

Research Department

Statistics Norway

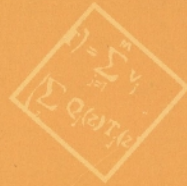
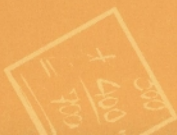
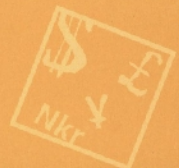
Annual Report 1997

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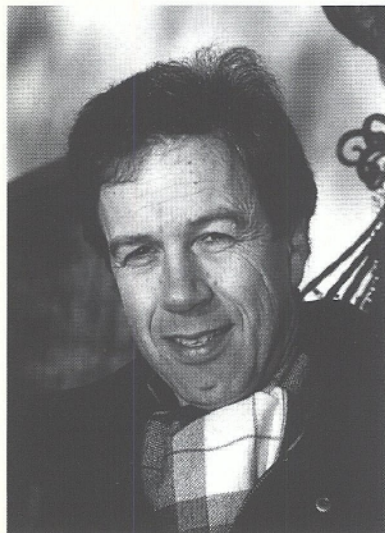
1997



Introduction	2
Brief history of the Research Department	2
General research objectives	3
Organization of Statistics Norway	4
Public economics	5
Taxes and transfers	5
Income distribution and household behaviour	5
Corporate taxation	6
Labour market	7
Regional and municipal economics	7
Staff	8
Resource and environmental economics	9
The European and Nordic energy markets	9
A verification theorem for combined stochastic control and impulse control	9
Voluntary agreements or environmental taxes?	10
Cost-benefit analysis and the democratic ideal	10
The waste generation and waste policy	10
Norwegian emissions of CO ₂ 1987-1994: A study of some effects of the CO ₂ tax	11
Staff	11
Macroeconomic analysis	12
Business cycle analysis	12
Macroeconometric models	13
General equilibrium models	14
International projects	14
Staff	15
Microeconometric research	16
Labour market	16
Welfare and inequality	16
Consumer behaviour	16
Producer behaviour and productivity	17
Discrete and continuous choice	17
Numerical algorithms in econometrics	17
Staff	18
Social and demographic research	19
Population projections	19
Demographic research	19
Immigration and social change	20
Social research	20
Staff	21
Administration	22
Personnel and budget	22
Staff Research Department	22
Statistics Norway Publications	23
Social and Economic studies (SES)	23
Statistical Analyses (SA)	23
Reports (REP)	23
Discussion Papers (DP)	23
Reprints	24
Documents (DOC)	25
Official Statistics of Norway (NOS)	25
Notater (NOT)	25
Økonomiske analyser (ØA)	26
Economic Survey (ES)	27
Samfunnsspeilet (SSP)	27
External Publications	28
Articles in international journals	28
Articles in Norwegian journals	29
Books and book chapters	29
Doctoral theses	30
Other publications	31

The Annual Report 1997 for the Research Department of Statistics Norway presents in outline major programmes and projects in 1997-98 with complete lists of publications and staff. The Annual Report also gives a brief history of the Department and its role as a social and economic research institution, related to the statistical responsibilities of Statistics Norway.

The ultimate aim of the research activity of Statistics Norway is to contribute towards a better foundation for social and economic policies. To an increasing degree theories and methods pertinent for this aim are drawn from international research pools



The Research Department welcomes interests in our publications, and we are happy to forward these on request or as institutional exchange subscriptions.

Oslo, May 1998

Øystein Olsen
Assistant Director General
Head of Research Department

Brief history of the Research Department

The research activities of Statistics Norway have roots far back in the history of the institution. The statistical bureau of Norway was founded in 1876 by separating a small statistical office from the Ministry of the Interior. In the historical chronicles of Statistics Norway the background for the separation of the statistical service from the ministerial environment was stated as follows: "The work of the Office would be facilitated by more distance from the government offices; the scientific character of the Office would thus be better understood by the public." Since then Statistics Norway, or as it was known until 1993—the Central Bureau of Statistics—has been the national statistical institution of Norway, part of the government administration but with an autonomy in statistical matters, like similar institutions in other countries.

The first Director General of Statistics Norway, Anders N. Kiær (1876-1913), took an active part in the international statistical cooperation and was a pioneer in the use of representative samples as a basis for statistics, especially with regard to income statistics. Kiær pioneered also in technical advances: a Hollerith electrical machine was employed in Norway for the first time in the compilation of statistics of incomes and wealth for 1891, shortly after its invention. The research activity of Statistics Norway in the early years was modest and mostly related to analysis of data from the population census and income statistics. Later on after the turn of the century statistical investigations of social issues and poverty conditions became an important area. After World War I Statistics Norway started to publish regular economic surveys.

A separate Research Department was not established, however, until 1950 on the initiative of the new Director General Petter Jakob Bjerve (1949-1980) who had strong academic interests and to whom applied economic and econometric research was a natural extension of the statistical work. In the years just preceding 1950 intensive efforts had taken place in establishing National Accounts, based on production statistics as the primary data source. The pioneering national accounts work of this period was an empirical research frontier which later would provide a basis for macroeconomic modelling and other planning and policy oriented tools. The national accounts system was completed in the early 1950s as one of very few, which at that time integrated detailed annual input-output tables within the national accounting framework.

In the first decade the work of the Research Department comprised in addition to national accounts, tax research, monthly and annual economic surveys, and other research activities often directed towards improving methods of eco-

conomic planning in the postwar period. Towards the end of the 1950s the first macroeconomic model of Statistics Norway—the MODIS I model—was developed as a simple input-output model, large in relation to the computer capabilities of the time. The model drew on inspiration from W. Leontief's pioneering work as well as the modelling experiments of Ragnar Frisch at the Institute of Economics (University of Oslo). The computer used to solve the MODIS I model from 1960 until its replacement in 1965 was a British built first-generation vacuum-tube computer called DEUCE, the only one of its kind in Scandinavia.

Throughout the 1960s and 1970s models of the MODIS family, ever increasing in size continued to be developed and used intensively by policy makers. Around 1980 a new breed of macroeconomic models were finally taking over, and constituted the family of models used today. The 1960s also initiated an era of computer based tax models run by the Research Department as a service directed primarily towards the Ministry of Finance and the Storting (Parliament).

In the 1970s natural resource accounts and energy economics became new adopted research fields, later on after 1980 petroleum economics followed. During the 1980s and even today, a major emphasis is placed on developing microsimulation models, combining advances in computer technology, econometric methods, and data availability. These models, although far from having reached perfection, have been extremely versatile and useful vehicles for the analysis of societal change as a result of demographic development, economic growth, and government policy.

From 1996, research activities and publications of the Division for Social and Demographic Research are included in the Annual Report of the Research Department. In its present form, this research unit was established in 1991 as a separate division for research activities within the Department of Social Statistics. In a historical perspective, however, the present unit continues a more than 100 year long tradition of social and demographic research within Statistics Norway.

Thus, by including the research activities in this area in Annual Report, it comes closer to convey the broad, interdisciplinary range of present research activities within Statistics Norway.

General research objectives

The general objectives of the Research Department's function within Statistics Norway are four-fold:

Enhanced empirical knowledge

Statistics alone is an insufficient source of information for understanding social and economic development. Analysis of statistical data by means of relevant theory and analytical methods and the

use of models when appropriate may give enhanced empirical insight and deeper understanding of the phenomena under consideration. Such analytic knowledge beyond what can be derived from data alone, is inherent in many of the published results of the Department on the state of the economy, the environmental situation etc. Key parameters, such as the interest sensitivity of household saving or of the relation between economic growth and environmental deterioration, are examples of embodiments of empirical knowledge beyond the realm of statistics.

Analytical tools for monitoring economic and environmental development or government planning

An important use of empirical insight gained is embodied in the design of tools for government planning, usually in the form of simulation models. Modelling activities are carried out in close contact with user interests and with emphasis on government planning needs. Signals concerning needs will generally be channelled through Research council programmes and direct contact with ministries. Analytical tools will often involve substantial operational commitments. In order to avoid an accumulation of operational tasks in the Research Department, continual attempts is made to make operation of existing models more efficient, and assessing the society's need and willingness to pay for continued operation.

Feed-back to the statistics

Researchers in the Statistics Norway have a unique position close to the sources of data. The Statistics Act clearly states that this position should not be utilized to monopolize access to data. The proximity with the statistical work provides special opportunities for exploitation of the data expertise in the Statistics Norway, for special organization of data material and links to other sources, and for influencing the methods of collection of primary data. The analytic use gives feed-back effects to statistical work and may serve to improve the quality of the official statistics.

Cumulating competence

Adequate expertise and scientific competence are obvious prerequisites for successful performance of research tasks. The research activity shall give results that can be utilized in the Norwegian society and provide documentation that high scientific standards in the analyses have been maintained. Good contact with research institutes and universities abroad and at home is a necessity. Competence building and the maintenance of a high scientific level demands considerable resources.

Department	Division	Office	
Economic Statistics	National Accounts	Administration	
	Environmental Statistics	Systems Development	
	External Trade, Energy and Industrial Production Statistics		
	Economic indicators		
	Public Finance and Credit Market Statistics		
	Labour Market Statistics		
	Social Statistics Johan-Kristian Tønder	Social and Demographic Research Lars Østby	Administration Gro Halvorsen
		Population and Education Statistics	Systems Development
		Health Statistics	
		Sample Surveys	
Industry Statistics	Social Welfare Statistics		
	Population and housing Census		
	Business Register	Administration	
	Income and Wage Statistics	Systems Development	
	Primary Industry Statistics		
	Transport and Tourism Statistics		
	Data Registration		
	Construction and Service Statistics		
	Research Øystein Olsen	Public Economics Nils Martin Stølen	Administration Otto Gerhard Vaagen
		Resource and Environmental Economics Torstein A. Bye	
Macroeconomics Adne Cappelen			
Administrative Affairs	Microeconometrics Jørgen Aasnes		
	Budget and Accounting	Joint Services, Oslo Joint Services, Kvgr.	
Coordination and Development	IT Development		
Units without department connection	Statistical Methods and Standards		
	Information and Publishing		
	Computer Services	International Consulting	

Chairman of the Board
Åge Danielsen

Director General
Svein Longva

Each division has its own responsibilities and research tasks. On an ad hoc basis the divisions join forces to co-operate on major studies or special investigations. A staff unit deals with personnel, finances, publication, and computer resources.

The Research Department has for many years had the responsibility for tax simulation models used by the Ministry of Finance and the Storting (Parliament). The models are also used for income distribution studies. The current model strategy aims at further development of microsimulation models, both static and dynamic.

