix du Conseil des gouverneurs pourrait être tiré en faveur de pays plus inflationnistes. Ceci souligne l'importance, pour les anciens membres de la zone euro, de voir le Royaume-Uni, la Suède et le Danemark rejoindre la zone euro avant les plus grands des nouveaux États membres.

Finalement, dans une zone euro à 25, le système de rotation (rapide) des votes décidé par le Conseil européen paraît acceptable par tous les États membres car ce n'est le système le pire pour aucun d'entre eux. Cependant, la centralisation complète (qui laisserait au Directoire le soin de fixer le taux d'intérêt) aboutirait aux mêmes choix, avec beaucoup moins de coûts de transaction.

Les résultats apparaissent robustes par rapport à la règle de détermination des taux d'intérêt désirés et par rapport aux chocs sur les écarts de production. Ils diffèrent des analyses purement probabilistes qui mettent en avant la perte d'influence du Directoire et des grands pays de la zone après l'élargissement de la zone euro. Ici, le Directoire adopte une position médiane en termes de taux d'intérêt désirés : il ne souhaite jamais ni des taux très bas, ni des taux très élevés, et c'est cela qui assure le maintien de son pouvoir au sein du Conseil des gouverneurs, malgré la baisse relative de ses droits de vote.

RÉSUMÉ COURT

Nous évaluons la règle de rotation décidée par le Conseil européen relative au fonctionnement du Conseil des gouverneurs après l'élargissement de la zone Euro. Les taux d'intérêt souhaités par chacun des membres du Conseil des gouverneurs sont successivement calculés à l'aide d'une règle de Fisher, d'une règle de Taylor tronquée et d'une règle de Taylor, avec une hypothèse de convergence en 30 ans du PIB par habitant et des niveaux de prix dans l'Union Européenne. Puis, différentes règles de décision sont modélisées. Nous montrons que le passage de l'ancienne règle (où tous les membres du Conseil des gouverneurs ont toujours un droit de vote) à la nouvelle règle (où, à une réunion donnée, seuls quinze gouverneurs nationaux ont un droit de vote) n'a pas grand impact sur les décisions prises par le Conseil des gouverneurs dans une zone euro élargie. Cependant, si la fréquence des rotations s'avérait relativement faible, le système pourrait dériver vers un système de circonscriptions. Nous montrons dans ce cas que les pays de du cœur de l'Euro12 pourraient bénéficier de l'élargissement à 25 États-membres parce qu'ils pourraient imposer des taux d'intérêt plus bas, mais souffrir d'un élargissement à seulement 22 États-membres (sans le Danmark, la Suède et le Royaume-Uni) parce qu'au contraire les pays à forte croissance et forte inflation seraient en mesure d'imposer des taux d'intérêt plus élevés. Finalement, dans une zone euro avec 25 pays, le système de rotation (rapide) qui a été décidé par le Conseil européen semble acceptable par tous les États membres, parce que ce n'est la pire des règles pour aucun d'eux. Cependant, une centralisation complète (où le Directoire choisirait seul le taux d'intérêt) donnerait les mêmes résultats, et ce avec des coûts de transaction bien inférieurs.

Classement JEL : E58
Mots Clés : Conseil des gouverneurs de la BCE, élargissement de la zone euro, politique monétaire, vote.

ECB GOVERNANCE IN AN ENLARGED EUROZONE

Agnès Bénassy-Quéré[(*)] *and Edouard Turkisch*[(**)]

1. INTRODUCTION

By joining the European Union in May 2004, the ten new Member states (NMS hereafter) committed to also join the Eurozone when appropriate. The opting out clause, that allows the United Kingdom, Denmark and Sweden to stay away from the monetary union, does not apply to them. In June 2004, three NMS (Estonia, Lithuania and Slovenia) joined ERM2; in April 2005, three others (Latvia, Malta and Cyprus) joined; in November 2005, Slovakia joined. These countries are likely to be part of the Eurozone by 2007-2008. Poland, Hungary and the Czech Republic, which are not yet part of ERM2, generally mention 2009-2010 as the target date for entering the Eurozone

The question of monetary policy-making in an enlarged Eurozone was tackled by the European Council of March 21, 2003, which modified Article 10.2 of the statutes of the Eurosystem.[1] A system of rotation was adopted in order to limit to 21 the number of votes at the Governing council which is the decision body of the Eurosystem concerning monetary policy. Although the ECB has stayed claiming that the decisions of the Governing council are made by consensus without use of any formal voting, reaching a consensus will become more difficult with enlargement, and the use of formal voting may become necessary (Berger and de Haan, 2002). With six members of the Executive board still being always entitled with a vote, this would leave 15 votes to be distributed amongst the governors of national central banks (NCBS), hence amongst 25 national governors when the Eurozone meets the frontiers of the present European Union. The European council adopted a system of rotation of the votes within two or three groups of countries, depending on the total number of the Eurozone.

This limitation in the number of votes when a decision is under way aims at (i) allowing tractability of the decision-making despite the growing number of Member states, and (ii) guarantee that the decision meets the interest of the Eurozone as a whole despite the growing proportion of "small" member states which by construction have a small contribution in Eurozone aggregate inflation.

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[1] See *Official Journal of the European Union*, 1.4.2003, (2003/223/EC).

The present paper tries to assess the advantages of the new rules as far as the latter point is concerned. It also studies the implications of the new decisional rules for individual member states.

The literature on Eurozone decision-making after EMU enlargement is rooted on researches on the balance of power between the "centre" (the Executive board of the Eurosystem, the Board of governors of the US FOMC) and the "periphery" (the national governors of the Eurosystem, the rotating presidents of US Federal Reserve district banks). For instance, von Hagen and Süppel (1994) show that decentralisation of monetary policy-making leads to inefficient monetary stabilisation; in addition, long-run inflation is shown to be higher if decentralisation of monetary policy coincides with a weak political centre, which is likely to be the case in a multi-country monetary union. Consistently, several papers[2] have noted that the US FOMC is more centralised than the European Governing council. The high weight of national governors in the Governing council is not harmful if national governors embrace a euro-wide view, as claimed by the ECB. However there is some (debated) evidence that US regional governors are at least partly influenced by regional considerations (Havrylesky and Gildea, 1995). Although similar behaviour cannot be examined for the European Governing council (since the minutes of the meetings are not published), the heterogeneity and multi-national features of the Eurozone are likely to increase the risk that national governors be influenced by national considerations. Furthermore, the risk is likely to increase with EMU enlargement.

Decentralisation of decision-making is benign in a homogenous monetary union, since regional and federal interest are likely to coincide, which, again, is less the case in the Eurozone than in the United States. Askoy, de Grauwe, and Dewachter (2002) consider a model where asymmetrical shocks on production and inflation, as well as asymmetric economic structures are potential sources of tension on the single monetary policy. Various rules of vote are then compared in terms of their capacity to bring the interest rate at its desired level for the Eurozone as a whole. They conclude that the decision-making rule with a Eurozone 12, implying that each governor plays a part in the decision process, is efficient. Indeed, the decision almost always follows the desired rate of the Executive board which by assumption has a euro-wide view (whereas national governors are assumed to follow national views). This is due to the median position of the Executive board regarding desired interest rates. Moreover, the correlations between the interest rates wished and decided are more important for the large countries, which is consistent with their weight in the aggregate of the zone.

With more national governors allowed to vote on monetary decisions, however, the weight of the Executive board and of large, core countries is reduced by construction. More specifically, enlarging the Eurozone to NMS carries the risk that a group of small, high inflation countries form a winning coalition against the interest of the countries forming the bulk of Eurozone GDP (Baldwin et al., 2000). Here we explore this possibility by simulating various voting procedures with various Eurozone perimeters.

[2] Dornbusch et al. (1998), Wynne (1999), Heinsohn and Steiger (2002, 2003), for instance.

Berger (2002) already studied the implications of Eurozone enlargement for the balance of power in the Governing council. He considers the decisions of the Governing council to be the result of a bargaining process between (i) old EMU members and new ones, and (ii) the Executive board and the group of all national governors. To the extent that new members have a higher inflation bias (stemming from higher output target), he concludes that centralisation is preferable to close the gap between economic and political weights, and that a weighted voting scheme or a rotation system perform better than the status quo. Still, the whole analysis focuses on the discrepancy between political weight and economic weight, with no regard of the outcome of monetary policy. Specifically, Berger does not account for the interest rate decided by the Governing council being the same as the Executive board's choice despite low power of the Executive board. Depending on the characteristics of newcomers, the Executive board and core EMU countries could *de facto* obtain the monetary policy they wish, despite the drop in their voting weight.

In turn, Fahrholz and Mohl (2004) study EMU enlargement through a voting-power analysis where the power of a player depends on his ability to move a losing coalition into a winning coalition. They find that the power of the Executive board shrinks from 59% in the Euro12 to 17% in the Euro25, applying the rotation system proposed by the ECB. Fahrholz and Mohl conclude that "fears of considerable loss of current EMU-members' influence on European monetary policy are well-founded" (p. 19). Again, however, the analysis does not account for the proximity of the players in terms of monetary policy needs: in Fahrholz and Mohl, Slovakia has the same probability of forming a coalition with Hungary as with Germany. In reality, high inflation countries will more likely form a coalition within themselves than with low inflation countries, as mentioned by Baldwin et al. (2000). This could sustain the power of core EMU countries and of the Executive board, provided they have enough voting rights to face high inflation countries. In brief, the nature of new comers (in terms of desired interest rates) is as important as their voting rights when analysing the impact of EMU enlargement.

Here we simulate various decision rules within four Eurozone perimeters: Euro12, Euro18 (12 plus Baltic countries, Slovenia, Cyprus and Malta), Euro22 (18 plus Hungary, Czech Republic, Poland and Slovakia) and Euro25 (22 plus Denmark, Sweden and the UK). We first calculate desired interest rates on the basis of Fisher, truncated Taylor and Taylor rules successively, and on the basis of a real and price convergence of all Euro25 countries towards the Euro12 aggregate within 30 years. Consistent with the literature, national governors are assumed to adopt nationalist views whereas the Executive board embraces a euro-wide view. The decided rate is then calculated as the median of all voting members of the Governing council. We compare the rotation rule with the "old" rule (where all national governors are entitled to vote) and with a system of constituencies.

The new decisional system is described in Section 2. Section 3 presents the methodology used to simulate the decisions of the Governing council. The various decision rules are compared in Section 4. Section 5 details the impact of Eurozone enlargement for Euro12 countries. Section 6 concludes.

2. THE NEW DECISION SCHEME

With 12 members in the Eurozone and 6 members in the Executive board (EB), the Governing council (GC) totalises 18 members. The new decisional system will apply when this number exceeds 21. The EB staying unchanged, this means that the new system will apply when there are more than 15 members in the Eurozone. From 16 to 21 governors, the voting rights for national governors will be fixed at 15, and these votes will rotate within two groups of countries: the group of the five largest countries, and the group of N-5 smaller countries, where N denotes the number of Euro members. Over 21 members, the number of votes for national governors will stay fixed at 15 but the rotation will then be organised within three groups of countries: the group of the five largest countries, the group of average-size countries totalising half the total number of governors (hence N/2), and the group of smaller countries (N-5-N/2 smallest countries).[3]

The size of each country will be assessed on the basis of a mix between GDP (5/6 of total weight), and total assets of monetary and financial institutions (1/6 of total weight). The classification of the countries in groups will be revised every five years. Based on 2002 data, the distribution of member states in the two or three groups is detailed in Table 1 for 18, 22 and 25 Member states.

