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ABSTRACT

EU declares to provide support for the rural and poor regions of its member states. However, recent research shows that past EU budget allocations (in EU-15) can be attributed to measures of the distribution of voting power in the Council of Ministers deciding on the bulk of EU spending. A standard power measure alone can explain about 85% of the variance of the past EU budget shares, while, if stable coalition patterns among member countries are taken into account, power can explain at least 95% of the budget allocation. In this paper we use such estimates to predict EU budget shares after the eastern enlargement. According to our estimates eastern enlargement has large effects on the budget receipts of the incumbent member states. Moreover, whether the voting rules are based on the Nice Treaty (NT) or the Constitutional Treaty (CT) makes a difference for most member states. Many member states would be worse off under CT than under NT.

JEL Classification: C71, D70, D72

Keywords: EU budget, voting power, Constitutional Treaty, Treaty of Nice

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1 Introduction

After the first phase of the eastern enlargement in May 2004 the European Union went through tough negotiations on the financial perspectives for 2007-2013. The perspectives, that were accepted in December 2005, define general frames and principles of the collection of revenues for the next seven years.[1] The next interesting question is how these revenues will be reallocated back to the member states of the enlarged EU including Bulgaria and Romania that will joint the EU in 2007 or 2008.

Most of the previous analyses on the allocation of EU budget spending have focused on estimating the costs of the eastern enlargement using directly or indirectly the declared objects. Courchene et at. (1993) derive estimates for the structural funds receipts of the candidate countries by using a simple extrapolation of the budget receipts of the poorest incumbent countries. Other studies, like Brenton and Gros (1993), Anderson and Tyers (1995), Jackson and Swinnen (1994), and Tangermann (1996), make specific predictions for the costs of the Common Agricultural Policy (CAP) due to the eastern enlargement. All of these studies assume that the budget shares derive from the recipients' needs and contributors' solidarity.

Recent research has, however, demonstrated that a completely different approach manages to explain member states' past receipts from the EU budget. This public choice approach argues that EU budget allocations attribute to the distribution of voting power

[1]The EU budget is financed collecting revenues from four resources. The traditional resources are the tariff revenues and agricultural levies, both collected at the Union's external border. They are transferred directly to the common resources except a share that goes for the local administrative costs of the collection. While the traditional resources had a relatively important role initially, nowadays their proportion is only one tenth of the total revenues. The third resource is based on Member States' value added tax (VAT) base and is like a EU-wide consumption tax, currently one percent rate. The relative importance of this resource is also declining. The fourth resource is collected from the member states based on their GNPs. That is, each member state pays a certain percentage (common to all countries) of its GNP to the common resources. Currently, this resource constitutes about 45 percent of the EU budget and the share continues to increase.

in the Council of Ministers, the key decision maker of EU spending. In this *power politics view*, member states' needs deriving from low income regions and poor agricultural conditions obtain only a minor role, if any.

Baldwin et al. (1997) made, to our knowledge, the first attempt to use the political power view to explain EU budget allocations empirically.[2] Using observations for 1993 and 1994, they regressed per capita receipts on a constant, per capita voting power, and a dummy variable for poor member countries. They used the Shapley-Shubik index (SSI) and the actual vote shares to proxy member states' voting power. Subsequently, Baldwin et al. (2000, 2001) carried out similar regressions for the periods 1992-94 and 1995-99, separately. In the latter papers also the normalized Banzhaf index (NBI) of cooperative games were used as a measure of voting power.[3] Based on OLS regression analyses these studies concluded that per capita budget shares can be explained pretty well by measures of political power, while variables like the agriculture share of GDP and GDP per capita fail to be statistically significant.

Also Kandogan (2000) studied the correlation between actual budget shares and SSI. He developed a tailored game theoretic model for EU's budget decision-making and applied it to assess the costs of the eastern enlargement. His empirical analysis were conducted for years 1976-85 and were concerned with both the CAP and the structural expenditures. He regressed the ratio of the budget shares in CAP expenditures to the voting power for each country against a constant, deviation of that country's adjusted percent of population in agriculture from the EU-average and the logarithm of the voting power (SSI). He argued that this regression can explain why some countries are receiving more agricultural funds than implied by their voting power alone. He run a similar regression for the structural funds and obtained the same conclusion as on the CAP shares. In a way Kandogan's (2000) analyses indicate that the budget shares cannot be explained by power politics alone. Nevertheless, it is difficult to see from his analysis what part of the budget shares can be explained by power politics and what determines the rest of the

[2]See, however, already the discussion in Baldwin et al., eds., (1995).