Microsimulation model tools for projection of the labour force by gender, age and education and social security rights are used for projections of the labour market. Other model tools have been developed for analyses of labour market imbalances, regional development and municipal economics.

Taxes and transfers

The tax-benefit model LOTTE

The tax-benefit model LOTTE is the main tool in analysing effects on income and revenue from the tax system and social security benefits. The model is, like its many counterparts in other European countries, designed for such purposes by simulating taxes and transfers based on very detailed information about the tax rules and various transfer systems and with data from income tax returns. From a core model of personal taxation LOTTE has developed into a system of models that can be used separately or in combination. An advantage of this system is that e.g. taxes and social security benefits can be simultaneously analysed with consistency between tax rules and social security entitlements for each individual in the sample. Recent applications of the model range from analyses of the tax reform for corporate taxation and transfers to families with children.

The basic LOTTE model includes only direct taxes but has been extended by a module for econometric simulation of consumption, LOTTE KONSUM, which allows calculation and simulation of policy mixes of indirect taxes as well.

The model which calculates direct taxes and social security benefits for stylized household types has been included in LOTTE. This means that the tax law module in LOTTE is used to calculate taxes, disposable income, marginal tax rates, etc. for households with given characteristics.

Project workers: Tom Kornstad (project leader), Iulie Aslaksen, Erik Fjærli, Hanne A. Gravnings-myhr, Kirsten Hansen, Mohamed Farah Hussein, Bård Lian, Kjetil Lund and Thor Olav Thoresen.

Financial support: Ministry of Finance.

Documentation: SA 14, ØA 2/97.

Transfers to families with children

Since the report from the committee evaluating the transfers to families with children was published in 1996, the work within this field in 1997 has included some reporting on results from the committee's work.

Since the Parliament has decided to introduce a cash transfer to families with preschool children not attending child care centres, this issue will be focused in the years to come.

Motivated by the recent studies of parents' labour supply responses to various transfer programs for children, a new project aiming at supplementing LOTTE with algorithms for adjusting income before tax in relation to labour supply elasticities has been launched. Preliminary results from this project have been presented in 1997.

Project worker: Thor Olav Thoresen.

Financial support: Ministry of Children and Family Affairs.

Documentation: SES 98, ØA 4/97.

Income distribution and household behaviour

The tax reform—distributional effects and the high-income response

In this project a panel data approach to behavioural analyses is employed, observing the individuals' adjustment to the tax law changes in the Norwegian tax reform, in order to explain the observed increase in income inequality after the reform. The "implied

References given under Documentation are to issues in Statistics Norway Publications, see pp. 23-27, or for numbers in brackets to External Publications, see pp. 28-32.

The microsimulation model LOTTE

LOTTE is a static tax-benefit microsimulation model that simulates direct taxes and social security benefits. Simulations are based on a sample of income tax returns, with additional information from administrative registers. Household characteristics are recorded by interview. The sample size varies from year to year. The sample from 1995 includes approximately 26 000 individuals (10 000 households). Sophisticated calibration methods are applied to ensure consistency between model estimates and the corresponding totals from the tax register. The individual records can be aggregated to households and married couples, and are weighted in terms of consumption units. The model keeps track of the link between each individual's income, tax, pension entitlement and pension income. For any change in tax or benefit rules, the model simulates taxes, disposable income, and average and marginal tax rates, for individuals and households. Model results comprise total tax revenue, as well as effects on tax revenue and income distribution of specified policy changes. LOTTE is extensively used by the government, especially the Ministry of Finance, and by the Storting (Parliament).

elasticity estimates" from this analysis do not indicate any strong income adjustments to the reform. Changes in the taxation of dividends together with changes in the accounting rules might, however, have had an impact on the increase in inequality. Results from the project have been presented in various conferences in 1997, e.g. at the Congress for the International Institute of Public Finance in Kyoto, Japan.

Project workers: *Thor Olav Thoresen and Karl Ove Aarbu.*

Financial support: The Research Council of Norway.

Documentation: DP 207.

Labour supply

This project aims at providing more information about the labour supply effects of various reforms, in addition to the revenue and distributional effects described by the LOTTE model. The framework will be extended to a life cycle perspective. As part of this study, extensive microeconomic research has been directed towards estimating the parameters of stable distribution from data on female wage incomes. A model for female labour supply is also estimated, employing a version of a labour supply model developed at the microeconomic division. In order to exemplify the use of such tools, an ongoing project simulates the effects of various reforms discussed by the committee for evaluation of transfers to families with children (see project described above).

Project workers: *Tom Kornstad and Thor Olav Thoresen.*

Financial support: The Research Council of Norway.

Analysis of changes in income distribution

A recent project involves a methodological approach to the issue of comparing measures of inequality before and after substantial changes in policies influencing income distribution, or large structural changes in e.g. labour market conditions. A main conclusion is that the effect on income distribution from a policy change should be analysed by decompositions of the Gini-coefficient rather than by merely comparing Gini-coefficients before and after the policy change. The new methodology has been applied to a study of the effect on inequality in personal income distribution of increased labour market participation of married women. This study uses data from a sample of income tax returns over the last 20 years.

Project workers: *Iulie Aslaksen and Rolf Aaberge.*

Documentation: DP 182.

"Time puzzle"—Time use and consumption patterns

Within the framework of household production theories, this project analyses the relation between

time use—for both paid work, unpaid household work and leisure—and consumption patterns of various household types. The focus is to describe the "time puzzle" encountered by especially families with children. The aim of the project is to link partial analyses to the microsimulation models.

The first part of the project has focused on developing household production tables, where consumption expenditure is allocated to household productive activities by various allocation rules. These tables show considerable variations in consumption patterns and time use across various household types. Household production tables have a natural interpretation as input-output tables and may thus be linked to the satellite accounts for household production within the national accounts framework.

A further extension of this project is to analyse the transition from unpaid work to paid work in service production over time, and its consequences for the measurements of economic growth. Preliminary results from this project have been presented at two international conferences.

Project workers: *Iulie Aslaksen and Hanne A. Gravningsmyhr.*

Financial support: The Research Council of Norway.

Documentation: ØA 2/97.

Corporate taxation

The choice between owner's wages and dividends under the dual income tax

Most tax systems give clear incentives for a single owner of a corporation in the choice between dividends and owner's wages. In this project, a model is developed for testing the hypothesized effects on micro data for Norway in 1991, combining tax return data of owners and corporations. The model identifies and measures tax incentives induced by the progressivity in the personal taxation and by some properties of the corporate tax code. The empirical results show that the owners are strongly aware of the optimal mix of dividends and wages induced by the progressivity in the personal taxation of wage income. The results also indicate that the owners are clearly aware of the effects induced by the corporate tax code, but the behaviour is less affected by these incentives than by the incentives in the personal tax code.

Project workers: *Erik Fjærli, Diderik Lund and Jeffrey K. Mackie-Mason.*

Financial support: The Research Council of Norway.

Documentation: DP 211.

Labour market

Projections of household composition, labour force, education and social security in the MOSART model

In 1997 the MOSART model has been expanded by including capital income and taxes. Since capital income includes owner occupied housing, a simple modelling of the acquisition of a home has been included. This expansion of the model has made it possible to use the model to undertake income distribution analyses. At present we are studying the distributional consequences of changes in the public pension system, analysing how much the income distribution is affected by inequality over the life cycle of each individual, by inequality within a generation and inequality between generations. The model has been used by several government ministries to evaluate government policy regarding disability and old-age pensions covered by the Norwegian National Insurance System.

Project workers: *Leif Andreassen (project leader), Helge Brunborg, Øystein Dahl, Dennis Fredriksen, Inger Texmon and Rolf Marius Torsvik.*

Financial support: Ministry of Finance.

Documentation: ØA 2/97, [70].

Labour market imbalances

In order to analyse the possibility of disequilibrium in different segments of the labour market a simple submodel to the macroeconomic model MODAG and the microsimulation model MOSART is constructed. In this model supply and demand for different kinds of labour by education are compared by using the number of persons as the unit of measurement.

The projections are rather simple regarding the assumptions about the composition of demand for the different kinds of education. To improve the projections, further work is carried out to analyse the factors determining the composition of employment by education in the metal industry.

To analyse labour market imbalances in the health and social welfare sector in more detail, a special model is constructed giving projections for supply and demand for 18 professional groups. The supply side is based on a demographic projection of persons with relevant educations and assumptions about labour force participation. Projections of demand are based on demographic and economic development and assumption about political priorities. A corresponding model is constructed for the educational sector to analyse labour market imbalances for four groups of teachers.

Project workers: *Knut Olav Oftedal, Gudrun Rogdaberg, Inger Texmon and Nils Martin Stølen.*

Financial support: Ministry of Health and Social Affairs and Ministry of Education, Research and Church Affairs.

Documentation: REP 97/8, DP 187.

Regional and municipal economics

Analyses of regional labour markets and migration

REGARD is a regional model for the Norwegian economy based on regional national accounts and other statistical sources. The present economic part of the model is a simple submodel to the macroeconomic model MODAG where national figures for gross production, gross investments and employment in 28 industries are distributed on 19 counties by coefficients from 1992. A demographic model block takes care of internal migration and labour force participation. The model provides projections of labour market imbalances, illuminating the implications for regional employment, labour force and population growth of a given macroeconomic scenario and from changes in economic policy. In 1997 the model was used in the preparation of economic surveys for four Norwegian regions.

A project analysing regional differences in wages and demand for labour started in 1997. By including the results in REGARD, the model may be even more applicable for analysing the effects on regional labour markets from policy changes.

A research project investigating regional migration patterns in three Nordic countries continued in 1997 by a co-operation with researchers in Finland and Sweden. The main approach has been to make comparative analyses of regional migration by using gross-stream-data, analysing the migration patterns decomposed by the migrants' and non-migrants' status of the labour market. Analyses especially dealing with supply-side adjustments in regional labour markets have been accomplished.

Project workers: *Eva Ivås, Randi Marie Rosvold, Lasse S. Stambøl, Nils M. Stølen and Turid Åvitsland.*

Financial support: Nordic Council of Ministers, Ministry of Local Government and Labour and Sparebank1 Group.

Documentation: NOT 97/68, [38], [61], [73], [80].