The voting rights of each group of countries will be distributed in the following way. From 16 to 21 countries in the Eurozone, the first group (five largest countries) will have 4 voting rights and the second one (smaller countries) will have 11 voting rights. Votes will rotate within each group provided the frequency of the votes within the second group does not exceed that of the first group. In practice, the system of rotation may be postponed (upon a two-third majority of the Governing council, irrespective of whether members hold or not a voting right) until the number of countries in the Eurozone reaches 19 (Graph 1). From 22 members in the Eurozone, the votes will rotate within the first group (4 voting rights for 5 members), within the second one (8 voting rights), and within the third one (3 voting rights).

In any case, the EB will retain six voting rights. In case of a division of the votes, the President, also a member of the EB, would have the casting vote. In practice, consensus will still be sought, and the decisions will be made unanimously when possible. Hence the system will apply mainly in the case of large divergences of views within the GC.

[3] N/2 will be rounded up when necessary.

Table 1: distribution of member states in the three pools of voting rights, based on 2002 data

	Euro-18*		Euro-22	Euro-25
	Euro12 + Baltic countries + Cyprus + Malta + Slovenia		Euro12 + 10 NMS (UK, Sweden, and Denmark out)	EU25
Group 1	Germany	**Group 1**	Germany	Germany
4 voting rights	France	4 voting rights	France	United Kingdom
	Italy		Italy	France
	Spain		Spain	Italy
	Netherlands		Netherlands	Spain
Group 2	Belgium	**Group 2**	Belgium	Netherlands
11 voting rights	Austria	8 voting rights	Austria	Belgium
	Ireland		Ireland	Sweden
	Portugal		Poland	Austria
	Greece		Portugal	Denmark
	Luxemburg		Greece	Ireland
	Finland		Luxemburg	Poland
	Slovenia		Finland	Portugal
	Lithuania		Czech Republic	Greece
	Cyprus		Hungary	Luxemburg
	Latvia		Slovakia	Finland
	Estonia			Czech Republic
	Malta			Hungary
		Group 3		Slovakia
		3 voting rights	Slovenia	Slovenia
			Lithuania	Lithuania
			Cyprus	Cyprus
			Latvia	Latvia
			Estonia	Estonia
			Malta	Malta

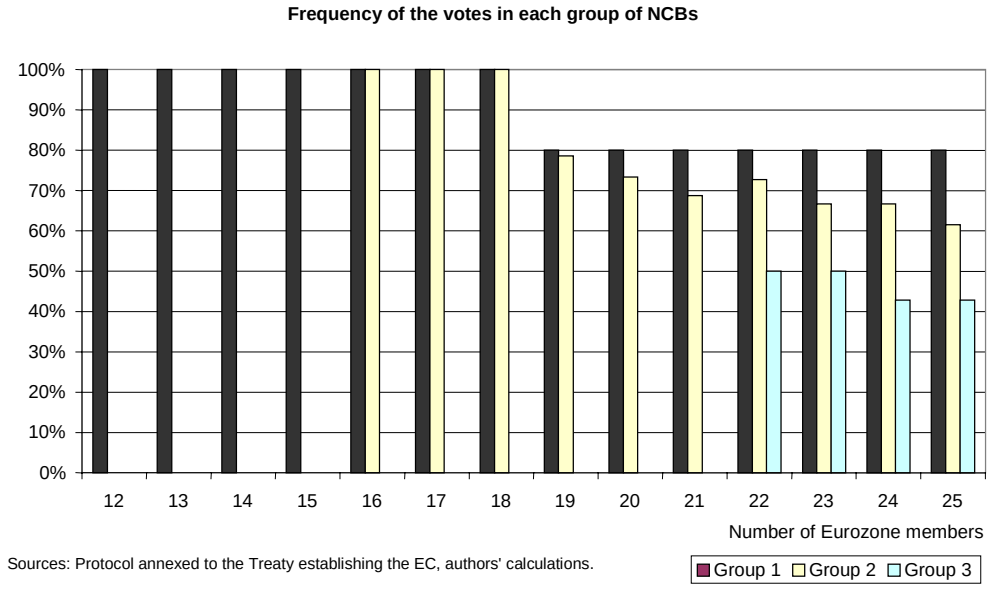
* In the Euro 18 case, the distribution of voting rights will likely not apply in practice, see the next.

Source : ECB, own calculations.

It should be noted that all national governors will still attend the meetings of the GC, but some of them will no longer be entitled to vote. The rotation system aims at allowing large economies to preserve their weight despite the enlargement which will mainly concern "small" countries, and despite the principle of one person-one vote. The frequency of vote for each NCB is obtained by dividing the number of voting rights of the corresponding group by the number of governors (see Graph 1). The frequency is higher for large countries (Group 1), for which it remains constant around 80% when the number of members rises from 19 to 25.

Finally, the sequences of rotation are left to the latitude of the ECB.

Graph 1



Sources: Protocol annexed to the Treaty establishing the EC, authors' calculations.

This new decision scheme, which was initially suggested by the ECB[4], was first rejected by the European Parliament in March 13, 2002[5], before being adopted by the European Council in March 21, 2003[6]. The Friedrich report (2003)[7] considered that the new voting system would be less transparent and less accountable, and not more efficient than the old one, since all governors would still take part in the debates, even without a voting right. The report recommended to delegate operational decisions to an enlarged EB while keeping the one member, one vote principle for institutional/strategic decisions within the Governing council, conditional on a demographic threshold (double-majority requirement).

[4] ECB, Recommendation, under Article 10.6 of the Statute of the European System of Central Banks and of the European Central Bank, for a Council Decision on an amendment to Article 10.2 of the Statute of the European System of Central Banks and of the European Central Bank (ECB/2003/1) (2003/C 29/07), http://www.ecb.int/ecb/legal/pdf/c_02920030207en00060011.pdf.

[5] See www.europarl.eu.int/activities/archive/ta/, P5_TA(2003)0094.

[6] Decision of the Council, meeting in the composition of the heads of states or governments of 21 March 2003 on an amendment to Article 10.2 of the Statute of the European System of Central Banks and of the European Central Bank (2003/223/EC), http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l_083/l_08320030401en00660068.pdf.

[7] Report on the proposal for a Council decision on an amendment to Article 10.2 of the statute of the European system of central banks and of the European central bank, A5-0063/2003, www.europarl.eu.int/activities/archive/reports/

Three other solutions for a reform of the decision scheme had been contemplated:[8] (i) weighted votes, (ii) centralisation, or (iii) a system of constituencies, such as that used at the International Monetary Fund.

(i) *Weighting* the votes of national governors would have required a modification of Article 10.2 of the Maastricht treaty (one member, one vote principle), which appeared politically complicated.

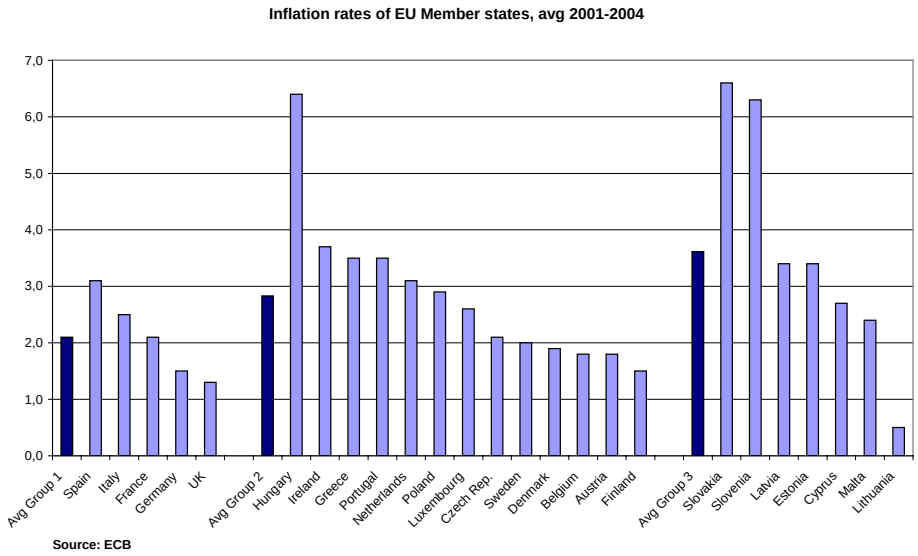
(ii) A system of *centralisation* would have attributed to the Executive board more power or even all power concerning monetary policy. Again, this would have required the revision of the Maastricht treaty. In addition, such a solution would have made the already-existing problem of accountability even more acute. One suggestion (Baldwin et al. 2000) was to centralise the conduct of monetary policy in the hands of the Executive board but leave the Ecofin council with the task to define the inflation target. Another suggestion, made by Gros (2003), was that the plenary GC meet only every quarter for strategic decisions, leaving the EB the responsibility for week-to-week monetary tuning. This proposal was close to the European Parliament (2003) one (see above).

(iii) Finally, a system of *constituencies* similar to that of the International Monetary Fund was also considered. Voting rights would have been distributed across several groups of countries, and only one representative of each group would have been entitled to vote (with a specific weight) at the GC, after consulting the members of his group. This system appeared relatively heavy since it would have implied pre-negociations within each group (see, for instance, Eichengreen and Ghironi, 2001; Berger, 2002).

The solution which was adopted is thus intermediate, and seems to account for the multiple constraints. Its resilience remains to be proven once confronted with the risks related to enlargement. More specifically, the three groups designed by the new system are based on size rather than inflation or growth. Although large countries tend to display relatively low inflation rates compared to smaller ones, intra-group heterogeneity could introduce some instability in the outcome of the votes since the latter will depend on which NCB in each group are entitled to vote at each time (see Graph 2).

[8] See Eichengreen and Ghironi (2001), Berger (2002).

Graph 2



3. METHODOLOGY

Here we assume that, when allowed to vote, each NCB adopts a nationalist view whereas the EB always takes an euro-wide view. This may appear an extreme assumption, since so far the GC has always been claiming that its members were all adopting a euro-wide view of monetary policy. However, as argued in the introduction, EMU enlargement will likely raise nationalist concerns within the Governing council. Conversely, there is no doubt that enlarging the GC produces little change in decision-making if each NCB member adopts an euro-wide view.

3.1 Desired interest rates

To simulate the votes, a model of "desired" interest rates is needed. Here we use a basic Taylor rule:[9]

$$i_k = r_k + \pi_k + 0.5(\pi_k - 2\%) + 0.5\, og_k \qquad \text{k = 1 to 25} \qquad (1)$$

[9] Taylor (1993). Of course, the Taylor rule may not correctly describe desired interest rates of EMU members. However national desired rates in EMU are unobservable, and observed interest rates before EMU are useless due to the structural change when joining the monetary union. Using the same rule for all countries and for the EB allows us to catch the pure impact of enlargement, as opposed to a change in preferences.

where i_k denotes the desired short term interest rate of country *k*, r_k its "neutral" real interest rate, π_k its inflation rate, og_k its output gap (defined as the discrepancy between GDP and potential GDP). The desired rate of the EB is defined the same way but with euro-wide aggregates instead of national ones.

We must account for desired interest rates being dependent on real and nominal convergence, the latter being a pre-condition for euro membership. Here we assume that both GDP per capita and price levels converge in 30 years; hence, this convergence will still be under way when the Eurozone is enlarged. Following the golden rule, the "neutral" level of the real interest rate is equal to the growth rate, which itself results from the catching-up process. In a similar way, average inflation for each country can be calculated by assuming that remaining price discrepancies across euro members progressively disappear in 30 years. Before joining ERM2, nominal exchange rate appreciation can bear part of the convergence; this is no longer the case in ERM2, and of course no longer the case either in EMU.

