

Empirical Models and Policy-Making: Interaction and Institutions

Edited by

Frank A.G. den Butter and Mary S. Morgan



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Empirical Models and Policy-Making: Interaction and Institutions

- How are scientific models used in the policy domain?
- What factors determine the successful interaction between scientists and policy makers?
- How does the process of interaction work?

Empirical Models and Policy-Making: Interaction and Institutions challenges the usual assumption that when economic policy makers use economic models there is a oneway flow of information from the models to the policy analysis. In practice, as we learn from this book, the requirements and questions of policy makers play an important role in the development and revision of those very models. These articles, written by highly-placed practitioners and academic economists, explore how the interaction between modellers and policy makers and their institutional arrangements all contribute to the potential successful use of economic models in policy making. The range of cases and detail of circumstances covered, and the depth of insight from these analyses, combine to provide a convincing portrait of this hitherto hidden realm.

Professionals and students of economics, econometrics, policy-making and science studies will benefit greatly from this revealing, ground-breaking book.

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Preface

It is generally assumed that, when economic policy makers use economic models, the information flow is only one way: outputs flow from the models into the policy analysis. Yet, in practice, the requirements and questions of policy makers play an important role in the development and revision of economic models. How does this interaction between modellers and policy makers work? This research question can most easily be understood by re-interpreting it as a series of more specific questions along the following lines. How does the interaction work? What factors does successful interaction depend upon? What problems does interaction cause? What roles do different professional groups play in the interaction? How do the institutional or contractual arrangements of modellers and policy makers affect the process? What are the trade-offs between models designed for a specific purpose and models held to answer several questions in a general policy field? Do the arguments of model exercises really contribute to a consensus on the policy measures or are they just used as an alibi? Do the policy makers try to 'change' the calculations from the models? How is the plausibility of the policy advice from the models judged? What strategies do the modellers follow to make their work relevant for policy makers? What insights can social scientists offer on the process of interaction between modellers and policy makers? Exploring such questions as these, and a desire to seek answers to them, provided the motivation for the research and analyses of this volume.

This two-way interaction between economic models and policy-making, between modellers and policy makers, is almost certainly widespread and recognized by those participating in empirical modelling for policy work, but has been subject to very little systematic research and analysis. There is a paucity of published material on the topic, no doubt because research into the interaction faces an obvious problem, namely one of evidence. There is both a lack of evidence in the public domain and the nature of the evidence needed to provide material for analysis is inherently non-systematic. Although we can recognize the importance of institutional arrangements and can categorize these, this only takes us so far. The interaction process is a human one of day-to-day contacts, as much as being one of documents, so that much of the exchange of information we seek to understand is tied up in experience and embedded in the tacit knowledge of the participants. This being the case, we believed the most effective way to gain access to this experience was to invite contributions on the research topic

from those practitioners involved in interactions. By encouraging participants in the interaction process to write detailed case studies especially focused on their own experience, we could hope to make explicit some of their tacit knowledge, and from this, to begin to understand and even outline an analysis of the elements involved in the process of interaction. Thus the authors of the articles in this book are mainly practitioner economists inside government and international agencies and 'academic' economists and statisticians with experience in the field; we include also a few contributions from those with a professional 'outside' interest in these questions, namely from the history and sociology of economics.

This book represents, also, the outcome of the 10th Anniversary Conference of the Tinbergen Institute, a highly appropriate venue for the examination of our research themes. The 'Tinbergen legacy' to Dutch economics involves a commitment to economic expertise instantiated in empirical models and put to use in the public service. Tinbergen himself was both the originator of empirical macroeconometric modelling and founder of the Dutch Central Planning Bureau, while the Dutch use of macroeconometric modelling is known internationally, not only for its historical precedence, but also as paradigmatic for the use of empirical models in the policy process. The conference involved a two-day workshop of intensive discussion of the research issues followed by an open conference day culminating in a panel discussion. Paper givers had written their contributions especially to address the research questions, and panel members, like paper givers, drew on their experience of the model-policy interaction to help us understand the interaction process.

Most of the essays in this book are detailed case studies of particular interactions between empirical models and policy-making and they cover a considerable range of experience. One example is given by the simple monetary and balance of payments model that has been instrumental during a period of 40 years in the design of the structural adjustment programmes of the IMF. The various ways that modellers and policy makers interact inside central banks provides a series of further examples. The definition of 'empirical models' is broad. The guiding principle is that the models give a quantitative assessment of policy measures in the form of impulse-response effects or scenario analysis and that they have been 'used' in some way in policy-making. It is part of the strength of these essays that they provide detailed information about particular instances. But none are mere descriptions—all the authors analyse their material to seek answers to the research questions. Taken together, the materials of this book help us to build up a picture of how such interactions work and contribute to a more general appreciation and understanding of the process involved.