Municipal economics

MAKKO is a macro model for the local public economy. At the aggregate level, MAKKO contains submodels for services provided by

The microsimulation model MOSART

MOSART is a dynamic cross-sectional stochastic microsimulation model which projects population size, household composition, labour force, educational level, income wealth and future pension benefits. The simulation sequence for each year in the projection period starts with the demographic events death, birth, marriage, divorce and education, continues with the simulation of disability and retirement and concludes by simulating labour force participation, wage income and changes in wealth. The model keeps track of the links within families (used in modelling inheritance) and of each individual's pension entitlements and pension income. The initial population and the transition probabilities in the model are based on data registers covering the whole population. MOSART is extensively used by government ministries, especially the Ministry of Finance, in analysing long-run developments in the labour force and in disability and old-age pensions. The current version of the model simulates life histories for a one per cent sample of the Norwegian population from 1994 to 2200.

local governments, like kindergartens, primary and secondary education, health care and care for the elderly. The model is used to project employment and the number of clients in local public services in Norway.

KOMMODE is a microeconomic model of the fiscal and spending behaviour of local governments. A linear expenditure system has been applied to the estimation of price and income elasticities for eight service sectors. The econometric model recognises user fees and budget deficits as endogenous variables. Moreover, the model accounts for heterogeneity in local tastes and production costs. A number of projects that applies KOMMODE in analyses of fiscal disparities and income distribution are in progress.

Project workers: *Audun Langørgen and Rolf Aaberge.*

Financial support: Ministry of Local Government and Labour.

Documentation: DP 196, NOT 97/35.

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The European and Nordic energy markets

Norwegian gas sales and the impacts on European CO₂ emissions

This project studies the impacts on Western European CO₂ emissions of a reduction in Norwegian gas sales. The impacts are due to changes in energy demand and energy supply, but environmental and political regulations also play an important role. The gas supply model DYNOPOLY is used to analyse the effects on Russian and Algerian gas exports of a reduction in Norwegian gas supply. The effects on the demand side and the effects of committing to CO₂ targets are analysed using the energy demand model SEEM. If the Western European countries commit themselves to keeping their announced CO₂ emissions targets, regardless of the costs associated with this, a reduction in Norwegian gas sales will have no impact on emissions. However, the consumption of oil and coal will increase slightly, while total energy consumption will go down. A reduction in Norwegian gas sales also seems to have only minor impacts on the CO₂ emissions from Western Europe in the situation where no emissions regulations are considered.

Project workers: *Elin Berg, Pål Boug and Snorre Kverndokk.*

Financial support: Ministry of the Environment.

Documentation: ØA 4/97, DP 199.

Gas thermal power and export of power to the Nordic countries or Nordic gas pipes

Developing gas power thermal plants in Norway is one possible option discussed as a contribution to reaching a sustainable development of the electricity market in the Nordic Countries. This may be probable to investing in more coal based power capacity in for instance Denmark and Finland. An alternative approach, however, is to invest in gas pipes to Denmark and Sweden. This will reduce energy losses and increase the utilisation rate of the primary energy due to better utilisation of the heat from gas power plants when localising these to Denmark and Sweden. In addition this will reduce total emissions of CO₂ and improve total profitability. In this article an energy market model for the Nordic Countries is applied to study these issues.

Project workers: *Finn Roar Aune and Tor Arnt Johnsen.*

Financial support: Nordic Energy Research Programme, Energy and Society, Nordic Council of Ministers.

Documentation: Aune F.R., and T. Bye (1997): *Gasskraft i Norge eller nye nordiske gassrørledninger*, Mimeo, Statistics Norway.

One important objective of the Research Department the last two decades has been to develop and apply proper models to analyse the interactions between economic development, energy extraction and use, and environmental consequences. In the last two years we have focused the functioning of a deregulated Nordic electricity market and the development of a European gas market. Methodological issues concerning the valuing of the environment and calculating the petroleum wealth has also been important subjects, as has analyses of the economic consequences of different waste policies.

Harmonising energy taxes in the Nordic countries

Some of the Nordic Countries (Finland) taxes heavily the supply side of the energy market (taxes on production of electricity) while some countries taxes only consumption (Denmark) and the rest (Norway and Sweden) taxes both consumption and production. The arguments for taxing varies between fiscal reasons and energy and environmental concerns. The actual combination of these in those countries are rarely based on optimal taxation philosophy. Since 1991 the electricity markets in the four Nordic countries are increasingly integrated. The existing tax regime may then be more and more inefficient with respect to the possibility of maximising the utilisation of the overall energy sector in these countries. In addition the actual tax regime do not minimise the total cost of reaching environmental goals. In this project a Nordic energy market model is applied to study the consequences of harmonising energy taxes between the Nordic countries. Harmonisation reduces energy production and emissions, and increases both the international trade of electricity and total benefits in the energy market (producer and consumer surplus).

Project workers: *Finn Roar Aune and Torstein A. Bye.*

Financial support: Nordic Council of Ministers

Documentation: Mimeo Statistics Norway and Tema Nord 1997:552, Nordic Council of Ministers.

A verification theorem for combined stochastic control and impulse control

We derive a sufficient condition for an optimal solution of a stochastic control and impulse control problem. We combine the well known sufficient conditions for optimal stochastic impulse control in terms of quasi-variational inequalities and the Hamilton-Jacoby-Bellman condition for continuous

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stochastic control to derive a sufficient condition for the mixed stochastic control and impulse control problem. The theorem applies to optimization problems with risk and with both continuous and discrete decisions variables.

Project workers: *Kjell Arne Brekke and Bernt Øksendal.*

Project Documentation: [24].

Voluntary agreements or environmental taxes?

In recent years, so-called voluntary agreements between industry organisations and environmental authorities have gained popularity, both in Norway and several other countries. While it is reasonable that firms prefer such agreements to having to pay environmental taxes, it is more surprising that the authorities do not rather use environmental taxes as a policy instrument. This paper demonstrates that when a precise, unambiguous definition of the tax base for an environmental tax is impossible, both the industry and the regulator may be better off with voluntary agreements than with taxes. In this situation, a voluntary agreement differs from a direct command-and-control-regulation in a non-trivial way.

Project worker: *Karine Nyborg.*

Financial support: The Research Council of Norway, Ministry of the Environment, Professor Wilhelm Keilhaus Fund of Memory, State Consult, Norwegian Central Banks Fund for Economic Research and Arne and Ingegerd Skaugs fund.

Documentation: DP 214.

Cost-benefit analysis and the democratic ideal

In traditional cost-benefit analyses of public projects, every citizen's willingness to pay for a project is given an equal weight. This is sometimes taken to imply that cost-benefit analysis is a democratic method for making public decisions, as opposed to, for example, political processes involving log-rolling and lobbying from interest groups. Politicians are frequently criticised for not putting enough emphasis on the cost-benefit analyses when making decisions. In this paper we discuss the extent to which using cost-benefit analysis to rank public projects is consistent with Dahl's (1989) criteria for democratic decision-making. We find several fundamental conflicts, both when cost-benefit analysis is used to provide final answers about projects' social desirability, and when used only as informational input to a political process. Our conclusions are illustrated using data from interviews with Norwegian politicians.

Project workers: *Karine Nyborg and Inger Spangenberg (Norwegian Institute of Transport Economics).*

Financial Support: The Research Council of Norway.

Documentation: DP 205.

The waste generation and waste policy

Residuals from production accounted from a mass balance

This is an analysis of the generation of residuals in all production sectors in Norway from 1988 to 2010, on the basis of the macro economic model MSG-EE. Our starting point is the principle of a mass balance: all mass that enters into a production sector must equal the mass that leaves the same sector. Inputs can be different raw materials and manufactured materials, and outputs consist of products, emissions to air and a residual (other emissions than those included in emissions to air, e.g. emissions to land and water). We have constructed an additional module to MSG-EE, which converts monetary units to physical units, i.e. tonnes. We find, using the reference scenario from MSG-EE, that total residuals from production will increase with 69 percent from 1988 to 2010.

Project workers: *Karin Ibenholt and Henrik Wiig.*

Financial support: The Research Council of Norway.

Documentation: Massebalanse i den makroøkonomiske modellen MSG-EE (Mass balance in the macro economic model MSG-EE). To be published in the series Reports, Statistics Norway.

Tracing optimal waste policies; getting the prices right

Based on an extensive literature survey, we argue that an overuse of natural resources leads to waste on all stages in the materials' life cycles. The overall conclusions from this study are in accordance with the suggestions from the advocates for market based incentives. Important factors behind the waste problems are relative price failures. Subsidised use of virgin materials and lack of internalised environmental costs increase the materials use in the first place and later the waste amounts. Also the waste policies induce misallocation of resources. Flat waste collection rates give no incentives to generate waste according to the marginal costs. Furthermore, there is a fundamental lack of analyses on costs and benefits justifying the heavy emphasis on recycling. Many studies show that recycling costs far exceed the costs of end treatment of waste. Rigid recycling mandates create artificial markets and eliminate cost efficient levels of recycling. A step towards price incentives and Pigou taxes instead of regulations is also a step towards less waste of resources and a cost efficient mixture of recycling and end treatment of waste. A regression analysis within this project confirms that economic incentives are effective in influencing the choices between waste treatment methods.

Project worker: *Annegrete Bruvoll*.

Financial support: The Research Council of Norway, Ministry of the Environment.

Documentation: Bruvoll, A. (1998): Tracing the optimal waste policies; getting the prices right, forthcoming as Report, Statistics Norway.

Bruvoll, A. (1998): Factors influencing solid waste generation and management, forthcoming as Document, Statistics Norway.

The costs of alternative policies for paper and plastic waste

In order to improve the understanding of optimal policies for paper and plastic waste reductions, we compare the costs of the four alternatives: recycling, incineration, landfill and source reduction implemented by a tax on material inputs. This study supports the ranking of source reduction as the most efficient alternative. Price incentives directed towards reducing material use and waste is more efficient than rectifying the damages of already generated waste. While a tax on waste generating materials actually involves net benefits, all the other alternatives involve net costs.

Furthermore, in an environmental as well as economic perspective the heavy emphasis on recycling may well be misleading, as the environmental and the economic costs exceed the costs of incineration and landfill in most cases. Higher environmental and economic transport costs from recycling more than outweigh the emission costs and conventional costs from incineration and landfill plants in our analysis.

Project worker: *Annegrete Bruvoll*.

Financial support: The Research Council of Norway.

Documentation: REP 98/2.

Norwegian emissions of CO₂ 1987-1994: A study of some effects of the CO₂ tax

Several countries have introduced taxes on fossil fuels with the aim of reducing atmospheric emissions, partly because of local environmental goals (SO₂, NO_x) and partly to participate in a global effort to reduce emissions of greenhouse gases. Norway has had a CO₂ tax since 1991, thereby providing a unique opportunity to evaluate the effects of this tax on CO₂ emissions. The paper provides a counterfactual analysis of Norwegian energy consumption and emissions if noCO₂ taxes had been introduced, and compares the outcome with the actual situation in which such taxes exist.

