Zentrum für Europäische Integrationsforschung
Center for European Integration Studies
Rheinische Friedrich-Wilhelms-Universität Bonn

Karl-Martin Ehrhart, Roy Gardner, Jürgen von Hagen and Claudia Keser

# Budget Processes: Theory and Experimental Evidence

Working Paper

B 18
2000

# Budget Processes: Theory and Experimental Evidence

**Karl-Martin Ehrhart*, Roy Gardner**, Jürgen von Hagen***,**

**and Claudia Keser*,******

*University of Karlsruhe, ** Indiana University and ZEI, University of Bonn,
*** University of Bonn, Indiana University, and CEPR, **** CIRANO, Montreal

**November 2000**

**Abstract**

*This paper studies budget processes, both theoretically and experimentally. We compare the outcomes of bottom-up and top-down budget processes. It is often presumed that a top-down budget process leads to a smaller overall budget than a bottom-up budget process. We show, using structurally induced equilibrium theory, that this may but need not be the case. To test the implications for budget processes of structurally induced equilibrium theory, we conduct a series of experiments. The evidence from these experiments supports the predictions of structurally induced equilibrium theory, both at the aggregate and at the individual subject level.*

**Keywords:** Budget processes, structurally induced equilibrium, experimental economics

**JEL Classification Numbers:** C92, D71, H61

***Non-technical Summary***

A budget process is a system of rules governing the decision-making that leads to a budget, from its formulation, through its legislative approval, to its execution. The paper studies budget processes both theoretically and experimentally, focusing on the sequence in which decisions are taken. In a top-down process, the first decision taken is the size of the budget; subsequent decisions determine the composition of the budget. In a bottom-up process, the various spending categories are voted on one-at-a-time. The total size of the budget emerges at the end of the voting, but summing up all the spending categories.

We compare the outcomes of top-down and bottom-up budget processes. It is often presumed that a top-down budget process leads to a smaller overall budget than a bottom-up budget process. This presumption stands in stark contrast to structurally induced equilibrium theory. Suppose rational agents participate as voters in a budget process, and consider the implications of voting in early stages of the processes for later stages of the process. Then the structurally induced equilibrium of a top-down process generally differs from that of a bottom-up process: sequence matters. Indeed, we give a quite stringent sufficient condition for the outcomes of the two processes to be the same. Depending on rational voters' preferences, a top-down process can lead to larger or smaller budgets.

The rationality of voters is crucial to these theoretical results, and is itself an empirical issue. To address this issue, we conduct a series of controlled laboratory experiments. While laboratory experiments create artificial environments, they have the advantage over international comparisons (another source of relevant data) that the design of an institution and the setting of a decision-making process can be controlled much more precisely.

The paper reports on a series of 128 independent trials of voting over budgets. 640 volunteer subjects, each playing for significant amounts of money, participated in these trials. With this many observations, we are able to achieve statistically significant results. We have two preference designs, one in which a top-down process is predicted to lead to a larger budget, and one in which a bottom-up process is predicted to lead to a larger budget. In addition, we have two treatments: complete vs. incomplete information, and 2 spending categories vs. 4 spending categories.

Our main experimental result is that institutions imbedded in a budget process matter. The data from all treatments correspond closely to the predictions of structurally induced equilibrium, and institutions drive those equilibria. The subjects display a high degree of rationality over all treatments. Both an increased number of spending categories and incomplete information increase the complexity of the decision problem subjects face, and increase the number of periods needed to reach a final decision.

## 1. Introduction

A budget process is a system of rules governing the decision-making that leads to a budget, from its formulation, through its legislative approval, to its execution. Consider the budget process of the United States government. The President formulates a budget proposal as part of his annual obligation to report on the State of the Union. Each house of Congress then reworks the budget proposal, with a final budget being passed by both houses for presidential approval.

In the last quarter century, the details of the budget process, both in the United States and in other countries, have been the object of considerable research, beginning with seminal works of Wildavsky (1975) and Ferejohn and Krehbiel (1987). More recently, see Alesina and Perotti (1995, 1999); von Hagen and Harden (1995, 1996); see also the contributions in Poterba and von Hagen (1999). There is a growing body of empirical research, based on international comparative studies, suggesting that the design of budget processes has considerable influence on the fiscal performance of governments. This has also been reflected in political decisions. In the United States, the Budget Act of 1974, the Gramm-Rudman-Hollings Act of 1985, and the Budget Enforcement Act of 1991 all tried to reduce excessive government spending and deficits by changes in the budget process. In the European Union, the Maastricht Treaty on European Union of 1992 mandates reform of budget processes of the member states to enhance fiscal discipline.

One aspect of the budget process that has received considerable attention is the sequence of budgeting decisions. Traditionally, Congress votes on budget items line-by-line, or category-by-category. The sum of all spending approved by Congress emerges as the overall budget—a budget process called *bottom-up*. The budget reforms stemming from the Budget Act of 1974 replaced this tradition with a different sequence. First, Congress was to vote on the total size of the budget. Once that was determined, Congress would allocate that total budget among spending categories. A budget process of that type is called a *top-down* process. It was argued at the time, that a top-down budget process would lead to a better outcome, in particular, to a smaller budget, than would a bottom-up budget process (Committee on the Budget, 1987).

A similar presumption is shared by many international organizations, which act as if a top-down budget process is inherently preferable to a bottom-up process. The Organization of Economic Cooperation and Development (OECD, 1987) reported approvingly that several countries adopted top-down budget processes in quest of greater fiscal discipline. Schick (1986) analyzes this report, explaining (and supporting) the thinking behind it in great detail. The International Monetary Fund (IMF) expresses a similar preference for top-down processes (IMF, 1996).

The presumption in favor of top-down budgeting stands in stark contrast to structurally induced equilibrium theory (McKelvey, 1979). Suppose rational agents participate as voters in a budget process. In particular, if voters are sophisticated in the sense of Farquharson (1969) and Kramer (1972): they consider the implications of voting in early stages of the budget process for later stages of the process. Furthermore, assume that voters have convex preferences over the individual dimensions of the budget, and that the budget process divides the decision-making process into a sequence of one-dimensional decisions. Based on these assumptions, Ferejohn and Krehbiel (1987) show that the structurally induced equilibrium of a top-down budget process generally differs from the equilibrium of a bottom-up process: sequence matters. However, there is no unambiguous relation between sequence and the size of the budget. Depending on the voters' preferences, a top-down process can lead to larger or smaller budgets.

This argument, based on structurally induced equilibrium, depends crucially on the rationality of voters—itself an empirical issue. One way to get at this empirical issue is with controlled laboratory experiments. While laboratory experiments create artificial environments, they have the advantage over international comparisons that the design of an institution and the setting of a decision-making process can be controlled much more precisely. Previous experiments have found some evidence for sophisticated voting in two stage voting games (Holt and Eckel, 1989; Davis and Holt,1993). Similarly, in a pilot experiment Gardner and von Hagen (1997) find that structurally induced equilibrium best accounts for the data from their experimental trials of bottom-up and top-down budget processes.

This paper reports on a series of 128 independent trials of voting over budgets. The first testable implication of the theory of structurally induced equilibrium is that the outcome of a budget process depends on the voters' preferences and on the structure of the process. Therefore, we vary voters' preferences and the structure of the process (bottom-up or top-down) in a systematic way over these 128 trials. The second testable implication of the theory concerns the effect dimensionality—the number of spending categories—has on the budget process and its outcome. Whereas previous experiments have been confined to two dimensions, ours include treatments with two and four dimensions. This leads to a gain in applicability, since naturally occurring budget processes only rarely deal with two dimensions. A third testable implication of the theory concerns the effect of incomplete information on the budget process and its outcome. Whereas previous experiments have assumed complete information (each voter knows the preferences of all voters), ours include treatments with complete and incomplete information. In the incomplete information treatment, a voter knows only his or her own preferences, and not the preferences of any other voter. This extension is again made in the interest of realism. Many budgets are processed in situations where a voter has limited knowledge of the preferences of other voters.

Our main result is that institutions imbedded in a budget process matter. The data from all treatments correspond closely to the theory of structurally induced equilibrium, and institutions drive those equilibria. The subjects display a high degree of sophistication over all treatments. Both extra dimensionality and incomplete information increase the complexity of the decision problem subjects face, and increase the number of periods needed to reach a final decision.

The paper is organized as follows. The next section sets out the general model, as well as the specification we have implemented experimentally. Section 3 describes the experimental design, as carried out at the economics behavior laboratory of the University of Karlsruhe. Our aggregate results are presented in section 4; individual results, in section 5. Section 6 concludes with the policy implications of these experiments.

## 2. A model of budgeting

We present a model of budgeting which is an extension to many dimensions of the model of Ferejohn and Krehbiel (1987). To solve this model, we use the notion of structurally induced equilibrium following McKelvy (1979).

### 2.1 The general model

There are n voters, indexed by i, i=1,..., n. Using majority rule, the voters decide on the size and allocation of a budget. There are m spending categories in the overall budget. Each budget category corresponds to a dimension of $R_m^+$, the non-negative orthant of m-dimensional Euclidean space. Let the vector $\mathbf{x} = (x_1, ..., x_n) \in R_m^+$ denote a possible budget, where $x_j$ represents spending in the budget category j. The total spending implied by the budget vector **x** is

$$B = \sum_{j=1}^{m} x_j .$$

Each voter i has preferences over budgets **x** represented by his or her utility function $u_i(\mathbf{x})$. We assume that each voter i has an ideal budget (or an ideal point) **x*(i)**. The closer the actual budget is to a player's ideal budget the higher is the player's utility, where closeness is measured by the Euclidean distance function:

$$u_i(\mathbf{x}) = K_i - \sqrt{\sum_{j=1}^{m} [x_j - x_j^*(i)]^2} ,$$

where $K_i$ is the utility attached to the ideal point.[1] In general, each voter i has an ideal point **x*(i)** distinct from that of all other voters.

[1] In the two dimensional case the Euclidean utility function leads to circular indifference curves. More general preferences are studied experimentally in Lao-Araya (1998), whose results suggest that structurally induced equilibrium theory is robust with regard to elleptical indifference curves.

Several interpretations of players and their ideal points are possible. For instance, the players may be spending ministers in a coalition government. In this case, an ideal point represents the budget size and composition a spending minister would most like to see enacted. As another instance, suppose the player is a member of a legislature. Then the ideal point may represent a legislator's campaign promise to get this ideal point or something close to it enacted.

