POLICY ANALYSIS USING MICROSIMULATION

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ABSTRACT

Recent changes in the social policy development arena in New Zealand mean that traitional methods of social policy analysis are not now adequate for all analyses. Microsimulation is a technique that can provide another dimension to social policy analysis.

The thesis starts by discussing some of the major social policy developments in New Zealand pointing out some of the weaknesses in the analyses accompaning them. The thesis then goes on to introduce microsimulation as a technique that can help improve the analysis of social policy. However, the main body of the thesis consists of the development of a microsimulation model, a discussion of the database upon which the model is based, and an analysis carried out using the model.

The thesis demonstrates the usefulness of microsimulation models in identifying impacts of social policy changes on small sectors of the population. It does this by simulating the income effects of the increase in the qualification age for National Superannuation on the population sector aged sixty to sixty - five.

Although the thesis demonstrates the effectiveness of microsimulation models, the project uncovered a number of areas where currently available data are not sufficiently adequate for the methodology to be utilised to the full. The thesis finishes by suggesting a number of areas where further development could be productive and assist in improving the quality of social policy analysis.

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TABLE OF CONTENTS

List of Figures and Tables

List of Synonyms and Abbreviations

ACC	Accident Compensation Corporation payments
ASSET	A Simulation System for Evaluating Taxation - microsimulation model
BERL	Business and Economic Research Ltd
CPI	Consumers Price Index
HEIS	Household Expenditure and Income Survey
HLFS	Household Labour Force Survey
GMFI	Guaranteed Minimum Family Income
NZIER	New Zealand Instituts of Economic Research
POBOC	Payment On Behalf Of Crown
SEBIRD	Study of the Effects of the Budget on Income Distribution and Redistribution - extension of ASSET
TAXMOD	TAX-benefit MODel - microsimulation model

CHAPTER 1: INTRODUCTION

Over recent years there has been considerable discussion about National Superannuation and the public provision of retirement pensions. Some say that taxes National Superannuation is unsustainable because it costs too much making taxes too high. Others state that they have paid taxes all their lives and have paid for the pensions of the previous generation, therefore the state has contracted to pay them a pension. Still others comment that they cannot save for retirement on the wages they are paid, therefore the country owes them a pension when they retire.[1]

Whatever stance is taken, one thing that rapidly becomes clear is the lack of information and tools necessary to make fully informed decisions on the subject. The problem with lack of information and tools is not just confined to the subject of provision of income for the elderly, it applies to much of social policy and the associated government expenditure. As former prime minister of New Zealand Geoffrey Palmer has said:

> Social policy formation in New Zealand generally is beleaguered by an absence of adequate statistical information.[2]

As groups concerned about the size of government expenditure become more vocal, there is increasing pressure to reduce that expenditure.[3] The biggest segment of

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[1] Department of Social Welfare (1988), Task Force on Private Provision (1992a).

[2] Palmer (1977b) page 10.

[3] Boston and Dalziel (1992)

government expenditure goes upon social welfare including public provision for the retired. Therefore, social welfare expenditure is often considered fair game for being cut back. The emphasis then becomes 'target government assistance only to those who need it'.

However, calling for government assistance to be paid only to 'those who need it' raises a number of questions. Who are these people? How do we identify them? What assistance and how much do they need? The more tightly government assistance is targeted, the more detailed and accurate are the forecasts and analyses needed. Answers are required to questions such as :-

> How many people will be eligible for benefits under different definitions of eligibility? Who are they? What are their characteristics?
>
> How much will it cost to pay for the benefits?
>
> How will the costs differ if the income cutoff is modified?
>
> How will behaviour change as eligibility is allowed/disallowed?

While standard methods involving aggregated data can give reasonable answers to the third question, they are inadequate in providing answers to the other questions. There have not been the tools available to provide in-depth analyses in answer to those questions.

Why is it that standard methods are inadequate in identifying some of the important impacts of social policy proposals? Part of the reason is that aggregated methods describe the 'average person' who may in actual fact make up just a small proportion of the population. However, there is more to the problem than that.

While standard aggregated models can produce aggregated cost estimates, there are structural difficulties and inadequacies incorporated in them. If estimates of the effects of programmes are calculated using the aggregated grouped data, every time the groups are changed, models using aggregated data must also be recalculated and rebuilt. However, if models were to use disaggregated data they would only have to have the results retabulated with the new set of input parameters. With the expectation of immediate responses to questions on the effects of programmes, there is often not the

time to recalculate and rebuild aggregated models. This can lead to inadequate analyses and poor forecasts, but the greatest problems are caused by the continuing demand by Parliament and the Government for more and more detail in the expenditure and impact assessments.[4] Aggregated models just cannot adequately handle this detail.

Eligibility and level of benefit are usually based upon an assessment of economic need and/or demographic category and these are becoming more and more narrowly defined. 'Economic need' is commonly defined by income levels, while demographic categories are usually defined by age, handicap, family type and other socio-economic characteristics. Thus potential costs of programmes will depend on the numbers eligible and the kind and amount of benefits for which they qualify. Actual costs will also depend upon behavioral responses to the incentives perceived in relation to the programmes. Analysis models using aggregated data cannot adequately identify the effects and costs at the detail now being required.