Project workers: *Bodil M. Larsen and Runa Nesbakken*.

Financial support: Ministry of the Environment.

Documentation: REP 95/14, ES 2/96.

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The objective of macroeconomic analysis within Statistics Norway is to analyse the state, functioning and development of the Norwegian economy by exploiting internal and external data sources and by developing and utilizing macroeconomic models. Key users of the models are the Ministry of Finance and the Storting (Parliament), although general availability to the public of models and results is emphasized. Business cycle analysis reports are published quarterly. Current work is organized under four headings: Business cycle analysis, Macroeconometric models, General equilibrium models and International projects.

Business cycle analysis

Business cycle reporting

As in earlier years the Research Department has published the annual economic survey of the preceding year and three quarterly surveys in parallel editions in Økonomiske analyser and Economic Survey. The summary and the National Accounts are also available on Internet. Besides presenting the quarterly national accounts, these surveys also offer a brief presentation of the main international economic trends and forecasts of the macroeconomic development of the Norwegian economy. The forecasts are constructed using the quarterly macroeconometric model KVARTS (see below). The KVARTS model is also used to provide alternative scenarios for the Government appointed Expert Committee for Income Settlements in connection with the annual nationwide wage and income negotiations.

To appraise international economic developments, the Research Department also employs the NIGEM model of the National Institute of Social and Economic Research in London, UK. The Research Department is also a member of the now UN-based LINK system which links national macromodels to a global model. The LINK forecasts also provide an important source of information in our forecasting activity.

Project workers: *Knut Mourm (project leader), Knut Magnussen and Mette Rolland.*

Sources of economic fluctuations

These two papers constitute the final parts of a project analysing the sources of economic fluctuations in the Norwegian economy, with comparisons made to the United States, the United Kingdom and Germany in particular. Earlier empirical studies addressing the sources of aggregate economic fluctuations in Norway have typically been conducted using large scale models (or partial econometric analysis). The project described here, draws instead

on recent developments in modern business cycle research and econometric methodology and analyse economic fluctuations with the aid of complete, yet small and transparent systems.

The first of these two papers, Bjørnland (1997), is concerned with the identification and measurement of the so-called core inflation rate. Many countries that have adopted an inflation target calculate core inflation by adjusting the consumer price index for some noisy price signals (that should not respond to monetary policy). However, many of these 'adjustment methods' are ad hoc, and involve elements of judgement. Bjørnland (1997) identifies instead core inflation by imposing dynamic restrictions implied by economic theory on a structural vector autoregression model. Core inflation is identified as that component of inflation that has no long run effect on output. Allowance is made for the influence of oil price shocks. The analysis is applied to Norway and UK. For Norway, it is also distinguished between 'domestic' and 'imported' core inflation.

The second paper, Bjørnland (1998), analyses the relative ability of real and nominal shocks to explain business cycles in a small open economy like Norway. In particular, Bjørnland (1998) studies the sources behind the real exchange rate fluctuations since the collapse of the Bretton Woods. The results highlight the exchange rate as a transmission mechanism in an energy based economy and suggest a plausible sequence of shocks (productivity shocks in the 1970s, velocity shocks in the middle 1980s, productivity and labour supply shocks in the late 1980s, and velocity and fiscal shocks in the early 1990s) which help to explain the evolution of real GDP, unemployment, CPI, the real wage and the real exchange rate the last two decades.

Project worker: *Hilde Christiane Bjørnland.*

Financial support: The Research Council of Norway.

Documentation: The project comprises Hilde Christiane Bjørnland's thesis, and is published in SES 92, DP 174, DP 179, DP 200 and DP 215. SES 92 and DP 179 are accepted for publication and are forthcoming in *Applied Economic Letters* and *Scottish Journal of Political Economy* in 1998 respectively.

Sources of business cycles in the Norwegian economy 1973 - 93

In the 1980s and beginning of the 1990s the Norwegian economy was hit by shocks and experienced the strongest cyclical fluctuations since World War II. While impulses from abroad used to be the main source of the Norwegian business cycles, the recent strong fluctuations have to a large degree had domestic origins. Liberalisation of the credit market and interactions between the petroleum sector and the mainland economy have

References given under Documentation are to issues in Statistics Norway Publications, see pp. 23-27, or for numbers in brackets to External Publications, see pp. 28-32.

probably been the dominating factors behind this development.

GDP for Mainland-Norway is often seen as the most adequate indicator of the overall level of activity, and the cycles in this variable are often used as an indicator of the general business cycle in Norway. The magnitude of the Norwegian business cycles were substantially larger after 1980 than before. The duration of a cycle increases over time and the maximum amplitude triples from the 1970s to the 1980s. In the period 1973 to 1984, the cycles were in general smaller in Norway than in the OECD region in total, while the opposite was the case in the following ten years. Before 1980 the Norwegian cycles followed OECD with approximately one year time lag. After 1980 this pattern has disappeared, indicating that domestic factors are the main source of the business cycles.

The fundamental problem is to define the many different shocks hitting the Norwegian economy in this period. As Norway is a small economy, it seems not too problematic to define impulses from the rest of the world as exogenous. Counterfactual simulations using the KVARTS model, fixing Norwegian export market indicators at their trend levels, reveal that Norwegian business cycles up to 1983 were partly generated by impulses from *international business cycles*, cf. REP 97/2. The demand cycles from abroad have on average after 1983, contributed to reduce the swings in the Norwegian business cycles. The large fluctuations in the Norwegian economy of the 1980s must therefore have other explanations.

The effects of *the liberalisation of the credit- and foreign exchange markets* are studied (ØA 8/97, pp 6-14). The deregulation contributed in the first place to generate cyclical movements through powerful demand effects. Approximately 2/3 of the strong swings in the overheated Norwegian economy in the middle of the 1980s were the result of the liberalisation, while the contribution to the following depression was calculated to approximately 30 per cent. The credit market liberalisation seems to have been the most important source of the Norwegian business cycles from the mid 1980s. Through econometric analyses it is also shown that the deregulation, changed the functioning of the economy, by increasing the sensitivity to changes in interest rates.

In DP 210 it is argued that *the temporary increase in oil prices from 1979 to 1985* increased the cycles after 1984. The direct effects of increased oil prices from international business cycles work to decrease the economic activity in Norway, but this effect is probably more than offset by the income effects due to a more expansionary fiscal policy.

In DP 192, the focus is to study economic effects of the *incomes policies*. The analysis covers a wide range of policy actions from direct price- and wageregulations to changes in the system of

taxation. With respect to the business cycles the price- and wageregulation in 1978/79 worked as intended; it reduced the depression in the beginning of the 1980s. The wage regulation in 1988/89 strengthened the depression at the end of the 1980s, but contributed to decrease the maximum variations in the depression in 1991-92.

Project Workers: *Einar Bowitz, Ådne Cappelen, Torbjørn Eika, Stein Inge Hove, Kjersti-Gro Lindquist, Knut Magnussen and Knut Moum.*

Documentation: DP 192, DP 210, REP 97/2, ØA 2/97, ØA 8/97.

Macroeconometric models

Model applications and development

The Research Department operates two large macroeconometric models—KVARTS and MODAG. The KVARTS model is used for forecasting and analysis in our business cycle reports. In addition, the KVARTS model has been a central tool in the historical business cycle project described above. The MODAG model is used mainly by the Ministry of Finance for forecasting and policy analysis.

Both models are updated using the most recent final national accounts data. The current input-output structure and base year of the models is 1993. KVARTS has not been changed much during the previous year. Parts of MODAG have been reestimated using the recent revised national accounts data. A major reestimation of the models was postponed until the quarterly data became available early in 1998.

Project workers: *Pål Boug, Einar Bowitz, Ådne Cappelen (project leader), Robin Choudhury, Torbjørn Eika, Inger Holm, Håvard Hungnes, Laila Haakonsen, Kjersti-Gro Lindquist, Knut Moum, Bjørn Naug, Jørgen Ouren, Terje Skjerpen and Ingvild Svendsen.*

Financial support: Ministry of Finance.

Documentation: NOT 97/5, NOT 97/30, REP 97/3.

Macroeconomic models:

All of Statistics Norway's macroeconomic models are based on the national accounts. The core of the models consists of input-output relations for supply and utilization of specified goods and services. Linked to this core are behavioural relations etc. for different sectors of the economy.

The MODAG model is an annual model and has an input-output core with 45 goods and 29 production sectors. This model is particularly designed for medium term analysis. The behavioural relations cover production, consumption, investments, imports, exports, prices, interest rates, wages and the labour market. The Ministry of Finance is an important user of the MODAG model for forecasting and economic policy analyses.

The KVARTS model is a quarterly model which contains largely the same type of behavioural relations as MODAG. The input-output core is identical to that of MODAG. In the model great emphasis is placed on short-run dynamics. The model is used in business cycle analyses and for work in the Expert Committee for Income Settlements.

The MSG model is an applied general equilibrium model based on optimising individual behaviour and market clearing flexible prices. In 1995 a new version, MSG-6, became operational, which specifies 45 commodity groups and 38 production sectors. Producer behaviour is typically based on the theory of monopolistic competition with free entry and exit of heterogeneous firms. MSG-6 is intended to be particularly suitable for long-run growth projections and to assess welfare and allocation effects of various policy changes, including taxation, energy policy and various kinds of industry assistance. The Ministry of Finance is an important user of the model.

General equilibrium models

Model development

The research department has for more than 20 years developed and used successive versions of the Multi-Sectorial Growth (MSG) model which originated in the late Professor Leif Johansen's doctoral thesis of 1959.

The new model, labelled MSG-6, exists in several versions reflecting the need for different model users to design the model simulations according to their particular priorities. The most sophisticated versions include endogenous labour supply and intertemporal consumer and producer behaviour based on perfect foresight. During 1997 efforts have been devoted to document the model. The empirical properties of the different versions have also been explored through systematic simulations of general equilibrium elasticities with respect to important exogenous variables.

A special feature of the MSG-6 model is that the production functions of the industries reflect the production function of an endogeneous number of heterogeneous firms. Thus, the link between firm and industry behaviour is explicitly specified. In 1997 an analytical discussion of this way of modelling aggregate industry behaviour was worked out. This study focuses on how productivity shifts at the level of the firm are transmitted to aggregate industry productivity.

Project workers: *Brita Bye, Erling Holmøy (project leader), Jørn Arne Jørgensen, Birger Strøm and Turid Åvitsland.*

Financial support: Ministry of Finance.

Documentation: REP 97/16, DOC 97/13, DP 198.