Here we proceed in three steps. Firstly, we only apply the first half of the Taylor rule which reduces to a Fisher equation:

$$i_k = r_k + \pi_k \qquad \text{(Fisher)} \qquad (2)$$

Secondly, we assume that countries with higher inflation will call for higher real interest rates, as represented by a truncated Taylor rule:

$$i_k = r_k + \pi_k + 0.5(\pi_k - 2\%) \qquad \text{(truncated Taylor)} \qquad (3)$$

In a final step, we introduce output-gap asymmetries in the analysis, as in the genuine Taylor rule:

$$i_k = r_k + \pi_k + 0.5(\pi_k - 2\%) + 0.5\, og_k \qquad \text{(Taylor)} \qquad (4)$$

In each case, we compare four decision rules:

1. **Centralisation**: the GC follows the EB view, i.e. everyone adopts an euro-wide view (no vote is required in this case);
2. **Old rule**: all NCBs have a voting right and vote according to their nationalist interest;
3. **New rule**: only 15 NCBs have a voting right and vote according to their nationalist interest;
4. **Constituencies**: the desired rate of each group of NCBs is assumed to be the median of the desired rates within the group; then, the decided rate of the GC is the weighted median of the three (or two) groups of NCBs and of the EB. Although this last decision rule was discarded in 2003, we believe a slow rotation of the votes (say, once a year) could show up close to it in practice.

We now turn to the assumptions used to calculate desired interest rates on the basis of equations (2), (3) and (4).

3.2 Neutral real interest rates

The neutral real interest rate is assumed to be equal to the long-run real GDP growth rate, consistent with the golden rule. A linear convergence of GDP per capita to the Euro12 level in 30 years is used to recover average growth rates of GDP per capita. Then, United Nations long-run forecasts concerning labour force growth are introduced. Hence the long-run growth rate of GDP in each country, g_k, is the following:

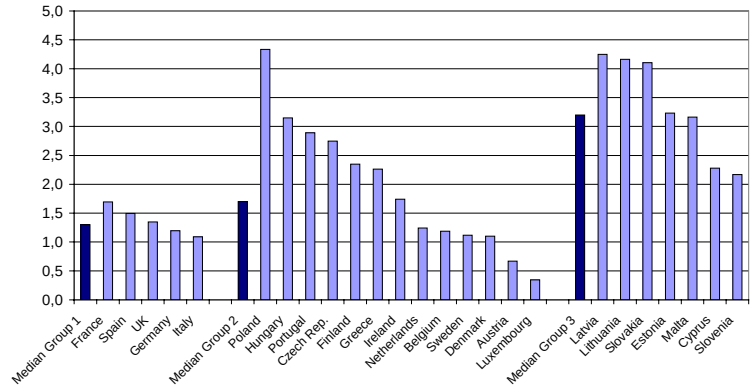
$$g_k = \left(\left(\frac{Y_{euro,2004}}{Y_{k,2004}} \right)^{\frac{1}{30}} * 1.02 - 1 \right) + n_k \qquad (5)$$

where n_k is the average yearly growth of the labour force in country k between 2004 and 2034, the growth rate of GDP per capita in the Euro12 is assumed to be 2% per year, $Y_{euro,2004}$ denotes the level of GDP per capita of the Eurozone in 2004, $Y_{k,2004}$ the level of GDP per capita of country k the same year, both in purchasing power parity.[10] The resulting growth rates are displayed in Graph 3. Growth rates are generally higher in Group 2 than for Group 1, and much higher in Group 3 than in Group 2. However Group 2 is more heterogeneous than the two other groups, with a number of countries displaying very low growth rates (less than 1.5% a year).

[10] The use of PPP levels is consistent with price convergence being accounted for as a separate effect. ECB data are used (see Appendix A).

Graph 3

Growth rates of EU Member states, avg 2004-2034



Sources: ECB and authors' calculations.

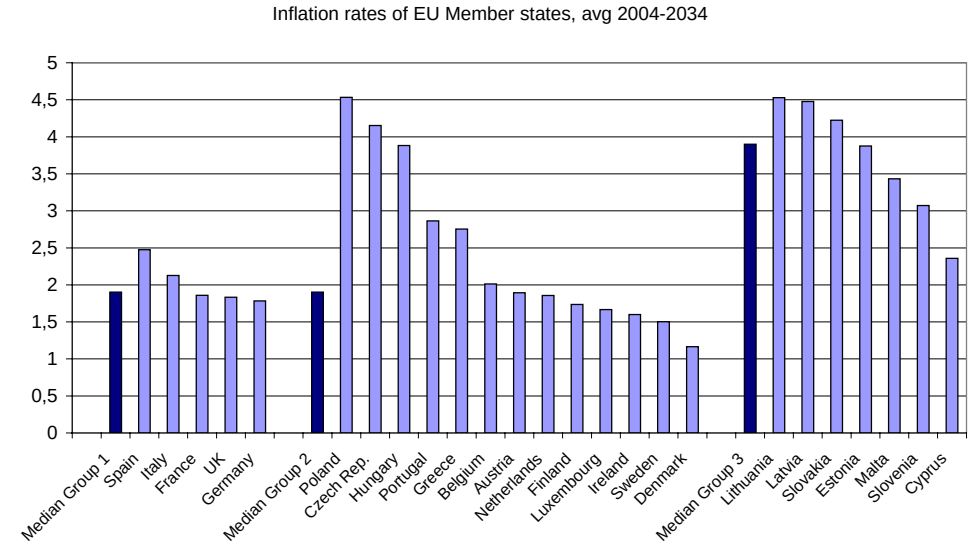
3.3 Inflation rates

Concerning inflation, we assume a complete, linear convergence of price levels towards the Euro12 level in 30 years, inflation in the Euro12 being 2% on average. Hence the average inflation rate of country *k* over 2004-2034 is given by:

$$\pi_k = \left(\left(\frac{P_{Euro,2004}}{P_{k,2004}} \right)^{\frac{1}{30}} * 1.02 - 1 \right) \qquad (6)$$

where $P_{\text{euro},2004}$ denotes the price level of the Euro12 in 2004 and $P_{k,2004}$ the price level of country *k* in 2004 (calculated on the basis of ECB data on GDP per capita in purchasing power parity and in current euros, see Appendix A). The resulting inflation rates are reported in Graph 4. Like for growth rates, average inflation is higher for Group 3 than for Group 2. However Median inflation rates are the same in Groups 2 and 1, although there is much heterogeneity within Group 2, with three large NMS displaying high inflation rates (over 3.5%).

Graph 4



Sources: ECB and authors' calculations.

3.4 Output gaps

By construction, the average output gap of each member state is zero. Hence, output gaps cannot impact on NCBs desired interest rates on average. However, to the extent that business cycles are asymmetric within the Eurozone, at each point of time differences in output gaps translate into differences in desired interest rates by NCBs. Here we successively consider four typical events in the Eurozone:

- A positive aggregate output gap for the EU25;
- A negative aggregate output gap for the EU25;
- A positive aggregate output gap for the NMS;
- A negative aggregate output gap for the NMS.

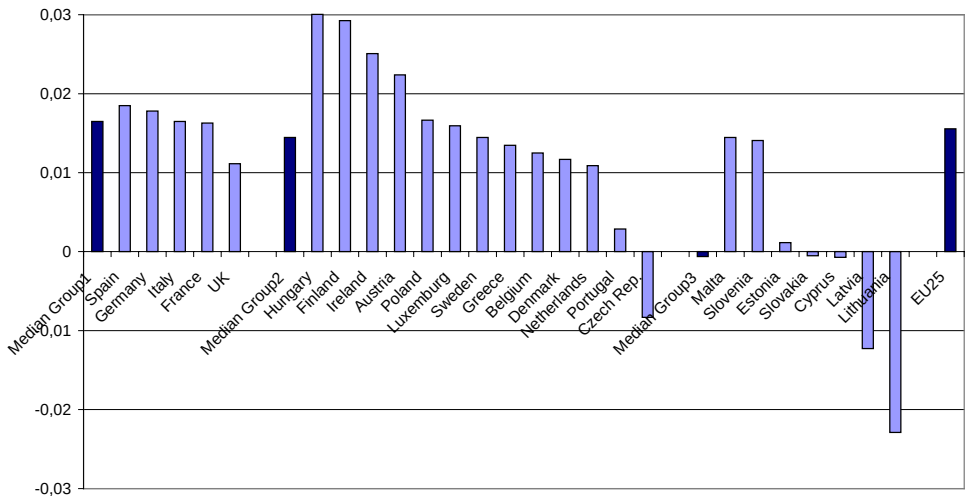
In each case, the size of the output gap (either positive or negative) is assumed to be one standard deviation. On the basis of the variance-covariance matrix of output gaps between each member state and the EU25, we recover the "typical" output gap of each member state when the EU25 is hit by a positive or negative shock. For instance, if the correlation between the Austrian output gap and the EU25 output gap is 0.70, it will be assumed that, when the output gap of the EU25 is $+\sigma_{EU25}$, then the Austrian output gap is $0.70\sigma_{Austria}$ where σ_{EU25} and $\sigma_{Austria}$ denote the standard deviations of the EU25 and Austrian output gaps, respectively. The general formula is the following, where $CORR_{EU25,k}$ denotes the correlation between the cyclical component of industrial production of each country and

that of the EU25 aggregate, calculated over 1995-2004[11], and α is a dummy variable which is equal to +1 in the case of a positive shock, -1 in the case of a negative one:[12]

$$og_k = \alpha \frac{\sigma_{EU25}\sigma_k CORR_{EU25,k}}{\sigma_{EU25}} = \alpha\sigma_k CORR_{EU25,k} \quad (7)$$

The resulting output gaps are displayed in Graph 5 in the case of a positive shock on the EU25 aggregate ($\alpha = +1$). The output gap of Group 1 countries (including the UK) is close to that of the EU25 aggregate, which is hardly surprising given the weight of these countries in the aggregate. Most Group 2 countries (with the exception of Portugal and the Czech Republic) also display positive output gaps. However Hungary, Finland and Ireland will call for relatively higher rates because their output gaps are more volatile. Finally, the situation is contrasted in Group 3 where only Malta and Slovenia are symmetric with the EU25 aggregate.

Graph 5: output gaps, positive shock on EU25



Sources: Eurostat, authors' calculations.

In the case of a shock on NMS, we calculate the aggregate shock on the basis of a shock on

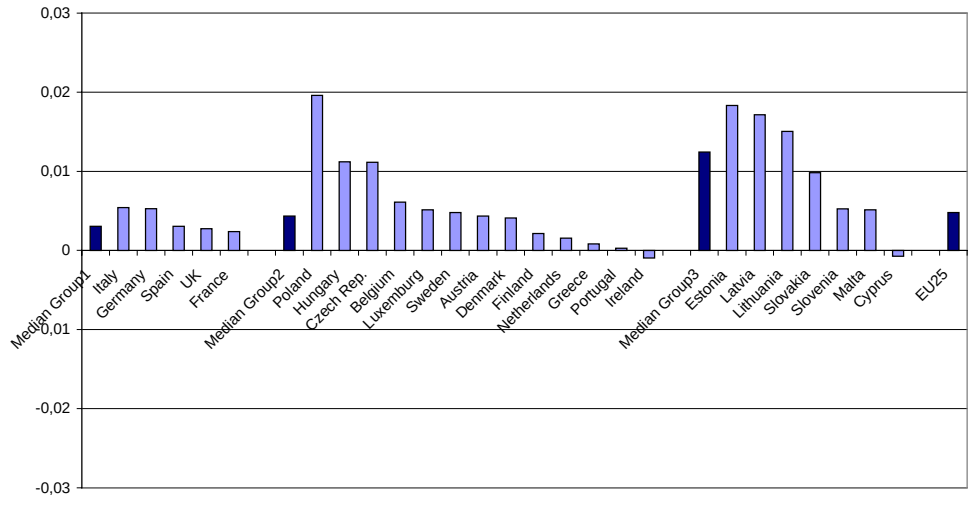
[11] Diseasonalised industrial production is used together with a Hodrick Prescott filter with a 500,000 smoothing parameter. For Malta, only annual data were available. Greek output gaps were used.