[3]For the SSI, see below, Shapley (1953) and Shapley and Shubik (1954). For the NBI, see Penrose (1946) and Banzhaf (1965).

shares. Also, a major part of the variation in the budget shares remains unexplained in these regressions.

Kauppi and Widgrén (2004) make the first attempt to explore the relative importance of the two hypotheses. For this purpose, Kauppi and Widgrén propose simple relative measures for the needs of the member states and then combine these with the SSI to estimate weights for the two views of the EU budget allocation. In their baseline model, political power explains about 60% of the member states' budget receipts and the remaining 40% derive from member states' needs.[4] This result is obtained using annual observations for 1976-2001, a larger data set than in any previous empirical paper on EU budget. The novel feature of the study is to examine whether the power politics explanation can be improved by taking possible cooperation patterns between EU countries into account. Kauppi and Widgrén find that even 95% of the budget shares can be explained by voting power measures that allow for correlated preferences and cooperative voting patterns between the member states. Interestingly, the paper identifies a stable cooperation patterns between France and Germany. Altogether, Kauppi and Widgrén conclude that selfish power politics is likely to drive EU's decision making in general and the allocation of EU budget in particular, while needs play at most a little role.

In this paper, we assume that voting power is what counts in EU budget decision making and accordingly apply relevant power measures to project budgetary consequences of the eastern enlargement under two different voting schemes: the Nice and the Constitutional Treaty voting rules, the former being the current state, while the latter being a possible future state depending on an ongoing political decision process. As we do not have historical data (budget shares) for the enlarged EU, we cannot examine the importance of particular cooperative voting patterns for the power distribution of the EU-27. Therefore, our budget projections rely on a standard voting power measure that does not take any cooperative voting patterns among member countries into account. Even if this measure may miss some important cooperative patterns among the current EU member

[4]The predictive power of the pure SSI improves to 70 percent if the UK rebate is taken into account. A modified version of the SSI that draws on Straffin (1977, 1988) improves the predictive power of pure power based explanation to 90 percent (see Kauppi and Widgrén 2004 for details).

states we think it is likely to provide the most accurate budget share projections among alternative prediction approaches. To support this conclusion we revisit some (of our) earlier empirical analyses on the determinants of past EU budget shares.

Our voting power based budget share predictions yield the following findings. Independently of the voting rules examined, we find that eastern enlargement has large effects on the budget receipts of the incumbent member states. Different voting rules make significant difference for most countries' positions in the allocation. Most notably, Germany would gain remarkably from the voting rules of the Constitutional Treaty. The key explanation is that population counts more under the Constitutional Treaty - with its large population Germany would be pivotal in most voting situations in the future. According to our estimates the Constitutional Treaty would make Germany the biggest recipient of the EU budget. Currently, France is holding this position. Whether this issue explains why Frenchmen were reluctant to accept the Constitutional Treaty is an interesting question.

The rest of the paper is organized as follows. Section 2 describes the theoretical and empirical background behind our voting power measure. Section 3 gives background for the two voting rule proposals we consider, while our projections are given in Section 4. Section 5 concludes.

2 Voting Power and Past EU Budget Allocations

The starting point of our analysis is that EU budget shares are determined by the distribution of political power among member states, and not by their needs. The following section reviews the relevant theoretical arguments, while the subsequent section shows how the theory matches with the past EU budget allocations.

2.1 Theory

We assume that the member states use their influence in the Council of Ministers to allocate as much money to their home country as possible.[5] Under this hypothesis member

[5]For recent applications evaluating the distribution of voting power in the Council of Ministers, see e.g. Widgrén 1994, Laruelle and Widgén 1998, Felsenthal and Machover 2001, 2003, Leech 2002, Baldwin

states' budget shares should reflect their voting power in the Council rather than their needs for CAP or structural support. In the formal analysis the budget allocation problem is treated as the dividing-up-the-cake problem. This is one of the most investigated problems in game and bargaining theory. The literature is very wide ranging from cooperative to non-cooperative game theory with several applications. In recent years, these methods have been applied to study different aspects of EU decision-making as well. Here we adopt the cooperative approach.

A commonly used measure for actors' voting power is the *Shapley-Shubik index* (SSI) (Shapley and Shubik 1954). It can be seen as a special case of a broader concept the *Shapley value* (Shapley 1953) in cooperative coalitional form games. SSI is restricted to so-called simple games that are usually used to model voting games. In simple voting games, winning and losing coalitions have different worth (usually one and zero respectively). The SSI is based on the broad idea that an actor that can break a winning coalition into losing, or vice versa, exerts power. These actors are critical in the sense that they may help a coalition to achieve its goals. Suppose that this help is rewarded by a price, which ends up as money in the data. Despite of their abstractness there is some recent evidence that power indices are able to capture actors' power and that they can be used to predict decision outcomes in a meaningful way (e.g. Pajala and Widgrén 2004, Thompson et al. 2006).

