MONASH UNIVERSITY

Faculty of Business and Economics

Centre of Policy Studies

Self Review 2006

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Internal Review Process

The Self-Review report was put together by:

Professor Philip Adams, Director, CoPS

Professor John Madden, Deputy Director, CoPS (Chair, Self-Review Team)

Professor Peter Dixon, Sir John Monash Distinguished Professor, CoPS

Professor Ken Pearson, Director GEMPACK Software

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The document was revised in line with comments from other members of CoPS.

External Review Panel

The External Review Panel consists of the following persons:

Two senior academics:	Professor John Freebairn (Director, Melbourne Institute of Applied Economic and Social Research, University of Melbourne) - Chair
	Professor Kym Anderson (Lead Economist, World Bank, Washington; on extended leave from University of Adelaide)
Senior Monash academic:	Professor Max King (PVC, R&RT)
One from professional Society:	Professor Jeff Borland (University of Melbourne - Fellow of Academy of Social Sciences and former editor (1998 – 2002) of the *Economic Record*, the journal of the Economic Society of Australia)
One from industry:	Mr Jon Stanford (Co-chairman, Insight Economics)
Senior student/recent graduate:	Dr Sharn Enzinger (Graduated 2002, now at the Victorian Department of Treasury & Finance)

Terms of Reference

1. Research and Research Training
   - 1.1. To review CoPS' performance against its objectives and its national and international strengths in comparison with its competitors in the following activities:
     - 1.1.1. Research in computable general equilibrium (CGE) modelling
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Overview of the Centre

The Centre of Policy Studies (CoPS) is a research centre within the Faculty of Business and Economics at Monash University. It specializes in computable general equilibrium (CGE) modelling which is listed as an outstanding research strength of the Faculty.

The Centre's staff have conducted research on the development and application of CGE models over a thirty year period, the last fifteen of them at Monash University. Researchers within the Centre are the creators of the large-scale CGE models: ORANI, MONASH, MMRF, TERM and USAGE. ORANI, and the GEMPACK programs for solving economic models, were the principal achievements of the IMPACT project, now part of CoPS. Over the past three decades the comparative-static ORANI model and its dynamic successor MONASH, plus multiregional variants MMRF and TERM, have come to be the major modelling tools used in Australian economic policy making. Many hundreds of reports and papers applying these models to the key policy questions facing Australia have been produced. Variants of the ORANI model have now been developed for over 20 countries and ORANI-style models are becoming increasingly important in economic policy analysis in these countries. The USAGE model of the United States, constructed by CoPS staff over the past 6 years and based on dynamic MONASH, has now been used for a number of major U.S. studies. The ninth version of GEMPACK was released in 2005 and is now being used in over 400 locations in around 60 countries. GEMPACK has had a profound effect on economic modelling by reducing computational difficulties and facilitating communication between modellers across the globe.

The Centre has a staff of 18 (see Appendix 1) of whom 14 are research-only academics (including one emeritus), 3 are administrative and one is computer support. There are five professors: the CoPS Director, Professor Philip Adams; its Principal Researcher, Professor Peter Dixon (the chief author of ORANI, MONASH and USAGE, and a Sir John Monash Distinguished Professor); CoPS' Deputy Director, Professor John Madden; GEMPACK Director, Professor Ken Pearson; and Emeritus Professor Alan Powell (Director of the IMPACT Project for its first two decades). The remaining research-only academics are: Dr Mark Horridge (the chief developer of TERM); Dr Maureen Rimmer (co-author of MONASH and USAGE); Dr James Giesecke; Dr Glyn Wittwer; Dr Yinhua Mai (developer of the China-Australia model, MMC); Dr Tony Meagher (who operates the Centre's labour market forecasting service); Dr Ashley Winston; Mr Mark Picton and Dr Michael Jerrie.

The Centre as at December 2006 had 3 Australian Research Council grants and currently shares a $3.5 million National Health and Medical Research Council grant (2005-09) with two other centres (CoPS' share is $1.05 million). CoPS is a self-funded research centre whose main source of income is contract research ($8.5 million during 2000-06). CoPS' clients include federal and state government departments, private firms and universities in many parts of the world and several international organisations such as the World Bank, the United Nations and the U.S. Department of Commerce.

A feature of the Centre's approach is openness. This includes complete documentation of its models and research, and the provision of training programs in the use of economic models. Since 2000, just over 800 participants, 60 per cent of them from 32 countries other than Australia, have attended 42 CoPS' training courses

held in Melbourne, China, Germany, Brazil, Indonesia, South Africa, the Philippines and the United States. A particular emphasis within these training courses is on interpreting simulation results in terms of major model mechanisms (i.e. the particular aspects of the model's theory and data base driving a particular result).

Members of CoPS have authored many high impact publications, including 4 books in the prestigious North-Holland Contribution Series and the lead chapter to a North-Holland Handbook on Computational Economics. The Centre's principal researcher, Professor Dixon, has appeared in 3 editions of the *Who's Who in Economics* which lists the top thousand-plus economists based on the number of citations in the Social Science Citation Index.

The Centre has extensive linkages throughout the world. CoPS is a leading participant in the Global Trade Analysis Project (GTAP), a worldwide network of researchers in economic modelling, headquartered at Purdue University in the United States. A history of GTAP on its website shows the project was born after Professor Tom Hertel, the founder of GTAP, spent a year in Melbourne with members of the CoPS' group in 1990. GTAP is built around a model of the world economy, with the underlying country models being based on an ORANI-like model. The computational software used by GTAP is GEMPACK. CoPS' staff act as instructors on GTAP courses and two former members of CoPS are now senior members of GTAP's staff at Purdue. A major GTAP award is named for CoPS' Professor Alan Powell. CoPS undertakes model-building projects for organisations in many countries, including China, Denmark, Indonesia, Japan, Pakistan, the Philippines, South Africa, Vietnam and the U.S. The Centre is currently engaged in a joint project with Hunan University in China that involves a substantial training component in CGE for Chinese academics. The Centre has one of its staff members stationed full-time in Washington (with the U.S. International Trade Commission) as part of its major U.S. modelling project. There have been 25 visitors to CoPS from 14 countries since 2002 (see Appendix 5 for details). There is strong competition each year for places in CoPS' postgraduate research program.