Concern about economic need has led to many proposals for alternative social welfare systems, from the private provision - minimalist public backup approach, through compulsory contributory social insurance to the universalist type system such as that used for the National Superannuation programme.[5] However, throughout all this discussion there do not appear to be any publically acknowledged mechanisms for assessing either the full costs and benefits of different types of social welfare systems or for assessing the full and long term impacts of those different social welfare systems on the various sectors of the population. While Government Departments (notably The Treasury) and Government instituted working parties (such as the Task Force on Private Provision for Retirement) have produced cost estimates of policy proposals, there has not been a forum to challenge (or have knowledge of) the assumptions upon which the estimates were based. Neither are there alternative sources of analysis with suitable methodologies able to contest in detail the advice given to the Government.

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[4] State Sector Act (1988), Public Finance Act (1989), Fiscal Responsibility Bill (1993).

[5] See Department of Social Welfare (1988) and Task Force on Private Provision (1992a) for a variety of the methods suggested.

This has meant that income maintenance (the term usually applied to the alleviation of economic need through social security), along with most other social welfare policies, has been discussed in an environment of uncertainty of the actual final outcome arising from the implementation of these policies. Policies appear to have been implemented on the strength of the pressure group and the eloquence of their arguments rather than on the strength of a detailed estimation of the impact of the policies. The arguments usually purport to show how effective the policies have been in other countries such as Australia, UK or more often the USA. However, policies cannot just be transplanted from one society into another. Historical and cultural backgrounds to societies differ and make transplanting policies to a different society something that should be done with care. The outcome has often meant excess or unanticipated costs, unexpected social implications and the most needy persons missing out on the assistance meant to help them. These problems are not restricted to New Zealand for as Citro and Hanushek state for the USA scene:-

> "Despite the widespread use of formal models to provide information to the legislative debate, neither the policy analysis tools employed nor the estimates they produce have been subject to much explicit evaluation of their utility or accuracy."[6]

There are a number of other reasons why little in-depth evaluation of the likely impact of social policy has been carried out in New Zealand. One reason is that it suits some people to make social policy decisions on the basis of ideology rather than non-partizan analysis. Another reason is that the desired analysis would be difficult because the data may not be available or may have been collected for another purpose and may not be totally suitable for the current activity. However, the major reason for the lack of evaluation of social policies remains the lack of suitable data and analytical models at the Department of Social Welfare and other interested parties. Recent discussions about private and public provision of retirement income have further highlighted the lack of capacity in government departments, universities and elsewhere that is capable of contesting policy advice given to the Government by, in particular, The Treasury.

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[6] Citro and Hanushek (1991) page 2.

The small amount of social policy evaluation that has been carried out in New Zealand has usually been historical evaluation of social policy and at an aggregated level. This can make it difficult to identify the impact of social policy on specific groups. But for the most part, social policy remains unevaluated.[7]

The problem of inadequate evaluation of the impacts of policy is not unique to New Zealand and techniques have been developed to enable more widespread evaluation to take place. One of the more recent developments and one developed particularly for the analysis of social policy is the technique of microsimulation or micro-analysis.

Microsimulation is an analysis technique that uses disaggregated information representing individual people and applies policy rules to that information. Thus the effect of the policy rules on the individuals represented can be determined. The adjusted data can also be aggregated to determine the effects of the policy at the aggregated level. As Haveman and Hollenbeck state in their introduction:

> Microsimulation models are designed to simulate the effects of proposed changes in economic policy variables - prices, taxes, subsidies, regulations - on data bases containing observations of disaggregated components of one or more major sectors of the economy.[8]

Merz expands on this when he says:

> Because microsimulation models are concerned with the behaviour of microunits (such as persons within a family/household/firm), they are especially well suited to analyze the distributional impacts of policy changes.[9]

Merz further goes on to say:

> Microsimulation is considered a forecasting instrument because policy effects can be forecasted by a microsimulation model.[10]

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[7] Boston and Dalziel (1992). The lack of evaluation is underlined by the difficulty there is in obtaining substantive evaluations of policy after it has been in place for some time.

[8] Haveman and Hollenbeck (1980), page xxi.

[9] Merz (1991), page 77.

[10] Merz op cit.

While these comments were made in relation to economic policy, they also apply to social policy.

Although microsimulation has been in use in other countries for over twenty years, there has been little literature produced in New Zealand on the topic. Most of the papers published in other countries and those few published in New Zealand relating to microsimulation have discussed the analyses done with the models. According to Hancock and Sutherland:

> Much has been written on the findings and policy recommendations by the users of such models.....Rather less emphasis has been placed on detailing the workings of the models or the process of their design and construction. Yet there is much to be gained by sharing such information. The process of exchanging experiences helps to identify directions for future developments and to suggest new solutions to continuing problems.[11]

The objective of this thesis is to introduce the discussion of the topic of microsimulation to New Zealand, to develop a microsimulation model and to demonstrate the use of such a model in estimating the impacts of a policy change. The change that will be analyzed is the recent increase of the qualification age for National Superannuation from sixty to sixty five. The aspect that will be estimated is the impact on income of those in the age-group 60 - 64. The 60 - 64 age group currently receives National Superannuation, but when the qualification age change is fully implemented, this group will be ineligible for National Superannuation.

Chapter two introduces social policy development and discusses how policy has been developed in the past and methods currently used in policy development. The discussion will draw out some of the strengths and weaknesses of the methods used. Chapter three introduces microsimulation and discusses the development of the technique both in New Zealand and in other countries. The model itself is developed in chapter four while chapter five covers the need for data and what data are currently available in New

[11] Hancock and Sutherland (1992), pages 1-2.

Zealand. Chapter six shows the use of the model in an analysis of the possible income impact of the increase in the qualification age for National Superannuation. The concluding chapter discusses the effectiveness of the model and includes recommendations for future work.