One of the features of the research material available here is the richness of the discussion of each case. Each case study essay touches on many different aspects of the models-policy interaction and the nature of institutional arrangements, addressing several questions during their close examination of a chosen experience. This made it difficult to organize an order for the volume, as the essays could have been arranged in many different ways, and the content and interest of

each chapter goes beyond that indicated in its section heading. We begin with some chapters especially defined as part of the Tinbergen legacy; the next set of chapters gives a feeling for the range of experience of institutions and interaction. Essays in the third section of the book deal more particularly with model products and how they are used, while the fourth section includes specific cases where institutional arrangements are discussed in terms of their outcomes for interaction. The final section brings together the general research themes both in the panel discussion and in the editors' attempts to understand the implications of all the case material and draw some conclusions about the nature and process of the empirical models—policy-making interaction. A selection of the chapters were previously published in a special issue of the journal *Economic Modelling*. Here we are able to publish together the full set of papers and the panel discussion.

Acknowledgements

We gratefully acknowledge the help of many people and organizations in helping us to realize our ambition to explore how empirical models and policy-making interact in practice.

First, we thank those who made the Tinbergen Institute 10th Year Anniversary Conference possible. We are grateful to the Ministry of Economic Affairs and the Ministry of Social Affairs and Employment in the Netherlands, the CPB Netherlands Bureau for Economic Policy Analysis and De Nederlandsche Bank NV for their financial support. We thank the Tinbergen Institute and its directors for providing intellectual and financial backing for the initiative. A more personal thanks go to Elfie Bonke, Irene Kluin, Edwin van Gameren and Udo Kock for help in arranging the conference and for organizing and transcribing the tapes of the panel discussion and to Philip Epstein for helping with this volume.

Second, we thank all the participants at the Tinbergen Institute Conference. We are aware our research questions were somewhat unusual and that we needed the participation of practitioner modellers from the policy domain to make the conference and this volume viable. We are most grateful that authors were prepared to write papers especially on the conference topic and we appreciate their continued commitment to the research questions in their willingness to revise and improve their chapters to take advantage of insights gained from the conference. (In this respect, we appreciate the contribution that participants, particularly Eilev Jansen, Anton Barten, Edmond Malinvaud and Piet Rietveld, made in refereeing the original papers for publication.) The conference discussions were most stimulating and critical to us as editors in understanding the general issues involved in the interaction of empirical models and policy-making. They were particularly important because most aspects of the use of models or interaction with policy-making are not normally subject to public discussion and open analysis: the nature of interactions is usually largely tacit and unreported. We are grateful to all participants at the conference in sharing their experience with us. We wish to mention expressly the contributions of Ralph Bryant and Kenneth Wallis who took part in the workshop and contributed substantially to the public day. Their perceptive questions helped the group to extend their thinking and their commentaries were insightful and fruitful for all our thinking about the topic.

Finally, we thank Elsevier for permission to reprint (with some minor revisions) those of the chapters in this volume which first appeared in a special issue of *Economic Modelling*, Volume 15:3 in 1998.

Part I

The Tinbergen tradition

The relevance of economic modelling for policy decisions*

G.Zalm

The development of macroeconomic models is influenced by policy makers and vice versa. In this chapter the situation in this field in the Netherlands is sketched. The CPB National Bureau for Economic Policy Analysis plays a special role. While in other countries various institutes and ministries evaluate economic policy and prepare forecasts, in the Netherlands these functions are concentrated within the CPB. This approach holds some (scale) advantages, which should be used to make progress in the evaluation of new problems with which policy makers are confronted.

JEL classifications: A11, C5

I. Introduction

The information flow between economic policy makers and economic model builders is not a one-way flow. The requirements and questions of policy makers play an important role in the development of economic models. It is not only the information that flows, but also people who flow. I have crossed the bridge between empirical modelling and policy-making several times, so I can touch upon my own experience with respect to the interaction between macroeconomic modelling and policy-making.

First, I will sketch briefly the major economic problems of the twentieth century and their influence on macroeconomic modelling. It is interesting to notice that economic problems, such as the oil crises, the deterioration of public finance and long-term unemployment have led to fundamental changes in macroeconomic models. Second, I describe the use of macroeconomic models for policy evaluation. In the Netherlands, policy makers have relied heavily upon macroeconomic models. Third, I will talk about the influence of forecasts in the process of policy-making and fiscal policy. Finally, I give some suggestions for future research.

*Reprinted from *Economic Modelling*, 15, G.Zalm, 'The relevance of economic modelling for policy decisions', pp. 309–16, Copyright (1998), with permission from Elsevier Science.