[12] Differentiating positive and negative shocks is useful since depending on the direction of the shocks, NCB desired interest rates will either converge or diverge.

each NMS of one standard deviation multiplied by the share of the corresponding country in the NMS aggregate, accounting for intra-NMS correlations. We then apply a generalisation of (7) where all cross-correlations are accounted for. The resulting output gaps are reported in Graph 6 in the case of a positive shock. Not surprisingly, Group 3 is the most concerned by the shock. Within Group 1, Germany and Italy are more concerned than the other three countries. The combined impact of the shock leads to a significant discrepancy between the median output gap of Group 1 and that of the EU25.

The inclusion of output gaps in the analysis is questionable because it is based on the variance-covariance matrix of national output gaps over the past. If national business cycles are to converge over time due to EU membership and later to euro membership, then our methodology tends to overplay the heterogeneity of desired interest rates stemming from business cycle asymmetry. However there is no simple way of forecasting business cycle convergence over the 2004-2034 period. This is the reason why using both Taylor rules (based on past business cycles) and truncated Taylor rules (which exclude business cycles from desired rates) in the analysis.

Graph 6: output gaps, positive shock on NMS



Source: Eurostat and authors' calculations.

3.5 Desired interest rates again

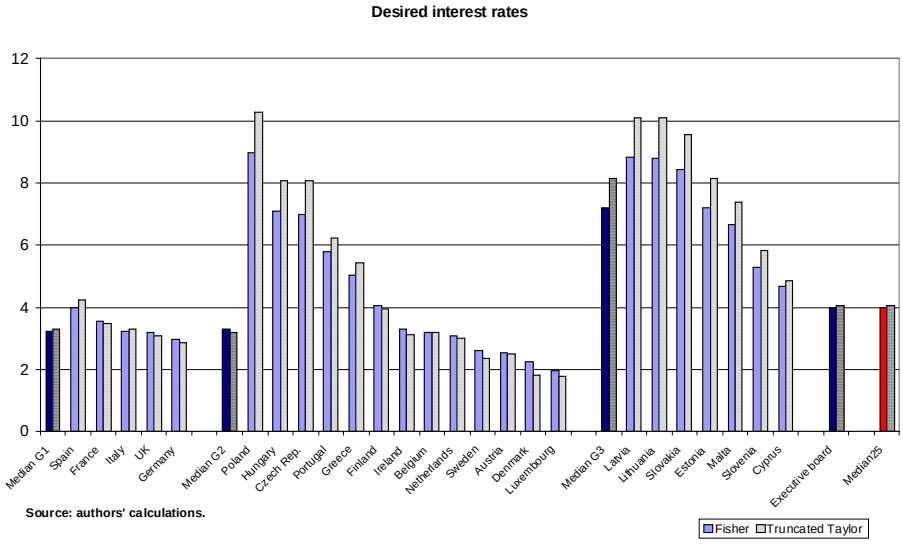
Desired interest rates can now be recovered following the three models listed in Section 3.1: Fisher, truncated Taylor, and Taylor. The desired rates for each country is displayed in Graphs 7 to 9, together with the median of each group. Not surprisingly, desired rates are higher in Group 3 than in Group 1. Interestingly, though, the median of Group 2 is very

close to that of Group 1. This is due to the large heterogeneity in Group 2: the number of countries calling for high interest rates is not large enough to bring the median of this group higher than that of Group 1.

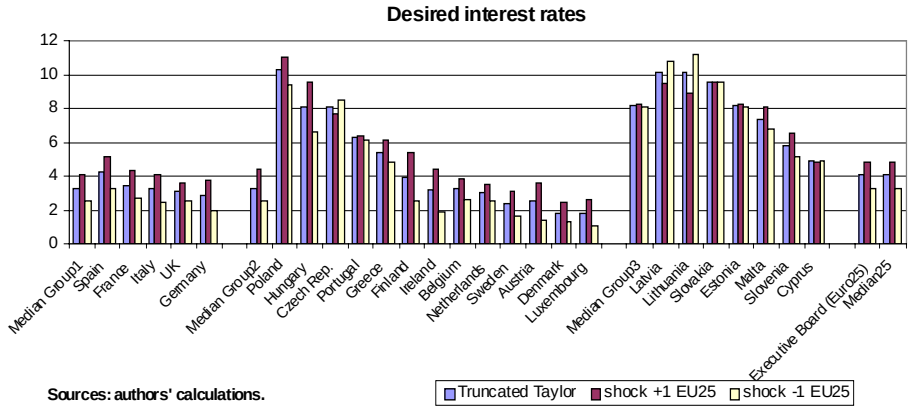
Accounting for output gap asymmetries does not change the broad picture. In the case of a negative shock on the EU25, Latvia, Lithuania and the Czech Republic ask for higher rates (because they face a positive shock) whereas a number of countries ask for no change in the interest rate (because they do not face any shock). Contrasting with Groups 1 and 2, the median of Group 3 does not decline, but Group 3 alone cannot have a strong impact on the final decision of the GC, as will be shown in the following. In the case of a shock in NMS, there is no marked divergence of views across the three groups concerning the direction of the interest-rate change.

The desired rate of the EB (which here embraces a Euro25-wide view) is also reproduced in the graphs. It lies in-between the choices of Groups 1-2 and Group 3. Finally, the median of the GC with 31 members (6 members of the EB plus 25 national governors) is displayed ("Median25"). The latter median represents the choice of the whole GC if all members have a vote, assuming there are no strategic votes. Strikingly, the choice of the GC if all members have a voting right is the choice of the EB. Using a Fisher rule, a truncated Taylor or a full Taylor rule does not change the picture.

Graph 7: desired interest rates, Fisher /truncated Taylor

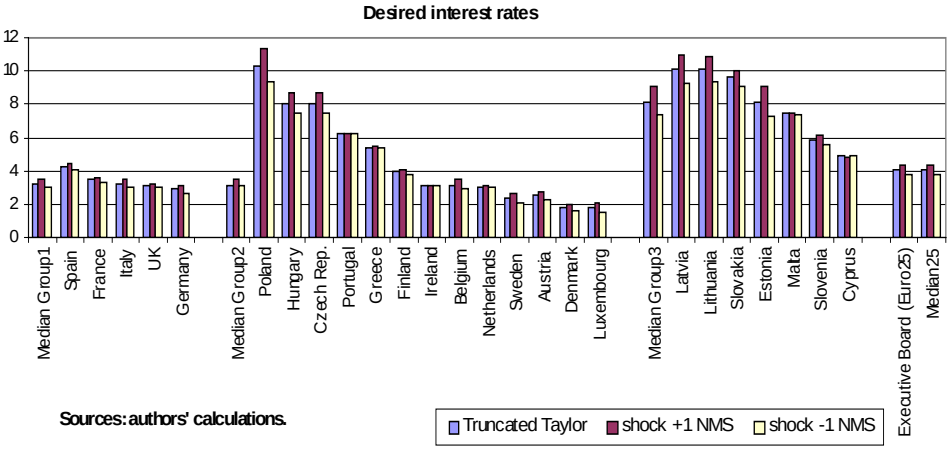


Graph 8: desired interest rates: Truncated Taylor/Taylor, shock on EU25



Sources: authors' calculations.

Graph 9: desired interest rates: Truncated Taylor/Taylor, shock on NMS



Sources: authors' calculations.

4. COMPARING DECISION RULES

Here we compare the outcome of various decision rules at the Governing council. We start with benchmark simulations which cover the centralisation case (where the interest rate is decided by the EB or by an euro-wide consensus) and the old rule (where all NCBs are allowed to vote). For the sake of comparison, we add two hypothetical rules: a "Euro12" rule where only "old" Eurozone members are allowed to take part in the vote (along with the EB), and a "weighted average" rule where the decided rate is a weighted average of all desired rates, the weights being in line with voting rights.[13] The latter case could correspond to a decision made by consensus after discussion where the influence of each national governor would be in line with the frequency of his voting right.

Then, the "new" rule is simulated. Since the sequence of rotations has not yet been decided, we simulate two polar scenarios. In the first one ("Median15 high"), voting NCBs happen to be those asking for the higher interest rates in each group; in the second one ("Median15 low") they happen to be those asking for the lowest rates in each group. Finally, we argue that a system of slow rotations (say once a year) could end up close to a constituency system where there would be preliminary votes within each group. We explore this last possibility.

In each case, we start with a Euro25 and then show what happens in the case of a Euro18 (Euro12 + Baltic countries + Slovenia + Cyprus + Malta) and in the case of a Euro22 (Euro12 + NMS10).

4.1 Benchmark simulations

Here we compare four decision rules: (i) centralisation ("Executive board"), (ii) old rule ("Median25"), (iii) Euro12-centered rule ("Median12"), (iv) weighted average. In all cases, the EB votes using EU25-wide aggregates (or EU22, or EU18, in the Euro22 and Euro18 scenarios). In the fourth rule, the decided rate is a weighted average of desired rates, the weights being based on voting frequencies within each group, i.e. 4/5 for countries in Group 1, 8/13 for those in Group 2 and 3/7 for those in Group 3 countries, each member of the EB being weighted 1.[14] None of these four rules correspond to the new voting system. They are used as benchmarks in the following.

Euro25

The results for a Euro25 are reported in Graphs 10 to 12. They show that enabling new national governors to take part in the vote (Median25 rule) does not change the result of the vote compared to leaving the choice to the EB (centralisation rule). This is because half of the countries have desired rates close or inferior to the desired rate of the EB: in the case of

[13] Note that our results cannot directly be compared to Berger (2002) where the weights used are the shares of member countries in GDP. For instance, the weights of NMS is higher in our analysis than in Berger.

[14] The weights are normalised so as to sum to unity.

a Fisher rule, for instance, the five members of Group 1 plus seven members of Group 2 wish interest rates that are lower than the EB desired rate. This makes 12 national governors voting for rates below the EB board choice, the remainder (13 national governors) voting for rates above the EB's choice. Hence the Board represents the median for a Governing council with 25 member states.

This situation contrasts with the result of a weighted vote. In this case, the interest rate shows up much higher than the EB's preference. This is because some small countries ask for very high interest rates (see Graphs 7 to 9). Although their weight is limited, there impact on the weighted average is sizeable.

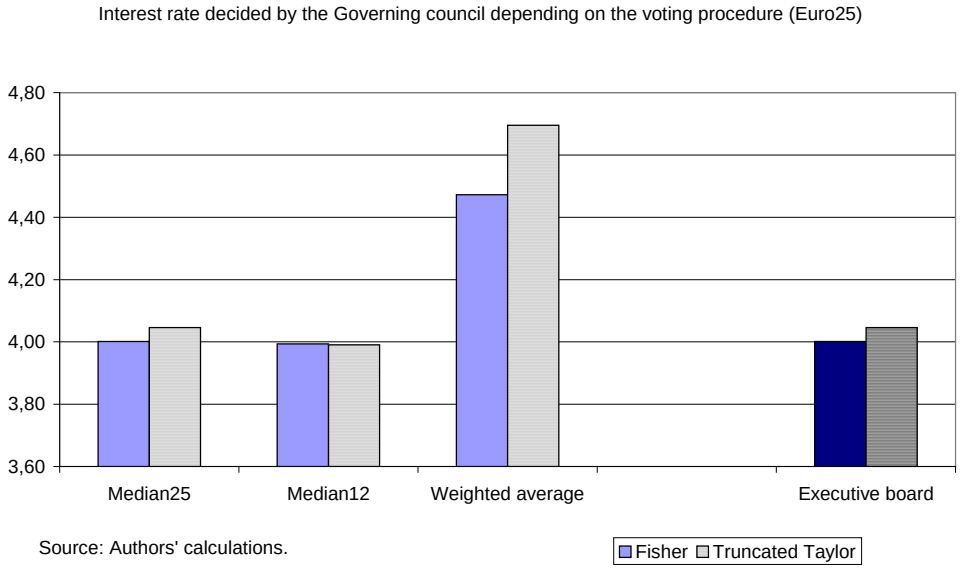
Finally, when only Euro12 members are entitled to vote (along with the EB), the decided rate is slightly lower than the EB's preference, especially when inflation differentials are accounted for (truncated Taylor, Taylor). The difference between Median25 (or EB) and Euro12 rules is negligible in the Fisher case; it amounts to 0.06 percentage point in the truncated Taylor case, rises to 0.1 percentage point in the case of a Taylor rule with a positive shock on NMS and reaches 0.3 percentage point in the case of a Taylor rule with a negative shock on the EU25.