Welfare analysis of environmental taxes

Analyses of the welfare effects of green tax reforms, where taxes are shifted from labour to fossil fuels, were continued. The importance of labour market rigidities was given particular focus. A special version of the intertemporal MSG-6 model was designed to suit this purpose. The bottom line of the study is that a green tax reform may cause a welfare loss if labour mobility is effectively restricted.

Project worker: *Brita Bye.*

Financial support: The Research Council of Norway.

Documentation: DP 185, NOT 97/70.

Social costs of increased public sector consumption

An increase in public sector consumption has opportunity costs in terms of welfare from private consumption and leisure. The costs associated with a given amount of resources used by the public sector depend on how the purchases of the

resources are financed. The project using MSG-6 to quantify these costs was continued in 1997. Efforts were mainly devoted to documentation and presentation of the results. The results indicate that costs are considerably lower compared to previous Norwegian studies. Sensitivity tests identify that the results are robust with respect to changes in a number of exogenous parameters and model specifications. On the other hand, and not surprisingly, the results are quite sensitive to alternative assumptions about the allocation of time between leisure and labour supply.

Project workers: *Erling Holmøy (project leader) and Birger Strøm.*

Financial support: Ministry of Finance.

Documentation: REP 97/16, ØA 9/97, DOC 97/10, NOT 97/41, [43].

Structural indicators

Effective Rates of Assistance (ERA) are summary measures of the effective assistance to labour and capital implied by direct Government transfers, indirect taxes and subsidies, import protection through tariffs and non-tariff barriers and price regulations. The relative dispersion of ERAs between industries in the business sector can under certain conditions be interpreted as indicators of resource allocation effects of these policy measures. ERAs have been calculated for 1989, 1991 and 1994, and ERAs were presented in the National Budgets of 1997. In 1997 estimates of protective trade policies presented in terms so-called Effective Rates of Protection were carried out. Moreover, a study presented an assessment of the extent to which different service sectors are exposed to international competition. Efforts were also devoted to updating information on various types of assistance to industries. This information will be used when ERAs for 1996 are to be calculated in 1998.

Project workers: *Taran Fæhn, Erling Holmøy (project leader), Jørn Arne Jørgensen, Birger Strøm and Turid Åvitsland.*

Financial support: Ministry of Finance.

Documentation: DP 195, REP 97/18.

International projects

Planning models for Saudi Arabia

The Research Department has contracted with UN to develop a system of models for the Ministry of Planning in Saudi Arabia. The first phase of the project—the development and documentation of three models—were completed in 1996. These models are a macroeconomic models for monitoring the short and medium term economic development, a general equilibrium model for planning purposes and finally an aggregated long term model for analysis of the relationships

between population growth, oil extraction and water supply within a macroeconomic framework. In 1997 the project continued with more emphasis on training and use of the models as well as some adjustments of the model frameworks. The models were updated to a new base year and the econometric equations reestimated and some policy simulations were performed.

Project workers: *Olav Bjerkholt (project leader), Ådne Cappelen, Robin Choudhury and Knut A. Magnussen.*

Financial support: UN/DDSMS.

Documentation: ØA 9/97.

E3ME

The Research Department is an associate contractor to Cambridge Econometrics, UK, in a project that involves extending and revising a macroeconomic model designed for analysis of environmental and energy issues in Europe. Our responsibilities are to deliver an input-output basis for the Norwegian model including a time-series databank, and to estimate energy demand for all European countries. The current project started in 1996 and was completed in 1997. Financial support for a new two-year project has been given by the European Commission.

Project workers: *Pål Boug, Ådne Cappelen, Inger Holm, Alexandra Katz, Kjersti-Gro Lindquist, Terje Skjerpen and Ingvild Svendsen.*

Financial support: European Commission.

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A long tradition within the Research Department is econometric analyses of micro-data collected by Statistics Norway and application of estimated behavioral relations and welfare measures in policy simulation experiments.

The overall aim has been to establish a micro-based system of structural behavioral relations for households and firms. Adequate theory and methods for econometric analysis is developed and adapted for this purpose. The microeconomic research activity within Statistics Norway emphasise empirical studies and the application of findings from these in the Department's inventory of macroeconomic models and microsimulation tools.

Labour market

The labour market studies are focused on developing empirical models of labour supply, models for structural multistate duration analysis, and equilibrium models of labour supply and demand in a matching market. Also work concerned with analysing earnings functions is in progress.

The labour supply models are designed to account for nonstandard budget constraints (such as kinked and non-convex tax systems), and non-pecuniary job-attributes (such as type of work). Currently, the models for labour supply are being updated and extended to include both paid work as well as work in the self-employment sector. A framework for multistate duration analysis, which is under development, has been revised and is currently being used to apply to study the dynamics of labour force participation. By applying the general framework for matching behaviour in DP 173 as a point of departure, work is going on to integrate labour supply and demand in an equilibrium model. New statistical techniques (related to stable and selfsimilar stochastic processes) have been applied to analyse the structure of wage and earnings functions.

Project workers: *Rolf Aaberge, John K. Dagsvik (project leader), Bjørn Helge Vatne and Tom Wennemo.*

Financial support: The Research Council of Norway.

Documentation: Reprints 96, [69], [71].

Welfare and inequality

A joint project with the Nordic countries compares the development of inequality of disposable income in Denmark, Finland, Norway and Sweden during the recent 15 years, when inter alia unemployment rose dramatically.

Project workers: *Rolf Aaberge (project leader) and Tom Wennemo.*

Financial support: Nordic Council for Economic Research.

Documentation: DP 201, [1], [2].

Consumer behaviour

Systems of household demand functions are estimated, tested, implemented into a network of macro- and microeconomic simulation models, and used for policy analysis.

Statistics Norway carried out their first household expenditure survey in 1888 and has collected such data every day since January 1, 1973. The survey design includes a module of two-year rotating panels since 1975. We have recently started up a long term project on constructing and documenting systems of detailed datasets from these surveys, and combining them with price data from the consumer price index and income data from tax files. In particular we have information for each household on expenditures on about 700 different goods, with documentation on the content of each good and how new goods have entered over time. Standard aggregates of these 700 goods, and procedures for constructing and documenting aggregates tailor-made for different research projects, are available.

Systems of Engel functions with demographic effects, using 9, 37, 149, and 478 commodity groups, have been estimated. The results have been used to discuss distributional effects of indirect taxes, including green taxes, food subsidies and VAT on services. A first publication of results is given in [58]. Results for specific goods and aggregates have been reported to the Ministry of Finance as a contribution to their current work on evaluation of indirect taxation.

We have earlier calibrated and documented a household consumer demand model, based on a multilevel non-homothetic utility tree with demographic effects, exploiting both our microeconomic estimates of Engel functions and estimates of price elasticities from different types of data. This demand system has been aggregated across all Norwegian households, implemented in an applied general equilibrium model (MSG) and used in analysis of e.g. the effects of CO₂ taxes on the growth of the standard of living of different household types. A first version of a refined model with a five level utility tree, including 15 transportation goods and 14 other goods, was established successfully at the end of 1997.

Two PhD projects have been started up, exploiting the detailed databanks from the Household budget surveys. Knut Reidar Wangen is studying the demand for health related good, with focus on tobacco. Erling Røed Larsen is studying the devel-

References given under Documentation are to issues in Statistics Norway Publications, see pp. 23-27, or for numbers in brackets to External Publications, see pp. 28-32.

opment of the level and composition of consumption in Norway and its effects on the environment and welfare.

Econometric experiments have been performed on estimating price elasticities from the Norwegian household expenditure surveys, published in DP 202, using (i) observed endogenous unit prices for each household in the survey, exploiting methods developed by Deaton, and (ii) average prices in different regions and seasons from the price survey used in the Consumer Price Index. Further empirical work, using an alternative approach developed by Dagsvik, were also carried out, see the paragraph on Discrete and continuous choice below.

Project workers: *Jørgen Aasness (project leader), Frode Alfnes, Leif Brubakk, Erling Røed Larsen and Knut Reidar Wangen.*

Financial support: The Research Council of Norway.

Documentation: DP 202, DP 203.

Producer behavior and productivity

Studies are conducted on R&D, education, scale economies, investment, job creation and productivity. The role of internal and external finance for investment at the micro level has been investigated. Studies on job creation and the relationship between job creation and innovation have also been completed. Another ongoing study examines the relationship between productivity, wages and education profiles at the plant level, on the basis of a matched panel with plant and individual worker information. In collaboration with Zvi Griliches (Harvard University) work is going on to develop a new framework for studies of the relationship between R&D, profits and productivity.

Project workers: *Torbjørn Hægeland, Frode Johansen, Tor Jakob Klette (project leader) and Jarle Møen.*

Financial support: The Research Council of Norway.

Documentation: REP 97/11, DP 188, DP 190, DP 194, DOC 97/6, NOT 97/36, [34], [35], [44].

Discrete and continuous choice

Many important choice settings can be formulated as discrete and continuous choice processes where heterogeneous decision makers face different and partly unobservable choice constraints. This is a typical challenge with which the theory of discrete choice is concerned.

The research activity in this field includes the development of theory and methodology for structural analysis of data generated by individual choice from a continuous or finite set of alternatives. In particular, it is focused on topics such as:

- characterization of transition probabilities for individual choices;
- modelling two-sided search/matching behaviour in markets with flexible contracts and limited information;
- characterization of models for discrete and continuous choice;
- development of models of consumer demand for commodities with unobservable quality attributes;
- application of the methodology in empirical analysis, and in the construction of price indexes;
- stochastic models for choice among strategies when the outcomes are uncertain.

Based on a particular formulation of the discrete/continuous choice setting, the standard theory for consumer demand has been extended so as to accommodate for products that are differentiated with respect to unobservable quality attributes, and moreover, that prices vary across product variants and stores. This extension is the basis for an empirical analysis based on microdata, in which a consumer demand model has been estimated. As a by-product, price indexes have been constructed which account for aggregation of product variants and stores.

Project workers: *Rolf Aaberge, Leif Brubakk, John K. Dagsvik (project leader), Bjørn H. Vatne and Tom Wennemo.*

Numerical algorithms in econometrics

Microeconomic research often requires specialized computer programming and development of new algorithms. The current activities focus on the following topics: estimation of nonlinear models with emphasis on discrete choice, numerical integration of unobservable heterogeneity, stochastic simulation and bootstrap analysis, and descriptive methods for microdata.

Project worker: *Bjørn Helge Vatne.*

Documentation: [68].

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Population projections

BEFREG—population projections 1996-2050

An extensive report has been published containing detailed results for the 1996 based projections by age, sex and municipality. An evaluation has been made of the accuracy of projected population size by municipality on the basis of observed statistics for 1997.