Two members of the Centre (Professors Dixon and Powell) have been awarded the Distinguished Fellowship of the Economic Society of Australia. This is an annual award and is the highest recognition in Australian economics. There are currently only 10 living holders of the award. Professor Powell is a Fellow of the Econometric Society, while Professors Dixon, Pearson and Powell are all Fellows of the Academy of the Social Sciences in Australia. CoPS' members are on the editorial boards of 5 journals. Professor Adams is the Australian coordinator for the Pacific Economic Outlook Taskforce. Professor Powell is a foundation member of the GTAP Board. Professor Madden is one of six elected Councillors-at-Large on the international council of the Regional Science Association International. Madden was also the expert witness called by the Commonwealth in the 2005 national wage case. In 2006 the title of Sir John Monash Distinguished Professor was conferred on Peter Dixon. This title is the most prestigious conferred on serving Monash professors and is reserved for eminent professors of exceptional distinction. The title is awarded to only a few with Peter being only the second recipient from the Faculty of Business and Commerce.

CoPS clearly makes a key contribution to Monash University's research profile. An instance of this was in an *Age* newspaper article on key discoveries and cutting-edge technology emanating from Victorian Universities (20 June 2005). In that article

CoPS' economic modelling and GEMPACK software was one of the nine research discovery areas put forward for Monash University, and the only one for Monash outside the sciences, engineering and medicine.

Addressing the Terms of Reference

1 Research and Research Training

1.1 CoPS' performance

The Centre has an outstanding record of continued performance in the development and application of computable general equilibrium modelling (for which it has a world-wide reputation).

CoPS objectives are to provide a focus for research related to CGE modelling within the Faculty of Business and Economics. Its mission is to:

- **undertake world-class independent research in the field of computable general equilibrium modelling.** The Centre is committed to the University's objectives of internationalization and excellence in research. The Centre's primary research focus has been on the construction and application of computable general equilibrium models. It will continue to build on its national and international reputation in this area with a program of research aimed at improvements in the state-of-the-art and publications in nationally and internationally refereed journals.

- **use its research to improve the quality of economic policy debates in Australia and overseas.** In line with the University's mission of research engagement with the community, the Centre is committed to research which is applied and of direct relevance to current economic issues in Australia and overseas. The Centre provides a high-quality cost-effective commissioned research capability for government, business and other organizations in Australia and overseas. Policy relevance is a key to maintaining public support for the work of the Centre and to enriching cooperative research links both within the University and with other Australian and overseas universities, research institutions and government organizations.

- **provide training and software support for economic modelling.** The Centre is home to GEMPACK, one of the two most used software packages in computable general equilibrium modelling worldwide. Maintaining and improving the software, providing customer support and training in the application of the software will remain key objectives of the Centre - as will general training in the construction and application of applied economic models via commercial short-courses, undergraduate teaching and post-graduate supervision.

In the following sub-sections we review CoPS' performance against its objectives, over the period 2000 to 2006, and its national and international strengths.

1.1.1 Research in computable general equilibrium (CGE) modelling (2000 to 2006)

During this period, CoPS made a major advance in CGE modelling with the completion of a fully-documented large-scale dynamic CGE model, MONASH. This model is capable of historical, forecasting and policy analysis. The historical features allow for timely updating of data bases and for the decomposition of movements in endogenous variables into parts attributable to exogenous causal factors. The forecasting feature allows policy scenarios to be assessed against a realistic baseline. This means that movements in the structure of the economy can be taken into account in the assessment of long-run policy impacts, and in the estimation of adjustment costs.

A United States version of MONASH (entitled USAGE) was constructed for the United States Government. It is now in constant use in Washington at the U.S. International Trade Commission, the U.S. Department of Commerce and the U.S. Department of Agriculture.

The Monash-Multi-Country model (MMC) is an advanced dynamic CGE model with bilateral investment flows between countries. It has been used mainly to assess policy and other shocks affecting China. In a recent study it was used to assess the worldwide implications of Chinese convergence (i.e. GNP per capita in China converging to that in developed economies).

MMRF (the MONASH Multi-Regional Forecasting model) has undergone several rounds of development during the assessment period to improve its capability for energy modelling. This has included: more detailed accounting of greenhouse gas emissions and energy usage; an increased range of substitution possibilities between fuels (coal and gas, for example) and between different electricity generation technologies; and enhancements in its treatment of transport, including the introduction of inter-modal substitution for freight and passenger movements. Dynamics has been another focus of recent development for the MMRF framework, with the model now able to undertake historical analyses for states and territories in the same way that MONASH decomposes recent history for Australia as a whole.

Another major development in the assessment period was the production of the TERM model. TERM introduces techniques for reducing the computational burden of multiregional models, thus allowing for bottom-up modelling of 50 or more regions containing around 40 industries, with a detailed specification of margin inputs on all intra-regional, inter-regional and international trade flows.

The Centre maintains a template CGE model, ORANI-G, for use as a starting-point in developing new models for other countries. During 2000-06 a number of new single-country models based on ORANI-G were created, mostly in collaboration with Centre staff. An ambitious example is the ORANIG-FR model of Brazil, which has been extended to model the income and spending patterns of 300,000 Brazilians. This model, which has been widely cited, was used to examine the effect of trade and other policies on the regional incidence of poverty in Brazil.

There are two external types of direct beneficiaries of these modelling developments: those that commission CoPS to use models to analyze issues of interest to them; and those that use CoPS models and derivative models on their own behalf. Organizations of

the second type often draw on training courses conducted by CoPS and on detailed documentation of CoPS' publicly available models. Some organizations are of both types.