In the case of a positive shock on the Euro25 output gap, the desired rate of the EB increases less than the Median12 one because the Euro25 output gap is less reactive than the Euro12 one (see Graph 5); hence an enlarged Eurozone decision making leads the desired rate of Euro12 countries, which is lower than that of other countries, to slightly converge towards the EB's choice which is the same as the decided rate of the Euro25. Conversely, in the case of a negative shock on the Euro25 output gap, a majority of Euro12 countries wants a larger rate cut than the EB's choice because their output gap is more reactive than that of the aggregate Euro25. Since their desired rate already lies below the EB's choice, the gap between Euro12 preferred rate and the decided rate rises.

In the case of a shock on NMS' output gaps, the reverse picture applies. Specifically, the gap between the decided rate of the Euro25 and the desired rate of the Euro12 rises in the case of a positive shock on NMS and falls in the case of a negative shock on NMS. In the latter case, for instance, the fall in the Euro12 desired rate is smaller than the fall in the EB's desired rate.

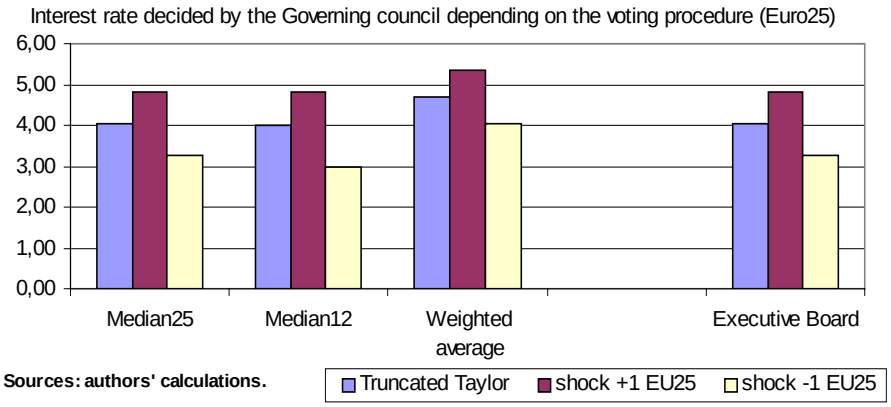
This varying gap between the desired rate of the EB and that of the Euro12 (Euro12 countries + EB) is one building block of the cost suffered by Euro12 countries when the Eurozone is enlarged to 25 countries. The second building block is the rise in the desired rate of the EB which amounts to 0.3-0.4 percentage point when moving from Euro12 to Euro25. Hence in the worst case (negative shock on the Euro25), Euro12 countries would suffer from a rise in the gap between their desired rate and the decided rate by 0.7 (0.3 + 0.4) percentage point.

Graph 10 : benchmark simulations, EU25, Fisher/truncated Taylor



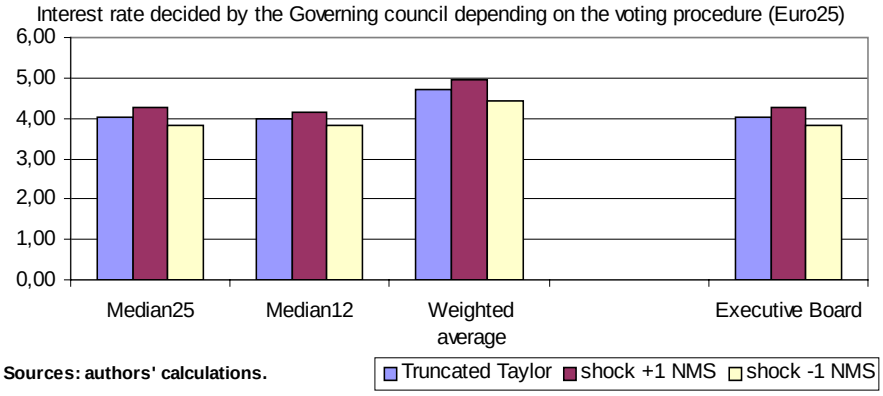
Source: Authors' calculations.

Graph 11 : benchmark simulations, EU25, truncated Taylor/Taylor, shock on EU25



Sources: authors' calculations.

Graph 12: benchmark simulations, EU25, truncated Taylor/Taylor, shock on NMS



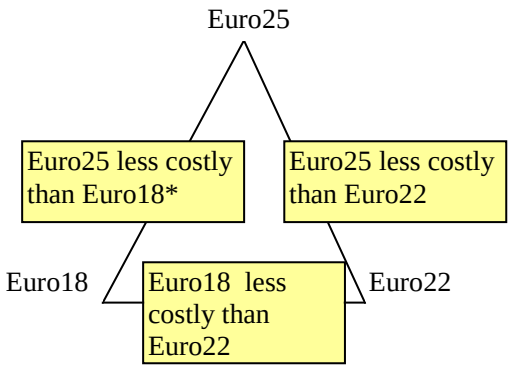
Sources: authors' calculations.

Euro22 and Euro18

These conclusions remain qualitatively unchanged when a Euro22 or Euro18 is contemplated. As shown in Appendices C and D, the result of a vote where all 22 or all 18 NCBs have a vote is exactly the same as the EB's choice (accounting for the fact that the desired rate of the EB is now calculated on a Euro22 or Euro18 aggregate rather than a Euro25 one).

Again, the Euro12 suffers from enlargement since the Median22 (i.e. the decided rate of the Euro22 within the "old" decision rule) and the Median18 (i.e. the decided rate of the Euro18 within the "old" rule) are always higher than the Median12. Interestingly, the gap between the Euro22 decided rate and the desired rate of Euro12 countries (the cost of enlargement for Euro12 countries) is larger than in the Euro25 case. It reaches 0.4 percentage point in the case of a positive shock on NMS and 1 percentage point in the case of a negative shock on the Euro25. Indeed, the cost of enlargement appears larger for Euro12 countries when the Eurozone is enlarged to 22 countries compared to either 25 or 18. This is because the Eurozone22 includes four high growth, high inflation countries (Poland, Hungary, Czech Rep., Slovakia) which happen to have more impact on decided rates within a Euro22 than within a Euro25 where the three additional countries (UK, Sweden, Denmark) have low desired rates and a large weight (UK). Consistently, a Euro25 appears less costly for Euro12 countries than a Euro18 scenario, thanks to the inclusion of Sweden, Denmark and especially the UK which have a sizeable impact on the desired rate of the EB. Graph 13 below summarises the cost of enlargement for Euro12 countries.

Graph 13: Cost of enlargement for Euro12 countries, old rule (gap between decided rate and desired rate)



* Euro25 and Euro18 are close to each other for Euro12 countries.

4.2 Rotating votes

We now consider rotating votes. In order to gauge the risk of Governing council's decisions being twisted towards higher or lower interest rates, we consider two polar scenarios. In the first one (Median15 high), the voting rights are allocated by chance to the members of each group displaying the highest desired interest rates; in the second one (Median15 low), they are allocated to the members of each group displaying the lowest desired interest rates. The selection of countries is detailed in Table 2, for a Euro25 and a Euro22. In the case of a Euro18, following a provision of the protocol annexed to the Treaty (see Section 2) the rotation system will likely be postponed because Group 1 would suffer from lower frequency than Group 2. Hence, the old rule still applies and all 18 national governors have a vote. We nevertheless explore two scenarios where only 15 national governors have a vote, but there are no rotations in Group 1 (hence all five members have a vote) whereas Group 2 is attributed only 10 votes (for 13 NCBs).[15] Finally, we also consider a system of constituencies where the decided rate is the weighted median of four rates: the median of each NCB group, and the desired rate of the EB.

[15] The selection of the countries is not reproduced in Table 2 because all simulations lead to the same result in the Euro18 case, see below.

Table 2: two polar scenarios (Fisher or truncated Taylor rule)*

	Eurozone25			Eurozone22		
	Group 1 (4 countries)	**Group 2 (8 countries)**	**Group 3 (3 countries)**	**Group 1 (4 countries)**	**Group 2 (8 countries)**	**Group 3 (3 countries)**
High rates	Spain France Italy UK	Poland Hungary Czech Rep. Portugal Greece Finland Ireland Belgium	Latvia Lithuania Slovakia	Spain France Italy Netherlands	Poland Slovakia Hungary Czech Rep. Portugal Greece Finland Ireland**	Latvia Lithuania Estonia
Low rates	France Italy UK Germany	Finland Ireland Belgium Netherlands Sweden Austria Denmark Luxembourg	Malta Slovenia Cyprus	France Italy Netherlands Germany	Czech Rep. Portugal Greece Finland Ireland Belgium Austria Luxembourg	Malta Slovenia Cyprus

* for Taylor rule, see Appendix B. ** Fisher case. For a truncated Taylor rule, Ireland is replaced by Belgium.

Source: Graph 7.

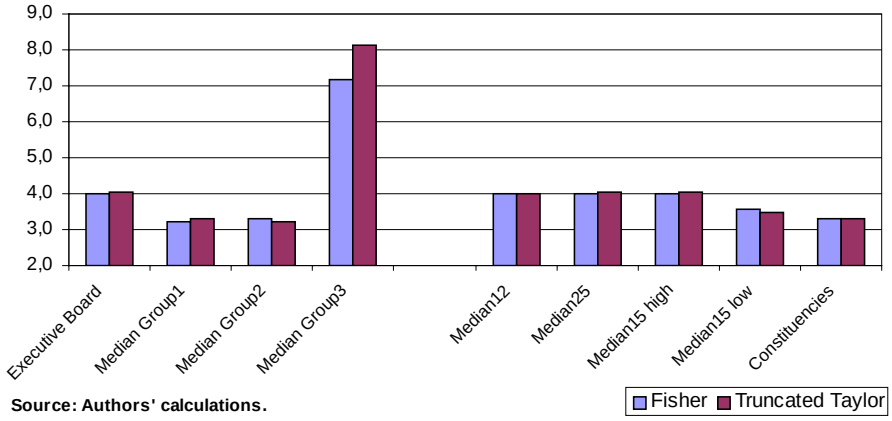
Euro25

The results for a Euro25 are displayed in Graphs 14 to 16. In the case the NCBs entitled with a voting right are those of each group calling for the highest rates (Median15 high), the results are exactly the same as when all governors have a vote (Median25) and close to the results with only Euro12 governors having a vote (Median12). However in the case only countries with the lowest desired votes have a voting right (Median15 low), the interest rate chosen by the GC is much lower. This means that the risk for the enlarged Eurozone is more of a low interest rate than of a high one. However this risk has a very small probability (basically, only very few drawings correspond to this scenario).

