Government decisions on income redistribution and public production
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Prologue

Policy evaluation

The impact of public policies on the development of a society is an extensively discussed issue. In this discussion, not only politicians and opinion makers participate, but also researchers in social sciences. The contribution of social scientists in this discussion is, in general, motivated by their professional background. Economists are, in particular, interested in the impact of public policies on the economic performance. In their contribution economists pay, for example, attention to the efficiency of the policy proposals, the distributive effects of these proposals and the question whether the policy proposals stabilize economic fluctuations. Political scientists focus not only on the distributive effects, but also on the political support of policy proposals and on the decisionmaking process.

To get a better understanding of the impact of a policy proposal, the different effects of a public policy have to be evaluated. For a consistent evaluation of these effects, economists use models. An economic model may become rather complex if the model has to be open for the analysis of different types of policy instruments and if these instruments have to be evaluated on a number of effects. Therefore, an economic model is often designed for the analysis of a limited number of public policies, that are evaluated only on a limited number of effects. The structure of the model is given by the main mechanisms that describe the interrelations between the policy variables and the assessment variables.

The policies that are central in this monograph have to do with the redistribution of income and the production of public goods. The main effects of these policies and the important mechanisms that describe the interrelations between policy and economic variables are discussed in the remainder of this introduction. The prologue, furthermore, gives the purpose and the outline of the monograph.

The use of economic models to evaluate policies

The choice of a model to analyze the effects of economic policies is, in the last decades, less straightforward than it once used to be, since the landscape of economic modeling has changed dramatically since the mid-seventies. Until that time, most model builders were working on large macroeconometric models that were rooted in
the Keynesian tradition. Economists strongly agreed upon the usefulness of these models for economic forecasting and policy evaluation. It was asserted that these forecasts and evaluations could be improved by incorporating more details in the models.

The widely held consensus with respect to economic modeling broke in the early seventies. The breakdown was the consequence of empirical as well as theoretical problems that emerged after the oil shock in 1973 [cf. MANKIW (1988)]. The empirical problem concerned the poor forecasts of the Keynesian macroeconometric models in the years after the occurrence of the oil shock. It was, in addition, difficult to give an adequate policy advice with these models. The models were in particular equipped to advice politicians how to respond to demand shocks. The oil shock can be regarded as a supply shock. For such shocks, it was difficult to deduce an appropriate policy answer from the large macroeconometric models of that time.

From a theoretical point of view, the discrepancy between microeconomic principles and the weak behavioral underpinning of macroeconomic models became more and more unsatisfactory. LUCAS (1976) noticed that changes in government policies affect the behavior of private sector agents (consumers and producers). If this effect is neglected, the model gives poor predictions of the impact of policy interventions on the economy. Macroeconomic models were, in Lucas' view not well-suited for the evaluation of alternative policy proposals. Although Lucas was in particular referring to the fact that changes in government policies affect the way that private sector agents form expectations about the future, his critique is often put in a broader perspective and includes also other types of behavior. To meet this critique, a stronger microeconomic foundation of the macroeconomic models is required. In the last decades this topic was on top of the research agenda of many macroeconomists.\(^1\)

Macroeconomics investigates fluctuations in aggregate real variables (output, employment) and nominal variables, and the interrelations between the fluctuations in these variables. Recessions and expansions, as well as monetary and fiscal policies to dampen these fluctuations are key-issues in macroeconomics. Following Musgrave’s division of policies into stabilization, distributive and allocative policies [MUSGRAVE

(1959)], macroeconomics can be regarded as the research field that evaluates, in particular, policies that intend to stabilize economic fluctuations or to increase the economic growth rate.\textsuperscript{3} Macroeconomic models are ill-suited for the analysis of distributive and allocative policies, because most of these models have one (representative) consumer and producer.\textsuperscript{4} For the analysis of distributive and allocative policies, general equilibrium models are more appropriate. These models are, however, less suitable to evaluate stabilization policies. In the absence of a manageable, generally accepted model structure, that can handle stabilization and growth issues as well as distributive and allocative issues, a choice must be made. The selection of the model structure depends crucially on the type of policies one intends to evaluate.\textsuperscript{4} The topic in this monograph is decisionmaking with respect to redistribution and public goods. A general equilibrium model is more appropriate for the evaluation of such policies.