2. The importance of modelling for policy evaluation

2.1. Using models for policy evaluation

The most well-known disruptive economic problem in the twentieth century was the Great Depression. In the 1930s Western economies experienced massive unemployment and greatly reduced incomes. In the year 1935, in the Netherlands more than 10 per cent of the working population was unemployed, and real GDP was 25 per cent below its 1930 level. From the start of the Depression a theory, a model or a structure was needed, to offer possibilities that could reduce the economic hardship so many people faced. Confronted with the question of developing policy instruments to reduce these economic problems, Tinbergen (1936) developed the first macroeconomic model of the Dutch economy in 1936. Later he also prepared macroeconomic models for the US and UK economies. The efforts of Klein (1950) and Stone and Stone (1939) followed Tinbergen's model. After the Second World War, these Keynesian models increased in scale. The advances made in computer technology and better economic statistics improved the scope for developing models in this tradition.

However, in the 1970s, the inadequacy of these Keynesian models to deal with the large structural changes linked to the oil crises shook the trust of policy makers in these models. The increase in oil prices led to double-digit inflation and rising unemployment and that clearly shook the confidence of the belief in the traditional Keynesian trade-off between inflation and unemployment. In a critical evaluation of the existing type of modelling, Lucas (1976) argued that conventional macroeconomic large-scale models were fatally flawed and were not useful for the policy debate. Economists and policy makers turned their heads to the supply side. It was realized that structures that were developed were far from ideal and blocked a continuation of a high growth path. Gradually, also by model builders, more emphasis was put on endogenizing the supply side of the economy. For example, it was demonstrated that a rise in real wages exceeding the rate of technical progress would increase unemployment. In the Netherlands this model extension has been very important for the acceptance of the policy of wage restraint (e.g. Den Butter, 1991).

In the 1980s, the structural problems had been worsened by the deterioration of public finance. In Western Europe this had been caused by the inability to trim the welfare state. In the Netherlands the deficit rose from almost zero in the beginning of the 1970s to almost 9 per cent of GDP in 1983. In the United States the combination of a policy of cutting taxes and increasing public spending was responsible for the rise in the budget deficit in the beginning of the 1980s. Moreover, this combination of a loose fiscal policy with a tight monetary policy to fight inflation led to a rise in the interest rate and the dollar. To deal with these problems, new macroeconomic models with a fully-fledged description of monetary sectors with an endogenous portfolio behaviour of the private and banking sectors were developed. These so-called monetary blocks have not always been successful. Although Ministers of Finance in a lot of countries were quite successful in bringing budget deficits down, they got little support

from model builders. Nevertheless, almost all economists will agree that the future of the Dutch economy is better off with the present budget deficit than with the deficit of 1983.

Currently, the economy is in a better shape than in the 1980s. However, we still face some serious economic problems. One of the most severe problems is the duration of long-term unemployment, especially amongst low-skilled workers. As is typically the case in Europe today, the Dutch unemployment rate in this area is more than double the overall rate. The functioning of the labour market in its connection with the social security system is held responsible for this large share. Therefore a model with a detailed description of the tax system and the various labour-market institutions was required and the applied general equilibrium framework seemed appropriate.

Despite its incapability to predict large economic shocks or to deduce the structural flaws of the economy, the use of macroeconomic models in policy design is quite common and largely undisputed. Especially in the Netherlands, we have a very long tradition of relying upon technical expertise from macroeconomic models as a guide in macroeconomic policy formation. In 1936 the publication of the first macroeconomic model by Tinbergen (1936) was accompanied by the simulation of several policies and the effect on employment and the current account. In the post-war period different generations of this model have played a role in policy evaluation.

By experience, the idea that there should be one model for all problems has been abandoned. Instead, a large variety of economic models has been developed to cope with the broad range of different policy questions. This is a very natural development that Tinbergen certainly would have appreciated. A physicist by origin, in his early days nuclear scientists were looking for one model for the atomic nucleus. Nowadays, there are many models describing different aspects of the atomic nucleus. Economic science shows a similar development. At the CPB National Bureau for Economic Policy Analysis different models are used for different purposes. Donders and Graafland (1998, Chapter 2 in this volume) give a historical overview of (macroeconomic) model development at the CPB.

2.2. Fiscal policy and policy evaluation

In the use of macroeconomic models for policy evaluation, simulations to assess the effect of fiscal policy have been very important. Keynesian models have been focusing on the level of government expenditures and taxation. The so-called conjunctural-structural models have been used to investigate the impact of different tax rates on wages and, nowadays, detailed tax proposals are discussed with the help of a model.

At several points in time, macroeconomic models have been used intensively to investigate the effect of a particular policy under consideration. There are many examples to give. In 1992, the report of the committee for green taxes, the so-called Wolfson committee, was guided by a thorough investigation of the employment effects

of a shift between labour and green taxes and the impact on the competitive structure of industries. Similar efforts have been made with the Quest-model of the European Commission and the Green-model of the OECD.