Project workers: *Nico Keilman* and *Arve Hetland*.

Documentation: NOS C414.

Stochastic forecasts

A three-year project on stochastic population forecasts has been initiated. Its aim is to produce confidence intervals around the outcomes of population forecasts at the national level.

Project workers: *Nico Keilman* and *Pham Dinh Quang*.

Financial support: The Research Council of Norway.

Long-term accuracy of national population forecasts

An analysis of ex-post observed errors in national population forecasts in industrialized countries since World War II was concluded. Results appeared in the *Journal of Official Statistics*.

Project worker: *Nico Keilman*.

Documentation: DOC 97/4, [32], [63], [81].

Demographic research

A substantial part of research activities over the later years has focused at structural changes in central demographic processes, in particular fertility, family formation (nuptiality) and family dissolution. The retrospective Family and Occupation Survey of 1988 (and its predecessor, the Fertility Survey of 1977), has been a major data source for these analyses. With time, however, it is increasingly important to supplement data from the 1988 survey with more recent data sources. Since 1994, survey data on consensual unions are collected on a regular basis through Statistics Norway's Omnibus Surveys. Survey data are also supplemented with data from registers.

Family formation in post WWII Norway—demographic change, historical and sociological perspectives

The aim of the project is twofold: The first part is a descriptive and demographic presentation of trends in family building patterns over the last fifty years. The second and more analytical part is interdisciplinary, combining sociological theories and historical knowledge. Special attention is called for by the growth in consensual unions, which is considered as the most important change in the family formation pattern in the postwar period.

The general objective is to analyse demographic development and changes in economic and social living conditions of the population. The research activities combine a microanalytical approach focusing on demographic and socioeconomic processes, with a macro level approach directed at describing changes in social and demographic structure. Research results from demographic analyses also serve as input for revising model structure and parameters of forecasting and simulation models in Statistics Norway. The division is responsible for BEFREG (Statistics Norway's model for national and regional population projections).

Project worker: *Turid Noack*.

Documentation: SSP 3/97, [41], [47].

Financial support: The Research Council of Norway.

Fertility and labour force participation in the Nordic countries - a comparative analysis of Norwegian, Swedish and Finnish women

The main purpose of this project is to study the determinants of female fertility and afterbirth employment in the Nordic countries by comparing the development in Norway, Sweden and Finland since the late 1960s. The study gives special emphasis to the effects of family policies, in particular the parental leave programmes.

The analyses are based on longitudinal data from similar Family and Fertility Surveys containing complete retrospective life histories on child-bearing, cohabitation and marriage, educational activities and employment.

Project workers: *Marit Rønsen*, *Marianne Sundström* and *Ali Tasiran*.

Financial support: Joint Committee of the Nordic Social Science Research Councils (NOS-S).

Documentation: SSP 1/97, [41], [59].

Mortality and residential history—recent Norwegian experiences

Underlying many studies examining associations between regional patterns of mortality and hypothesised causal factors, is the assumption that residence in a region at the time of death can be equated with prevailing exposure to local condi-

BEFREG – A model for regional population projections

BEFREG is Statistics Norway's model for population projections at the national, provincial and municipal level. It projects the population broken down by one-year age group, sex, and municipality (435 on 1 January 1996). It consists of two sub-models: In the first sub-model projections are made at the level of 101 so-called forecast regions. These calculations require assumptions on future trends in fertility, mortality, immigration, emigration, and internal migration. Numbers of immigrants and out-migrants for each forecast region are projected by means of a migrant pool approach. Births, deaths, and international migrants are handled by a standard cohort component approach for each forecast region. The second sub-model divides the projected growth over the municipalities that make up each forecast region. It undertakes a further breakdown of future population trends computed in the first step for each combination of age and sex into developments at the level of municipalities.

References given under Documentation are to issues in Statistics Norway Publications, see pp. 23-27, or for numbers in brackets to External Publications, see pp. 28-32.

tions. Migration violates this assumption. To reduce this problem one might apply a life history approach.

The main objective of this project is to explore the relationship between residential history and regional mortality for Norwegian men and women, using a life history approach. Four partly overlapping strategies will be applied in this endeavour.

- 1) Examine total and cause specific mortality related to different types of residential history.
- 2) Investigate time dependence of the effects of migration on the risk of dying.
- 3) Evaluate regional mortality differences in Norway controlling for migration.
- 4) Describe how urban-rural mortality differences are influenced by migration.

Project worker: *Erik H. Nymoen*.

Financial support: The Research Council of Norway.

Immigration and social change

Over the period 1992-1997, the Department of Social Statistics has carried out the so-called «Immigration Statistics Project», under financial support from and in collaboration with the Ministry of Local Government and Labour. A minor milestone was reached in 1997 when publishing in the SA-series a broadly based compilation of knowledge about immigrants and immigration to Norway. Present projects include an on-going study of the development of attitudes towards refugees and immigrants. From 1993, yearly opinion data are collected and published.

Project worker: *Svein Blom*.

Financial support: Ministry of Local Government and Labour.

Documentation: SA 20, NOT 97/54, DOC 97/11, [19], [51], [89].

Level of living survey 1996

A representative sample of eight major immigrant groups, aged 16-70, was interviewed in their mother tongue about different aspects of their material and social welfare. Results from this Level of living survey among immigrants in 1996 are being compared to results from a similar survey among foreign citizens conducted by Statistics Norway in 1983 and the ordinary Level of living survey 1995. The research objective is to contrast differences in the level of living between immigrants and non-immigrants, to investigate conditions for a successful integration of immigrants in the host society, and to describe the process of social integration of immigrants over time. The first results from the survey was published early in 1997. A report containing the main findings from the survey will be published in 1998.

Project worker: *Svein Blom*.

Financial support: Ministry of Local Government and Labour.

Documentation: SA 20, NOT 97/6, NOT 97/7, SSP 1/97, SSP 4/97.

Return migration

During 1997, a short-term project which analyses emigration among foreigners who have ever lived in Norway was completed. Register data on demographic, geographic, legal, and labour market status is the main source of information.

Project workers: *Tone Tysse* and *Nico Keilman*.

Financial support: Ministry of Local Government and Labour.

Documentation: SSP 4/97.

Social research

Due to organisational changes, the activities under this heading can be increasingly focused on more specialized analyses and research projects and less on social reporting. Analyses of living conditions of particular population groups and analyses of effects of social welfare policies will constitute a larger part of our research activities. It is also a challenge for the division to combine commissioned research activities with continued and cumulative research efforts on distributional processes and changes in social structures.

Big cities, little welfare? Segregation and inequality in Norwegian cities

This project has used surveys of level of living and other data sources to describe inequalities in this level between the cities and other parts of the country, and also differences within the cities. Particular attention is given to the large differences in level of living within Oslo.

Project worker: *Anders Barstad*.

Financial support: Ministry of Local Government and Labour.

Documentation: SES 97.

Welfare changes, living conditions and social integration. Norway 1973-1995

This project aims at studying the development and consequences of social integration in Norway the last 20-25 years. Are there tendencies towards social isolation and disintegration, and for which groups? Can such tendencies explain the growth in «new» welfare problems, like suicide and violence?

Project worker: *Anders Barstad*.

Financial support: The Research Council of Norway.

Documentation: NOT 97/11, SSP 2/97, SSP 4/97.

Time Use Research

Research on changes and variations in people's allocation of time supplement surveys of level of living by focusing on the opportunities and limitations inherent in their living standards. Also, the Time Budget Surveys, of which Statistics Norway has conducted three, are our most important sources of information about how much, and what forms of unpaid work is performed in society, and who performs this work. Research activities in 1996 include a project on changes in the time use of parents the last 25 years, and a project discussing the extent and changes in the use of domestic help among Norwegian women during the 1980s and 1990s.

Project worker: *Ragni Hege Kitterød*.

Financial support: Ministry of Children and Family Affairs, Ministry of Planning and Coordination and Ministry of Local Government and Labour.

Documentation: REP 97/6.

Single parents—living conditions and economic provision

The project analyses living conditions and economic provisions of single parents, on the basis of a level of living survey of a sample of single parents in 1991. Main emphasis is put on economic adjustments in a life cycle perspective, in particular individual human capital at the time of transition to the single parent life cycle stage. The project is concluded in 1997 and will be reported i.a. in a forthcoming publication in the SES-series (early 1998).

Project worker: *Randi Kjeldstad*.

Documentation : SSP 1/97, (SSP 1/98), (US 35/97).

Life chances in the melting pot

The project has a twofold purpose: At the first stage, survey data from the level of living surveys of 1991 and 1995 and register data from the tax and income registers are used for analysing status and development of economic living conditions and activities over the period 1990-1995 for younger generations (defined as the birth cohorts 1961-1975). At the second stage, the analysis will focus on longitudinal changes in socioeconomic structures and demographic processes and their contribution to differences in opportunity structures and individual adjustment of young women and men in the transitional period from adolescence to (established) adulthood.

Project workers: *Mette Ryen* and *Kari Skrede*.

Financial support: The Research Council of Norway.

Living conditions of the agrarian population

This project is part of a joint project with Division of Public Economics: "Living conditions and income distribution of the agrarian population". The project analyses the living conditions of the

Norwegian agrarian population relative to the living conditions of the Norwegian population in general, at individual and household level. The analyses are based on data from respectively "Survey of Level of Living of the agrarian population, 1995", and "Survey of Level of Living 1995", as well as "Survey of Income and property 1994". Data from Tax and Tax and Income Register 1994 are linked to the sample data from the Survey of level of living of the agrarian population 1995, at individual and household level.

Project workers: *Torkil Løwe* and *Kari Skrede*.

Financial support: The Research Council of Norway.

Staff

Østby, Lars, Director of Research

Barstad, Anders, Research fellow

Blom, Svein, Research fellow

Keilman, Nico, Senior Research Fellow

Kitterød, Ragni Hege, Research fellow

Kjeldstad, Randi, Research Fellow

Noack, Turid, Research Fellow

Rønsen, Marit, Research fellow

Skrede, Kari, Senior Research Fellow

Hansen, Liv, Executive Officer

Hetland, Arve, Senior Executive Officer (Graduate Student, Informatics)

Løwe, Torkil, Sociologist (from March 1997)

Nymoene, Erik H., Geographer

Ryen, Mette, Economist

Tysse, Tone Ingrid, Economist

Sevaldson, Per, Adviser (former Director of Research, Sociodemographic Research Unit)

Personnel and budget

The total staff in the Research Department in 1997 was roughly 100 in total number of persons. The distribution by division is given by the table below.