More formally, let N be a set of n member states in the Council and let $S \subset N$ denote any coalition of member states having s members. A voting game in the Council can be characterized by a set function $v(S)$ taking on value 1 when a coalition S forms a qualified majority and zero otherwise. In this simple setting, the Shapley-Shubik index ϕ_i of a member state i can be written

$$\phi_i = \sum_{S \subseteq N, i \in S} \frac{(s-1)!(n-s)!}{n!}[v(S) - v(S \setminus i)],$$

where $i = 1, ..., n$. The first term in the sum gives the probability of country i being in a pivotal position in coalition S and the latter term counts those pivotal positions where

and Widgrén 2004a, 2004b, 2005.

country i is able to swing a winning coalition into losing, i.e. S is winning and the removal of i from it makes it losing.[6] The individual actors' SSI values ϕ_i sum up to unity.[7] Thus, SSI implies that the relative shares of the players' swing positions predict their shares of the total pay-off. In our application the total pay-off constitutes the EU's total budget spending.[8]

2.2 Evidence

On the basis of the theory outlined above the actual budget shares of the member states should be equal to their corresponding voting power shares measured by SSI. However, looking at past EU budget shares reveals that the SSI values and the realized budget shares do not match one-to-one (see Kauppi and Widgrén (2004, p. 239)). Does this then indicate that the theory fails to work in practise? We think this is not necessarily the case. Even if the decisions (obtained through actual voting) of the Council of Ministers would be perfectly in line with the member states' voting power distribution, their practical implementation is subject to numerous details that are likely to result in deviations from the intended budget allocation, at least in the short run. Thus, it is reasonable to assume that the theoretical predictions are accurate only on average. To assess whether such a long-run notion of the theory works we conduct a statistical analysis.

The simplest possible test of the theory can be based on a single regression

$$S_{it} = \beta_0 + \beta_1 SSI_{it} + u_{it}, \tag{1}$$

where S_{it} denotes country i's budget share in period t and SSI_{it} denotes the Shapley Shubik index of voting power for that country. Here the term u_{it} is a stochastic error that

[6] One characterization of the SSI refers to actors' permutations that are equally likely. This is not, however, a generic property of the index.

[7] The SSI obeys four axioms. The dummy axiom states that a player without any contribution (swings) to any coalition is powerless. The efficiency axiom states that the cake is fully allocated and there is no surplus left. The symmetry axiom states that the names of the players do not affect the allocation but only their voting rights and, finally the transfer axiom gives the way to combine games. Another classical power index, the Banzhaf index, obeys all these except the efficiency axiom (see Dubey and Shapley 1979 and for an alternative characterization Laruelle and Valenciano 2001).

[8] Here it is important to see that the EU budget (the cake) can be taken as fixed when decisions on its allocation are made in the Council. For a careful explanation see Kauppi and Widgrén (2004, p. 230).

should capture all the short run variation of the budget shares that cannot be explained by the power measure. We will come back to this in more detail below. To this end, notice that should the voting power distribution explain the budget shares all alone, we should have the restrictions $\beta_0 = 0$ and $\beta_1 = 1$; and, of course, then the error term should have conditional mean zero.

To examine whether these theoretical conditions get any empirical support, we estimate the regression (1) using a budget share variable obtained from the member states' budget receipts of which we have annual data from 1976 to 2001. This time span covers four sub-periods determined by the actual composition of the EU countries: Period 1 (EU-9): 1976-80, Period 2 (EU-10): 1981-85, Period 3 (EU-12):1986-94, and Period 4 (EU-15): 1995-2001. Notice that the power distribution remains constant over a given sub-period, and thus changes only four times during the sample period. To remove part of the short run variation in the dependent variable we employ sub-period observations computed as the averages of the annual observations of the years of the above four periods (cf. Kauppi and Widgrén (2004)).

Pooled OLS estimates of the parameters of (1) are reported in Table 1 (column 1). Notice that the estimate of the constant term does not deviate significantly from zero, while the parameter estimate of the SSI variable is clearly significant. The 95% confidence interval of the SSI parameter is $[.985, 1.25]$. This interval includes 1.0, and thus, is in line with our theoretical expectations. Furthermore, an F-test for the joint hypothesis of $\beta_0 = 0$ and $\beta_1 = 1$ has a p-value 0.21. Thus, these simple statistics imply that the data is consistent with our theoretical predictions. It is rather astonishing that in this single regression the SSI variable is able to explain 87 percent of the variance in budget shares.