Interestingly, the constituency case can lead to decided rates that are lower than the Median15 low outcome. This is because the desired rate of the EB is higher than both the median of Group 1 and that of Group 2. Hence Groups 1 and 2 can together have the majority against the Board, despite the fact that some countries in Group 2 disagree with this choice. This situation can significantly favour the large core countries (Group 1) and the majority of Group 2 countries. For Euro12 countries, this fall in the decided rate (-0.4 to -0.7 percentage point compared to Median12) can usefully compensate for the rise in the desired rate of the EB in the Eurozone25 compared to the non-enlarged Eurozone (+0.3 to +0.4 percentage point, see *supra*).

Graph 14

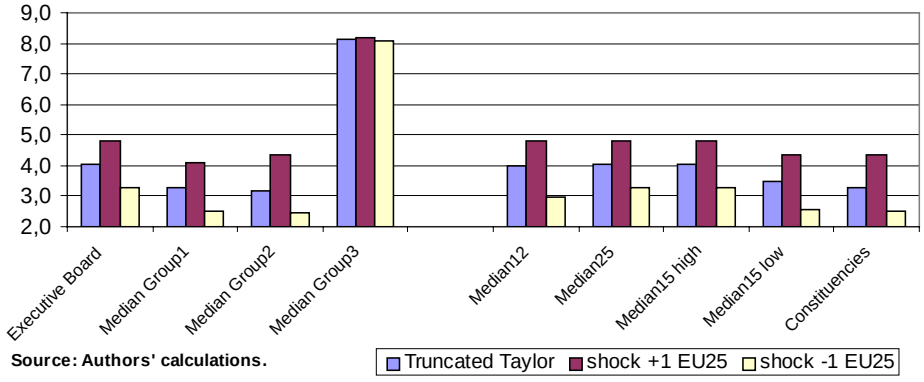
Interest rates desired and decided by Governing council depending on the voting procedure (Euro25)



Source: Authors' calculations.

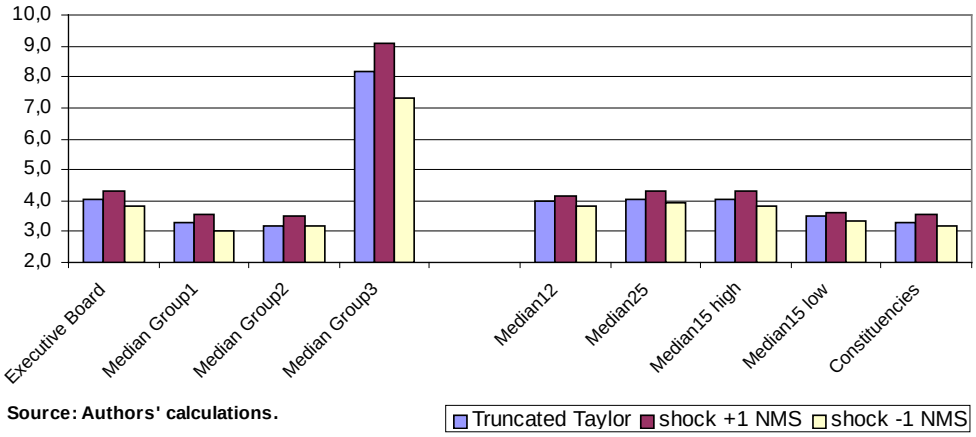
Graph 15

Interest rates desired and decided by Governing council depending on the voting procedure (Euro25)



Source: Authors' calculations.

Graph 16



Source: Authors' calculations.

Euro22 and Euro18

If UK, Denmark, and Sweden do not join the Eurozone (Euro22 case, see Appendix C), then the interest rate desired by the EB always lies between the median rates of Groups 1 and 2 (the median of Group 2 is higher than in the Euro25 case due to the absence of the Netherlands, Denmark and Sweden from this group, and to the presence of Slovakia, see Table 1). For the constituency rule, this leads to rates in favour of Group 2 (thanks to Group 3), and thus to a decided rate above the Board's choice. Thus, a low rotation of the votes could end up in decided rates that are higher than the desired rate of the EB, whereas in the Euro25 case, the decided rate in the constituency scenario tends to be lower than the desired rate of the Board.

Hence, too low sequences of rotations could be harmful for the aggregate Euro22 as for large core countries (Group 1). Compared to the Median12, the interest rate is much higher in all cases, the constituency case being the worse scenario. In the case of a negative shock on the Euro25, the gap between the Median12 desired rate and the decided rate in the constituency case amounts to almost 2 percentage points.

In the case of a Euro18 (Appendix D), the Board can impose its choice in all cases due to its high weight (6 votes out of 21) and median position in terms of desired rates. Interestingly, the Median12 desired rate is generally close to the decided rate. The maximum gap is 0.4 (in the case of a negative shock on the Euro25) which is much smaller than in the Euro22 scenarios.

Our results are summarised in Table 3. They show that, in the case of a Euro25, there is no difference between the new rule and the old one (and with complete centralisation of monetary policy), provided the sequence of rotations is fast. If the sequence is low, then the system will move close to a constituency system which would favour core Euro countries. However this result only holds for a Euro25. With only 22 countries in the Eurozone, a slow-rotation system would favour high inflation countries whereas a fast-rotation system would make no difference compared to the old rule. Finally, with only 18 countries in the Eurozone, all rules provide the same result as complete centralisation.

Table 3: summary results

	Old rule: all countries vote	New rule: fast rotations	New rule: slow rotations
Eurozone25	The Board imposes its choice, which is above but close to the rates desired by Group 1 and Group 2	The rule can lead to lower rates than the Board's one, in favour of large/core countries, but with a very small probability.	The rule can lead to much lower rates than the Board's one, in favour of large/core countries
Eurozone22	The Board imposes its choice, which lies in between the rates desired by Group 1 and Group 2	The Board imposes its choice.	The rule can lead to higher rates than the rate desired by the Board, in favour of Group 2.
Eurozone18	The Board imposes its choice, which lies in between the rates desired by Group 1 and Group 2	The Board imposes its choice.	The Board imposes its choice, which lies in between the rates desired by Group 1 and Group 2

For Euro12 countries, enlarging the Eurozone bears a cost which can be decomposed into (i) the rise in the desired rate of the Board and (ii) the change in the balance of powers. Type 1 cost is higher if UK, Sweden and Denmark stay out of the Eurozone. It amounts to 0.3-0.4 percentage point when enlarging from 12 to 25 members, 0.3-0.5 when enlarging from 12 to 18 countries, but 0.7-1.0 when enlarging from 12 to 22 members. Type 2 cost depends both on the perimeter of enlargement and on the frequency of the rotations. In the case of fast rotations, there is no additional cost related to the changing balance of power because the Board is always able to impose its choice. Only in the case of a Euro25 is there a very small probability that the decided be lower than the Board's desired rate. In the case of slow rotations, which could resemble a system of constituencies, Type 2 costs are relatively slow when enlarging to 18 countries. In the case of a Euro25, Euro12 countries could benefit from a system of constituencies since this would ensure a lower rate that would compensate for Type 1 cost. However such a system would be costly for Euro12 countries in a Euro22 because Groups 2 and 3 could together obtain higher rates than the Board's choice. Hence Euro12 countries would rather not suggest such a system before the participation of the UK, Sweden and Denmark is ensured.

We now turn to country-by-country consequences of Eurozone enlargement, focusing on Euro12 countries.

5. EURO12 LOSSES

Here we compare the enlargement losses for Euro12 countries, restricting ourselves to the Euro25 case and shocks to the Euro25 aggregate. More specifically, we calculate a loss function of each NCB which is the squared percentage discrepancy between its desired rate i_k and the rate which is selected by the Governing council, i:

$$L_k = 100 \times \left(\frac{i_k - i}{i_k} \right)^2 \tag{8}$$

Here unweighted average losses of Euro12 countries are compared before and after enlargement. Before enlargement, all Euro12 NCBs have a voting right and the desired rate of the EB is calculated on the basis of Euro12 (not Euro25) aggregates. After enlargement, not all Euro12 NCBs have a vote, some non-Euro12 NCBs also have a vote and the EB's vote is based on the Euro25 aggregate. Hence here both Type 1 and Type 2 costs of enlargement are covered. Graphs 17 and 18 compare the additional loss for Euro12 countries when enlarging the Eurozone across various decision rules:

$$AddLoss = 100 \times \left(\frac{\sum_{k=1}^{12} L_k(Euro25)}{\sum_{k=1}^{12} L_k(euro12)} - 1 \right) \tag{9}$$

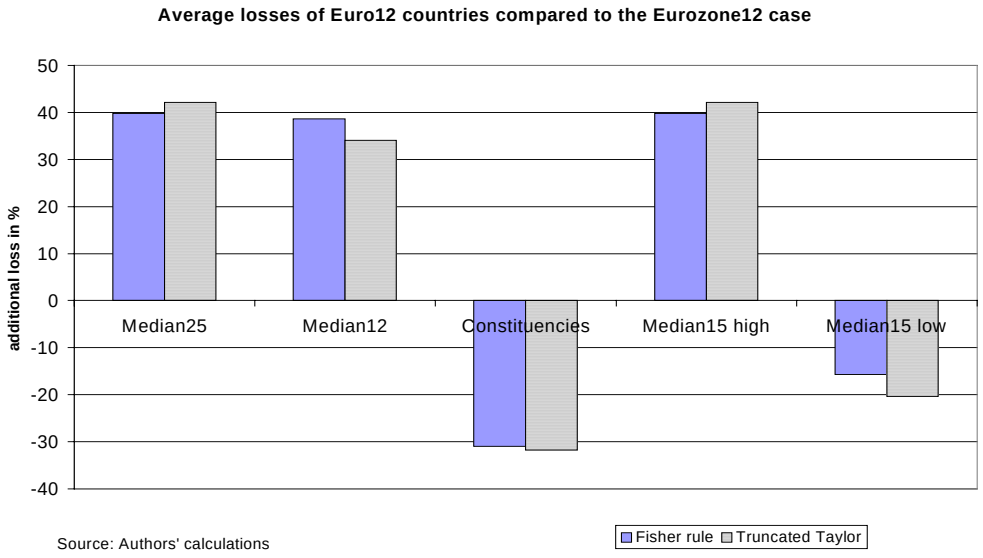
The loss is generally similar whether, in the enlarged Eurozone, all 25 NCBs are entitled to vote (Median25 scenario) or whether only the initial 12 Euro members vote (Median12). Hence, as already mentioned, the loss mainly comes from the shift in the EB vote which raises its desired rate when the Eurozone is enlarged. This confirms that Type 2 (balance of power) costs are relatively small compared to Type 1 (change in Euro aggregates) costs, for a Euro25. There is one exception, when a negative shock on the EU25 occurs. This shock triggers a divergence between Euro12 countries and EB desired rates, which increases the cost of enlargement.

The Median25 rule, where all 25 NCBs are entitled to vote, yields the same results as the Median15 high rule, where only 15 NCBs have a vote and where these NCBs happen to be those calling for the highest rates. This means that, for old Euro members within a Euro25, the new rule cannot do worse than the old one, but it can do better in the very rare case when the NCBs entitled with a vote have low desired interest rates (Median15 low scenario).

Finally, the best rule for Euro12 countries would be a constituency rule, followed by a Median15 low one. Alas, the Median15 low rule has a very low probability of occurrence.