In a budget process, voting translates preferences into outcomes. In a bottom-up budget process the sequence of votes is taken on a spending category at a time. If there are two dimensions the vote is taken first on one spending category and then on the other. We define $\mathbf{x}^{\mathbf{bu}}$ as the vector consisting of the *respective* median voter's ideal value in each spending category. The vector $\mathbf{x}^{\mathbf{bu}}$ can be thought of as an equilibrium induced by a bottom-up budget process.

In a top-down budget process, the sequence of votes starts with a vote on the total budget. Then votes are taken on the spending in all but one of the spending categories. If there are two dimensions, the vote is taken first on the total budget and then on one of the spending categories. We define $\mathbf{x}^{\mathbf{td}}$ as the vector consisting of the *respective* median voter's ideal value for total spending and for all but one of the spending categories. The vector $\mathbf{x}^{\mathbf{td}}$ can be thought of as an equilibrium induced by a top-down budget process.

Assume that votes are based on majority rule. Suppose the vote is over two budget proposals **x** and **y**. If the number of those voting for **x** is greater than the number of those voting for **y**, **x** defeats **y**. A budget $\mathbf{x}^{\mathbf{C}}$ is a Condorcet equilibrium, if it defeats all other budgets. For budget decisions with a single budget category (m = 1) and where the number of voters is odd, there exits a unique Condorcet equilibrium, identified by the ideal point of the median voter. In this case, the Condorcet equilibrium is also the outcome of top-down and bottom-up budget processes, since those processes do not differ on a single budget category.

For budget decisions with more than one spending category (m > 1) we can show that if there exists a Condorcet equilibrium, the Condorcet equilibrium is also the outcome of the top-down and bottom-up budget processes.

*Proposition*: $\mathbf{x}^{\mathbf{td}} = \mathbf{x}^{\mathbf{bu}} = \mathbf{x}^{\mathbf{C}}$, if $\mathbf{x}^{\mathbf{C}}$ exists.

The proof is in the appendix. Figure 1 gives the intuition for the case of 2 spending categories and 3 voters. In this figure, all 3 ideal points of the voters lie on a straight line. Voter 2's ideal point is the median along the line and, thus, this voter's ideal point is a Condorcet equilibrium. At the same time, voter 2's ideal point is the median with respect to both spending categories in the bottom-up process. It is also the median with respect to total spending and the difference between spending on category 1 and category 2 in the top-down process. Hence, both the top-down and the bottom-up process lead to the Condorcet equilibrium.

However, in case of more than one spending category, in general, there exists no Condorcet equilibrium (Riker 1962). Both $\mathbf{x}^{td}$ and $\mathbf{x}^{bu}$ still exist as the medians along each spending category (or the sum of spending categories) still exist. We can interpret $\mathbf{x}^{td}$ and $\mathbf{x}^{bu}$ as structurally induced equilibria, based on a majority rule for a single issue at a time. In general, however, $\mathbf{x}^{td}$ and $\mathbf{x}^{bu}$ will differ. Both will belong to the convex hull of the set of ideal points, and therefore, are Pareto optimal. In this case $\mathbf{x}^{td}$ can just as easily leave to a larger budget as $\mathbf{x}^{bu}$ can. Figures 2 and 3, illustrate this for the case of n = 5, m = 2. In Figure 2 $\mathbf{x}^{td}$ leads to a larger budget than $\mathbf{x}^{bu}$, while the opposite is the case in figure 3. These two figures differ only in the location of a single ideal point, that of voter 4.

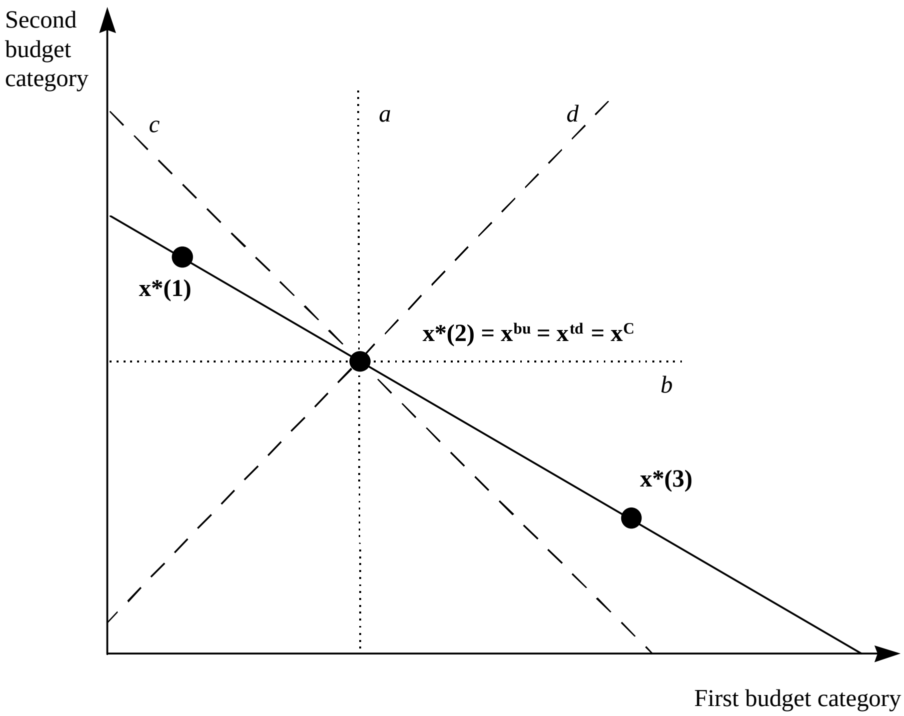


*Figure 1:*

A Condorcet equilibrium

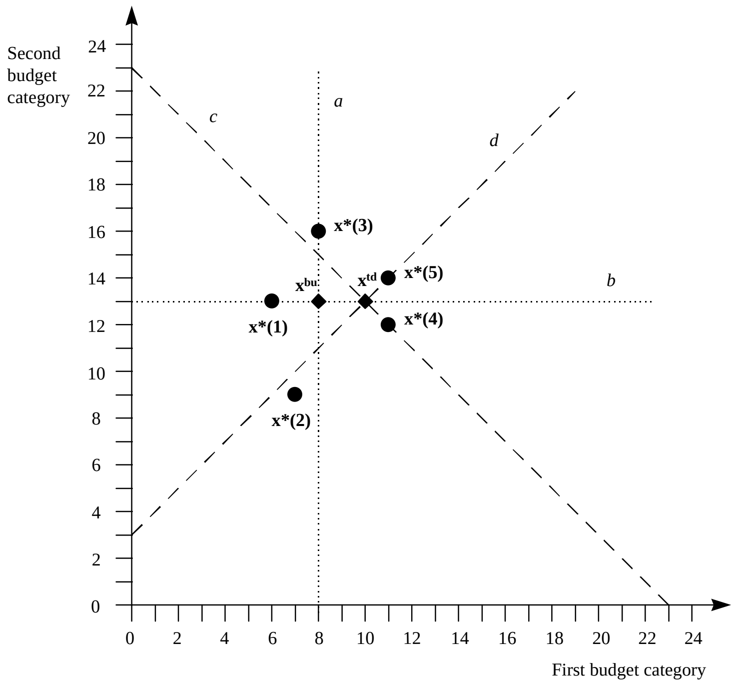


*Figure 2:*

Ideal points and structurally induced equilibria in design I

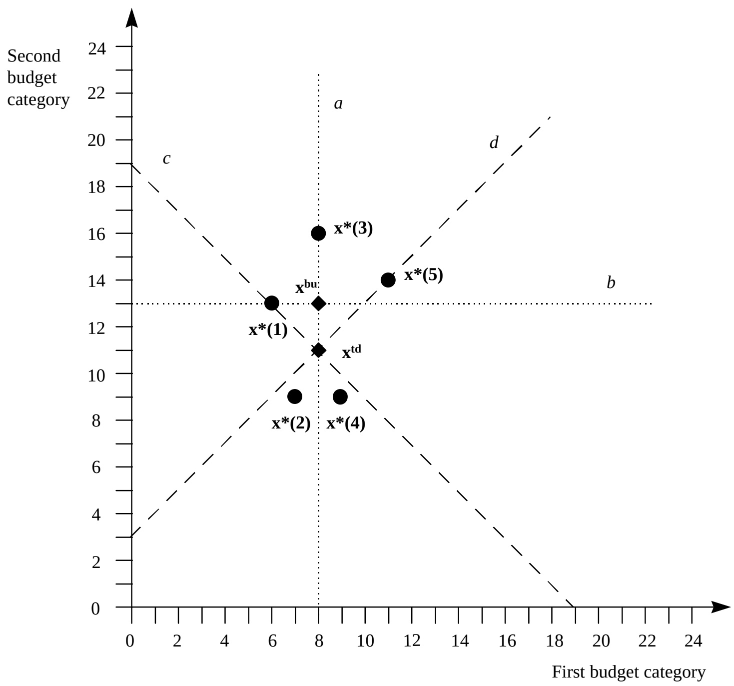


*Figure 3:*

Ideal points and structurally induced equilibria in design II

## 2.2 Specific models

For all experiments studied here, the number of voters, n, equals 5. The number of spending categories, m, equals either 2 or 4. To specify the voters' utility functions, we have two designs—one design is such that the structurally induced equilibrium of a top-down budget process leads to a larger budget than the structurally induced equilibrium of a bottom-up budget process, and vice versa in the other design.

*We discuss first the simpler case m = 2*. To specify the voters' utility functions, we have two designs, design I and design II. They are presented in Table 1. Notice that the two designs differ by voter 4's ideal point only. Voters 1, 2, 3, and 5 have the same ideal points in both designs. The general intention behind these two designs is to make the difference between the equilibrium induced by a bottom-up process, $\mathbf{x}^{td}$ , and the equilibrium induced by a top-down process, $\mathbf{x}^{bu}$, large and in different directions. As can be seen in Table 2, in design I, the total budget corresponding to $\mathbf{x}^{bu}$ is smaller than the total budget corresponding to $\mathbf{x}^{td}$ , while the opposite is true in design II.