The financial resources of the research activities stem partly from the government budget as allocated within Statistics Norway. About 42 per cent of total total expenditures in 1997, or Nok 13,6 million are project financed. The bulk of the project revenues comes from research grants from the The Research Council of Norway and from contracts with Ministries, primarily the Ministry of the Environment, the Ministry of Finance, the Ministry of Petroleum and Energy, the Ministry of Local Government and Labour, and the Ministry of Foreign Affairs.

Staff

Vaagen, Otto Gerhard, *Head of Administration*

Dihle, Anne Kari, *Senior Executive Officer (Personnel)*

Rambøl, Hanne, *Senior Executive Officer (Finances)**

Karlsen, Anne Strandli, *Executive Officer (Publications)*

Boquist, Siri, *Clerical staff*

Gundersen, Marit Berger, *Executive Officer*

Mysen, Lise Nevjar, *Clerical staff*

Salvesson, Sigmund G., *Clerical staff*

Skoglund, Anne, *Clerical staff*

Tillereggen, Geir, *Computer Scientist**

Veiby, Tone, *Executive Officer**

Vågdal, Marit, *Executive Officer*

Walseth, Aud, *Clerical staff*

* On leave

Distribution of operating costs in 1997. 1000 Nok

	Government Budget	Project	Total
Personnel	20 360	11 787	
Office expenses etc.	2 366	1 825	
Research Department	22 726	13 612	36 338
Social and Demographic Research	2 790	2 863	5 653

Personnel in Research Department in 1997

Division/Unit	Government Budget	Project	Total
Head of Department	1	-	1
Public Economics	13	8	21
Resource and Environmental Economics	14	13	27
Macroeconomics	17	11	28
Microeconometrics	7	5	12
Administration and Computer Services	9	2	11
Research Department	61	39	100
Social and Demographic Research	7,5	7,5	15

Age structure of the Research Department (including personnel on leave). Women, Men

Division/Unit	20-29		30-39		40-49		50-59		>60	
	W	M	W	M	W	M	W	M	W	M
Head of Department/Administration and Computer Services	1	-	4	1	6	2	-	1	-	1
Public Economics	3	1	1	8	2	2	2	1	-	-
Resource and Environmental Economics	4	1	6	8	2	2	-	1	-	-
Macroeconomics	1	2	6	11	3	4	3	1	-	-
Microeconometrics	-	3	-	3	-	1	-	1	-	-
Research Department	9	7	17	31	13	11	5	5	-	1
Social and Demographic Research	2	1	1	1	2	4	3	1	-	-

Social and Economic studies (SES)

- 97 **Barstad, A.:** *Store byer, liten velferd? Om segregasjoner og ulikhet i norske storbyer* (Big Cities, Little Welfare? Segregation and Inequality in Norwegian Cities).
- 98 **Thoresen, T. O.:** *Mikrosimulering i praksis. Analyser av endringer i offentlige overføringer til barnefamilier* (Tax-Benefit Models in Use. Analysing Changes in the Public Policy towards Families with Children).

Statistical Analyses (SA)

- 14 **Aslaksen, I. (ed.):** *Inntekt, skatt og overføringer 1997* (Income, tax and transfers 1997).
- 17 **Natural Resources and the Environment 1997.**
- 20 **Innvandring og innvandrere** (Immigration and immigrants):
- Blom, S.:** "Bokonsentrasjon blant innvandrere i Oslo" (Residential concentration among immigrants in Oslo)
- Blom, S.:** "Levekår blant ikke-vestlige innvandrere: Trang økonomi, men færre enn antatt opplever diskriminering" (Living conditions among non-western immigrants: Economic problems, but fewer than expected experience discrimination)
- Blom, S.:** "Holdninger til innvandrere og innvandring" (Attitudes towards immigrants and immigration) .

Reports (REP)

- 97/2 **Eika, T. and K.-G. Lindquist:** *Konjunkturimpulser fra utlandet* (Impacts of international business cycles on Norwegian economy).
- 97/3 **Skjærpen, T. and A.R. Swensen:** *Forecasting Manufacturing Investment Using Survey Information.*
- 97/6 **Kitterød, R.H.:** *Leid hjelp til husarbeid? Bruk av privat rengjøringshjelp 1980-1995* (Waged domestic labour? Use of private cleaners 1980-1995).
- 97/8 **Oftedal, K.O.:** *Arbeidstilbudet fra sykepleiere og leger ved endret studie- og arbeidsmønster* (Supply of labour from nurses and doctors by shifts in educational and working attitudes).
- 97/11 **Førre, S.E.:** *Er store foretak mer forskningsintensive? En anvendelse av diagnostiske metoder* (Are larger firms more R&D-intensive? An application of regression diagnostics).

Statistics Norway monographs are published in the series Social and Economic Studies and Statistical Analyses, other research reports and documentation in the Report series or as Documents/Notater. The Discussion Papers series comprises research papers intended for international journals or books. There is also a Reprint series of journal articles and book chapters by staff employees. The Research Department publishes two periodicals: Økonomiske analyser, in Norwegian with 9 issues a year, and Economic Survey, in English with 4 issues a year.

- 97/16 **Holmøy, E. and B. Strøm:** *Samfunnsøkonomiske kostnader av offentlig ressursbruk og ulike finansieringsformer - beregninger basert på en disaggregert generell likevekt-smodell* (The social cost of public sector consumption and tax financing - general equilibrium assessments).
- 97/18 **Fæhn, T. and L.A. Grünfeld:** *Commercial Policy, Trade and Competition in the Norwegian Service Industries.*
- 97/19 **Mamelund, S.-E., H. Brunborg and T. Noack:** *Skilsmisser i Norge 1886-1995 for kalenderår og ekteskapskohorter* (Divorces in Norway 1886-1995 for calendar years and marriage cohorts).
- 98/2 **Bruvoll, A.:** *The Costs of Alternative Policies for Paper and Plastic Waste.*

Discussion Papers (DP)

- 186 **Grepperud, S.:** *Soil Depletion Choices under Production and Price Uncertainty.* January 1997.
- 187 **Stølen, N.M. and T. Åvitsland:** *Has Growth in Supply of Educated Persons Been Important for the Composition of Employment?* January 1997.
- 188 **Klette, T.J. and Z. Griliches:** *Empirical Patterns of Firm Growth and R&D Investment: A Quality Ladder Model Interpretation.* February 1997.
- 189 **Aune, J., S. Glomsrød, V. Iversen and H. Wiig:** *Structural Adjustment and Soil Degradation in Tanzania. A CGE-model Approach with Endogenous Soil Productivity.* February 1997.
- 190 **Biørn, E. and T.J. Klette:** *Panel Data with Errors-in-Variables: A Note on Essential and Redundant Orthogonality Conditions in GMM-estimation.* March 1997.

- 192 **Bowitz, E. and Å. Cappelen:** *Incomes Policies and the Norwegian Economy 1973-93*. April 1997.
- 193 **Glomsrød, S., M.D. Monge A. and H. Vennemo:** *Structural Adjustment and Deforestation in Nicaragua*. May 1997.
- 194 **Johansen, F. and T.J. Klette:** *Wage and Employment Effects of Payroll Taxes and Investment Subsidies*. May 1997.
- 195 **Fæhn, T.:** *Non-Tariff Barriers - the Achilles' Heel of Trade Policy Analysis*. June 1997.
- 196 **Aaberge, R. and A. Langørgen:** *Fiscal and Spending Behavior of Local Governments: An Empirical Analysis Based on Norwegian Data*. June 1997.
- 197 **Hansen, A.C. and H.K. Selte:** *Air Pollution and Sick-leaves - is there a Connection? A Case Study using Air Pollution Data from Oslo*. July 1997.
- 198 **Holmøy, E. and T. Hægeland:** *Aggregate Productivity Effects of Technology Shocks in a Model of Heterogeneous Firms: The importance of Equilibrium Adjustments*. July 1997.
- 199 **Berg, E., P. Boug and S. Kverndokk:** *Norwegian Gas Sales and the Impacts on European CO₂ Emissions*. July 1997.
- 200 **Bjørnland, H.C.:** *Estimating Core Inflation - The Role of Oil Price Shocks and Imported Inflation*. August 1997.
- 201 **Aaberge, R., A. Bjørklund, M. Jäntti, P.J. Pedersen, N. Smith and T. Wennemo:** *Unemployment Shocks and Income Distribution. How Did the Nordic Countries Fare During their Crises?* September 1997.
- 202 **Brubakk, L.:** *Estimation of Price Elasticities from Norwegian Household Survey Data*. September 1997.
- 203 **Aasness, J. and L. Belsby:** *Estimation of Time Series of Latent Variables in an Accounting System: Petrol Consumption of Norwegian Households 1973-1995*. October 1997.
- 204 **Swensen, A. Rygh:** *Change in Regime and Markov Models*. November 1997.
- 205 **Nyborg, K. and I. Spangen:** *Cost-Benefit Analysis and the Democratic Ideal*. November 1997.
- 207 **Aarbu, K.O. and T.O. Thoresen:** *The Norwegian Tax Reform; Distributional Effects and the High-Income Response*. December 1997.
- 208 **Hægeland, T. and T.J. Klette:** *Do Higher Wages Reflect Higher Productivity? Education, Gender and Experience Premiums in a Matched Plant-Worker Data Set*. December 1997.
- 209 **Gjerde, J., S. Grepperud and S. Kverndokk:** *Optimate Climate Policy under the Possibility of a Catastrophe*. January 1998.
- 210 **Eika, T. and K.A. Magnussen:** *Did Norway Gain from the 1979-85 Oil Price Shock?* February 1998.
- 211 **Aarbu, K.O. and J.K. MacKie-Mason:** *Why some Corporations Pay More Tax than Necessary*. January 1998.
- 212 **Aaberge, R.:** *UMP Unbiased Tests for Multiparameter Testing Problems with Restricted Alternatives*. January 1998.
- 213 **Søberg, M.:** *"EPA's New Emissions Trading Mechanism: A Laboratory Evaluation" - A Comment*. January 1998.
- 214 **Nyborg, K.:** *Non-Verifiable Emissions, Voluntary Agreements, and Emission Taxes*. January 1998.