At this point it is reasonable to discuss the validity of the above statistical analysis. Basically, we wish that the above regression results reflect a true causal relationship: voting power measured by SSI essentially determines the EU budget shares in the long run. For this interpretation to be valid, the SSI measure should be exogenous. That is, any other factors (anything in the error term u_{it}) affecting the budget shares should be independent of the SSI measure. There is no obvious reason why this might not be the case. First of all, notice that the SSI measure derives from abstract game theoretical

considerations that are by no means related to the EU decision making or to the ways the Council's decisions are implemented in practise. Nevertheless, it is useful to discuss in more detail what the error term may contain.

There are natural reasons why the error in (1) may be nonzero. As we noted above, the actual decisions of the Council cannot determine precisely how much money is allocated to each country. As a result, the budget shares do not necessarily match with the power shares even if they should. Also, it probably takes relatively long time to correct past deviations from the intended budget shares, while new errors may still enter the process. Another issue is that the member states do not necessarily immediately see how much power their votes really give to them. It may well take a few years for a new member state to learn to take the full advantage of its voting power. For example, during their first seven years Austria, Finland and Sweden received clearly less from the EU budget than their power shares predict. It is interesting to see whether they have now learned their voting power so that their budget shares catch up with their SSI values in the enlarged EU. Nevertheless, we cannot see a reason why any of these factors should correlate with the SSI values.

Another type of challenge to the validity of the above regression derives from the view that the EU budget is in fact allocated on the basis of member states' needs rather their power. Namely, the EU declares that its spending aims at promoting equal economic and social progress across the member states. Official publications say, for example, that "by their nature, structural actions should result in differences in expenditure between member states". We believe these types of statements do not match with the reality concerning the decisions of the Council. Why would a minister, a representative of his or her country, care something else but the interests of his or her own country? Still, somebody may be willing to believe or argue that the EU decision making follows, as it declares, high minded principles and solidarity. Thus, one could claim that the above result are due to the fact that the power measure just happens to correlate with the actual needs of the member states. There is no obvious reason why the voting power measures should correlate with the actual needs of the member states. Why would the power shares match with the shares based on the true needs of these countries? If the power measure

does not need to match one-to-one with the needs share, why the evidence still supports such one-to-one relationship?

Although many arguments support the assumption that the SSI measure is exogenous, the above regression is still subject to some technical caveats. The key problem is the fact that the values of the dependent variable sum to unity for a given time period. Thus, observations within a sub-period cannot be purely independent. Also, it follows that the errors are non-normal and most likely heteroskedastic.[9] The underlying problems are discussed to some extent in the recent literature on the statistical analysis of fractional response variables (see, e.g., Kieschnik and McCullough, 2003, and Papke and Wooldridge, 1996). The general message from these studies is that these problems should be handled by formulating a linear model for the logistic transformation of the dependent variable or by applying a non-linear regression. Unfortunately none of the existing models applies directly to our set up here. Nevertheless, under the null hypothesis that the voting power is essentially what matters in the long-run, the linear specification seems to be the most natural choice, despite the fact that the short-run factors in the error term may involve nonlinearities.

The above approach for modeling past budget shares as a function of the SSI measure can be challenged by one more point. The critical question is whether the SSI measure gives accurate enough description of the actual power distribution of the member states. The SSI assumes that the voters' preferences (probabilities of voting yes) are correlated in the same way regardless of the group of actors. However, in reality some countries may have more similar interests than others in many issues and thus may find it optimal to cooperate on a wide range of issues more closely. If such cooperative groupings of EU member states are important in the real world, the standard SSI may yield an imprecise measure of the true power distribution of the member states. In our previous paper Kauppi and Widgrén (2004), we considered modified SSI values under the assumption that the EU is divided into two opposite groups of member states. We computed corresponding

[9]To check whether potential heteroscedasticity of the errors might make any difference to our results, we repeated the above t- and F-tests using White's heteroscasticity consistent standard errors. This did not lead to any significant difference to the previous results, even if the validity of these robust standard errors entails large samples.