Sometimes an outcome of a model creates its own policy rhetoric. In 1992, the CPB published an applied general equilibrium model, called MIMIC (Gelauff and Graafland, 1994). One of the doubtful outcomes was that a progressive tax system encourages employment. It even led to suggestions for a 'Robin-Hood' policy of raising the tax rate of the last bracket and lowering the tax rate of the first bracket. However, in these applied general equilibrium models, it is very hard to model the consequences of a more progressive tax system on training, work intensity and the desire for promotion and, therefore, the adverse effects of a progressive tax system can be underestimated. The model does not seem adequate for analysing such questions. Fortunately, policy makers base their judgements on more than the outcome of a single model.

2.3. The Dutch case of models and policy analysis

The institutional setting in the Netherlands differs from that in other countries. A central role has been laid down by law for the CPB, which is an independent organization within the Ministry of Economic Affairs. The CPB has the obligation to prepare every year a Spring forecast, the so-called Central Economic Plan. Since its founding, the CPB has expanded its tasks and nowadays it also puts a lot of time into policy analysis.

In the Netherlands, models, especially those from the CPB, have played an important role in policy analysis. As I have worked both with the Ministry of Economic Affairs and the CPB, I will shortly comment on the special relationship between the two as far as model-based policy analysis is concerned. At some Ministries, and at the Ministry of Economic Affairs in particular, own models were developed in reaction to the view that adjustments in CPB models to new circumstances were, in certain cases, slower than policy makers would like. This has not much to do with laziness or the monopoly position but with the high standards of the CPB. Models developed at Ministries, I know from experience, can be quickly fixed if and when it serves the policy objectives of the ministry. So, at the Ministry of Economic Affairs a number of model exercises have been conducted, and as a director of the department doing those exercises I have always supported it. However, I have never seen results published from the research at the Ministry of Economic Affairs which gave ammunition to the Ministry of Social Affairs or the Ministry of Finance in case of conflicting interest.

Besides, if the Ministry of Social Affairs or Finance were to develop their own models, the Ministry of Economic Affairs would rather rely on the CPB than on the models of the other ministries. This does not mean that the CPB work is beyond criticism and the government policies should only be based on it. The CPB has been criticized by independent sceptics, but also by economists at the various ministries.

The chapter of Donders and Graafland (1998, Chapter 2 in this volume) shows

that important developments have occurred in the work of the CPB while, at the same time, there is a clear consensus of the limitations of models. Therefore I wholeheartedly agree with the new stress on international comparative and qualitative institutional studies. The role of the CPB as the economic conscience for government policy should not be overstated. Nevertheless, I just hope that the balance between international and scientific reputation on the one hand, and policy relevance on the other hand, will be kept, and that Tinbergen's idea about mission will continue to lead us. There is no use in reputation if it is not useful for improving policies.

2.4. Forecasting and policy-making

In the process of policy-making the forecasts of a macroeconomic model are still of relevance, although, as I explain later, its relevance in our country has decreased as the CPB always wanted. In the Netherlands, the yearly Budget Memorandum in September is accompanied by the yearly forecast of the CPB—the so-called Macro Economic Outlook—and the Memorandum is based on these insights. Technical information from other agencies such as the Ministry of Finance or the Ministry of Social Affairs are taken into account in order to come to a forecast. In addition, the Nyenrode Forum for Economic Research publishes their forecast, but until now the differences were rather small. The same holds for the secret shadow forecasts of the Central Bank.

In other countries a number of different organizations or independent research institutes publish annual forecasts. For example, there are seven different competing economic forecasts in the United Kingdom (e.g. Whitley, 1994). It should be noticed that the key features of these models differ substantially. In Germany, five institutes are engaged in forecasting, leading to a cry for a consensus forecast.

There has been a controversy about the usefulness of forecasting in the policy debate. Some economists argue that they do not have any faith in the forecasts of macroeconomic models (e.g. Gordon, 1984). In his Tinbergen lecture, however, Klein claims that in most cases during recent decades the forecast performance of macroeconomic models has been improved considerably and compared with their alternatives, such as naive models, time-series analysis, or judgemental forecasts, they do reasonably well (e.g. Klein, 1988). Nevertheless, forecasts should be treated with caution. Point estimates of important variables such as percentage change in GDP and unemployment are always surrounded by rather large confidence or prediction intervals.