For *design I*, the median of the dimension 1 components of the ideal points is 8. The median of the dimension 2 components of ideal points is 13. Putting the components from the two dimensions together, we get (8, 13). The solution induced by the bottom-up process is the vector (8, 13). This is $\mathbf{x}^{bu}$. The total spending under this budget is 21.

The solution induced by the top-down process is the vector (10, 13). This is $\mathbf{x}^{td}$. The total spending under this budget is 23. To find the top-down solution, start with two orthogonal dimensions, corresponding to the $x_1+x_2$ dimension and the $x_1-x_2$ dimension. In the $x_1+x_2$ dimension, the sum of ideal points components of the five players is 19, 16, 24, 23, and 25, respectively. The median of these components is 23. In the $x_1-x_2$ dimension, the difference of ideal points components of the five players is -7, -2, -8, -1, -3, respectively. The median of these components is -3. Solving the pair of equations $x_1+x_2 = 23$ and $x_1-x_2= -3$ yields $x_1 = 10$, $x_2 = 13$.

The ideal points and the voting equilibria of design I are shown in Figure 2. Graphically, the bottom-up equilibrium $\mathbf{x}^{bu}$ = (8,13) is determined by the intersection of the vertical median line through the ideal points *a* and the horizontal median line *b*. The top-down equilibrium $\mathbf{x}^{td}$ = (10,13) is determined by the intersection of the -45° median line *c* and the 45° median line *d*.

Notice that $\mathbf{x}^{\mathbf{td}}$ is different from $\mathbf{x}^{\mathbf{bu}}$. Bottom-up voting leads to a smaller budget, 21, than does top-down voting, 23.

For *design II*, the solution $\mathbf{x}^{\mathbf{bu}}$ induced by the bottom-up process is the vector (8, 13). The total spending under this budget is 21. This is the same as in design I. However, for the top down process, the solution $\mathbf{x}^{\mathbf{td}}$ is the vector (8, 11). The total spending under this budget is 19. Notice that $\mathbf{x}^{\mathbf{td}}$ is different from $\mathbf{x}^{\mathbf{bu}}$, but in contrast to design I, top-down voting leads to a smaller budget, 19, than does bottom-down voting, 21 (see Figure 3). This is because the median voter, here voter 4, goes from wanting to spend 23 units in design I to 18 units in design II.

*We consider now the case m = 4.* The basic principle in getting from two dimensions to four dimensions is projection: ($x_1$, $x_2$) maps into ($x_1$, $x_2$, $x_1$, $x_2$). The ideal points of each player are presented in Table 1. The medians of the ideal points in each dimension are preserved under projection.

For *design III*, which is the projection of design I, the medians in dimensions 1 and 3 are 8; in dimensions 2 and 4, 13. Putting the components from the four dimensions together, we get $\mathbf{x}^{\mathbf{bu}}$ , the vector (8, 13, 8, 13). The total spending under this budget is 42.

The solution $\mathbf{x}^{\mathbf{td}}$ induced by the top-down process is the vector (10, 13, 10, 13); this again follows by projection. The total spending under this budget is 46. Notice that $\mathbf{x}^{td}$ is different from $\mathbf{x}^{bu}$, and in particular that $\mathbf{x}^{td}$ spends more than $\mathbf{x}^{bu}$, 46 versus 42.

For *design IV*, which is the projection of design II, the medians in dimensions 1 and 3 of the ideal points are 8; in dimensions 2 and 4, 13. Putting the components from the four dimensions together, we get (8, 13, 8, 13) as the bottom-up vector $\mathbf{x}^{\mathbf{bu}}$ . Total spending under this budget is 42.

The solution $\mathbf{x}^{\mathbf{td}}$ induced by the top-down process is the (8, 11, 8, 11). The total spending under this budget is 38. Notice that $\mathbf{x}^{td}$ also differs from $\mathbf{x}^{bu}$. In contrast to design III, top-down voting leads to a smaller budget, 38, than the budget of size 42 that bottom-up voting adopts.

*Table 1*:

Individual ideal points and utility function, **x***(i) and $u_i(\mathbf{x})$

| | Two-dimensional | | | | Four-dimensional | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Design I | | Design II | | Design III | | | | Design IV | | | |
| Voter i | $x_1$*(i) | $X_2$*(i) | $x_1$*(i) | $x_2$*(i) | $x_1$*(i) | $x_2$*(i) | $x_3$*(i) | $x_4$*(i) | $x_1$*(i) | $x_2$*(i) | $x_3$*(i) | $x_4$*(i) |
| 1 | 6 | 13 | 6 | 13 | 6 | 13 | 6 | 13 | 6 | 13 | 6 | 13 |
| 2 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 9 |
| 3 | 8 | 16 | 8 | 16 | 8 | 16 | 8 | 16 | 8 | 16 | 8 | 16 |
| 4 | **11** | **12** | **9** | **9** | **11** | **12** | **11** | **12** | **9** | **9** | **9** | **9** |
| 5 | 11 | 14 | 11 | 14 | 11 | 14 | 11 | 14 | 11 | 14 | 11 | 14 |
| Utility function of voter i $u_i(\mathbf{x})$ | $15 - \sqrt{\sum_{j=1}^{2} [x_j - x_j^*(i)]^2}$ | | | | $30 - \sqrt{\sum_{j=1}^{4} [x_j - x_j^*(i)]^2}$ | | | | | | | |

*Table 2*:

Voting equilibria

| | Two-dimensional | | | | Four-dimensional | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Design I | | Design II | | Design III | | | | Design IV | | | |
| Process | $x_1$ | $x_2$ | $x_1$ | $x_2$ | $X_1$ | $x_2$ | $x_3$ | $x_4$ | $x_1$ | $x_2$ | $x_3$ | $x_4$ |
| Bottom-up | 8 | 13 | 8 | 13 | 8 | 13 | 8 | 13 | 8 | 13 | 8 | 13 |
| Σ | 21 | | 21 | | 42 | | | | 42 | | | |
| Top-down | 10 | 13 | 8 | 11 | 10 | 13 | 10 | 13 | 8 | 11 | 8 | 11 |
| Σ | 23 | | 19 | | 46 | | | | 38 | | | |

## 3. Experimental design

The instructions for the experiment are based on those of the classic voting experiment conducted by Fiorina and Plott (1978). Copies of the instructions (in German) are available from the authors upon request.

In the experiment, subjects are told that each of them is member of a group of 5 subjects. In designs I and II, the group's task is to decide on how many integer-valued tokens to spend on two activities, called A and B. In the instructions for a bottom-up budget process, subjects are told that they first have to decide on the number of tokens to be spent on activity A. Their decision on this number is final. They then have to decide on the number of tokens to be spent on activity B, at which point they have completed their task. In the instructions for a top-down budget process, subjects are told that they first have to decide on the number of tokens to be spent on activities A and B together. Their decision on this number is final. They then have to decide on the number of tokens to be spent on activity A, at which point they have completed their task.

In designs III and IV, the group's task is to decide on how many tokens to spend on four activities, called A, B, C, and D. In the instructions for a bottom-up budget process, subjects are told that they first have to decide on the number of tokens to be spent for activity A. Their decision on this number is final. They then repeat this process for activities B, C, and D in that order, at which point they have completed their task. In the instructions for a top-down budget process, subjects are told that they first have to decide on the number of tokens to be spent on activities A, B, C, and D together. Their decision on this number is final. They then have to decide on the number of tokens to be spent on activities, A, B, and C in that order, at which point they have completed their task.

At each step, the decision task is to decide on a number of tokens to be spent on some category or combination of categories. The decision process starts with a *proposal on the floor* which equals zero. At any point in time, each subject has the right to propose an amendment. If an amendment is proposed, then the group has to vote on it. If the proposed amendment is accepted, then it becomes the new proposal on the floor. If the proposed amendment is rejected, it has no effect; the proposal on the floor remains unchanged. In that case, each subject is free to propose other amendments, but only one amendment, at a time. At any point of time, a subject may also propose to end the process. If this proposal is accepted, then the proposal on the floor is considered accepted. If the proposal to end deliberations is rejected, then new amendments may be proposed or new proposals for ending the process may be made.

All votes are based on *simple majority rule*. This implies that if three or more members of the group vote in favor of the proposal, then it wins. Otherwise the proposal is rejected.

In the beginning of the experiment, each subject is informed about his personal payoff (or utility) function. The instructions give each subject the exact formula for the payoff function, which is also explained to him. In the case of two spending categories (design I and design II), the subject is given a table which shows his or her payoff for each combination of numbers in the two spending categories. In all four designs, each subject can, in the final dimension of voting, call up on his or her computer screen to see individual payoff for the proposal on the table and the proposed amendment.

Besides designs I through IV, which differ with respect to the number of spending categories and the ideal points, we distinguish between two informational treatments. In the complete information treatment each subject knows not only his own ideal point, but also the ideal points of the four other players in his group. In the incomplete information treatment, each player is only informed about his own ideal point.

The experiments were organized at the University of Karlsruhe. Subjects were students from various disciplines. The experiments were computerized. Each subject was seated at a computer terminal, which was isolated from other subjects' terminals by wooden screens. The subjects received written instructions that were also read aloud by a research assistant. Before an experiment started, each subject had to answer at his computer terminal a short questionnaire (10 questions) concerning the instructions. Only after all subjects had given the right answers to all questions did decision-making begin. No communication other than through the recognition of proposals and the announcement of the outcomes of votes was permitted.

We organized sessions with 15 or more subjects. Thus, no subject could identify with which of the other participants he or she was grouped. Each subject participated in exactly one experiment; thus, each group of 5 subjects yielded an independent observation. For each design (4), each budget process (2), and each information condition (2), we obtained 8 independent observations, for a total of 128 experiments. Table 3 gives an overview of the experimental design. In obtaining these 128 independent observations, we also acquired data on 640 subjects, 5 each per experiment.