As will be clear from the next two sub-sections, there are numerous examples of the first type of organization. In Australia, they include: six federal government departments (Defence, Employment & Workplace Relations, Foreign Affairs & Trade, Education, Science & Training, Transport & Regional Services, and Industry, Tourism & Resources); 10 federal government agencies (e.g. Productivity Commission, Australian Greenhouse Office, Centrelink); around 30 state government departments and agencies in every state of Australia (e.g. Victorian Department of Treasury and Finance, New South Wales Department of Environment & Conservation, Queensland Department of Primary Industry, Tasmanian Department of Infrastructure, Energy and Resources); more than 20 private companies and business organizations (e.g. Optus, Business Council of Australia), and a number of universities. Overseas they include several United States Government departments (e.g. International Trade Commission, Commerce, Agriculture), two South African Government Departments (National Treasury, Agriculture), departments and organizations in the Philippines, New Zealand and the United Kingdom, and universities in Thailand, China and Taiwan.

Organizations of the second type include: Australian federal government agencies (e.g. Productivity Commission), several state treasuries, economic consultancy firms, local and overseas universities (e.g. University of Pretoria), and various other overseas organizations (e.g. U.S. International Trade Commission, the Danish Research Institute of Food Economics, Center for Global Trade Analysis, World Bank).

The development of large-scale general-purpose CGE models by CoPS researchers has changed the landscape of economic analysis in Australia. Today, Australian policy-makers prior to the implementation of a major policy, require as standard a numerical assessment of its effects, usually carried out with a CoPS or CoPS-derivative model. This has led to a proliferation of consulting firms and other organizations in Australia that supply general equilibrium analysis. Apart from CoPS these include: the Allen Consulting Group; Insight Economics; Econtech; Access Economics; ABARE; Acil Tasman; and Charles River Associates. CoPS' modelling is also making a difference to the conduct of economic analysis in other countries.

Results from the new models developed by CoPS have been: discussed in the media; debated in parliament; and embedded in reports delivered to policy makers at the highest levels. For example, MONASH results on the effects in Australia of lowering tariffs on textiles, clothing and footwear were discussed in the Australian parliament. MMC simulations of the effects of a proposed Free Trade Agreement between Australia and China (commissioned by DFAT) are cited regularly in the Press and are used extensively in current negotiations. USAGE results on the effects of removing significant import restraints were delivered by the U.S. International Trade Commission to the Executive Office of the President, while the Centre's biomass energy simulation results are being used in U.S. Department of Commerce submissions to Congressional committees. ORANIG-FR analyses of Brazilian poverty have been reported in the London Financial Times. TERM results on the regional impacts of the Australian drought of 2002 received widespread media coverage. MMRF analyses of greenhouse abatement policies form the

core of state initiatives to encourage renewable forms of electricity generation and to introduce a national emissions trading scheme. Since 2000 the Centre has received almost $2.0 million in funding for its basic research on economic modelling.

There is no doubt that models developed by the CoPS researchers have changed the way that organizations in Australia and elsewhere undertake economic analysis. General equilibrium arguments are now frequently made in the Australian policy debate. The existence of well-designed policy-oriented general equilibrium models that show the ramifications of policies for each sector of the economy has made it hard for governments to institute policies that pander to sectional interests.

Clearly the objective of developing world-leading economic models has been met during the period under examination. University centres developing publicly-available models with extensive documentation and training courses are rare. Probably the most comparable centre to CoPS is the Center for Global Trade Analysis at Purdue University in Indiana which is responsible for the multi-country GTAP model. That centre is modelled on our research group and regularly employs CoPS staff to both improve its modelling products and to act as instructors in teaching its courses.

1.1.2 Research in economic modelling software (2000 to 2006)

The Centre's research on solution techniques and software for economic modelling has produced GEMPACK, one of the two main software packages used by general equilibrium modelling researchers worldwide. GEMPACK advances since 2000 include algorithms for handling rational expectations and practical methods for simulating realistically a variety of trade shocks. Also devised were techniques for decomposing in an efficient manner simulation results with respect to exogenous shocks. These and other new software features were incorporated into Releases 8 and 9 of GEMPACK. The features in these versions of the software are fully documented – see http://www.monash.edu.au/policy/gpdoc.htm.

Economic-modelling researchers in over 400 organisations in around 60 countries who use the GEMPACK software were the immediate beneficiaries of the Centre's software research. Some organisations using GEMPACK are: World Bank, U.S. Department of Commerce, U.S. Department of Agriculture, U.S. International Trade Commission, World Trade Organization, Danish Research Institute of Food Economics, GTAP, Productivity Commission Australia, Australian Bureau of Agricultural and Resource Economics, Centre for International Economics Canberra, Economic Social and Research Institute Japan. World-wide users of the GTAP model mainly use GEMPACK software to implement that model.

New techniques developed at CoPS for decomposing results from economic models have been incorporated in both GEMPACK and its major global rival GAMS. The techniques have improved modellers' ability to decompose results (particularly historical results) into constituent causes. The techniques for improving the modelling of trade shocks have improved researchers' ability to model the effects of international trade negotiations. Studies of the Doha negotiations that used the new GEMPACK techniques have received considerable attention in policy circles. Such trade negotiations can play an important role in world economic welfare, particularly in developing countries.

Sales and renewals of GEMPACK licences are a clear demonstration of the value of CoPS' software research. Many organisations using GEMPACK pay annual fees (of one to four thousand dollars) which provide them with continuing support and free upgrades, so clearly they see very tangible benefits from the research. Since 2000, GEMPACK sales amounted to $1.9 million.

1.1.3 Contract research (2000 to 2006)

During this period, CoPS undertook around 350 contract research projects which earned $8.5 million for the Centre. [A list of contracts for the period 2000-06 is in Appendix 4.] These studies covered a very wide range of economic issues encompassing nearly all of the major economic issues which faced Australia over the period. In order to summarise this work, while giving a good picture of what was undertaken, we discuss the contract research work (and associated own-account research, other than contract-funded basic research) under 5 broad headings below.