Table 1: OLS Regression estimates of the effect of voting power on EU budget shares in 1976-2001

	(1)	(2)
SSI	1.119	1.003
	(16.87)	(13.48)
Franco-German dummy		0.0287
		(2.79)
Intercept	-0.010	-0.005
	(-1.53)	(-0.80)
R^2	0.87	0.90

Notes: t-values are given in parentheses. The sample consists of 46 observations corresponding to the countries in EU-9, EU-10, EU-12 and EU-15.

modified SSI measures for all possible bi-partitions of the EU countries. Interestingly we found that such modified power measures provide significantly better match with the past EU budget shares than the pure SSI provided that France and Germany are on the same side. On the basis of this result it is likely that the pure SSI does not give a perfect measure of the true power distribution of the EU member states.

To see whether the Franco-German partnership suggested by Kauppi and Widgrén (2004) might explain why our initial regression estimates deviate slightly from the theoretical expectations we augmented our regression with a "Franco-German dummy" that equals one for the observations on France and Germany and is zero otherwise. The estimation results are presented in column (2) of Table 1. Clearly, the Franco-German dummy is significantly different from zero. With its positive parameter estimate it seems to capture at least a part of the extra gains France and Germany may have obtained through their shared interests in the EU decision making. Notice also that the estimate of the coefficient of the power measure is approximately equal to one.

It would be interesting to examine more carefully what cooperative patterns may be important in the current EU. Unfortunately, we have to wait for a couple of years to obtain suitable data for such an analysis of the enlarged EU. For the time being, we thus compute budget share predictions on the basis of the standard SSI values. Even if this approach may neglect some important cooperative patterns among the current member

states, the above evidence on the EU-15 data indicates that this measure can still be rather accurate first approximation for the power distribution and hence for the budget allocation.

3 Considered Voting Rules

The voting rules of the Council of Ministers have always been a big issue for the expanding EU, even if they have been practically constant from the Treaty of Rome in 1957 until the Treaty of Nice in 2001.[10] A concern has been that the EU's decision making becomes increasingly difficult or even paralyzed when the number of its member states increases. The worst conflicts have, however, been around the distribution of voting power. Especially large member countries have been concerned that old rules are too favorable to small countries. The importance of this problem raised considerably in the case of eastern enlargement, which brought in a number of new small countries. Therefore, these issues have now resulted in a true change of voting rules.

The ongoing revision of the Council voting rules started already in the 1996 intergovernmental conference (IGC-1996). Voting rule reform was then stated as a precondition for the eastern enlargement. The following summit in Amsterdam in June 1997 failed to find an agreement on re-weighting of the votes, thus this question was further postponed to IGC-2000. Based on several proposals made during the conference by the Commission and different national delegates[11] the marathon Summit of Nice finally reached an agreement in December 2000. The agreement was a re-weighting scheme that reallocated votes from the smallest to the biggest nations.[12]

The voting rules set in the Nice Treaty maintained the qualified majority voting frame-

[10] In 1973, the Treaty of Rome votes were multiplied by 2.5 except by 2 for Luxembourg. Table 2 gives the numbers of votes for EU-15 using the 1973 weighting that remained until the Treaty of Nice.

[11] A throughout evaluation on different alternatives, see Baldwin et al. 2000.

[12] The Nice rules came into force on November 1, 2004. The first months after the eastern enlargement were governed under the old rules. In EU jargon, these rules were called Temporary Accession Treaty voting rules. Their contents are qualified majority voting with weighted votes and the old majority threshold of 71 percent to win (88 of 122 votes). The numbers of votes for the incumbent 15 are unchanged; those for the 10 new Member States are a simple interpolation of EU15 votes as specified in the Accession Treaty. We also computed the estimates under the temporary rules. They are not, however, reported here. These results can be obtained from the authors upon request

Table 2: The Treaty of Nice votes and population of the member states in EU-27 and the pre-enlargement votes in EU-15

Member state	Old votes	Nice votes	Pop (Milj.)	Member state	Old votes	Nice votes	Pop (Milj.)
Germany	10	29	82.5	Bulgaria		10	8.2
UK	10	29	61.7	Austria	4	10	8.1
France	10	29	59.7	Denmark	3	7	5.4
Italy	10	29	57.9	Slovakia		7	5.4
Spain	8	27	42.3	Finland	3	7	5.2
Poland		27	38.2	Ireland	3	7	4.0
Romania		14	22.5	Lithuania		7	3.4
Netherlands	5	13	16.3	Latvia		4	2.3
Greece	5	12	11.0	Slovenia		4	2.0
Portugal	5	12	10.5	Estonia		4	1.4
Belgium	5	12	10.4	Cyprus		4	0.7
Czech Rep.		12	10.2	Luxembourg	2	4	0.5
Hungary		12	10.1	Malta		3	0.4
Sweden	4	10	9.0	TOTAL	87	345	489.3

work, but added two extra criteria concerning the number of countries that support a proposal and the share of EU population they represent. Specifically, the vote threshold was set in Nice to 74 percent (255 of 345 votes).[13] Moreover, a simple majority of member states (14 members in EU-27) and countries representing 62 percent of the EU population were required for the acceptance of a proposal. The distribution of the Council votes under the Treaty of Nice are shown in Table 2.