*Table 3*:

Treatment design: number of groups (subjects) in each treatment

| Information | Process | Two-dimensional | | Four-dimensional | |
|---|---|---|---|---|---|
| | | Design I | Design II | Design III | Design IV |
| Complete | Bottom-up | 8 (40) | 8 (40) | 8 (40) | 8 (40) |
| | Top-down | 8 (40) | 8 (40) | 8 (40) | 8 (40) |
| Incomplete | Bottom-up | 8 (40) | 8 (40) | 8 (40) | 8 (40) |
| | Top-down | 8 (40) | 8 (40) | 8 (40) | 8 (40) |

## 4. Experimental results

This section considers aggregate data from the experiment; the next section, individual data. Start with the sizes of the overall budgets we observe in these 128 experiments. Tables 4 (for the 2-dimensional treatment) and 5 (for the four-dimensional treatment) give an overview of observed group voting outcomes in all treatments. In situations where top-down voting equilibria spend more than bottom-up voting equilibria (designs I and III), we observe this very clearly in the data. The same holds true in situations where top-down voting equilibria spend less than bottom-up voting equilibria (designs II and IV). With complete information, the differences between bottom-up and top-down total budgets are significant at the 10% level in design I, and at the 5 percent level in designs II, III and IV (Mann-Whitney U-test). With incomplete information, the corresponding differences are significant at the 10 percent level in design II, and at the 5 percent level in designs III and IV. In design I the difference is not statistically significant at the 10 percent level; but it does go in the right direction.[2]

*Result 1*: Sequence matters. The outcomes observed under bottom-up and top-down voting differ from each other significantly.

We next show that structurally induced equilibrium is a good predictor. To see this visually, first pool the data from designs I and II, and call the pooled data the 2-dimensional treatment. Figure 4 shows the scatter diagram of 2-dimensional treatment data relative to the predicted value. Notice how tight the scatter is around the structurally induced equilibrium prediction; the average Euclidean distance of an observation from the predicted value is 1.5, a small number relative to a predicted total sum of between 19 and 23. A similar picture emerges for the 4-dimensional treatment, where the average Euclidean distance of an observation from the predicted value is 2.6, again a small number relative to a predicted total sum of between 38 and 46. Pooling over all 128 observations, the average Euclidean distance of the observed budgets from structurally induced equilibrium is 2.1.

*Result 2*: Structurally induced equilibrium is a good predictor of budget outcome: the average distance of observed outcomes from predicted equilibrium is relatively small.

*Table 4*:

Average budgets in the two-dimensional treatments

| | Design I | | Design II | |
|---|---|---|---|---|
| Information | Bottom-up | Top-down | Bottom-up | Top-down |
| Complete | 21.4 | 22.5 | 21.4 | 19.0 |
| Incomplete | 22.6 | 22.6 | 21.5 | 20.1 |
| Structurally induced equilibrium | 21 | 23 | 21 | 19 |

[2] A single large outlier is responsible for this lack of statistical significance.

*Table 5*:

Average budgets in the four-dimensional treatments

| | Design III | | Design IV | |
|---|---|---|---|---|
| Information | Bottom-up | Top-down | Bottom-up | Top-down |
| Complete | 42.1 | 46.4 | 43.0 | 38.0 |
| Incomplete | 43.4 | 46.6 | 43.8 | 38.6 |
| Structurally induced equilibrium | 42 | 46 | 42 | 38 |

Next, introduce another measure of closeness of an observed budget to a predicted equilibrium: an observation is close to predicted equilibrium if it does not deviate from it by more than one unit in any spending category. Over all treatments, 53.9% are close (10 out of 128 outcomes, or 7.8%, hit the predicted equilibrium exactly).

Table 6 reports the percentages of observations close to the structurally induced equilibrium prediction for all information-dimensionality treatments. First, we see that with complete information, a higher percentage of outcomes is equal or close to the structurally induced equilibrium than under incomplete information. This is true for each dimensional treatment separately, as well as on average, the respective averages being 62.5% versus 45.3%. Second, we see that with lower dimensionality, a higher percentage of outcomes is equal or close to the structurally induced equilibrium than with higher dimensionality. This is true for each information treatment separately, as well as on average, the respective averages being 67.2% versus 40.6%.

*Result 3*: Structurally induced equilibrium is a good predictor of budget outcome: more than half of all observed budgets are close to the predicted structurally induced equilibrium.

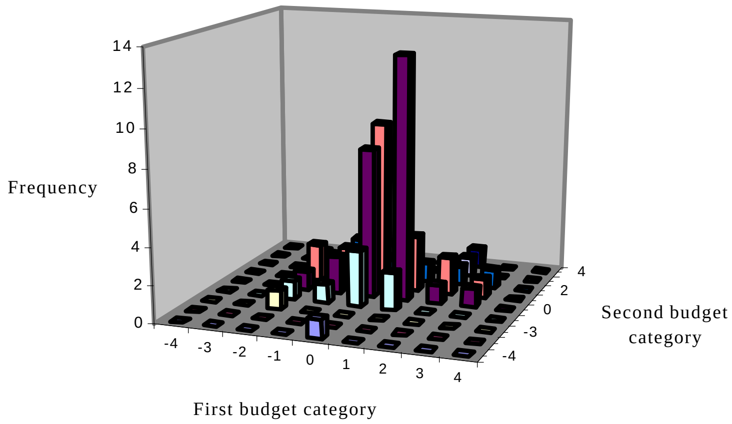


*Figure 4:*

Distribution of outcomes around equilibrium (0,0) in the 2-dimansional treatment

It is mathematically easier to realize an outcome which is equal or close to the structurally induced equilibrium in two dimensions than in four dimensions. To address this concern, we apply to the data in Table 6 Selten's (1991) *measure of predictive success*, which adjusts for dimensionality in the following way. Define the *hit rate as* the frequency of outcomes close to the structurally induced equilibrium; define the *area rate* as the area of all points near the structurally induced equilibrium, relative to the set of reasonable outcomes—outcomes any reasonable theory might allow for. Selten's measure then is the difference between the hit rate and the area rate. In particular, the area rate in two dimensions is greater than the area rate in four dimensions.

To see this, consider the set of natural numbers bounded in each direction by the minimum and the maximum values of subjects' ideal points. Call this the set of *reasonable outcomes*—it contains the set of Pareto optima, and also includes outcomes which are nearly Pareto optima. In designs I and II (dimension 2), the set of reasonable outcomes is the rectangle defined by the corners (6,9), (6,16), (11,9), (11,16), and contains 48 points. The area close to the structurally induced equilibrium covers 9 points, so the area rate is 9/48 or 19 percent.

In designs III and IV (dimension 4), the set of reasonable outcomes is the polyhedron defined by the points (6,9,6,9), (6,16,6,16), (11,16,11,16), and (11,9,11,9), and contains 2304 points. The area equal or close to the structurally induced equilibrium covers 81 points, so the area rate is 81/2304 or 3%. This verifies mathematically that it is harder to get close to a structurally induced equilibrium in four dimensions where the area rate is 3%, than in two dimensions, where the area rate is 19%.

*Table 6*:

Percentage of budgets close to the structurally induced equilibrium budget

| Information | Two-dimensional | Four-dimensional | Average |
|---|---|---|---|
| Complete | 78.1 | 46.9 | 62.5 |
| Incomplete | 56.3 | 34.4 | 45.3 |
| Average | 67.2 | 40.6 | 53.8 |

Given these area rates, we can compute the measures of predictive success for the dimensionality treatment; Table 7 shows the results. In two dimensions, the hit rate is 67.2% and the area rate is 19%, yielding a predictive success of 48.2%. In four dimensions, the hit rate is 40.6% and the area rate is 3%, yielding a predictive success of 37.6%. Although predictive success is still greater in two dimensions than in four, the difference is much reduced. To put these levels of predictive success in context, note that the predictive success of Nash equilibrium theory is often less than 5% (Keser and Gardner, 1999).

*Result 4*: The predictive success of structurally induced equilibrium theory increases with complete information, and with fewer spending categories.

*Table 7:*

Predictive Success of Voting Equilibria

| Information | Two-dimensional | Four-dimensional | Average |
|---|---|---|---|
| Complete | 59.1 | 43.9 | 51.5 |
| Incomplete | 37.3 | 31.4 | 34.4 |

| | | | |
|---|---|---|---|
| Average | 48.2 | 37.6 | 43.0 |

Table 8 shows the average number of moves—a proposal followed by a vote—needed to reach a budget decision in the information-dimensionality treatments. To reach a budget decision takes about 30 percent more moves with incomplete information, as opposed to complete information. To reach a budget decision in four dimensions takes about twice as many moves as in two dimensions. Since the 4-dimensional case requires twice as many final decisions made as the 2-dimensional case, we conclude that, relative to the number of spending categories the same effort is needed to reach a budget decision in both cases.

*Result 5*: The number of moves needed to reach a budget decision is greater with incomplete information than with complete information. The number of moves needed to reach a budget decision increases proportionally with the number of spending categories.

*Table 8*:

Average number of moves to reach the budget decision

| Information | Two-dimensional | Four-dimensional |
|---|---|---|
| Complete | 11.0 | 22.6 |
| Incomplete | 14.5 | 28.8 |

## 5. Individual behavior

Now turn to data on individual behavior. We consider first the effect of the information treatment on individual proposals. In two dimensions with incomplete information, subjects propose their ideal points 55.9% of the time; with complete information, 42.5%. This difference is significant at the 1 percent level ($\chi^2$ - test). In four dimensions with incomplete information, subjects propose their ideal points 47.8% of the time; with complete information, 40.8%. This difference is significant at the 5 percent level ($\chi^2$ - test).

*Result 6*: With incomplete information, subjects propose their individual ideal points significantly more often than with complete information.

This makes sense. If subjects' information is incomplete, then proposing one's ideal point has considerable signaling value. Subjects could be exploiting this signaling potential.

*Table 9*:

Direction of Proposals, with reference to an individual's optimal value (OV) .[3]

| Dimensions | Information | Percent of proposals | | |
|---|---|---|---|---|
| | | Towards equilibrium | Equal to OV | Away from equilibrium |
| Two | Complete | 57.3 | 37.6 | 5.1 |
| Two | Incomplete | 30.8 | 53.0 | 16.2 |
| Four | Complete | 49.9 | 41.9 | 8.2 |
| Four | Incomplete | 35.3 | 46.4 | 18.3 |

Table 9 gives the relative frequencies with which proposals made by individuals moved towards equilibrium, stayed at an individuals' optimal value (OV), or moved away from

[3] By value we mean the amount of either the total budget or the respective spending category, depending on the decision situation. We exclude from consideration all subjects whose OV coincides with equilibrium.

equilibrium. With complete information, the most frequently made proposals moved towards equilibrium; with incomplete information, the most frequently made proposals stayed at an individual's optimal value. Across all treatments, the least frequently made proposals moved away from equilibrium. Table 9 clearly reveals that across all treatments, the majority of proposals, if they deviate from a subject's respective optimal value, move towards structurally induced equilibrium. This is significant at the 5 percent level (sign-test).