Public Finance

A number of model-based analyses of public finance issues were undertaken. Early in the period, the new Goods and Services Tax (GST) was still highly topical. CoPS had contributed assessments of the effects of implementing the GST that were extensively discussed in Parliament and in the media. The Centre then extended its modelling of the GST to generate detailed analyses of GST pass-on by major companies. More recently, CoPS undertook considerable research on issues concerned with Commonwealth-state financial arrangements and with competition between the states. In some cases this involved development of new theory. For example, the Centre developed a model, CSF, which encompassed: interstate differences in tax bases and unit costs of state-provided services; factor mobility; differences in congestion costs across state capitals; flypaper effects (a tendency by state governments to spend rather than pass on to their citizens funds provided by the Federal Government); and fiscal externalities. In another model CoPS' researchers added game-theoretic aspects of state rivalry. New theory was also developed for the Centre's analysis of the efficiency effects of state payroll taxes. This research pinpointed design faults associated with the use of thresholds and with the interaction between payroll-taxes and Commonwealth formulas for distributing money to the states. A final area in which CoPS undertook public-finance research was the extent to which state governments can influence growth in their jurisdictions through their own tax and expenditure policies.

The research undertaken in the public finance area has important policy implications. Each year, the Commonwealth Government distributes about $70 billion (8 per cent of Australia's GDP) to Australia's states and territories. The distribution is required because in the Australian federation, the state/territory governments are responsible for the bulk of public expenditure while the Commonwealth Government is responsible for the bulk of tax collections. The distribution is administered by the Commonwealth Grants Commission according to the principle of fiscal equalization. Under this principle, the Commonwealth ensures that states/territories that make equal fiscal efforts (have the same payroll tax rates, for example) can enjoy the same per capita levels of state-government-provided services (e.g. primary school education, policing, roads, etc). Implementation of the principle means that states with small per-capita tax bases and

high costs are subsidized by states with the opposite characteristics. Both the principle and the details of its implementation are hotly disputed by the states and territories. In 2001 the governments of Victoria, New South Wales and Western Australia formed the Committee for the Review of Commonwealth-State Funding. The Committee commissioned CoPS to calculate the deadweight losses associated with the implementation of the principle of fiscal equalization. The consequent modelling by CoPS was a central part of the Committee's report. The report was discussed extensively in the media and in the Commonwealth and state parliaments.

Payroll taxes are the major taxes imposed by Australia's states. It is widely believed that these taxes are efficient (carry low deadweight losses). The Centre was commissioned by the Victorian Government to investigate this and related issues. Contrary to the conventional wisdom, the Centre's modelling showed that payroll taxes, as implemented by Australia's state governments, are not particularly efficient. In addition, their design can be manipulated by a state government to influence its grant from the Commonwealth under the principle of fiscal equalization. This research was used by the Victorian Government in negotiations with the Commonwealth Grants Commission. It also played a role in the Victorian Government's consideration of a major report on simplifying the State's business taxes, which led to reforms of the payroll tax, land tax and stamp duties.

At the time of the implementation of the GST in July 2001, the federal government required companies to pass on the full extent of cost savings resulting from the tax reform (such as the removal of wholesale sales tax). Large companies failing to comply could be fined up to $10 million. CoPS supplied general equilibrium analysis for cost changes faced by clients of PriceWaterhouseCoopers based on detailed information of their cost structures. This modelling provided important evidence of compliance for some of Australia's leading companies.

The Centre received around $0.46 million in funding for its research in the public finance area.

Labour Economics

During this decade CoPS developed labour-market modules that can be integrated with dynamic CGE models. These modules are of two types. The first is used in policy work concerned with labour-market programs including minimum wages, unemployment benefits, job-skill provision and employment subsidies. This type of module covers demand for labour by occupation and industry, and supply of labour from different categories of workers defined mainly by reference to their labour-market activities of the previous period. The second type of labour-market module is concerned with forecasting labour-requirements by detailed occupation and with computing disruption indicators that take account of the number of people that need to change jobs to maintain employment when the economy undergoes a shock.

The Centre's labour-market research has been used to inform policy makers on five issues.

The first issue is the effect of changes in award wage rates. Under the system in place during the assessment period (recently changed), award wage rates were centrally imposed after hearings by the Australian Industrial Relations Commission. Awards

covered about 20 per cent of Australian workers right across the spectrum (around 1 million persons). CoPS was commissioned to prepare reports on the effects of variations in award wage rates as part of the Government's evidence at hearings held by the Commission in 2005 and by state industrial commissions in 2006.

The second issue was the displacement effects of labour-market programs. The Australian Treasury was of the view that helping one unemployed worker to obtain a job simply meant that another potential worker failed to get a job. The Centre was commissioned by the Department of Family and Community Services to model the effects on aggregate employment of different types of labour-market programs. Our research showed that, while in the short run displacement was extremely high, in the long-run, depending on the exact nature of the program, it could be very low. Our results were used within government in discussions of the future of Australian labour-market programs.

The third issue is adjustment costs. Australia has undertaken and continues to undertake a vigorous program of microeconomic reform. Opponents of these reforms often claim without empirical justification that the benefits in terms of improved efficiency are outweighed by adjustment costs suffered by displaced workers. To measure adjustment costs requires models with four characteristics: detail (adjustment costs are about narrowly defined occupations, industries and regions); forecasting capacity (it makes all the difference whether the adjustment occurs through firing or through a reduced rate of hiring, and to know which will apply requires a forecast of what would happen without the reform); dynamics (adjustment is a process through time); and an economy-wide perspective (cost-reducing job losses in one part of the economy may reduce adjustment costs by saving jobs in other parts of the economy). Using MONASH, MMRF and FEDERAL-F - models that possess the required characteristics - CoPS provided clients with calculations of adjustment costs associated with different reforms. For example, the Centre prepared reports for the Productivity Commission on adjustment costs of changes in tariffs, and for the Department of Transport and Regional Services on adjustment costs of microeconomic reforms in the Utilities sector. The Productivity Commission has adopted the CoPS' method of measuring adjustment costs in research that it has undertaken independently of CoPS. The Centre's research on adjustment costs provides a counterbalance to exaggerated claims by opponents of micro-economic reforms and assists in supporting the on-going reform program.

The fourth issue was an assessment of a widely-publicized plan put forward by five prominent economists (the five economists plan) to boost employment in Australia by a combination of negative income taxes for low income workers and a freeze on award wage rates. Variants of the original plan are still being actively considered by the Government and are part of the Opposition's policy platform.