The Constitutional Treaty that was politically agreed in June 2004 resulted in a switch from a weighted voting into a dual majority voting system with additional requirements. First, a winning coalition must represent at least 55 percent of the EU members and, second, 65 percent of the EU population. Moreover, during the final negotiations two last-minute Summit compromises were inserted: first, at least 15 member states are required

[13]The Treaty of Nice defines the voting rules for EU27. The *Draft Council Decision relating to the implementation of Article I-24* in the *Accession Treaties* of the ten new member states made a temporary change by reducing the quota to 72.2 percent of the Council votes. When Bulgaria and Romania enter in 2007 or 2008 the original Nice rules will come into force.

to pass a proposal and second, no proposal can be blocked by less than four countries. Both of these additional rules have a negligible impact on EU-27 decisions. In EU-27, 15 members constitute 55.6 percent of membership meaning that the membership criterion (55 percent) is not binding. After the entry of Turkey and Croatia '15 member states' criterion would not, on the contrary, be binding any longer. Voting rules specified by the Constitutional Treaty are supposed to become into force in November 1, 2009. The rejection of the constitution by the French and Dutch referenda put, however, the whole constitution in jeopardy and has, at least, made the timetable, if not the ratification, highly uncertain.

In the following, we focus on the Nice and the Constitutional Treaty voting rules, since they are the relevant alternatives in the foreseeable future. As long as the Constitutional Treaty or any other alternative reform fails to pass, the Treaty of Nice rules form the fall-back solution. Our analysis below attempts to assess the budget allocation consequences of the eastern enlargement under the two alternative states of the future EU.

4 Budget Allocation Predictions

In this section, we present budget allocation estimates for the EU by applying the SSI power measure under the two voting rule schemes discussed in the previous section. We present separate estimates for EU-15 and EU-27. Our EU-15 estimates are predictions for the receipts of the incumbent member states prior to the enlargement using the pre-enlargement voting rules, while the EU-27 estimates are for all twenty-seven member states after the 2004 enlargement and the entry of Bulgaria and Romania. The latter estimates are considered under the voting rules of the Nice Treaty (NT) and the Constitutional Treaty (CT). Table 3 reports the respective budget share estimates and Table 4 translates them into actual receipts in 2003 Euros.

The results in Table 3 demonstrate that voting rules have large impacts on most member states' budget share predictions. In particular, the budget share estimates of EU-27 under CT deviate rather much from those obtained under NT. In particular, Germany does much better under CT than under NT. CT is also favorable to the other big countries

France, Italy and the UK, while the rest of the incumbent countries clearly loose under the CT rules. Most notably, Germany also gains if we compare her budget share in EU-15 under the pre-enlargement rules to the CT rules in EU-27.[14] Among the new member states, only Romania receives more in CT than in NT, while the reverse holds for the remaining new member states.[15] In sum, CT is favorable to big countries except Spain and Poland that gained significantly in Nice compared to the pre-enlargement rules (cf. Baldwin et al. 2001 and Baldwin and Widgrén 2004b).

In Table 4, we take 2003 as the reference year, as this was the last complete year of EU-15. The size of the EU budget was about 100 billion Euros in 2003. Consequently, our estimates for the receipts of the EU-15 countries prior to eastern enlargement are obtained by multiplying this figure by the budget share estimates given in Table 3. We estimate that the EU-budget will be 4.5% larger in EU-27, corresponding the percentage increase in EU wide GDP due to the new countries. Therefore, a comparable "as if" estimate for the EU-27 budget is 104.5 billion Euros. The estimates of the receipts of the EU-27 countries are computed by applying the corresponding budget share estimates.

According to the figures in Table 4, new member states' aggregate share of the total 104.5 billion Euros is 32.1 billion Euros under the NT rules and 26.3 billion Euros under CT rules using 2003 prices. The new member states contribute 4.5 billion Euros leaving the aggregate budget loss of 27.6 billion euros under NT and 21.8 billion euros under CT for EU-15 respectively.