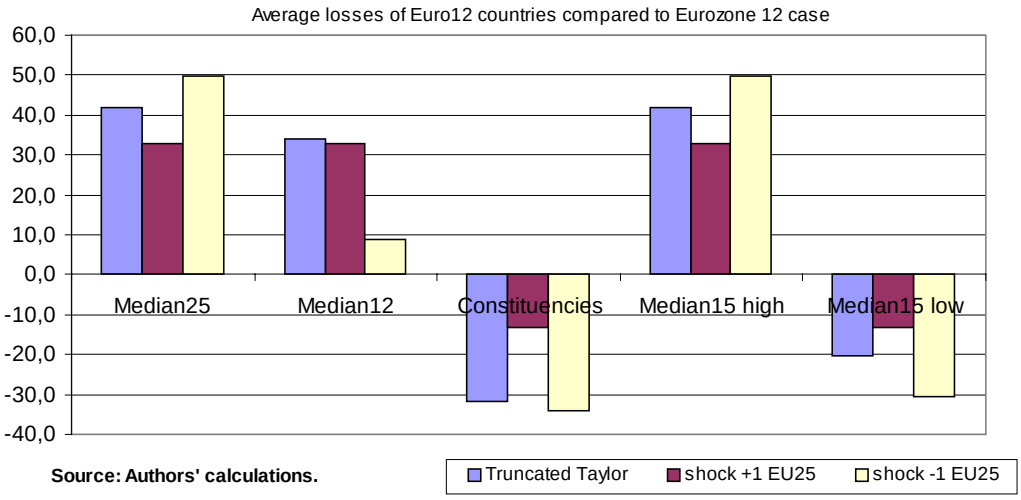
As for the constituency rule, we have seen that it is dangerous for Euro12 countries if before being enlarged to 25 countries, the Eurozone is enlarged to 22 countries, which is likely to be the case.

Graph 17: cost, for Euro12 countries, of enlarging the Eurozone (Fisher/truncated Taylor)



Source: Authors' calculations

Graph 18 : cost, for Euro12 countries, of enlarging the Eurozone (truncated Taylor/Taylor)

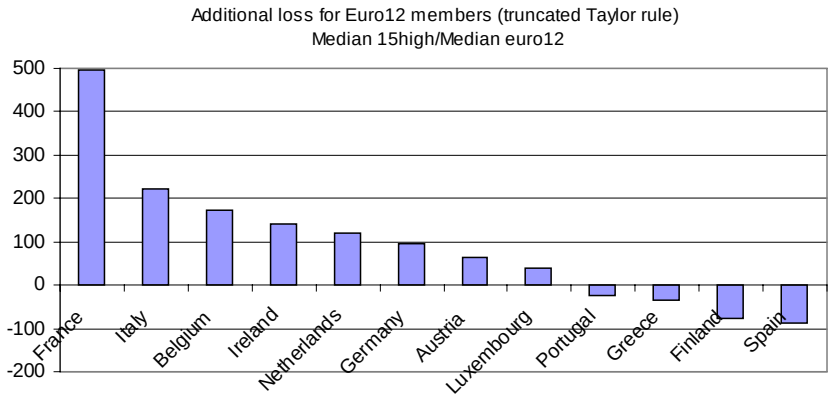


Source: Authors' calculations.

The additional loss for each Euro12 country is detailed in Graphs 19 and 20 in the Median15 high case (which is the same as the Median25 one) and in the constituency case, for a truncated Taylor rule.[16] In the case of fast rotations (Graph 19), France is by far the country suffering the most from Eurozone enlargement because the French desired rate is very close to the decided rate in the non-enlarged Eurozone. By contrast, Portugal, Greece, Finland and Spain gain from enlargement because the decisions of the Governing council are now closer to their needs.

The situation is opposite in the case of slow rotations (constituencies, see Graph 20): low growth countries (including Ireland which is assumed to have completed its catch up in 2004) are better off than in the non-enlarged Eurozone, whereas high growth countries (Finland, Spain, Greece and Portugal) are worse off. In a Euro25 scenario, these countries, together with the NMS, would clearly oppose a move from a fast-rotation system towards a slow-rotation (or constituency) one.

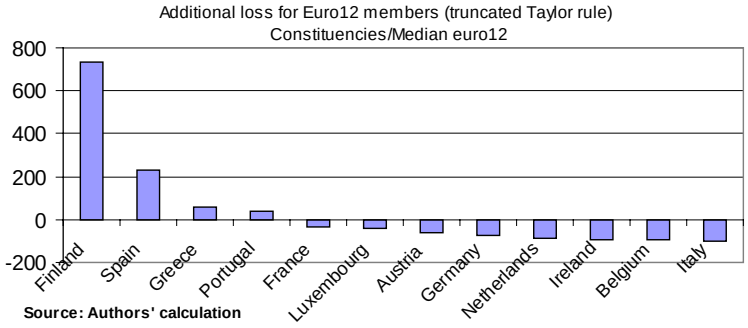
Graph 19: cost of enlargement for Euro12 member states (Median15 high scenario)



Source: Authors' calculation

[16] The results are similar with a Fisher rule (not displayed here).

Graph 20: cost of enlargement for Euro12 member states (Constituency scenario)



6. CONCLUSION

In this paper, we provide an assessment of the rotation rule decided by the European Council for the functioning of the Governing council once the Eurozone is enlarged to 18, 22 and 25 member states. First, desired interest rates by each member of the Governing council are calculated on the basis of Fisher, truncated Taylor and Taylor rules, successively, and on the basis of a convergence of both GDP per capita and price levels within the EU in 30 years. Then, various decision rules are simulated: the old rule where all Governing council members are entitled to vote at each meeting, the new rule where only 15 national governors are allowed to vote at a given meeting, a weighted average, a constituency system, and a complete centralisation of monetary policy where the Executive board decides on the interest rate. In order to gauge the losses incurred by old EMU members when the Eurozone is enlarged, we also simulate monetary policy before the enlargement, with the "old" rule.

The main results are the following. First, moving from the "old" rule to the "new" one does not have much impact on the decisions made by the Governing council in an enlarged Eurozone, should it be with 25, 22 or 18 members, because the median desired rate generally lies within the Executive board. Hence the cost of enlargement, for Euro12 countries, essentially lies in the higher interest rate desired by the Executive board. It is more pronounced if the UK, Sweden and Denmark stay out of the Eurozone, because the three outs have relatively low desired rates while the UK would have a relatively high share in Euro25 aggregates. Second, should rotations be relatively infrequent (say once a year), the system could end up close to a constituency system. In this case, core Euro12 countries could be better off in a Euro25 than in the Euro12, because Groups 1 and 2 would be in the position of imposing lower interest rates. However, core Euro12 would be worse off in a Euro22 compared to a Euro12 because Groups 2 and 3 would be able to impose higher

interest rates. This underlines the importance, for core Euro12 countries, of UK, Denmark and Sweden joining the Eurozone before large NMS countries join. Third, in a Euro25, the (fast) rotation system which was decided by the European Council is acceptable by all Euro members because it is never the worse system. However, full centralisation (where the choice of the interest rate is left to the Executive board) would deliver the same results, with much lower transaction costs.

The results are shown to be robust to various types of interest-rate rules and various shocks on output gaps. They contrast with pure probabilistic analyses highlighting the loss of influence of the Executive board and of large Eurozone countries after EMU enlargement. This is because of the median position of the Board in terms of desired interest rates: the Board never asks for extremely low or extremely high interest rates, which ensure his influence within the Governing council despite loss of voting power.

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Appendix A: the data

- **Industrial production**, 1994-2004 monthly, constant prices, deseasonalised. Source: Eurostat. For Malta, industrial production was not available, hence Greek output gaps were used. The sample starts in 1995 for Austria, Greece and Poland and 1998 for Hungary and Slovenia.

- **Inflation rates**, 2001-2004, year-on-year variation in percentage, source ECB.

- **GDP per capita in 2004**, in purchasing power parity: source ECB.

- **Price levels in 2004**: ratio of GDP per capita in current euros to GDP per capita in purchasing power parity. Source: ECB.

- **Labour force growth**, 2004-2034, average year-on-year variation in percentage. Source United Nations. For Cyprus, data were not available, hence we used Greek figures.

- **Country coverage**: 25 EU member states.

Appendix B: polar scenarios in the case of a Taylor rule, Euro25, shocks on EU25

Here we show the changes to be made in Table 2 when considering the case of the Taylor rule, with shocks on the aggregate Eurozone (25 countries)

- In the case of positive shock +1 on EU25 :

    - Median 15 high : Germany replaces the UK, but this will not change the decided rate for this rule, which will remain the desired rate by the Executive Board.

    - Median 15 low : the countries remain the same as in Table 2, and the decided rate stays below the rate desired by the Executive Board.

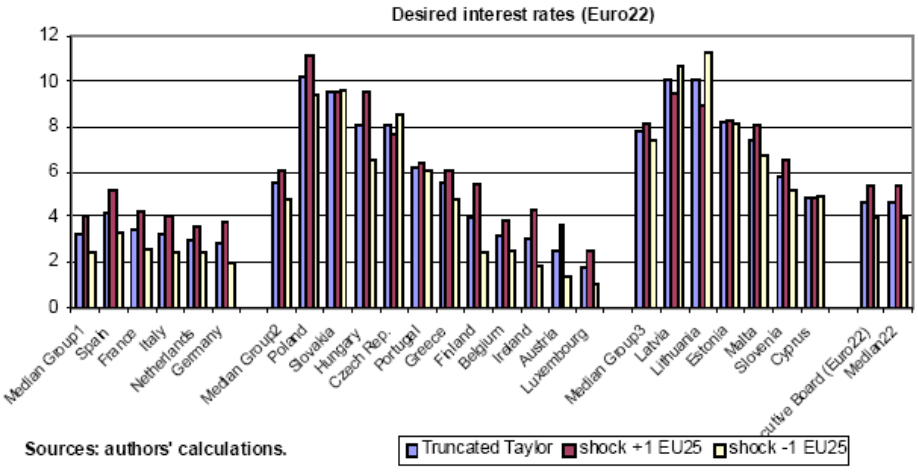
- In the case of negative shock -1 on EU25 :

    - Median 15 high : the Netherlands replaces Ireland, but the decided rate for this rule remains the desired rate of the Executive Board.

    - Median 15 low : the countries remain the same as in Table 2, and the decided rates stays below the rate desired by the Executive Board.

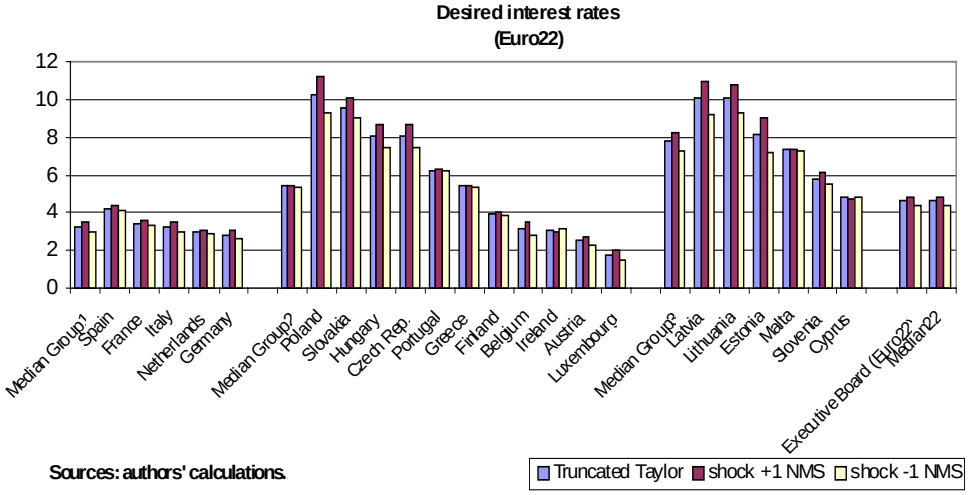
Appendix C: desired rates and decided rates in a Euro22

Graph C-1



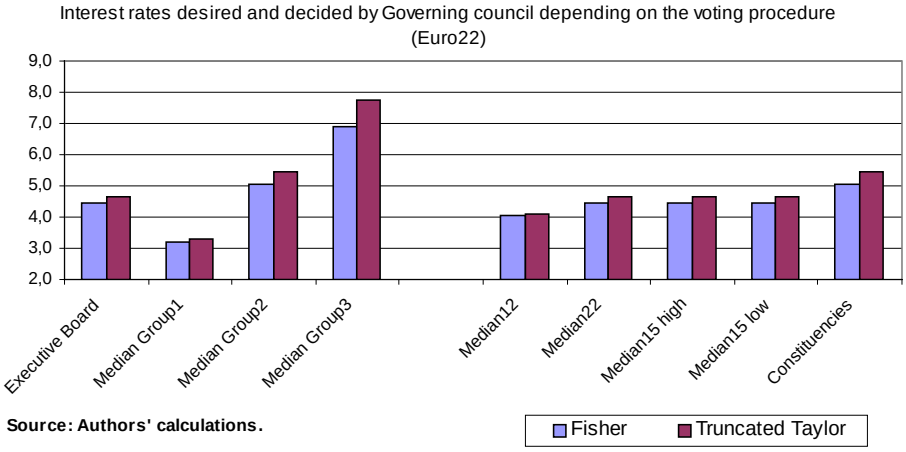
Sources: authors' calculations.