*Result 7*: Subjects, when not proposing their optimal value, deviate from it in the direction of the structurally induced equilibrium. This is true both under complete and incomplete information.

This is an important indicator of the quality of proposals and of the rationality of the subjects. Subjects' proposals drive an equilibrium-seeking process.

Once an amendment to a proposal has been made, subjects have to vote on it. Table 10 considers for each individual vote whether the amendment, if adopted, would increase, leave unchanged, or decrease the subject's status quo utility, and records the relative frequency of votes for acceptance in each case. We see that in all information-dimensionality treatments, a majority of individuals vote to support utility-increasing amendments, while a minority of individuals vote to support utility-decreasing amendments. This tendency to accept utility-increasing amendments and to reject utility-decreasing amendments is significant at the 1 percent level (binomial-test)

*Result 8*: Subjects' voting behavior with respect to amendments on the floor is sequentially rational. They accept amendments if they increase their status quo utility, and reject amendments if they decrease their status quo utility.

This result provides more support for subjects' rationality, as evidenced through their voting behavior.

Table 11 shows for all information-dimensionality treatments, the percentage of proposals that have the values of structurally induced equilibrium, at the amendment stage, as accepted proposals, and as final decisions. In each treatment we observe an increase in the frequency of structurally induced equilibrium values, from the amendment stage to final decision. Furthermore, across all dimension-information treatments, the frequency of structurally induced equilibrium is higher with complete information than with incomplete information, and higher in 2 dimensions than in four dimensions. This suggests that complexity challenges the predictive success of structurally induced equilibrium, since both incomplete information and more spending categories make the decision task more complex.

*Result 9*: The percentage of structurally induced equilibrium values increases from the amendment stage to the final decision stage. Complexity in the form of more spending categories or incomplete information reduces this percentage.

To conclude, our results support the concept of structurally induced equilibrium also on the level of individual behavior, as subjects exhibit considerable rationality in their proposals and votes.

*Table 10*:

Percentage of individual votes supporting proposals to increase, leave unchanged, or decrease utility

| | | Relative frequency of accepted votes if the effect of the amendment relative to the status quo is | | |
|---|---|---|---|---|
| Dimensions | Information | Increase | No change | Decrease |
| Two | Complete | 69.1 | 58.2 | 13.6 |
| Two | Incomplete | 69.0 | 48.6 | 7.6 |
| Four | Complete | 56.2 | 43.5 | 27.9 |
| Four | Incomplete | 63.9 | 46.8 | 24.6 |

*Table 11*:

Percentage of proposals that have the values of structurally induced equilibrium

| Dimensions | Information | Percentage of structurally induced equilibrium values in | | |
|---|---|---|---|---|
| | | Amendments | Accepted proposals | Final decisions |
| Two | Complete | 24.3 | 35.1 | 50.0 |
| Two | Incomplete | 15.9 | 25.2 | 37.5 |
| Four | Complete | 20.7 | 28.6 | 36.7 |
| Four | Incomplete | 16.3 | 21.5 | 34.4 |

## 6. Conclusion

This paper has studied budget processes—the system of rules governing decision-making, leading to a budget—both theoretically and experimentally. On the theoretical side, we have shown that a top-down budget process does not necessarily lead to a smaller overall budget than a bottom-up budget process does. We then conducted a series of 128 experiments to study budgeting processes using subjects in a behavior laboratory. The evidence from those experiments supported the theory of structurally induced equilibrium, both at the aggregate level and at the individual subject level. The subjects in these experiments exhibited behavior of a high degree of sophistication, both in the proposals they made and in the votes they cast. Neither incomplete information nor high dimensionality of the task prevented them from coming close to the predicted structurally induced equilibrium.

These results have three important policy implications. First and foremost, institutions matter. The kind of budget one gets from a budget process is driven by the structurally induced equilibrium of that process, and the structurally induced equilibrium depends on the institution being used. If one uses an inefficient or irrational institution, one can expect inefficient or irrational outcomes.

Second, sequence matters. Policy makers should not presume that a top-down budget process always leads to less spending. As we have seen, that presumption is tantamount to presuming unsophisticated behavior on the part of voters in budget processes. On the contrary, we observe highly sophisticated voting behavior in our sample of 640 subjects. Indeed, sophisticated voters with big-spender preferences will not be deterred by a top-down process from arriving at a big-spending budget.

Finally, complexity is costly. If we measure decision-making costs in terms of the number of votes required to reach closure, those costs go up with more spending categories and with less incomplete information. To the extent that decision-making costs are important, agenda setters in a budget process, such as finance ministers, are well-advised to keep the overall decision low-dimensional, even if this means relying on local autonomy for more detailed budget allocations. While incomplete information also increases decision-making costs, it does not appear to significantly reduce the predictive success of structurally induced equilibrium theory. This increases the real-world applicability of our results, since complete information, even in a cabinet or legislature of long standing, is rare.

## Acknowledgements

Financial support by the Sonderforschungsbereich 504 at the University of Mannheim is gratefully acknowledged.

Claudia Keser thanks CIRANO and the Alexander von Humboldt Foundation (Feodor Lynen Research Fellowship) for their financial support.

**References**

Alesina, A. and Perotti, R. (1995) ” The Political Economy of budget Deficits.” *IMF Staff Papers* 42, 1-31

Alesina, A., and Perotti, R.(1999), ”Budget Deficits and Budget Institutions.” In: J.M. Poterba and J. von Hagen (eds.), *Fiscal Institutions and Fiscal Performance*. Chicago: University of Chicago Press

Committee on the Budget, United States Senate (1987): *Gramm-Rudman-Hollings and the Congressional Budget Process: An Explanation*, Washington: US Government Printing Office.

Davis, D., and C. Holt (1993): *Experimental Economics*, Princeton: Princeton University Press.

Eckel, C., and C. Holt (1989): "Strategic Voting in Agenda-Controlled Experiments," *American Economic Review* 79, 763-773.

Farquharson, R. (1969): *Theory of Voting*, New Haven: Yale University Press.

Ferejohn, J., and K. Krehbiel (1987): “The Budget Process and the Size of the Budget,” *American Journal of Political Science* 31, 296-320.

Fiorina, M. P. and C. R. Plott (1978): “Committee Decisions under Majority Rule: An Experimental Study,” *American Political Science Review* 72, 575-598.

Gardner, R., and J. von Hagen (1997): "Sequencing and the Size of the Budget: Experimental Evidence," in: W. Albers, W. Güth, P. Hammerstein, B. Moldovanu, and E. van Damme (eds.), *Understanding Strategic Interaction: Essays in Honor of Reinhard Selten*, Berlin: Springer-Verlag, 465-474.

International Monetary Fund (1996): *World Economic Outlook*, Washington DC, IMF.

Keser, C. and Gardner, R (1999): ”Strategic Behavior of Experienced Subjects in a Common Pool Resource Game,” *International Journal of Game Theory* 28, 242-252.

Kramer, G. H. (1972): "Sophisticated Voting over Multidimensional Choice Space," *Journal of Mathematical Sociology* 2, 165-180.

Lao-Araya, K. (1998)): ”Three Essays on the Fiscal Constitutions of Developing Countries,” Ph.D. dissertation, Indiana University.

McKelvey, R. D. (1979): "General Conditions for Global Intransitivities in Formal Voting Models," *Econometrica*, 47(5), 1085-1112.

Organization for Economic Cooperation and Development (1987): *The Control and Management of Government Expenditure*, Paris.

Plott, C. and Krehbiel, K. (1979): ”Voting in a Committee: an Experimental Analysis,” *American Political Science Review*

Poterba, J.M, and von Hagen, J. (1999): *Fiscal Institutions and Fiscal Performance*, Chicago: University of Chicago Press.

Riker, W. H. (1962): *The Theory of Political Coalitions*, New Haven, CT: Yale University Press.

Schick, A. (1986): "Macro-Budgetary Adaptations to Fiscal Stress in Industrialized Democracies," *Public Administration Review* 46, 124-134.

Selten, R. (1991): "Properties of a Measure of Predictive Success," *Mathematical Social Sciences* 21, 153-167.

von Hagen, J. and Harden, I. (1995), ”Budget Processes and Fiscal Discipline,” *European Economic Review* 39, 1995, 771-779.

von Hagen, J. and Harden, I. (1996), ”Budget Processes and Commitment to Fiscal Discipline,” *IMF Working Paper* WP96/97.

Wildavsky, A. (1975): *Budgeting*, Oxford: Transaction publishers.

## APPENDIX: Proof of Proposition

Consider budget decisions with $m > 0$ spending categories. Assume there exists a Condorcet equilibrium $\mathbf{x}^{\mathbf{C}}$.

By definition $\mathbf{x}^{\mathbf{C}}$ has a majority against any other vector in the space $R_m^+$. This implies $\mathbf{x}^{\mathbf{C}}$ has a majority against any alternative in a direction along a basis vector.

Recall that any vector in a vector space can be expressed uniquely as a linear combination of basis vectors. Consider the following two bases for $R_m^+$.

(1) The standard orthonormal basis, with the typical basis vector $\mathbf{e}_\mathbf{i}$ , having zero in all components except component i, where it has 1.

(2) The rotation of the standard othonormal basis which includes the vector $m^{-0.5}(1,\ldots,1)$.

Basis (1) corresponds to bottom-up voting; basis (2) to top-down voting.

Along any direction in basis (1), $\mathbf{x}^{\mathbf{C}}$ has a majority against any alternative. Thus, $\mathbf{x}^{\mathbf{C}}$ equals $\mathbf{x}^{\mathbf{bu}}$.
Along any direction in basis (2), $\mathbf{x}^{\mathbf{C}}$ has a majority against any alternative. Thus, $\mathbf{x}^{\mathbf{C}}$ equals $\mathbf{x}^{\mathbf{td}}$.