There are not many earlier studies attempting to evaluate the post-enlargement budget receipts on country-by-country basis. Baldwin et al. (1997) is, however, an exception. It applies a version of the *Political Power* model where budget receipts per capita are regressed on SSI values per capita. The study ends up with a total cost of 11.9 billion 1994 Ecus when eight CEE-countries join.[16] The cost increases to 15.1 billion 1994 Ecus when Bulgaria and Rumania enter as well. The cost estimates would have been 20.4 and

[14] this is reminiscent to the paradox of new members. Note, however, that here we have two changes: the enlargement and the voting rule reform. Germany's gain is primarily due to the latter.

[15] Note, however, that in the EU-25 also the smallest member states gain (see Kauppi and Widgrén 2005).

[16] The paper does not consider Malta and Cyprus. Their total impact is, however, relatively small.

Table 3: Budget share estimates in the EU-15 and in the EU-27 under the Treaty of Nice rules and Constitutional Treaty rules

Country	EU15	Treaty of Nice	Constitution
Germany	11.68	8.74	16.29
United Kingdom	11.68	8.70	10.88
France	11.68	8.72	10.82
Italy	11.68	8.69	10.56
Spain	9.56	8.02	7.05
Netherlands	5.52	3.67	3.20
Greece	5.52	3.40	2.35
Belgium	5.52	3.40	2.30
Portugal	5.52	3.40	2.27
Sweden	4.50	2.81	2.08
Austria	4.50	2.81	1.97
Denmark	3.50	1.95	1.52
Finland	3.50	1.95	1.49
Ireland	3.50	1.95	1.27
Luxembourg	2.10	1.10	0.75
EU15		69.31	74.81
Poland		7.99	6.92
Romania		3.98	4.35
The Czech Republic		3.40	2.32
Hungary		3.40	2.29
Bulgaria		2.81	1.99
Slovak Republic		1.95	1.52
Lithuania		1.95	1.27
Latvia		1.10	1.07
Slovenia		1.10	1.00
Estonia		1.10	0.91
Cyprus		1.10	0.80
Malta		0.82	0.75
New Member States		29.31	26.80
Total		100.00	100.00

Table 4: Budget receipt estimates, Mill. 2003 Euros

	Receipts, Mill. Euros			Receipts per GDP, %		
Country	EU15	EU27		EU15	EU27	
		NT	CT		NT	CT
Germany	11680	9130	17019	0.5	0.4	0.8
United Kingdom	11680	9091	11373	0.7	0.6	0.7
France	11680	9109	11311	0.7	0.6	0.7
Italy	11680	9085	11032	0.9	0.7	0.8
Spain	9560	8377	7367	1.2	1.1	0.9
Netherlands	5520	3839	3341	1.2	0.8	0.7
Greece	5520	3551	2455	3.6	2.3	1.6
Belgium	5520	3551	2405	2.0	1.3	0.9
Portugal	5520	3551	2372	4.0	2.6	1.7
Sweden	4500	2937	2175	1.7	1.1	0.8
Austria	4500	2937	2058	2.0	1.3	0.9
Denmark	3500	2040	1590	1.9	1.1	0.8
Finland	3500	2040	1560	2.4	1.4	1.1
Ireland	3500	2040	1331	2.5	1.5	1.0
Luxembourg	2100	1147	788	8.8	4.8	3.3
EU15	100000	72425	78178	1.1	0.8	0.8
Poland		8348	7228		4.4	3.8
Romania		4164	4548		8.2	9.0
The Czech Republic		3551	2422		4.4	3.0
Hungary		3551	2389		4.8	3.2
Bulgaria		2937	2076		16.6	11.7
Slovak Republic		2040	1590		7.0	5.5
Lithuania		2040	1331		12.4	8.1
Latvia		1148	1113		11.6	11.3
Slovenia		1148	1048		4.6	4.2
Estonia		1148	952		14.1	11.7
Cyprus		1147	835		9.8	7.1
Malta		853	788		20.2	18.7
New Member States	0	32075	26321		6.2	5.1
Total	100000	104500	104500		1.0	1.0

26.5 billion in 2003 budget respectively.