Don (1993) argues that there are several sources of unpredictability due to uncertainty in policy and non-policy exogenous variables and mis-specification in the model. Especially for a small open economy as the Netherlands, the short-term forecasts are highly conditional on international developments and to a lesser degree on domestic policy measures (Van den Berg, 1986). One of the possibilities for dealing with uncertainty about the exogenous environment is to present forecasts in different scenarios, for example with respect to the guilder/dollar exchange rate or the growth of world trade.

To illustrate the changing role of forecasting, a few words on Dutch fiscal policy. In the 1960s, fiscal policy was seen as an instrument for stabilizing the economy. In practice, this so-called structural fiscal policy consisted of two parts. First, the acceptable budget deficit was calculated for a cyclically neutral base year. Second, given this net amount of borrowing, the yearly additional budgetary resources were defined as the trend growth of tax revenues. The calculation of these additional budgetary resources required forecasts about trend GDP and trend tax elasticities.

After the recession of the mid-1970s, there was a tendency to overestimate trend GDP and public finances deteriorated. A major change in fiscal policy was unavoidable. Fiscal policy was concentrated on following a yearly rule to lower the budget deficit. Accordingly, economic forecasts became even more important. Every change in economic forecasts influenced the ex ante deficit and led to a fiscal reaction in order to re-establish the deficit target. It is clear that such an approach is unsatisfactory and could sometimes work pro-cyclically.

Therefore, in 1994, the present coalition announced a new type of fiscal policy: the so-called trend-based fiscal policy, where the budget deficit may change in order to absorb non-structural deviations in revenue. To create room for cutting the deficit and tax cuts, the central government has set ceilings for real expenditures from 1995 to 1998. Economic forecasts derived from a cautious scenario were used for calculating the budgetary resources for the government period. Hereby, the need for repeated adjustments of the budget due to changing economic conditions is reduced. So, fiscal policy nowadays takes into account the downward risks of economic forecasts much more. The life of a Minister of Finance has become easier, as have the lives of his colleagues.

3. Macroeconometric modelling in the twenty-first century

If we look back at more than half a century since Tinbergen published his first macroeconometric model, the widespread applications and the usefulness of models for policy-making seem an achievement to me. A good example for the Netherlands is that political parties also rely heavily on the scenarios and the effects of changed policies as calculated by the CPB. This leads to an unusual discipline in political programmes as well as to the comparability of the different programmes. It is impossible to get away with grand promises that are impossible to realize.

For model builders, there are still many avenues to explore. First, the modelling of market behaviour is still rudimentary. More emphasis should be put on imperfections in financial and goods markets. Hereby, one could perhaps rely more on the appealing results of the industrial organization literature. In order to assess behavioural responses to government policies, the focus should be changed from a macroeconomic orientation towards a microeconomic orientation. Second, many current policies and policy proposals are aimed at improving the basic technological and ecological infrastructure of the economy. Therefore, it seems challenging to model the driving forces behind the process of economic development, such as

infrastructure and technology, and I encourage the current efforts. For these issues the insights from the endogenous growth literature can be useful. Third, the effects of the ageing population in the years to come should be analysed in more detail in long-term models. Fourth, given the overwhelming problem of long-term unemployment, the efforts should be continued on modelling the effects of the welfare state and the institutions on the labour market. Finally, I could mention the problems of debts and deficits. But if I was a director of the CPB I would not concentrate on that as I am quite sure this will be taken care of effectively with or without models to support it. This may, of course, be arrogance on my part and perhaps he is wiser.

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References

- Van den Berg, P.J.C.M., 1986. 'De betrouwbaarheid van macro-economische voorspellingen', *Economische Statistische Berichten*, 1153–57.
- Den Butter, F.A.G., 1991. 'Macroeconomic modelling and the policy of restraint in the Netherlands', *Econ. Model.* 8, 16–33.
- Don, H.J.H., 1993. 'Forecast uncertainty in economies'. In: Grasman, J. and Van Straten, G. (eds.), *Predictability and non-linear Modelling in Natural Sciences and Economics*. Kluwer.
- Donders, J.H.M. and Graafland, J.J., 1998. 'CPB Models and Employment Policy in the Netherlands', *Econ. Model.* 15, 341–56 (Chapter 2 in this volume).
- Gelauff, G.M.M. and Graafland, J.J., 1994. *Modelling Welfare State Reform*. North Holland.
- Gordon, R.J., 1984. *Macroeconomics*. Brown, Boston.
- Klein, L.R., 1950. *Economic Fluctuations in the United States, 1921–1941*. Wiley, New York.
- Klein, L.R., 1988. 'Past, present and possible future of macroeconomic models and their uses.' In: Klein, L.R. (ed.), *Comparative Performance of U.S. Econometric Models*, Chapter 1. Oxford University Press, 1991.
- Lucas, R.E., Jr., 1976. 'Econometric policy evaluation: a critique'. In: *The Phillips Curve and Labor Markets, Carnegie-Rochester Conference Series on Public Policy, J Monet Econ.*, Suppl. 1, 19–46.
- Stone, R. and Stone, W.M., 1939. 'The marginal propensity to consume and the multiplier: a statistical investigation', *Rev. Econ. Stud.* 6, 1–24.
- Timbergen, J., 1936. 'Kan hier te lande, al dan niet na overheidsingrijpen, een verbetering van de binnenlandse conjunctuur intrede, ook zonder verbetering van onze exportpositie?' *Prae-adviezen van de Vereeniging voor de Staathuishoudkunde en de Statistiek*. Martinus Nijhoff, Den Haag, pp. 62–108.
- Whitley, J.D., 1994. *A Course in Macroeconomic Modelling and Forecasting*. Kluwer.