It follows that $\mathbf{x}^{\mathbf{td}} = \mathbf{x}^{\mathbf{bu}} = \mathbf{x}^{\mathbf{C}}$.

| | | |
|---|---|---|
| **2008** | | |
| B01-08 | **Euro-Diplomatie durch gemeinsame „Wirtschaftsregierung“** | *Martin Seidel* |
| **2007** | | |
| B03-07 | **Löhne und Steuern im Systemwettbewerb der Mitgliedstaaten der Europäischen Union** | *Martin Seidel* |
| B02-07 | **Konsolidierung und Reform der Europäischen Union** | *Martin Seidel* |
| B01-07 | **The Ratification of European Treaties - Legal and Constitutional Basis of a European Referendum.** | *Martin Seidel* |
| **2006** | | |
| B03-06 | **Financial Frictions, Capital Reallocation, and Aggregate Fluctuations** | *Jürgen von Hagen, Haiping Zhang* |
| B02-06 | **Financial Openness and Macroeconomic Volatility** | *Jürgen von Hagen, Haiping Zhang* |
| B01-06 | **A Welfare Analysis of Capital Account Liberalization** | *Jürgen von Hagen, Haiping Zhang* |
| **2005** | | |
| B11-05 | **Das Kompetenz- und Entscheidungssystem des Vertrages von Rom im Wandel seiner Funktion und Verfassung** | *Martin Seidel* |
| B10-05 | **Die Schutzklauseln der Beitrittsverträge** | *Martin Seidel* |
| B09-05 | **Measuring Tax Burdens in Europe** | *Guntram B. Wolff* |
| B08-05 | **Remittances as Investment in the Absence of Altruism** | *Gabriel González-König* |
| B07-05 | **Economic Integration in a Multicone World?** | *Christian Volpe Martincus, Jennifer Pédussel Wu* |
| B06-05 | **Banking Sector (Under?)Development in Central and Eastern Europe** | *Jürgen von Hagen, Valeriya Dinger* |
| B05-05 | **Regulatory Standards Can Lead to Predation** | *Stefan Lutz* |
| B04-05 | **Währungspolitik als Sozialpolitik** | *Martin Seidel* |
| B03-05 | **Public Education in an Integrated Europe: Studying to Migrate and Teaching to Stay?** | *Panu Poutvaara* |
| B02-05 | **Voice of the Diaspora: An Analysis of Migrant Voting Behavior** | *Jan Fidrmuc, Orla Doyle* |
| B01-05 | **Macroeconomic Adjustment in the New EU Member States** | *Jürgen von Hagen, Iulia Traistaru* |
| **2004** | | |
| B33-04 | **The Effects of Transition and Political Instability On Foreign Direct Investment Inflows: Central Europe and the Balkans** | *Josef C. Brada, Ali M. Kutan, Taner M. Yigit* |
| B32-04 | **The Choice of Exchange Rate Regimes in Developing Countries: A Mulitnominal Panal Analysis** | *Jürgen von Hagen, Jizhong Zhou* |
| B31-04 | **Fear of Floating and Fear of Pegging: An Empirical Anaysis of De Facto Exchange Rate Regimes in Developing Countries** | *Jürgen von Hagen, Jizhong Zhou* |
| B30-04 | **Der Vollzug von Gemeinschaftsrecht über die Mitgliedstaaten und seine Rolle für die EU und den Beitrittsprozess** | *Martin Seidel* |
| B29-04 | **Deutschlands Wirtschaft, seine Schulden und die Unzulänglichkeiten der einheitlichen Geldpolitik im Eurosystem** | *Dieter Spethmann, Otto Steiger* |
| B28-04 | **Fiscal Crises in U.S. Cities: Structural and Non-structural Causes** | *Guntram B. Wolff* |
| B27-04 | **Firm Performance and Privatization in Ukraine** | *Galyna Grygorenko, Stefan Lutz* |
| B26-04 | **Analyzing Trade Opening in Ukraine: Effects of a Customs Union with the EU** | *Oksana Harbuzyuk, Stefan Lutz* |
| B25-04 | **Exchange Rate Risk and Convergence to the Euro** | *Lucjan T. Orlowski* |
| B24-04 | **The Endogeneity of Money and the Eurosystem** | *Otto Steiger* |
| B23-04 | **Which Lender of Last Resort for the Eurosystem?** | *Otto Steiger* |
| B22-04 | **Non-Discretonary Monetary Policy: The Answer for Transition Economies?** | *Elham-Mafi Kreft, Steven F. Kreft* |
| B21-04 | **The Effectiveness of Subsidies Revisited: Accounting for Wage and Employment Effects in Business R+D** | *Volker Reinthaler, Guntram B. Wolff* |
| B20-04 | **Money Market Pressure and the Determinants of Banking Crises** | *Jürgen von Hagen, Tai-kuang Ho* |
| B19-04 | **Die Stellung der Europäischen Zentralbank nach dem Verfassungsvertrag** | *Martin Seidel* |

| | | |
|---|---|---|
| B18-04 | **Transmission Channels of Business Cycles Synchronization in an Enlarged EMU** | *Iulia Traistaru* |
| B17-04 | **Foreign Exchange Regime, the Real Exchange Rate and Current Account Sustainability: The Case of Turkey** | *Sübidey Togan, Hasan Ersel* |
| B16-04 | **Does It Matter Where Immigrants Work? Traded Goods, Non-traded Goods, and Sector Specific Employment** | *Harry P. Bowen, Jennifer Pédussel Wu* |
| B15-04 | **Do Economic Integration and Fiscal Competition Help to Explain Local Patterns?** | *Christian Volpe Martincus* |
| B14-04 | **Euro Adoption and Maastricht Criteria: Rules or Discretion?** | *Jiri Jonas* |
| B13-04 | **The Role of Electoral and Party Systems in the Development of Fiscal Institutions in the Central and Eastern European Countries** | *Sami Yläoutinen* |
| B12-04 | **Measuring and Explaining Levels of Regional Economic Integration** | *Jennifer Pédussel Wu* |
| B11-04 | **Economic Integration and Location of Manufacturing Activities: Evidence from MERCOSUR** | *Pablo Sanguinetti, Iulia Traistaru, Christian Volpe Martincus* |
| B10-04 | **Economic Integration and Industry Location in Transition Countries** | *Laura Resmini* |
| B09-04 | **Testing Creditor Moral Hazard in Souvereign Bond Markets: A Unified Theoretical Approach and Empirical Evidence** | *Ayse Y. Evrensel, Ali M. Kutan* |
| B08-04 | **European Integration, Productivity Growth and Real Convergence** | *Taner M. Yigit, Ali M. Kutan* |
| B07-04 | **The Contribution of Income, Social Capital, and Institutions to Human Well-being in Africa** | *Mina Baliamoune-Lutz, Stefan H. Lutz* |
| B06-04 | **Rural Urban Inequality in Africa: A Panel Study of the Effects of Trade Liberalization and Financial Deepening** | *Mina Baliamoune-Lutz, Stefan H. Lutz* |
| B05-04 | **Money Rules for the Eurozone Candidate Countries** | *Lucjan T. Orlowski* |
| B04-04 | **Who is in Favor of Enlargement? Determinants of Support for EU Membership in the Candidate Countries' Referenda** | *Orla Doyle, Jan Fidrmuc* |
| B03-04 | **Over- and Underbidding in Central Bank Open Market Operations Conducted as Fixed Rate Tender** | *Ulrich Bindseil* |
| B02-04 | **Total Factor Productivity and Economic Freedom Implications for EU Enlargement** | *Ronald L. Moomaw, Euy Seok Yang* |
| B01-04 | **Die neuen Schutzklauseln der Artikel 38 und 39 des Beitrittsvertrages: Schutz der alten Mitgliedstaaten vor Störungen durch die neuen Mitgliedstaaten** | *Martin Seidel* |
| **2003** | | |
| B29-03 | **Macroeconomic Implications of Low Inflation in the Euro Area** | *Jürgen von Hagen, Boris Hofmann* |
| B28-03 | **The Effects of Transition and Political Instability on Foreign Direct Investment: Central Europe and the Balkans** | *Josef C. Brada, Ali M. Kutan, Taner M. Yigit* |
| B27-03 | **The Performance of the Euribor Futures Market: Efficiency and the Impact of ECB Policy Announcements (Electronic Version of International Finance)** | *Kerstin Bernoth, Juergen von Hagen* |
| B26-03 | **Souvereign Risk Premia in the European Government Bond Market (überarbeitete Version zum Herunterladen)** | *Kerstin Bernoth, Juergen von Hagen, Ludger Schulknecht* |
| B25-03 | **How Flexible are Wages in EU Accession Countries?** | *Anna Iara, Iulia Traistaru* |
| B24-03 | **Monetary Policy Reaction Functions: ECB versus Bundesbank** | *Bernd Hayo, Boris Hofmann* |
| B23-03 | **Economic Integration and Manufacturing Concentration Patterns: Evidence from Mercosur** | *Iulia Traistaru, Christian Volpe Martincus* |
| B22-03 | **Reformzwänge innerhalb der EU angesichts der Osterweiterung** | *Martin Seidel* |
| B21-03 | **Reputation Flows: Contractual Disputes and the Channels for Inter-Firm Communication** | *William Pyle* |
| B20-03 | **Urban Primacy, Gigantism, and International Trade: Evidence from Asia and the Americas** | *Ronald L. Moomaw, Mohammed A. Alwosabi* |
| B19-03 | **An Empirical Analysis of Competing Explanations of Urban Primacy Evidence from Asia and the Americas** | *Ronald L. Moomaw, Mohammed A. Alwosabi* |