The fifth issue on which CoPS' labour-market research has been brought to bear is the efficient allocation of training resources to meet Australia's future employment requirements. The Centre uses the MONASH model and a Labour Market Extension to prepare detailed forecasts of the demand for labour by 158 industries, 340 occupations and 56 regions. These forecasts are supplied on a subscription basis, mainly to agencies within the State and Commonwealth Governments. The forecasts are used by the subscribers to inform the allocation of funding between providers of different types of

training programs in their different jurisdictions. The labour market forecasting system has also been used to perform comparative dynamic analyses of the effects of population ageing for the Department of Workplace Relations, and of an accelerated program of skilled migration for the Productivity Commission.

CoPS received almost $2.0 million in funding for its research on labour markets during the period. Organizations that commissioned CoPS to undertake research in this area included: the Business Council of Australia; the Australian Department of Employment and Workplace Relations; the Australian Department of Family and Community Services; the Australian Productivity Commission; the U.S. International Trade Commission; Oxford Economic Research Associates (UK); the Australian Labor Party; and 14 federal and state government departments/agencies (e.g. the Australian National Training Authority, Centrelink, Victoria Workcover, Queensland Treasury) subscribing to our labour market forecast services.

Environment and Natural Resources

CoPS has developed and applied a number of CGE modelling tools for the analysis of environmental and natural resources issues. Altogether the Centre has undertaken over fifty studies since 2000 in the area of environment, energy, water, agriculture, forestry and mining.

At the core of the 39 environment-energy studies undertaken by the Centre was the development of a CGE-environment-energy modelling framework. The Centre adapted a dynamic version of its MMRF model to incorporate detailed physical relationships between greenhouse gas emissions and energy use, and also added an electricity sub-module that involved a detailed treatment of nine generation technologies and distribution and transmission alternatives. Applications with this model (MMRF-GREEN) included year-on-year projections of greenhouse gas emissions by fuel and user through to the middle of the century. The Centre undertook a substantial number of studies analysing measures designed to curb greenhouse gas emissions (e.g. a carbon tax, tradable emissions permits), to foster renewable electricity generation (e.g. wind and biomass technologies), and to encourage energy efficiencies. The enhanced electricity modelling capabilities of MMRF-GREEN also facilitated analysis of electricity market reforms. In addition, the Centre used its China/Australia/Rest-of-the-world model to provide an input to discussions of the greenhouse gas implications of rapid technological catch-up by China over the next half century.

An important aspect of Australian environment management is water policy. The TERM model was adapted to allow for analysis of water policy issues by including irrigation water as a regional industry input and adding behavioural theory on water usage. A number of multiregional CGE studies were undertaken on urban and rural water usage and water trading. Two water studies were undertaken for Taiwan. TERM was also adapted to model the extreme drought in Australia in 2002. The Centre's drought study provided the first comprehensive study of the effects of a severe drought across industries and (forty three) regions. A feature of the Centre's results for the macroeconomic effects of the drought was that they were considerably more pessimistic than those by all other assessors of the drought's impact (e.g. the Reserve Bank and the Australian Bureau of

Agriculture and Resource Economics). CoPS was the first organisation to predict that 2002-03 real GDP growth would fall below 3%, as indeed turned out to be the case.

Sixteen studies were undertaken in the broadly defined area of natural resources. Twelve of these related to the Agriculture sector and covered such topics as plant and animal disease outbreaks (a dynamic version of the TERM model being developed to analyse the former), reductions in broadacre land usage, issues for the wine industry (including the development of a global wine model to analyse oversupply issues) and Chinese agricultural policy. Other studies concerned forestry, mining and the regional effects of land acquisitions for national parks in western New South Wales (with TERM modified to incorporate land substitution possibilities).

The direct beneficiaries of the Centre's environmental modelling have been a mixture of public and private sector organizations. Examples are: the Australian Greenhouse Office (AGO), the Australian Treasury, the Australian Business Roundtable on Climate Change (ABRCC)[1], and the Ministerial Council on Energy (a joint initiative of federal, state and territory government agencies).

State and federal government departments, including the Australian Productivity Commission and Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) have been the direct beneficiaries of the Centre's water modelling. The chief direct beneficiary of the Centre's modelling of agricultural diseases has been Plant Health, Australia. (While the studies in the period involved hypothetical disease outbreaks, a 2006 by-product of the research was the Centre's ability to model the economic effects of Cyclone Larry (which devastated Australia's banana crop) immediately in the cyclone's aftermath. This work allowed Geoscience Australia to inform the cyclone relief force on the best allocation of public funds.

Beneficiaries of the Centre's research on issues in the natural resources sector include state government primary industry departments, the New South Wales Department of the Environment & Conservation and various industry bodies concerned with the wine industry. These industry bodies include the Grape and Wine Research and Development Corporation (GWRDC) and Australian Wine and Brandy Corporation in Australia, plus wine economics groups in South Africa and Chile (which have requested outputs from simulations using the world wine model).

The Centre's research has played a key role in Australian policy-making on environmental issues. The projections for the AGO have been highly influential in the federal government's decision to meet Kyoto emission targets without ratifying the Accord. According to our modelling, measures currently in place will contain Australia's emissions to a point where the Kyoto target can be achieved without formal ratification[2]. Options developed for the ABRCC have been discussed extensively in the media and form the basis of the Roundtable's final recommendation for government: Australia can

[1] The Australian Business Roundtable on Climate Change is an independent entity established by six large businesses in Australia. Roundtable members are BP Australia, Insurance Australia Group, Origin Energy, Swiss Re, Visy Industries and Westpac with the Australian Conservation Foundation.

[2] Ratification of the Kyoto Accord would have meant that Australian energy producers would have borne the costs of entering the global carbon trading scheme.

deliver significant reductions in emissions at an affordable cost, and the longer action is delayed, the greater is the cost to businesses and to the Australian economy generally of large cuts to emissions. Our work for the National Framework for Energy Efficiency has also been discussed extensively in the media and features on the Council's official website (http://www.nfee.gov.au/home.jsp?xcid=48).

The Centre's water modelling is playing a key role in the federal research agencies concerned with this topic. A recently released CoPS-CSIRO report on water projections received high profile media coverage. The Centre's modelling of natural disasters in agriculture has formed an important component in Australia's preventative strategies and, as evidenced in the last section, in the management of an actual disaster. The Centre received over $1.8 million in funding for the research in environment and natural resources.