Table 5 shows our estimates for the incumbent countries' budget losses under NT and CT rules in 2003 Euros. The figures differ from those of Baldwin et al. (1997), since the voting rules are different.[17] Note, however, that the full eastern eastern enlargement scenario[18] in Baldwin et al. (1997), is well in line with our estimate using the CT rules. This is because the CT rules made the incumbent countries as an aggregate more powerful than they would have been under the pre-Nice or temporary rules in the Accession Treaties. Given that power politics dictate the determination of budget shares, this suggests that the budget cost of the enlargement should be lower under the CT rules than under pre-Nice rules.[19] If we compare our estimate under the NT rules to Baldwin et al. (1997) estimates they are practically the same.[20]

Let us next investigate the distribution of losses among EU-15 countries. The point of comparison here is the pre-Nice distribution of power in the Council of EU-15. Table 5 demonstrates that the distribution of losses differ substantially regarding the applied rules. Under the NT rules, the biggest countries loose more in absolute terms than the smallest countries whereas under the CT rules the reverse holds. In per capita terms, the smallest member states loose, however, more than the big countries in both scenarios. Under CT, the losses of the biggest countries are at the magnitude between 40 and 60 Euros per head per year, whereas they are at the magnitude of hundreds of Euros per head for the smallest countries. The most striking observation in Table 5 is Germany's absolute gain under the CT rules. Under the CT rules Germany obtains 5.3 billion euros more than under the pre-Nice rules before the enlargement. That is over 40 percent of

[17] In Baldwin et al. (1997) an interpolation of pre-Nice numbers of votes were used (for details see Widgrén 1994 or Baldwin 1994). They were based on estimated logarithmic function. In the Accession Treaty interpolation Estonia and Slovakia are the only countries in EU-25 that get one vote less than the mathematical formula suggests whereas the other countries are fitting perfectly.

[18] Cyprus and Malta are excluded in Baldwin et al. (1997). Their impact is, however, relatively small (1.6-2.0 billion Euros depending on the voting rule).

[19] In EU-25 the aggregate share of incumbents' power would have been 70.7 per cent under the temporary rules rules. Under NT rules the corresponding share is 73.2 and under CT rules 76.8 per cent. The temporary rules are not defined for EU-27 as at the time of Bulgaria's and Romania's entry the Nice rules shall apply.

[20] Results on temporary Accession treaty rules are not reported here in detail. They can be obtained from the authors upon request. The results differ surprisingly little from the NT rules.

Table 5: Incumbent member states' losses in budget receipts after the eastern enlargement

Country	Nice Treaty		Constitution	
	Mill. EUR	%	Mill. EUR	%
Germany	2540	21.8	−5349	−45.8
United Kingdom	2579	22.1	297	2.5
France	2561	21.9	359	3.1
Italy	2585	22.1	638	5.5
Spain	1173	12.3	2183	22.9
Netherlands	1681	30.5	2179	39.5
Greece	1969	35.7	3065	55.5
Belgium	1969	35.7	3115	56.4
Portugal	1969	35.7	3148	57.0
Sweden	1563	34.7	2325	51.7
Austria	1563	34.7	2442	54.3
Denmark	1460	41.7	1910	54.6
Finland	1460	41.7	1940	55.4
Ireland	1460	41.7	2169	62.0
Luxembourg	953	45.4	1312	62.5
Total	27485	27.5	21732	21.8

Notes: The entries in the table indicate the difference (in Millions of Euros and in percentages respectively) between the estimated budget receipts of the incumbent coutries after and before the eastern enlargement.

Germany's net contribution to the EU budget.

5 Conclusion

This paper has estimated the impacts of different voting rules on the allocation of EU budget expenditure before and after eastern enlargement. Our analysis was based on the views that the budget allocation is completely determined by member states' voting power in the Council of Ministers. We provided predictions for the EU budget under two voting rule schemes, one under the Nice and the other under the Constitutional Treaty.

The results indicate that eastern enlargement to the EU27 has large effects on the budget receipts of the incumbent member states. The incumbent member states are

predicted to loose 27.6 Billion Euros under the Nice Treaty and 21.8 billion Euros under the Constitutional Treaty when EU membership is expanded from 15 to 27 countries. Thus, according to our estimates the cost of the enlargement would roughly be six billion Euros smaller under the Constitutional Treaty than under the Nice Treaty voting rules.

In both absolute and relative terms, small countries loose more under the Constitutional Treaty than the biggest countries, whereas under the Nice Treaty only relative losses decrease in country size. Germany is the biggest winner under the Constitutional Treaty. The key explanation is that population counts more on power under the Constitutional Treaty than under the Treaty of Nice.

The results provide interesting ingredients for the evaluation of the recently agreed financial perspectives for 2007-2013 and for the membership negotiations with Turkey, Croatia and possibly Macedonia and other Balkan nations in the near future. For example, with its large population Turkey could have significant additional implications for future budget allocation under the Constitutional Treaty. Detailed examination of this and other related questions are, however, left for future research.

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