CPB models and employment policy in the Netherlands*

Jan Donders and Johan Graafland

The CPB Netherlands Bureau for Economic Policy Analysis plays an important role in the preparation of economic policy in the Netherlands. This chapter addresses the interaction between CPB models and employment policy during the period 1950–97. We discuss several examples of the impact of CPB models on employment policies. At the same time, the specific needs of policy makers influenced model-building at the CPB. Several innovations of CPB models were needed to explain the actual developments on the Dutch labour market and to investigate the usefulness of various remedies addressing the disequilibria in this market.

JEL classifications: B49, E1, E24, E65

I. Introduction

This chapter discusses the interaction between CPB models and economic policy in the Netherlands. We focus on employment policy, because employment is an important target for economic policy. Since 1973, it even is the most important target. The chapter deals with two questions: how did CPB models affect employment policy and how did the needs and views of policy makers impact CPB models?

The organization of this chapter is as follows. To begin with, Section 2 sketches CPB's role in the preparation of economic policy. Section 3 discusses the interaction between labour market developments, CPB models and employment policy during the period 1950–97. During this period the focus of the CPB shifted from (Keynesian) demand side macroeconomic models in the 1950s and 1960s, via an early attempt in the 1970s to incorporate supply effects (VINTAF), to the development of a fully-fledged general equilibrium model based on microeconomic foundations (MIMIC) in the late 1980s. The fourth section deals with the MIMIC model in more detail. Our discussion of the history of MIMIC, its influence on policy-making and the impact of the needs and views of policy makers on MIMIC serves as a case study.

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2. CPB's role in the preparation of economic policy

Immediately after the Second World War, the CPB Netherlands Bureau for Economic Policy Analysis, as we like to call it today, was founded with Tinbergen, the founder of macroeconomic model-building,¹ as its first managing director. The CPB would be a strictly advisory body, operating both as a central source of economic information within the government and as an independent centre for applied economic analysis. The latter includes monitoring and forecasting economic developments as well as policy analysis. Policy-making is the task of the ministries, the parliament and the government. A distinctive feature of the CPB is that it analyses policy proposals for political parties and other public organizations like employers' and employees' organizations, as well as for government ministries.² These studies tend to be conducted mainly in a medium—or long-term framework.

Each year in April, the CPB publishes the Central Economic Plan. This publication gives a detailed overview of the economy and contains forecasts for the current and—since 1992—the following year. Since the 1960s, the CPB prepares the Macro Economic Outlook every summer. Its forecasts help the cabinet to prepare the budget for the next calendar year. Updated with final decisions on fiscal policy, the Macro Economic Outlook is published in September simultaneously with the Budget Memorandum of the cabinet.

The Netherlands can be characterized as a consultation economy. One of the characteristics of the Dutch consultation economy is the need of all participants in the preparation of economic policy for factual knowledge and scientific analysis (CPB, 1992a, p. 95). This need explains the Netherlands' distinctive tradition of using econometric models to support economic policy-making. Policy co-ordination between the government and the organizations of employers and employees (the social partners) plays an important role in the Netherlands. Consultation bodies are the bipartite Foundation of Labour and the tripartite Social and Economic Council. The former is aimed at consultation between employers' and employees' organizations on labour conditions. The latter is an advisory body to government on social and economic policy. CPB's managing director is one of its independent members.

3. Labour market developments, CPB models and employment policy: a retrospect

This section discusses the policy questions raised by labour market developments during the period 1950–97. We show how these questions influenced model-building at the CPB. At the same time, we try to sketch the influence of CPB analyses on actual employment policies.

3.1. The 1950s and 1960s

After the Second World War, the Netherlands experienced remarkable economic growth. This favourable economic development can be attributed to a strong growth of both labour supply and labour productivity, the destruction of public and private capital during the war (that stimulated investments after the war), and the liberalization of international trade. Wage moderation also contributed to economic growth. Government and the social partners agreed on the need to limit the growth of real wages. Until 1963 the government set wage guidelines in close co-operation with and supported by employers' and employees' organizations.