CoPS's water modelling has formed the basis for papers by the Productivity Commission (including Peterson, D., Dwyer, G., Appels, D. & Fry, J. 2005, "Water Trade in the Southern Murray-Darling Basin", *The Economic Record*, vol. 81(s1), pages S115-S127).

The greenhouse-gas projections, undertaken every two years, form the basis for the federal government's official projections for greenhouse emissions. The Centre's modelling for the Ministerial Council on Energy, conducted with the Allen Consulting Group, was instrumental in the development of the Phase 1 measures under the Council's National Framework for Energy Efficiency.

Work on Chinese technological catch-up was undertaken for the AGO and the Australian Treasury, and was used by them as an input to an Expert Meeting on Emission Scenarios held in January 2004 in Washington DC by the Intergovernmental Panel on Climate Change.

CoPS's research features extensively in the official reports of the sponsoring agencies. These reports include:

"Tracking to the Kyoto Target to 2005", published electronically at http://www.greenhouse.gov.au/projections/index.html

"Deep cuts in Greenhouse gas emissions: Economic, Environmental and Social impacts for Australia", available at http://www.businessroundtable.com.au/html/documents.html

"Economic Impact Analysis of Improved Energy Efficiency", available at http://www.nfee.gov.au/librarydownloads.jsp?xcid=41#publications

For the U.S., CoPS has examined part of President Bush's recent energy policy: the part concerned with encouraging research aimed at reducing the cost of biomass-based motor fuels to become competitive with petroleum-based fuels. CoPS staff used USAGE to investigate the economy-wide implications of successful implementation of this policy and found in the long-run, 2020, that the U.S. would experience significant benefits arising from: (1) substitution of biomass whose price is likely to fall in the long-run for crude petroleum whose price is likely to rise; (2) reduction in the world price of crude petroleum; (3) an increase in employment; and (4) an increase in export prices.

International Trade and Microeconomic Reform

During the period CoPS undertook a number of CGE studies of changes in international trade patterns and of the effects of reforms aimed at increasing competition both in international markets and in internal markets. Seventeen reports related to international trade were completed, mainly concerning free trade agreements (Australia-China FTA, Southern Africa-India FTA, Australia-USA FTA, China's entry into WTO, and the Asian FTA) and reductions in Australian trade barriers on its most protected industries (Textiles, clothing & footwear, and Motor vehicles). The reports on the Australia-China free trade agreement involved the construction of the Monash Multi-Country (MMC) model which combines sectoral detail, the dynamic features of MONASH, and bilateral-investment flow accounting. MMC simulations dealt with trade, investment and services liberalisation. Other international trade research included historical modelling to uncover the factors behind Australia's rapid growth in trade, and the linking of a microsimulation model with CGE models to assess the effects on inequality and poverty in Brazil of multilateral trade agreements.

The Centre undertook 12 studies in the area of domestic competition policy, or as it is termed in Australia, microeconomic reform. These studies in the main related to Australia's major microeconomic reform agenda, national competition policy (NCP), a reform process that commenced in 1995 and is still continuing. Detailed studies were undertaken of the impacts on the national and regional economies of a variety of reforms to key sectors such as electricity and communications. The Centre also undertook, in conjunction with researchers at Curtin University, a major AusAID-funded study of competition reforms in the Philippines.

The Australian Department of Foreign Affairs and Trade (DFAT) was the main direct beneficiary of the work on free trade agreements and trade reform by other countries, sponsoring and collaborating in half a dozen studies of a China-Australia FTA and other Chinese trade reforms. Another major beneficiary was the Chinese Ministry of Commerce (MOFCOM) who conducted a joint feasibility study of the FTA. Other beneficiaries of the Centre's work on international trade included the South African Department of Agriculture, researchers at Chulalongkorn University in Thailand, the World Bank, and the Pacific Economic Cooperation Council. Major beneficiaries of the Centre's research on microeconomic reform were the Australian Productivity Commission, the Department of Transport and Regional Services, the Australian Competition and Consumer Commission, ENERGEX, AusAID and the Philippines Government.

The Centre's work on FTAs fed into deliberations on major bilateral and multilateral trade negotiations. For instance, trade, investment and services liberalisation from the Australia-China FTA was estimated to increase Australian and Chinese annual real GDP by around $3 billion and $12 billion respectively by 2015. The Centre's work on trade and Brazilian poverty fed into a World Bank study on the impacts of the Doha Trade Round on world poverty. Research by CoPS on microeconomic reform was used by government in its assessment of NCP and related reforms that have been estimated to increase Australian annual real household consumption by around 3 to 5 per cent when fully implemented. The Centre received $0.78 million in funding for the research in the area of international trade and microeconomic reform.

The Centre's modelling research formed an important input to the joint DFAT-MOFCOM feasibility study (see http://www.dfat.gov.au/geo/china/fta/). Following consideration of the joint FTA feasibility study in early 2005, the Australian Prime Minister, John Howard, and Premier Wen Jiabao of China agreed that Australia and China would commence negotiations on a free trade agreement.

The Centre's study on Doha and Brazilian poverty subsequently became part of a book published by Palgrave Macmillan and the World Bank entitled *Poverty and the WTO* (editors TW Hertel & LA Winters). This book has received substantial international press (see, for instance, the *Financial Times*, 16/11/05, article by Alan Beattie), while the Centre's paper has received considerable public debate in Brazil.

The Centre's research on assistance to individual Australian industry sectors was used in Productivity Commission inquiries. The research by the Centre on microeconomic reform was used by both national and state governments. CoPS members were referees for modelling of national competition policy undertaken by both the Productivity Commission and the Victorian Treasury.