Reprints

- 90 **Kverndokk, S.:** *Global CO₂ Agreements: A Cost-Effective Approach*. Reprint from *The Energy Journal* **14**, 2, 1993, 91-112.
- 94 **Grünfeld, L.A.:** *Monetary Aspects of Norwegian Business Cycles: An Exploratory Study Based on Historical Data*. Reprint from *Scandinavian Economic History Review* **44**, 1, 1997, 43-65.
- 95 **Fankhauser, S. and S. Kverndokk:** *The Global Warming Game - Simulations of a CO₂-reduction Agreement*. Reprint from *Resource and Energy Economics* **18**, 1 & 2, 1996, 83-102.
- 96 **Aaberge, R.:** *Unemployment Duration Models with Non-stationary Inflow and Unobserved Heterogeneity*. Reprint from *Ricerche Economiche* **50**, 1996, 163-172.
- 97 **Brekke, K.A. and R.B. Howarth:** *Is Welfarism Compatible with Sustainability?*. Reprint from *Nordic Journal of Political Economy* **23**, 1, 1996, 69-74.
- 99 **Johnsen, T.A. and F.F. Unander:** *Norwegian Residential Energy Demand: Coordinated use of a System Engineering and a Macroeconomic Model*. Reprint from *Modeling, Identification and Control* **17**, 3, 1996, 183-192.
- 100 **Grepperud, S.:** *Population Pressure and Land Degradation: The Case of Ethiopia*. Reprint from *Journal of Environmental Economics and Management* **30**, 1996, 18-33.

- 101 **Brekke, K.A., H. Lurås and K. Nyborg:** Allowing Disagreement in Evaluations of Social Welfare. Reprint from *Journal of Economics* **63**, 3, 1996, 303-324.
- 102 **Larsen, B.M.:** Economic Impacts of Reducing NO_x Emissions in Norway. Reprint from *Environmental and Resource Economics* **9**, 1997, 125-132.
- 103 **Grepperud, S.:** Soil Conservation and Governmental Policies in Tropical Areas: Does Aid Worsen the Incentives for Arresting Erosion? Reprint from *Agricultural Economics* **12**, 1995, 129-140.
- 104 **Brekke, K.A.:** The Numéraire Matters in Cost-Benefit Analysis. Reprint from *Journal of Public Economics* **64**, 1997, 117-123.
- 105 **Larsen, B.M. and R. Nesbakken:** Norwegian Emissions of CO₂ 1987-1994. A Study of Some Effects of the CO₂ Tax. Reprint from *Environmental and Resource Economics* **9**, 1997, 275-290.
- 106 **Rosendahl, K.E.:** Does Improved Environmental Policy Enhance Economic Growth? Reprint from *Environmental and Resource Economics* **9**, 1997, 341-364.
- 107 **Fæhn, T. and L.A. Grünfeld:** Norsk næringsliv i et nytt handelspolitisk regime (The Norwegian business sector under a new trade regime). Reprint from *Sosialøkonomen* **51**, 4, (1997), 18-25.
- 108 **Bowitz, E., T. Fæhn, L.A. Grünfeld and K. Moum:** Can a Wealthy Economy Gain from an EU Membership? Adjustment Costs and Long Term Welfare Effects of Full Integration. Reprint from *Open Economy Review*, **8**, 1997, 211-231.
- 109 **Aaberge, R. and X. Li:** The Trend in Urban Income Inequality in two Chinese Provinces, 1986-90. Reprint from *Review of Income and Wealth* **43**, 3, 1997, 335-355.
- 110 **Berg, E., S. Kverndokk and K.E. Rosendahl:** Market Power, International CO₂ Taxation and Oil Wealth. Reprint from *The Energy Journal* **18**, 4, 1997, 33-71.
- 111 **Roll-Hansen, H.:** Å telle de ville (World wide census, the first attempt). Reprint from *ARR, Idéhistorisk tidsskrift*, **4**, 1997, 12-19.
- 112 **Alfsen, K.H., T.A. Bye, S. Glomsrød and H. Wiig:** Theory and Applications. Soil Degradation and Economic Development in Ghana. Reprint from *Environment and Development Economics*, **2**, 1997, 119-143.

Documents (DOC)

- 97/2 **Grepperud, S.:** *The Impact of Policy on Farm Conservation Incentives in Developing Countries: What can be Learned from Theory?*
- 97/3 **Rolland, M.:** *Military Expenditure in Norway's Main Partner Countries for Development Assistance. Revised and Expanded Version.*
- 97/4 **Keilman, N.:** *The Accuracy of the United Nations' World Population Projections.*
- 97/6 **Fløttum, E.J., F. Foyn, T.J. Klette, P.Ø. Kolbjørnsen, S. Longva and J.E. Lystad:** *What Do the Statisticians Know about the Information Society and the Emerging User Needs for New Statistics?*
- 97/8 **Brunborg, H. and E. Aurbakken:** *Evaluation of Systems for Registration and Identification of Persons in Mozambique.*
- 97/10 **Holmøy, E.:** *Is there Something Rotten in this State of Benchmark? A Note on the Ability of Numerical Models to Capture Welfare Effects due to Existing Tax Wedges.*
- 97/11 **Blom, S.:** *Residential Concentration among Immigrants in Oslo.*
- 97/13 **Bye, B. and E. Holmøy:** *Household Behaviour in the MSG-6 Model.*
- 97/14 **Berg, E., E. Canon and Y. Smeers:** *Modelling Strategic Investment in the European Natural Gas Market.*

Official Statistics of Norway (NOS)

- C414 **Keilman, N.:** Framskrivning av Folkemengden 1996-2050: Nasjonale og regionale tall (Population projections 1996-2050: National and regional figures).

Notater (NOT)

- 97/2 **Berg, E. and K. Rypdal:** *Historisk utvikling og fremskrivning av forbruket av noen miljøskadelige produkter* (Historical data and forecasts for some environmental harmful products).
- 97/5 **Cappelen, Å.:** *SSBs arbeid med investeringsrelasjoner: erfaringer og planer* (Studies of investment behaviour in Statistics Norway, status and plans).
- 97/6 **Blom, S., E. Gulløy and A.A. Ritland:** *Levekår blant innvandrere 1996. Dokumentasjons-rapport med tabeller* (Living conditions among immigrants 1996. Documentation report with tables).
- 97/7 **Blom, S. and A.A. Ritland:** *Levekår blant innvandrere 1996, Del II. Tabeller for*

X

- nordmenn* (Living conditions among immigrants. Part II. Tables for Norwegians).
- 97/11 **Barstad, A.:** *Frihetens århundre? Levekår i Norge i et 100-årsperspektiv* (The century of freedom? Living conditions in Norway in a 100 years perspective).
- 97/30 **Lindquist, K.-G.:** *Database for energiintensive næringer. Tall fra industristatistikken* (A database for heavily energy-using industries. Data from the manufacturing database).
- 97/35 **Langørgen, A.:** *Faktorer bak variasjoner i kommunal ressursbruk til pleie og omsorg* (Explaining expenditure and employment variations in municipal care for the elderly and disabled).
- 97/36 **Førre, S.E.:** *Registerdataene i lys av industristatistikken?* (The registerfiles in view of the manufacturing statistics).
- 97/37 **Gimming, K.:** *Virkninger på prisutviklingen på naturgass i Vest-Europa ved innføring av felles karbonavgift* (CO₂ taxes and the price of natural gas in western Europe).
- 97/39 **Holmøy, E. and Ø. Thøgersen (red.):** *Virkninger av strukturpolitiske reformer: Forslag til konkrete forskningsprosjekter* (Effects of structural policy reforms: Suggested research projects).
- 97/41 **Holmøy, E.:** *En presisering av hva som skal menes med tilbudskurven for arbeid i en generell likevektsmodell* (What should be meant by the labour supply curve in a general equilibrium model).
- 97/45 **Katz, A., B.M. Larsen, K.S. Eriksen and T. Jensen:** *Transport og makroøkonomi – en samkjøring av GODMOD-3 og MSG-6* (Transportation and macroeconomics - simulations on GODMOD-3 and MSG-6).
- 97/54 **Blom, S.:** *Holdning til innvandrere og innvandringspolitikk. Spørsmål i SSBs omnibus mail/juni 1997* (Attitudes towards immigrants and immigration policies. Questions in the omnibus survey May/June).
- 97/68 **Johansen, R.:** *REGARD - Modell for regional analyse av arbeidsmarked og demografi. Teknisk dokumentasjon* (REGARD - A model for regional analysis of labour market and demography - technical documentation).
- 97/70 **Bye, B.:** *Imperfeksjoner i arbeidsmarkedet. Konsekvenser for velferdseffekter av en grønn skattereform* (Environmental tax reform and labour market rigidities).
- 2/97 **Eika, T. and K.G. Lindquist:** *Konjunkturimpulser fra utlandet* (Impacts of international business cycles on Norwegian economy).
- Aslaksen, I., T. Fagerli and H.A. Gravningsmyhr:** *Tidsbruk, husholdningsproduksjon og utvidet inntekt i barnefamilier* (Time use, household production and extended income in families with children).
- Andreassen, L.:** *Ledighet og økt tilstrømming til høyere utdanning* (Unemployment and increased recruitment to higher education).
- Sørensen, K.Ø.:** *Økonomisk utvikling i fylkene 1990-1992 belyst med fylkesfordelt nasjonalregnskap* (Economic development in the countries 1990 - 1992 using National Accounts Statistics by County).
- 3/97 **Johnsen, T.A.:** *Opp og ned: Prisutviklingen i spotmarkedet for elektrisitet* (The Norwegian spot price of electricity).
- Berg, E., S. Kverndokk and K.E. Rosendahl:** *Kartellgevinster i oljemarkedet* (Gains from cartelisation in the oil market).
- Hansen, A.C. and H.K. Selte:** *Luftforurensning og sykefravær i Oslo – er det en sammenheng?* (Air pollution and sick-leaves in Oslo - is there a connection?).
- 4/97 **Longva, S. and T.O. Thoresen:** *Hvordan skal det gis økonomisk støtte til barn og barnefamilier? Noen resultater fra Barnefamilieutvalgets innstilling* (How to support children and families. Some results from the report by the committee evaluating the policy towards families with children).
- Berg, E., P. Boug and S. Kverndokk:** *Miljøvirkninger av norsk gassalg* (Environmental impacts of Norwegian gas sales).
- 5/97 *Konjunkturtendensene for Norge og utlandet* (Business cycle report).
- Koht, B. and L. Sandberg:** *Kilder til målefeil i konsumprisindeksen* (Sources of measurement errors in the consumer price index).
- Epland, J.:** *Inntektsfordelingen 1986-1995: Hvorfor øker ulikheten?* (Income distribution 1986 - 1995: Why is inequality increasing?).
- Bjerkholt, O., R. Choudhury and K.A. Magnussen:** *Fra dadler til olje - den økonomiske utvikling i Saudi-Arabia 1970-2000* (From dates to oil - the economic development in Saudi-Arabia 1970-2000).
- 6/97 **Todsen, S.:** *Realkapitalbeholdninger og kapitalslit i nasjonalregnskapet* (Capital

Økonomiske analyser (ØA)

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