In the early 1960s, the combination of fast economic expansion and labour time reduction led to a tight labour market, generating a stronger growth of wages. In 1964 the so-called wage explosion occurred: the average nominal labour costs per hour increased by more than 15 per cent. An increase in the burden of taxes and social security contributions also boosted the growth of labour costs in the second half of the 1960s. Consequently, profits fell and the competitive position of Dutch export industries deteriorated. These developments would contribute to the structural problems of the 1970s.

In the 1950s and 1960s, the CPB used annual models to assess short-term economic developments and the effects of alternative economic policies.³ These models had Keynesian characteristics: effective demand was the most important determinant of production and employment. Keynesian policies to regulate the level of effective demand were based on simulations with CPB models. In this connection, we should mention 1952 and 1957. In both years, which were characterized by overspending, effective demand was reduced by a package of measures. These measures were implemented by the government after discussions in the Social and Economic Council. Both times, CPB's analyses played an important role in the Council's discussions. Looking back, however, it should be observed that in 1957 the measures to reduce domestic demand were implemented too late, after the start of the downswing. This experience illustrates that stabilizing the economy by discretionary demand policy is difficult.

The CPB did not focus exclusively on short-term economic developments. In the early 1950s the CPB had begun to analyse the long-term developments. This research project resulted in an outlook for the period 1950–70, published in 1955. Ten years later the CPB published its first medium-term outlook for the period 1965–70. The CPB developed models that could describe the interaction between the demand—and the supply—side of the economy. That's why model-building at the CPB was aimed not only at improving the short-term model. In 1967 CPB's then managing director, Van den Beld, presented his so-called CS model, a dynamic model suited to analyse the interaction between the business cycle and the structural development of the economy. The CPB used this model to make medium-term forecasts and analyses.

Policy makers also understood the importance of the structural development of the economy. We have already mentioned the centrally guided wage policy. This

policy was an instrument not only to regulate the level of effective demand, but also to influence the structural growth of production and employment. Both government and social partners understood the need to contain the wage growth, because of its beneficial effects on investments and exports. CPB analyses supported this policy (Van den Beld, 1979).

3.2. The 1970s

The performance of the Dutch economy became very unfavourable in 1973, the year of the first oil crisis. As a consequence of the economic problems, CPB's contacts with the ministries and the cabinet became more intense in the 1970s, which enlarged CPB's influence on economic policy (Passenier, 1994, pp. 264–9). The Central Economic Commission, which normally prepares the macroeconomic policy of the government, also became more influential. The presidium of this commission consists of high-ranking officials of the five ministries involved in social and economic policy, CPB's managing director and, as a permanent adviser, a director of the Central Bank. Advice from the Central Economic Commission was often based on CPB forecasts and simulations with CPB models.

Although the Wage Act of 1970 limited the power of the government to interfere with wage negotiations, in the 1970s the government did interfere several times. Wage controls were aimed at reducing inflation and enlarging profits. The cabinet tried also to influence the distribution of income through these controls. Government interventions could not prevent, however, the rise in the labour share in enterprise income. As a matter of fact, government policy contributed to this rise since the gradual increase in the burden of taxes and social security contributions raised the growth of labour costs.

From 1973 employment in enterprises declined, although output still grew further. CPB models could not explain this development, since in these models the growth rate of employment in enterprises was usually linked to the growth rate of production by enterprises. Indeed, in the 1950s and 1960s, there was a strong correlation between employment and production. In the 1970s, however, this correlation did not hold any longer. As a consequence, CPB models overestimated employment.

In response, Den Hartog and Tjan tried to explain the fall in employment by means of a clay—clay vintage model.⁴ In such a model the stock of capital equipment is supposed to consist of vintages of investment goods each of which has its own technical coefficients. Increases in the real product wage surpassing the growth of labour productivity embodied in the capital goods result in a reduction of the economic life span of capital goods and the related number of jobs. Such a reduction explained the fall in employment. The concomitant increase in average labour productivity, as a consequence of scrapping capital goods with a relatively low labour productivity, explained the further growth of output.

The study of Den Hartog and Tjan quickly had an impact on the discussions on economic policy. In February 1975, the cabinet published its Memorandum on employment. In an appendix the CPB presented the Den Hartog and Tjan view on

the fall of employment. This analysis, however, did not yet lead to a change in macroeconomic policy. The cabinet was still convinced that the main cause of the economic problems was a lack of sufficient demand. That's why it decided to stimulate the demand for labour by employment programmes and by expanding the budget deficit.