Graph C-2



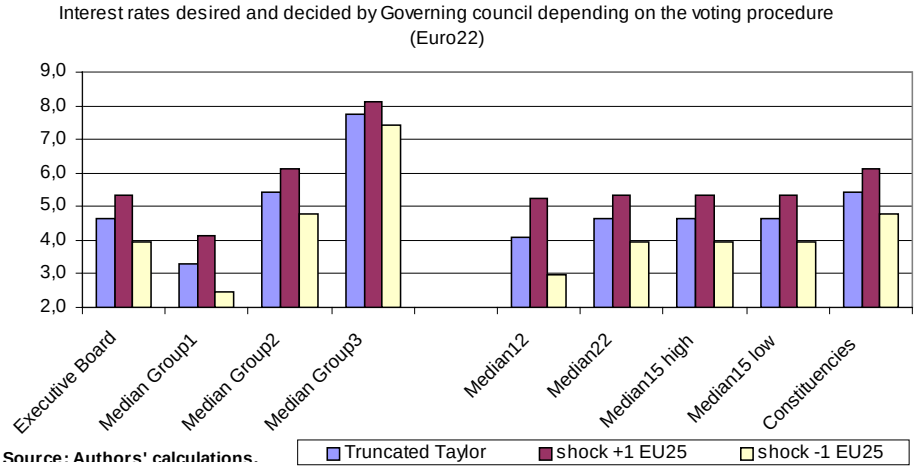
Sources: authors' calculations.

Graph C-3



Source: Authors' calculations.

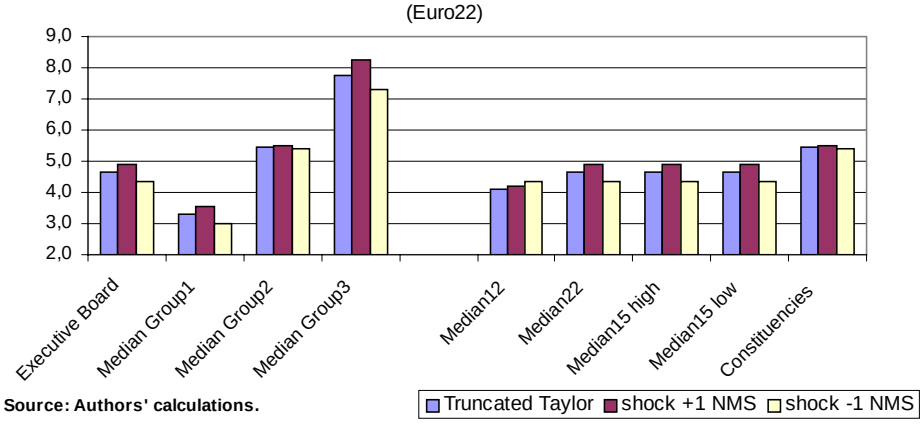
Graph C-4



Source: Authors' calculations.

Graph C-5

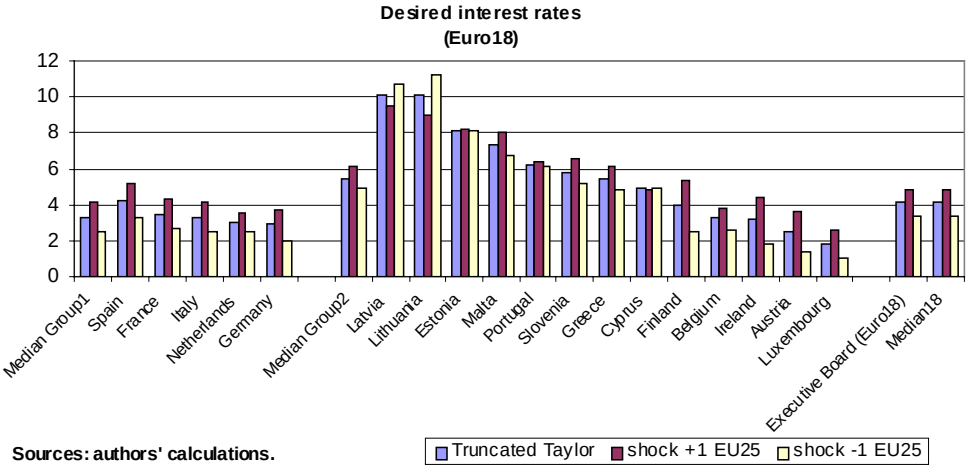
Interest rates desired and decided by Governing council depending on the voting procedure (Euro22)



Source: Authors' calculations.

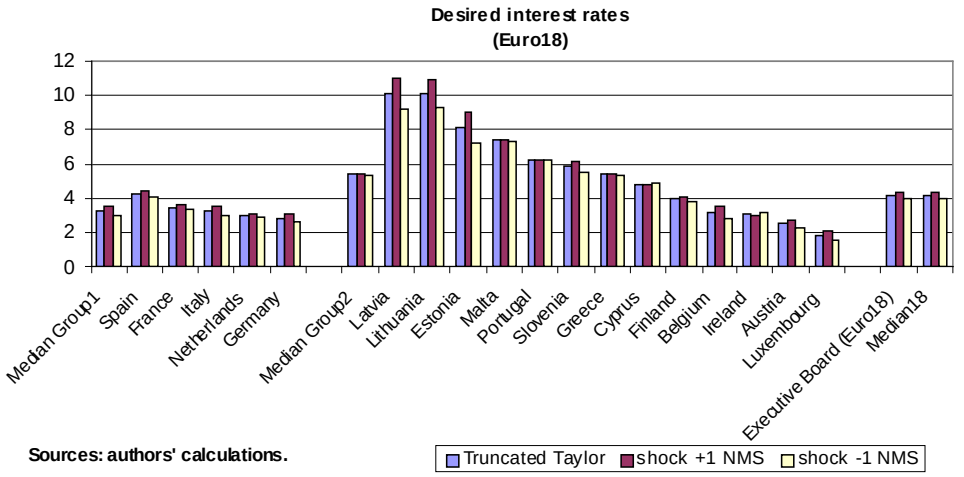
Appendix D: desired rates and decided rates in a Euro18

Graph D-1



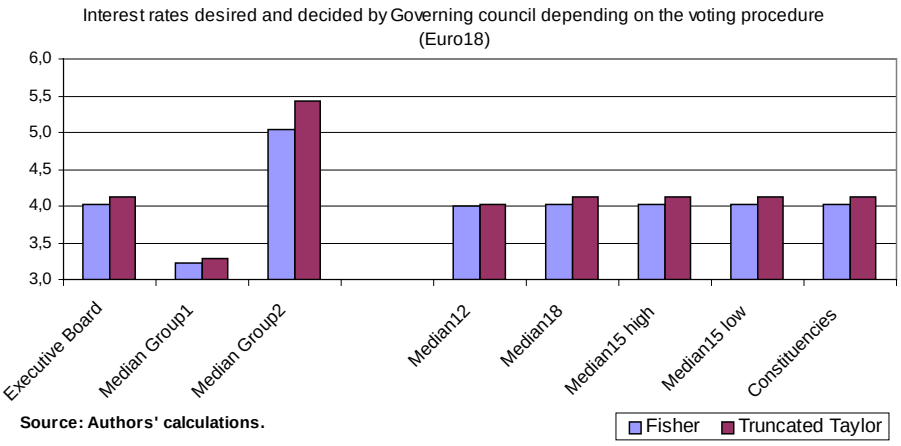
Sources: authors' calculations.

Graph D-2



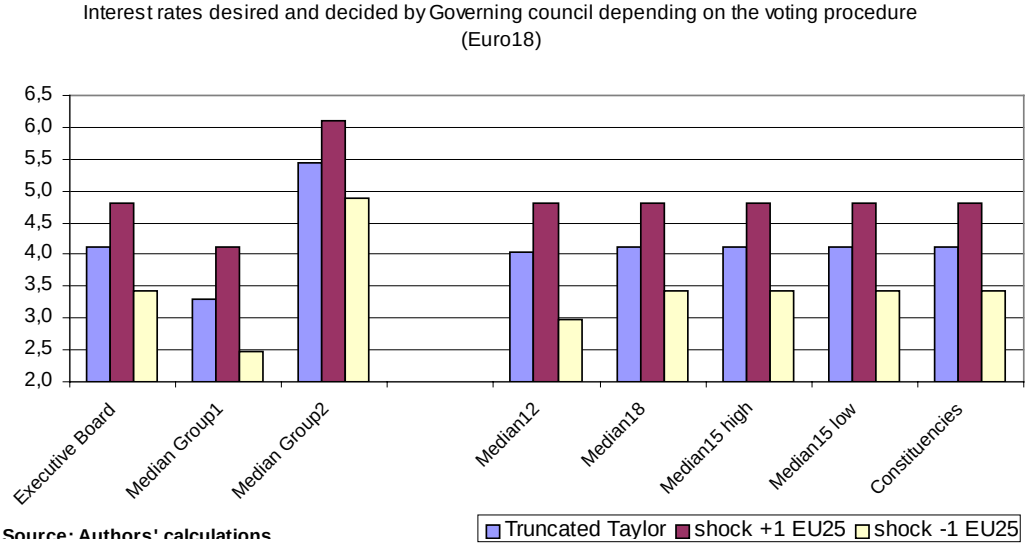
Sources: authors' calculations.

Graph D-3



Source: Authors' calculations.

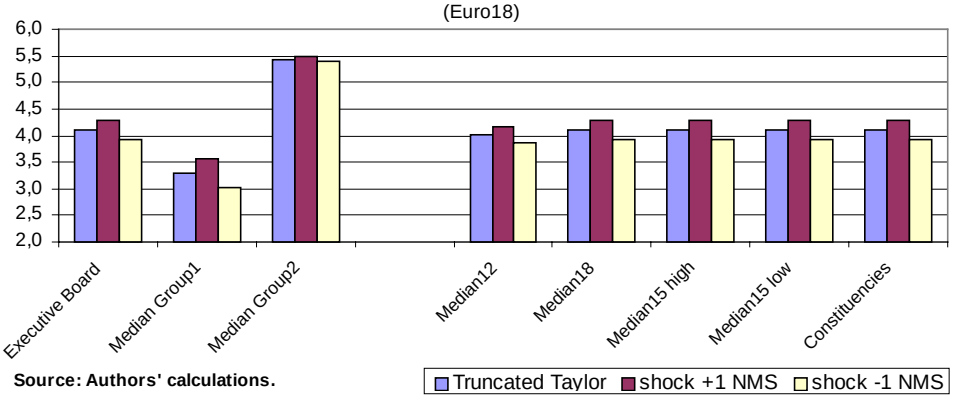
Graph D-4



Source: Authors' calculations.

Graph D-5

Interest rates desired and decided by Governing council depending on the voting procedure (Euro18)



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