Apart from the lack of microfoundations, macroeconomic models were criticized for an additional weakness. It was emphasized in the political economy literature that government policies cannot be changed at will, but follow, instead, from decision rules that are generated by the governmental decisionmaking process. By ignoring this, one runs the risk of a serious specification error and poor forecasts [cf. BLINDER AND SOLOW (1973) and CROTTY (1973)]. Policy rules can be obtained from the maximization of a social welfare function [cf. TINBERGEN (1952)]. The social welfare function determines, however, which policies are adequate to maximize social welfare and not necessarily the policies the government is actually implementing. To specify actual decision rules, it is necessary to understand how public sector agents (politicians, bureaucrats, voters and interest groups) behave. With respect to social welfare theory PERSSON AND TABELLINI (1990, p. 3) note that "this approach to the analysis of economic policy contrasts sharply with the way in which policy is carried out in practice. The policymaker is typically a rational and maximizing agent, or collection of agents, that respond to incentives and constraints just like the rest of the

\textsuperscript{2} STEIN (1988) even asserts that a correct definition of macroeconomics maybe the entire concern with stabilization issues. More or less analogous to MUSGRAVE (1959), ROBINSON AND D'ANDREA TYSON (1984) distinguish stabilization issues from sectoral or structural issues.

\textsuperscript{3} GRODAL (1991) gives more fundamental weaknesses of models that use representative individuals and neglect distributional effects.

\textsuperscript{4} Compare in that respect, e.g., the introductory reflections on model selection in ATKINSON AND STIGLITZ (1980) and AUERBACH AND KOTLIKOFF (1987).
economy. A theory of economic policy that neglects these incentives in policy formation is incomplete and is bound to yield misleading prescriptions. The concept of rational and maximizing agents, that is at the heart of microeconomic theory, is applied to the behavior of public sector agents in public choice theory.

Public choice starts from the same microeconomic behavioral axiom to investigate the process of political decisionmaking. It analyzes, in particular, which political decisions are actually made (positive approach) and not which decisions ought to be made in order to reach a particular goal (normative approach). Within public choice, at least four different approaches with respect to the modeling of political decisionmaking can be distinguished (see Section 1.3 for a more comprehensive discussion). First, the median voter model asserts that the preferences of the voter with the median income are decisive [cf. ENelow AND HINICH (1984)]. This approach only takes account of the preferences of voters. Second, the probabilistic voting model starts from the interests of politicians and incorporates the assumption that politicians must be (re-)elected before they can realize their own interests. Therefore, politicians have to take account of the interests of voters, while making decisions [cf. ENelow AND HINICH (1984) and COUGHLIN (1992)]. Third, in the interest function approach, the political decisions depend not only on the interests of politicians and voters, but also on interests of bureaucrats and interest groups [cf. VAN WINDEN (1983)]. Fourth, in BRENNAN AND BUCHANAN (1980), the government is regarded as a Leviathan. In that approach, policymakers only care about their own interests and maximize public revenues for that purpose.

Incorporating government behavior in a general equilibrium model

A model that is not vulnerable to the two critiques mentioned above, must start from behavioral assumptions regarding private and public sector agents. Consistency requires that the behavior of public sector agents is based on the same axioms as the behavior of private sector agents. An obvious choice as behavioral axiom is the microeconomic presumption that individuals are rational and seek to maximize their own interests. As noticed before, this axiom is the starting point in both modern macroeconomic models and general equilibrium models. Whether a macroeconomic model or a general equilibrium model is used depends on the type of policies that is investigated. To meet the second type of critique, a political behavioral model must be incorporated in the economic model.
The main issues that will be studied in this monograph are the production of public goods and the redistribution of income. As stated above, these issues are best analyzed with a general equilibrium model. In order to take account of the observation that the neglect of the political decisionmaking process may lead to serious misspecifications, a (computational) general equilibrium model is combined with a political economic model into a political-economic general equilibrium model. As will be discussed in Section 1.3, from the four approaches that were mentioned in the previous section, the probabilistic voting model and the interest function approach give a more satisfactory description of the political decisionmaking process in a representative democracy. Since, in our view, the interest function approach takes better account of the behavior of interest groups and bureaucrats, we have chosen this approach for our analysis.

Outline of the thesis

The organization of this monograph is as follows. The purpose of the monograph will be put in a broader perspective in Chapter 1. The relevant literature on (computational) general equilibrium modeling and public choice will be discussed in that chapter. Chapter 1 gives, furthermore, an overview of studies that incorporate a public choice model in an economic model.

Part I pays, in particular, attention to public policies that influence the private decisions on consumption. The decisionmaking on public consumption goods, income redistribution and social security will be studied. For the analysis of these policies, a political economic general equilibrium model is developed that is analytically solvable. The use of an analytically solvable model gives a better intuition of the economic and political mechanisms that are important for the results. In Chapter 2 a model is presented that describes an economy with one private good. For the production of that good, capital and labor inputs are required. These inputs are supplied by the consumers. Consumers are divided in two social groups. One group of consumers supplies only labor, while the other group supplies labor as well as capital. Consumers of different groups have not only different endowments, but they may also differ in preferences. The utility of consumers depends on the consumption of private goods, leisure and the level of a public consumption good. The prices of the private good and the inputs follow from the equilibrium conditions on the markets. The production of the public consumption good is implemented by the government. As holds for the private good, production of the public good requires capital and labor input. The capital input is equal to a public capital stock. To finance the production costs, the
government levies a uniform income tax. Furthermore, the government is allowed to redistribute income between the members of social groups. The redistribution system is assumed to be self-financing. The tax system and the redistribution system will be further discussed in Chapter 2. The government determines the level of the public consumption good and the redistribution scheme from the maximization of the political interest function. The interests of the social groups are captured by the (indirect) utility function. The political interest function weighs these utility functions with the political influence of the different social groups. The features of the model are studied in Chapter 2 by means of a comparative statics analysis. Furthermore, the results are compared with the results of a standard general equilibrium model. Finally, Chapter 2 discusses some tax reform issues.