Industry Studies, Regional Studies and Major Projects/Events

CoPS' research in this area had wide-ranging impacts. The Group undertook 138 studies in the 2000-06 period, all of which were of direct relevance to policy-makers. The research included 61 CGE modelling studies on particular industry sectors, including: the effects of. eCommerce; advances in the knowledge industries (e.g. the effects of research sponsored by the Australian Research Council, the regional effects of faster growth in a local university, the effects of improving school retention rates); tourism scenarios (e.g. the impact of government surcharges on airfares, and the effects of September 11); transport issues (e.g. a Smartrail project, introduction of a curfew at a major airport, a change in mode preferences towards bus transport, and the withdrawal of a freight subsidy scheme); the health industry (a 5-year collaborative study funded by the National Health & Medical Research Council); and industry regulation and conduct (e.g. the effects of a vitamin cartel). Ten regional forecasting studies were undertaken, plus an ARC-funded study involving an historical multiregional CGE analysis of the sources of regional growth. There were 57 CGE studies of major investment projects, fourteen of these being in the area of infrastructure (e.g. telecommunications, electricity, freeway systems) and the remainder mainly involving major industrial developments (e.g. mineral and energy projects, manufacturing plants). Thirteen of the remaining studies involved CGE modelling of major events, mainly major sporting events (e.g. Rugby World Cup) and also disasters (e.g. earthquakes). For further details of the studies, see http://www.monash.edu.au/policy/client.htm.

The above research was undertaken under contract to a range of organizations, including government departments (e.g. Department of Transport & Regional Services, Department of Industry, Tourism & Resources, Geoscience Australia, South African National Treasury, New Zealand Department of Internal Affairs, and various Australian state government departments), the ARC, universities (e.g. the University of Tasmania), major corporations (e.g. Optus, Telstra, Commonwealth Bank of Australia), and a number of

engineering and economic consultancy companies (e.g. Sinclair Knight and Mertz, Allen Consulting, PriceWaterhouseCoopers, KPMG, CRA International).

The research fed into numerous decision-making processes on industry regulation, plans and policies, infrastructure and major project developments, major event planning. The Group received almost $2.6 million in funding for the research in the area of industry studies, regional studies and major projects and events.

1.1.4 Publications

A list of CoPS publications for the period 2000-06 is in Appendix 3.

Each year CoPS staff produce in total about 80 publications of which about 9 are in refereed journals or books. This is a good performance for a self-funding research centre in CGE modelling[3]. The Centre's models, data and solution techniques are probably the best documented of any CGE group in the world.

1.1.5 Short courses in CGE modelling

Each year the Centre conducts a number of short training courses. Generally the following are held:

- A practical CGE modelling course (5 days), followed by a data base course (2-3 days)
- A dynamic CGE model course (5^+ days)

In some years a regional modelling course is also held.

CoPS has been conducting CGE training courses since our research group moved to Monash in 1991 (and for around a dozen years before that while at other institutions). Since the beginning of 2000, the Centre has conducted 42 courses with a total attendance of 809. Two thirds of the courses were held in Melbourne, while the rest were held in China, Germany, Brazil, Indonesia, South Africa, the Philippines and the United States.

Three hundred attendees were from Australia and over 260 were from Asia (84 of these from mainland China and 70 from Indonesia). There were 90 attendees from South Africa, 44 from Europe and 43 from the United States. Thirty-four attendees came from South America (mainly Brazil), with the remainder coming from other countries in Oceania and Africa.

Since 2000, short courses have brought in revenue of around $1 million.

Further information on CoPS' short courses can be found at:
http://www.monash.edu.au/policy/courses.htm

[3] For instance, a research group within the International Food Policy Research Institute (IFPRI) in Washington, DC, that undertakes CGE modelling uses CoPS as a comparator. In the period 1994 to 2002, this group, which is of a similar size to CoPS, produced an average of 3.2 publications per annum per researcher (excluding research assistants). Of these 0.8 were journal articles and 0.5 were book chapters (there were no books). In the period 2000-06, CoPS produced 5.2 publications per researcher per annum of which 0.7 were journal articles and 0.1 book chapters. It should be noted, however, that output of the CGE group in IFPRI grew rapidly over the period, reaching a high of 6.2 per researcher in 2002 (journal articles 1.1 and book chapters 0.4). However, the IFPRI group appears to have had substantially greater access to core funding than CoPS.

1.1.6 Postgraduate research training

The Centre currently has eight students enrolled in its PhD program. A list of all graduate students supervised by CoPS staff is provided in Appendix 6. Fourteen of these students (13 PhD, 1 MEc) graduated in the period since the beginning of 2000.

CoPS has a very strong record in the supervision of postgraduate students. It can be seen from Appendix 6 that all CoPS students complete their postgraduate degrees, nearly always within 4 years. Since 2001, students supervised by CoPS staff have won the Mollie Holman award for the best thesis from the Faculty of Business and Economics on three occasions (Gordon Schmidt, 2001, Paresh Narayan, 2004, and Xiujian Peng, 2005).

2 Strategic issues and appropriateness of objectives

2.1 Review the strategic plans of the Centre with respect to:

2.1.1 International initiatives

CoPS already operates with a strong international focus. CoPS' models and software are now used in over 60 countries. The Centre is now in the process of deepening this penetration in a number of key countries. Four key projects are at the forefront of this move. These involve modelling and training in the U.S.A. and China, international short courses and software development and promotion. A brief outline of the basic thrust of each of these projects is provided below.

U.SA. project This project was commenced in 2001 with its initial support being from the Faculty Strategic Research Fund. The project has received substantial financial backing from the United States International Trade Commission (USITC) and has also had support from an ARC Linkage grant. Using the MONASH model as a starting point, a 500-industry CGE model of the U.S.A. (USAGE) was constructed during the first two years of the project. From 2003 to 2006 the policy relevance of USAGE has been greatly enhanced. USAGE has been extensively documented with eleven papers describing aspects of its data bases and theory, and eight papers discussing results from model simulations.

The project has achieved much already and its potential is immense. In 2004 the USITC based a major report concerning the effect on the U.S. economy of major import restraints on results from USAGE. The Imports Restraints report is the flagship report of the USITC and is prepared once every two years and delivered to the Trade Representative in the Executive Office of the President. The 2004 USAGE-based report was particularly well received. Again in 2006 the USITC are using USAGE for their Import Restraints report. Recent extensions to USAGE have meant that the 2006 report contains the most comprehensive analysis of a country's trade policies ever undertaken in a formal modelling framework. In June 2006 CoPS was commissioned by the U.S. Department of Commerce to estimate the benefits to the U.S. economy that would follow from technological breakthroughs that make biomass fuels (e.g. ethanol) competitive with petroleum when the price of crude oil is at its 2004 level. The Department of Commerce has used the biomass report as an input to White House energy-policy deliberations. The report has created considerable interest within the U.S. Bureaucracy. The Department of

Agriculture have responded to the biomass report and commissioned CoPS to analyse the implications for U.S. agricultural industries of the President's energy policy.