| | | |
|---|---|---|
| B18-03 | **The Effects of Regional and Industry-Wide FDI Spillovers on Export of Ukrainian Firms** | *Stefan H. Lutz, Oleksandr Talavera, Sang-Min Park* |
| B17-03 | **Determinants of Inter-Regional Migration in the Baltic States** | *Mihails Hazans* |
| B16-03 | **South-East Europe: Economic Performance, Perspectives, and Policy Challenges** | *Iulia Traistaru, Jürgen von Hagen* |
| B15-03 | **Employed and Unemployed Search: The Marginal Willingness to Pay for Attributes in Lithuania, the US and the Netherlands** | *Jos van Ommeren, Mihails Hazans* |
| B14-03 | **FCIs and Economic Activity: Some International Evidence** | *Charles Goodhart, Boris Hofmann* |
| B13-03 | **The IS Curve and the Transmission of Monetary Policy: Is there a Puzzle?** | *Charles Goodhart, Boris Hofmann* |
| B12-03 | **What Makes Regions in Eastern Europe Catching Up? The Role of Foreign Investment, Human Resources, and Geography** | *Gabriele Tondl, Goran Vuksic* |
| B11-03 | **Die Weisungs- und Herrschaftsmacht der Europäischen Zentralbank im europäischen System der Zentralbanken - eine rechtliche Analyse** | *Martin Seidel* |
| B10-03 | **Foreign Direct Investment and Perceptions of Vulnerability to Foreign Exchange Crises: Evidence from Transition Economies** | *Josef C. Brada, Vladimír Tomsík* |
| B09-03 | **The European Central Bank and the Eurosystem: An Analysis of the Missing Central Monetary Institution in European Monetary Union** | *Gunnar Heinsohn, Otto Steiger* |
| B08-03 | **The Determination of Capital Controls: Which Role Do Exchange Rate Regimes Play?** | *Jürgen von Hagen, Jizhong Zhou* |
| B07-03 | **Nach Nizza und Stockholm: Stand des Binnenmarktes und Prioritäten für die Zukunft** | *Martin Seidel* |
| B06-03 | **Fiscal Discipline and Growth in Euroland. Experiences with the Stability and Growth Pact** | *Jürgen von Hagen* |
| B05-03 | **Reconsidering the Evidence: Are Eurozone Business Cycles Converging?** | *Michael Massmann, James Mitchell* |
| B04-03 | **Do Ukrainian Firms Benefit from FDI?** | *Stefan H. Lutz, Oleksandr Talavera* |
| B03-03 | **Europäische Steuerkoordination und die Schweiz** | *Stefan H. Lutz* |
| B02-03 | **Commuting in the Baltic States: Patterns, Determinants, and Gains** | *Mihails Hazans* |
| B01-03 | **Die Wirtschafts- und Währungsunion im rechtlichen und politischen Gefüge der Europäischen Union** | *Martin Seidel* |
| **2002** | | |
| B30-02 | **An Adverse Selection Model of Optimal Unemployment Assurance** | *Marcus Hagedorn, Ashok Kaul, Tim Mennel* |
| B29B-02 | **Trade Agreements as Self-protection** | *Jennifer Pédussel Wu* |
| B29A-02 | **Growth and Business Cycles with Imperfect Credit Markets** | *Debajyoti Chakrabarty* |
| B28-02 | **Inequality, Politics and Economic Growth** | *Debajyoti Chakrabarty* |
| B27-02 | **Poverty Traps and Growth in a Model of Endogenous Time Preference** | *Debajyoti Chakrabarty* |
| B26-02 | **Monetary Convergence and Risk Premiums in the EU Candidate Countries** | *Lucjan T. Orlowski* |
| B25-02 | **Trade Policy: *Institutional* Vs. *Economic* Factors** | *Stefan Lutz* |
| B24-02 | **The Effects of Quotas on Vertical Intra-industry Trade** | *Stefan Lutz* |
| B23-02 | **Legal Aspects of European Economic and Monetary Union** | *Martin Seidel* |
| B22-02 | **Der Staat als *Lender of Last Resort* - oder: Die Achillesverse des Eurosystems** | *Otto Steiger* |
| B21-02 | **Nominal and Real Stochastic Convergence Within the Transition Economies and to the European Union: Evidence from Panel Data** | *Ali M. Kutan, Taner M. Yigit* |
| B20-02 | **The Impact of News, Oil Prices, and International Spillovers on Russian Fincancial Markets** | *Bernd Hayo, Ali M. Kutan* |

| | | |
|---|---|---|
| B19-02 | **East Germany: Transition with Unification, Experiments and Experiences** | *Jürgen von Hagen, Rolf R. Strauch, Guntram B. Wolff* |
| B18-02 | **Regional Specialization and Employment Dynamics in Transition Countries** | *Iulia Traistaru, Guntram B. Wolff* |
| B17-02 | **Specialization and Growth Patterns in Border Regions of Accession Countries** | *Laura Resmini* |
| B16-02 | **Regional Specialization and Concentration of Industrial Activity in Accession Countries** | *Iulia Traistaru, Peter Nijkamp, Simonetta Longhi* |
| B15-02 | **Does Broad Money Matter for Interest Rate Policy?** | *Matthias Brückner, Andreas Schaber* |
| B14-02 | **The Long and Short of It: Global Liberalization, Poverty and Inequality** | *Christian E. Weller, Adam Hersch* |
| B13-02 | **De Facto and Official Exchange Rate Regimes in Transition Economies** | *Jürgen von Hagen, Jizhong Zhou* |
| B12-02 | **Argentina: The Anatomy of A Crisis** | *Jiri Jonas* |
| B11-02 | **The Eurosystem and the Art of Central Banking** | *Gunnar Heinsohn, Otto Steiger* |
| B10-02 | **National Origins of European Law: Towards an Autonomous System of European Law?** | *Martin Seidel* |
| B09-02 | **Monetary Policy in the Euro Area - Lessons from the First Years** | *Volker Clausen, Bernd Hayo* |
| B08-02 | **Has the Link Between the Spot and Forward Exchange Rates Broken Down? Evidence From Rolling Cointegration Tests** | *Ali M. Kutan, Su Zhou* |
| B07-02 | **Perspektiven der Erweiterung der Europäischen Union** | *Martin Seidel* |
| B06-02 | **Is There Asymmetry in Forward Exchange Rate Bias? Multi-Country Evidence** | *Su Zhou, Ali M. Kutan* |
| B05-02 | **Real and Monetary Convergence Within the European Union and Between the European Union and Candidate Countries: A Rolling Cointegration Approach** | *Josef C. Brada, Ali M. Kutan, Su Zhou* |
| B04-02 | **Asymmetric Monetary Policy Effects in EMU** | *Volker Clausen, Bernd Hayo* |
| B03-02 | **The Choice of Exchange Rate Regimes: An Empirical Analysis for Transition Economies** | *Jürgen von Hagen, Jizhong Zhou* |
| B02-02 | **The Euro System and the Federal Reserve System Compared: Facts and Challenges** | *Karlheinz Ruckriegel, Franz Seitz* |
| B01-02 | **Does Inflation Targeting Matter?** | *Manfred J. M. Neumann, Jürgen von Hagen* |
| **2001** | | |
| B29-01 | **Is Kazakhstan Vulnerable to the Dutch Disease?** | *Karlygash Kuralbayeva, Ali M. Kutan, Michael L. Wyzan* |
| B28-01 | **Political Economy of the Nice Treaty: Rebalancing the EU Council. The Future of European Agricultural Policies** | *Deutsch-Französisches Wirtschaftspolitisches Forum* |
| B27-01 | **Investor Panic, IMF Actions, and Emerging Stock Market Returns and Volatility: A Panel Investigation** | *Bernd Hayo, Ali M. Kutan* |
| B26-01 | **Regional Effects of Terrorism on Tourism: Evidence from Three Mediterranean Countries** | *Konstantinos Drakos, Ali M. Kutan* |
| B25-01 | **Monetary Convergence of the EU Candidates to the Euro: A Theoretical Framework and Policy Implications** | *Lucjan T. Orlowski* |
| B24-01 | **Disintegration and Trade** | *Jarko and Jan Fidrmuc* |
| B23-01 | **Migration and Adjustment to Shocks in Transition Economies** | *Jan Fidrmuc* |
| B22-01 | **Strategic Delegation and International Capital Taxation** | *Matthias Brückner* |
| B21-01 | **Balkan and Mediterranean Candidates for European Union Membership: The Convergence of Their Monetary Policy With That of the Europaen Central Bank** | *Josef C. Brada, Ali M. Kutan* |
| B20-01 | **An Empirical Inquiry of the Efficiency of Intergovernmental Transfers for Water Projects Based on the WRDA Data** | *Anna Rubinchik-Pessach* |
| B19-01 | **Detrending and the Money-Output Link: International Evidence** | *R.W. Hafer, Ali M. Kutan* |

| | | |
|---|---|---|
| B18-01 | **Monetary Policy in Unknown Territory. The European Central Bank in the Early Years** | *Jürgen von Hagen, Matthias Brückner* |
| B17-01 | **Executive Authority, the Personal Vote, and Budget Discipline in Latin American and Carribean Countries** | *Mark Hallerberg, Patrick Marier* |
| B16-01 | **Sources of Inflation and Output Fluctuations in Poland and Hungary: Implications for Full Membership in the European Union** | *Selahattin Dibooglu, Ali M. Kutan* |
| B15-01 | **Programs Without Alternative: Public Pensions in the OECD** | *Christian E. Weller* |
| B14-01 | **Formal Fiscal Restraints and Budget Processes As Solutions to a Deficit and Spending Bias in Public Finances - U.S. Experience and Possible Lessons for EMU** | *Rolf R. Strauch, Jürgen von Hagen* |
| B13-01 | **German Public Finances: Recent Experiences and Future Challenges** | *Jürgen von Hagen, Rolf R. Strauch* |
| B12-01 | **The Impact of Eastern Enlargement On EU-Labour Markets. Pensions Reform Between Economic and Political Problems** | *Deutsch-Französisches Wirtschaftspolitisches Forum* |
| B11-01 | **Inflationary Performance in a Monetary Union With Large Wage Setters** | *Lilia Cavallar* |
| B10-01 | **Integration of the Baltic States into the EU and Institutions of Fiscal Convergence: A Critical Evaluation of Key Issues and Empirical Evidence** | *Ali M. Kutan, Niina Pautola-Mol* |
| B09-01 | **Democracy in Transition Economies: Grease or Sand in the Wheels of Growth?** | *Jan Fidrmuc* |
| B08-01 | **The Functioning of Economic Policy Coordination** | *Jürgen von Hagen, Susanne Mundschenk* |
| B07-01 | **The Convergence of Monetary Policy Between Candidate Countries and the European Union** | *Josef C. Brada, Ali M. Kutan* |
| B06-01 | **Opposites Attract: The Case of Greek and Turkish Financial Markets** | *Konstantinos Drakos, Ali M. Kutan* |
| B05-01 | **Trade Rules and Global Governance: A Long Term Agenda. The Future of Banking.** | *Deutsch-Französisches Wirtschaftspolitisches Forum* |
| B04-01 | **The Determination of Unemployment Benefits** | *Rafael di Tella, Robert J. MacCulloch* |
| B03-01 | **Preferences Over Inflation and Unemployment: Evidence from Surveys of Happiness** | *Rafael di Tella, Robert J. MacCulloch, Andrew J. Oswald* |
| B02-01 | **The Konstanz Seminar on Monetary Theory and Policy at Thirty** | *Michele Fratianni, Jürgen von Hagen* |
| B01-01 | **Divided Boards: Partisanship Through Delegated Monetary Policy** | *Etienne Farvaque, Gael Lagadec* |