In the summer of 1975, the CPB informed officials of the Ministry of Finance of its views with respect to the economic development in the medium-term. Assuming unchanged economic policy the CPB expected that unemployment would reach 300,000 persons (6 per cent of the labour force) in 1980. Next to that, the CPB expected a strong increase in the burden of taxes and social security contributions, that would raise labour costs and thus unemployment. Not only would strong wage increases shorten the economic life span of capital goods, but they would also reduce profits and, hence, the creation of new jobs by investments. At this time, the CPB message was taken more seriously. The Minister of Finance, Duisenberg, understood the need for a policy change. He proposed to limit the *increase* in the burden of taxes and social security contributions to 1 per cent of national income each year. After discussions, the cabinet agreed with this so-called 1 per cent-policy (see Toirkens, 1988, pp. 32–40).

In 1976, the Minister of Economic Affairs, Lubbers, published his Memorandum on economic structure. Lubbers endorsed the diagnosis of Den Hartog and Tjan. According to the minister, the structural problems of the Dutch economy originated from the rise in the labour share in enterprise income that had occurred since the mid-1960s, as a consequence of the tight labour market in the 1960s, the gradual increase in the burden of taxes and social security contributions and the deterioration of the terms of trade as a result of the oil crisis. To strengthen the supply-side of the economy, the government decided to reduce labour costs by wage subsidies and to stimulate investments by investment subsidies. Simulations with CSVIN (an adjusted version of Van den Beld's CS model with the vintage production function of Den Hartog and Tjan) showed the economic effects of these policy proposals. According to the then secretary-general of the Ministry of Economic Affairs (Rutten, 1984), these simulations had an important influence on the policy mix that was proposed in Lubbers' Memorandum.

The vintage production function was not only embedded in the CS model, but also in a new medium-term macroeconomic model, called VINTAF. The first version of this model was published in 1975 (Den Hartog *et al.*, 1975). Two years later the CPB put into use a second version with endogenous social security contributions. Simulations with this model showed that an increase in the rate of unemployment results in an increase in social security contributions that raises labour costs and thus boosts unemployment further. In 1977, the Central Economic Commission based its projections and policy advice for the medium-term directly on the results of VINTAF. This model and its use for policy analysis incited a unique and vivid discussion among academics and government specialists.⁵ Driehuis and Van der Zwan, who started this debate, criticized VINTAF for several reasons. They claimed, for example, that the vintage

production function does not apply to all sectors of the economy and that not only labour costs, but also capital costs, determine the economic life span of capital goods. Moreover, they criticized the fact that VINTAF did not contain a financial sector. This debate led to further research on the specification and estimation of vintage models. Furthermore, the CPB decided to build a new version of the medium-term macroeconomic model with a financial sector.

In 1977 a new cabinet took office. This cabinet declared that it did not believe any more in Keynesian policies. Although the cabinet proposed to cut down government expenditure, it failed to do so. Consequently, it was not able to stop the simultaneous increase in the budget deficit and the burden of taxes and social security contributions, although the second oil crisis of 1979 led to a further increase in the natural gas revenues of government.

It is clear from the above that CPB analyses already showed the need for a change of economic policy in an early stage. In the 1970s, however, only a minor policy change occurred. Consequently, the labour share in enterprise income and unemployment kept rising. Yet, simulations with CPB models played an important role in the debate on economic policy and influenced actual government policies. Government defended wage controls by referring to simulations showing the beneficial effects of wage restraint; minister Duisenberg announced his 1 per cent-policy after the CPB presented its prospects for the second half of the 1970s; and minister Lubbers based wage and investment subsidies on model simulations. According to Den Butter (1991), even more important is the fact that the VINTAF models and the debate on the vintage production function have been instrumental in the general acceptance of the policy of wage restraint in the Netherlands. However, as we will discuss in the next subsection, it would take until 1982 before the labour share in enterprise income started to decline.

3.3. The 1980s

In 1981 a new cabinet took office, which would govern only until the next year. At the end of 1981, the Minister of Social Affairs and Employment, Den Uyl, proposed a 'jobs plan' to reduce unemployment, which led to heated discussions between the ministers involved in social and economic policy. The CPB estimated that the 'jobs plan' would raise employment by 5,000 jobs. This small effect disappointed Den Uyl and his officials. Ritzen, who was then with the ministry to co-ordinate the 'jobs plan', was not convinced. According to him, CPB's analysis showed the limitations of economic models (see Passenier, 1994, pp. 272–3).

In the early 1980s, the Netherlands experienced its most serious economic crisis since the Second World War. This crisis led to a boost in both the fiscal deficit and the unemployment rate. The huge fiscal deficit incited a debate on the necessity of a reduction of this deficit. Critics of CPB models argued that these models wrongly neglected the beneficial impact of a fall in the fiscal deficit on private investments, since these models did not contain a financial sector. This critique was expressed,