In Chapter 3, the model of Chapter 2 is further developed for the analysis of social security. To that purpose, two social groups are added: retirees and disabled individuals. Another extension of the model concerns the motives of individuals to take account of the interests of others. These motives may be due to pure altruism or to an individual’s subjective probability to become member of another social group. In Chapter 3 capital owners and workers care for the interests of disabled individuals and retirees, while disabled take account of the interests of retirees. The transfers to disabled and retired individuals are financed by two self-financing pay-as-you-go systems. Chapter 3 discusses, apart from the impact of political influence and motives of other-directedness, the effect of capital endowments of disabled individuals and retirees on the sustainability of the social security system.

In Part II public policies that influence private production decisions are added. To that purpose, a public production good is introduced. We will also refer to this good as infrastructure, although it does not have the function of a (public) consumption good, as real-life infrastructure often has. The public production good is not regarded as a stock, but as a good that requires capital and labor for production. Production of private commodities and of the public consumption good depends not only on capital and labor, but also on the level of the public production good. We are not only interested in the impact of this good on production and capital formation (investment), but also in the possible asymmetric growth of production sectors that differ in the productivity of infrastructure [compare the discussion on labor productivity in Baumol (1967)]. Therefore, two private commodities are distinguished, that are produced in two different sectors. One of these commodities can be used for consumption as well as for investment. The introduction of investment requires a dynamic specification of decisionmaking. The dynamic model that is introduced in
Chapter 4 focuses on production decisions in the private and the public sector. Investment decisions in the private sector depend on the maximization of the value of the firm. The underlying theory assumes that the installation of new capital leads to adjustment costs in the production process. The introduction of infrastructure leads to an interesting extension of this theory: the asset price does not only depend on the marginal benefit of own, private, capital but also on the current and (discounted) future marginal benefits of infrastructure. In the model of Chapter 4, it is assumed that the installation of new capital in the public consumption and production sector also leads to installation costs. The optimal production and investment levels in these sectors follow from the maximization of the value of the political interest function. This function weighs the interests of the three social groups that are distinguished in Part II: capital owners in sector 1, capital owners in sector 2 and workers. Other features of the model are discussed in Chapter 4. The complexity of the dynamic model that is developed in Part II has as a consequence that the model cannot be solved analytically. The numerical solution method that will be used to determine the equilibrium is presented in Chapter 4.

The use of a computational general equilibrium model allows us to introduce a more general utility function than we used in Part I. Because some of the comparative statics results that were presented in Chapter 2 did depend on the specification of utility, these results are re-examined in Chapter 5 for the more general utility function. The impact of changes in technology and adjustment costs are analyzed in Chapter 6. In that chapter we will also discuss the consequences of an asymmetric development of the infrastructure productivity between the two private sectors on the growth of production in these sectors. Chapter 6 discusses, furthermore, the role of infrastructure. Because the size of infrastructure is endogenously determined, an expansion of infrastructure is only obtained if preferences, technologies, the political influence structure or the time preference of the government (to be discussed in Chapter 7) change. A first comparison of the different underlying factors of an expansion in infrastructure is presented.

In Chapter 7 some institutional aspects are discussed. First, the impact of the time preference of the government is analyzed. A change in the time preference of the government affects the intergenerational distribution of income. In our model the government can only use public capital to change the intergenerational distribution

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5 The only exogenous variables in Part II are the numerical strengths of the different social groups.
(there are no overlapping generations). Second, we compare the impact of different tax systems. The tax system in Part II is similar to the system in Part I, and consists of a uniform income tax and group-specific lump-sum transfers. This tax-transfer system is compared with a labor tax, sales tax, value-added tax and uniform lump-sum tax (for the finance of the public goods), with or without group-specific lump-sum transfers (to redistribute income), and with a group-specific lump-sum tax that is used for the finance of public goods as well as the redistribution of income. We will also analyze a change in the political influence structure for the income tax system without group-specific lump-sum transfers. Although the government cannot use lump-sum transfers to redistribute income in that case, it can use the public goods for redistribution of income.

The main results are summarized and evaluated in Chapter 8. That chapter also offers some suggestions for further research.