**2000**

| | | |
|---|---|---|
| B20-00 | **Breakin-up a Nation, From the Inside** | *Etienne Farvaque* |
| B19-00 | **Income Dynamics and Stability in the Transition Process, general Reflections applied to the Czech Republic** | *Jens Hölscher* |
| B18-00 | **Budget Processes: Theory and Experimental Evidence** | *Karl-Martin Ehrhart, Roy Gardner, Jürgen von Hagen, Claudia Keser* |
| B17-00 | **Rückführung der Landwirtschaftspolitik in die Verantwortung der Mitgliedsstaaten? - Rechts- und Verfassungsfragen des Gemeinschaftsrechts** | *Martin Seidel* |
| B16-00 | **The European Central Bank: Independence and Accountability** | *Christa Randzio-Plath, Tomasso Padoa-Schioppa* |
| B15-00 | **Regional Risk Sharing and Redistribution in the German Federation** | *Jürgen von Hagen, Ralf Hepp* |
| B14-00 | **Sources of Real Exchange Rate Fluctuations in Transition Economies: The Case of Poland and Hungary** | *Selahattin Dibooglu, Ali M. Kutan* |
| B13-00 | **Back to the Future: The Growth Prospects of Transition Economies Reconsidered** | *Nauro F. Campos* |

| | | |
|---|---|---|
| B12-00 | **Rechtsetzung und Rechtsangleichung als Folge der Einheitlichen Europäischen Währung** | *Martin Seidel* |
| B11-00 | **A Dynamic Approach to Inflation Targeting in Transition Economies** | *Lucjan T. Orlowski* |
| B10-00 | **The Importance of Domestic Political Institutions: Why and How Belgium Qualified for EMU** | *Marc Hallerberg* |
| B09-00 | **Rational Institutions Yield Hysteresis** | *Rafael Di Tella, Robert MacCulloch* |
| B08-00 | **The Effectiveness of Self-Protection Policies for Safeguarding Emerging Market Economies from Crises** | *Kenneth Kletzer* |
| B07-00 | **Financial Supervision and Policy Coordination in The EMU** | *Deutsch-Französisches Wirtschaftspolitisches Forum* |
| B06-00 | **The Demand for Money in Austria** | *Bernd Hayo* |
| B05-00 | **Liberalization, Democracy and Economic Performance during Transition** | *Jan Fidrmuc* |
| B04-00 | **A New Political Culture in The EU - Democratic Accountability of the ECB** | *Christa Randzio-Plath* |
| B03-00 | **Integration, Disintegration and Trade in Europe: Evolution of Trade Relations during the 1990's** | *Jarko Fidrmuc, Jan Fidrmuc* |
| B02-00 | **Inflation Bias and Productivity Shocks in Transition Economies: The Case of the Czech Republic** | *Josef C. Barda, Arthur E. King, Ali M. Kutan* |
| B01-00 | **Monetary Union and Fiscal Federalism** | *Kenneth Kletzer, Jürgen von Hagen* |
| **1999** | | |
| B26-99 | **Skills, Labour Costs, and Vertically Differentiated Industries: A General Equilibrium Analysis** | *Stefan Lutz, Alessandro Turrini* |
| B25-99 | **Micro and Macro Determinants of Public Support for Market Reforms in Eastern Europe** | *Bernd Hayo* |
| B24-99 | **What Makes a Revolution?** | *Robert MacCulloch* |
| B23-99 | **Informal Family Insurance and the Design of the Welfare State** | *Rafael Di Tella, Robert MacCulloch* |
| B22-99 | **Partisan Social Happiness** | *Rafael Di Tella, Robert MacCulloch* |
| B21-99 | **The End of Moderate Inflation in Three Transition Economies?** | *Josef C. Brada, Ali M. Kutan* |
| B20-99 | **Subnational Government Bailouts in Germany** | *Helmut Seitz* |
| B19-99 | **The Evolution of Monetary Policy in Transition Economies** | *Ali M. Kutan, Josef C. Brada* |
| B18-99 | **Why are Eastern Europe's Banks not failing when everybody else's are?** | *Christian E. Weller, Bernard Morzuch* |
| B17-99 | **Stability of Monetary Unions: Lessons from the Break-Up of Czechoslovakia** | *Jan Fidrmuc, Julius Horvath and Jarko Fidrmuc* |
| B16-99 | **Multinational Banks and Development Finance** | *Christian E.Weller and Mark J. Scher* |
| B15-99 | **Financial Crises after Financial Liberalization: Exceptional Circumstances or Structural Weakness?** | *Christian E. Weller* |
| B14-99 | **Industry Effects of Monetary Policy in Germany** | *Bernd Hayo and Birgit Uhlenbrock* |
| B13-99 | **Fiancial Fragility or What Went Right and What Could Go Wrong in Central European Banking?** | *Christian E. Weller and Jürgen von Hagen* |
| B12 -99 | **Size Distortions of Tests of the Null Hypothesis of Stationarity: Evidence and Implications for Applied Work** | *Mehmet Caner and Lutz Kilian* |
| B11-99 | **Financial Supervision and Policy Coordination in the EMU** | *Deutsch-Französisches Wirtschaftspolitisches Forum* |
| B10-99 | **Financial Liberalization, Multinational Banks and Credit Supply: The Case of Poland** | *Christian Weller* |
| B09-99 | **Monetary Policy, Parameter Uncertainty and Optimal Learning** | *Volker Wieland* |
| B08-99 | **The Connection between more Multinational Banks and less Real Credit in Transition Economies** | *Christian Weller* |

| | | |
|---|---|---|
| B07-99 | **Comovement and Catch-up in Productivity across Sectors: Evidence from the OECD** | *Christopher M. Cornwell and Jens-Uwe Wächter* |
| B06-99 | **Productivity Convergence and Economic Growth: A Frontier Production Function Approach** | *Christopher M. Cornwell and Jens-Uwe Wächter* |
| B05-99 | **Tumbling Giant: Germany's Experience with the Maastricht Fiscal Criteria** | *Jürgen von Hagen and Rolf Strauch* |
| B04-99 | **The Finance-Investment Link in a Transition Economy: Evidence for Poland from Panel Data** | *Christian Weller* |
| B03-99 | **The Macroeconomics of Happiness** | *Rafael Di Tella, Robert MacCulloch and Andrew J. Oswald* |
| B02-99 | **The Consequences of Labour Market Flexibility: Panel Evidence Based on Survey Data** | *Rafael Di Tella and Robert MacCulloch* |
| B01-99 | **The Excess Volatility of Foreign Exchange Rates: Statistical Puzzle or Theoretical Artifact?** | *Robert B.H. Hauswald* |
| **1998** | | |
| B16-98 | **Labour Market + Tax Policy in the EMU** | *Deutsch-Französisches Wirtschaftspolitisches Forum* |
| B15-98 | **Can Taxing Foreign Competition Harm the Domestic Industry?** | *Stefan Lutz* |
| B14-98 | **Free Trade and Arms Races: Some Thoughts Regarding EU-Russian Trade** | *Rafael Reuveny and John Maxwell* |
| B13-98 | **Fiscal Policy and Intranational Risk-Sharing** | *Jürgen von Hagen* |
| B12-98 | **Price Stability and Monetary Policy Effectiveness when Nominal Interest Rates are Bounded at Zero** | *Athanasios Orphanides and Volker Wieland* |
| B11A-98 | **Die Bewertung der "dauerhaft tragbaren öffentlichen Finanzlage"der EU Mitgliedstaaten beim Übergang zur dritten Stufe der EWWU** | *Rolf Strauch* |
| B11-98 | **Exchange Rate Regimes in the Transition Economies: Case Study of the Czech Republic: 1990-1997** | *Julius Horvath and Jiri Jonas* |
| B10-98 | **Der Wettbewerb der Rechts- und politischen Systeme in der Europäischen Union** | *Martin Seidel* |
| B09-98 | **U.S. Monetary Policy and Monetary Policy and the ESCB** | *Robert L. Hetzel* |
| B08-98 | **Money-Output Granger Causality Revisited: An Empirical Analysis of EU Countries (überarbeitete Version zum Herunterladen)** | *Bernd Hayo* |
| B07-98 | **Designing Voluntary Environmental Agreements in Europe: Some Lessons from the U.S. EPA's 33/50 Program** | *John W. Maxwell* |
| B06-98 | **Monetary Union, Asymmetric Productivity Shocks and Fiscal Insurance: an Analytical Discussion of Welfare Issues** | *Kenneth Kletzer* |
| B05-98 | **Estimating a European Demand for Money (überarbeitete Version zum Herunterladen)** | *Bernd Hayo* |
| B04-98 | **The EMU's Exchange Rate Policy** | *Deutsch-Französisches Wirtschaftspolitisches Forum* |
| B03-98 | **Central Bank Policy in a More Perfect Financial System** | *Jürgen von Hagen / Ingo Fender* |
| B02-98 | **Trade with Low-Wage Countries and Wage Inequality** | *Jaleel Ahmad* |
| B01-98 | **Budgeting Institutions for Aggregate Fiscal Discipline** | *Jürgen von Hagen* |
| **1997** | | |
| B04-97 | **Macroeconomic Stabilization with a Common Currency: Does European Monetary Unification Create a Need for Fiscal Insurance or Federalism?** | *Kenneth Kletzer* |
| B-03-97 | **Liberalising European Markets for Energy and Telecommunications: Some Lessons from the US Electric Utility Industry** | *Tom Lyon / John Mayo* |
| B02-97 | **Employment and EMU** | *Deutsch-Französisches Wirtschaftspolitisches Forum* |
| B01-97 | **A Stability Pact for Europe** | *(a Forum organized by ZEI)* |

ISSN 1436 - 6053

Zentrum für Europäische Integrationsforschung
Center for European Integration Studies
Rheinische Friedrich-Wilhelms-Universität Bonn

Walter-Flex-Strasse 3
D-53113 Bonn
Germany

Tel.: +49-228-73-1732
Fax: +49-228-73-1809
www.zei.de