CoPS' aim of embedding USAGE in the U.S. bureaucracy has now been achieved. A consortium of U.S. government departments has been formed to interact with CoPS over USAGE development and application. The consortium is led by the USITC and includes the Department of Commerce and the Department of Agriculture. The consortium is: (a) co-ordinating substantial on-going funding for USAGE and (b) building up teams of modelers that apply USAGE to policy relevant issues. Many other U.S. government agencies are becoming aware of USAGE. In the last month CoPS has been approached by the Department of Homeland Security to analyse a specific policy issue.

China initiative CoPS has a long-standing interest in China research. In 1997, CoPS developed an ORANI-like model of China, PRCGEM, in conjunction with the Chinese Academy of Social Sciences in Beijing. In recent years, CoPS has been giving increased attention to the modelling of the Chinese economy. CoPS has had a considerable number of visitors and short-course attendees from China and has established strong links with economists in that country.

In 2002 the Centre completed a study on the effects of China's entry to the WTO for the Australian Department of Foreign Affairs and Trade (DFAT). CoPS modelling report contributed significantly to a book published by DFAT, *China: Embraces the World Market*.

In 2005, the Centre completed a major modelling study of the effects of a proposed Australia-China Free Trade Agreement. This modelling provided the analytical content of DFAT's study that preceded an agreement between the Australian Prime Minister and the Chinese Premier to commence negotiations on a FTA. The modelling was conducted jointly with Chinese Academy of Social Sciences and the Nankai University.

In 2006, CoPS started an initiative to build extensive economic modelling capacity for China. Under the initiative, two models (CHINGEM, a static CGE model of China, and MC-HUGE, a dynamic CGE model of China) were developed for Hunan University, an institution with which the Department of Economics at Monash University has a long-standing connection. The CHINGEM model was presented to the Hunan University through a static training course held in February 2006. The MC-HUGE model was presented in a dynamic training course held in Hunan in September 2006. The initiative has placed a strong emphasis on training as well as model development. The training will not only include initial short courses, but also a joint PhD program. After the static training course in February 2006, CoPS staff provided initial supervision to six students from Hunan University. Since the dynamic training course in September 2006 and further supervision by CoPS' staff, six PhD projects are well underway. The project so far has been mainly funded by Hunan University. We are currently seeking continued financial support for this initiative, especially the PhD program component.

CoPS is currently seeking funding for a new initiative to help the State Information Centre (SIC), a prestigious government research institute, to develop their CGE modeling capacities. Under this initiative, CoPS plans to develop MC-HUGE into a model with Chinese characteristics. More specifically, we plan to build into the model the following three modules: rural-urban labour transfer, rural household income, and a regional

module. We plan to present the improved model in China through a training course. We also plan to provide on-going technical support to SIC staff regarding model development and policy applications.

We are also interested in developing a large multi-regional model of China, SINOTERM. Two CoPS staff members have been awarded a Faculty Research Grant in order to undertake a pilot project to construct a prototype version of SINOTERM.

International training Training has played a key role in the technology transfer goal of the CoPS/IMPACT group since the late 1970s. Each year since then the group has conducted short courses on its Australian models in Melbourne. These courses often have waiting lists and a considerable portion of attendees are from overseas. CoPS' approach to training has been imitated in recent years by two overseas modelling groups, the Center for Global Trade Analysis (GTAP group) at Purdue University in the U.S.A. and the EcoMod Modelling School in Brussels. Both of these institutions now conduct short-courses in various locations throughout the U.S.A., Europe and Asia. CoPS staff have also been involved in quite a number of courses overseas. These include GTAP courses where CoPS staff have been involved as instructors, and courses conducted in conjunction with other institutions. Instances of the latter have been courses for African graduate students conducted in South Africa and sponsored by the Carnegie Foundation, courses in Indonesia and China sponsored by AusAid, and training work undertaken in India sponsored by the World Bank.

CoPS has been moving further to directly compete in the international market for short courses on CGE modelling. We now conduct an annual course on the use of dynamic CGE modelling for forecasting and policy modelling at the U.S. International Trade Commission in Washington D.C. In addition, in 2005 CoPS relocated one of its Australian-based courses to Lübeck, Germany to accompany an international conference on CGE modelling. Holding courses in strategic locations should prove an important element in further spreading the use of CoPS' modelling methods throughout the world.

2.1.2 Initiatives in new model development

The CoPS/IMPACT team's major contribution to CGE modelling has been as the leader in large-scale general-purpose models. In the U.S.A. and Europe the tendency has been to construct small-scale CGE models that are specifically designed for a particular application or class of applications. Large-scale models that have been constructed overseas, while following the CoPS example, do still tend to emphasize a particular side of the economy. Thus, for instance, the GTAP model tends to emphasize the trade side of the economy, with little emphasis, for instance, on the domestic-tax area.

The general-purpose nature of the ORANI and MONASH models has meant that they have been applied to a very wide range of economic questions. The models' detailed treatment of industries, commodities, margins, occupations and regions has seen many hundreds of applications across a wide range of policy-relevant economic issues such as trade (e.g. trade liberalization), tax (e.g. GST, FBT, business tax reform), microeconomic reform (e.g. national competition policy, waterfront reform), environmental policy (e.g. greenhouse policy, drought, water policy), labour markets (e.g. industrial reforms, minimum wage cases), fiscal federalism (e.g. horizontal fiscal equalisation), major

projects (e.g. large infrastructure development such as telecommunications, large mineral/energy-processing plants), natural resources (e.g. forest policy), transport (e.g. road projects, port development, major airports), major events (e.g. hallmark events such as the Olympic Games and the Rugby World Cup), regional (e.g. regional disparities, regional development policies), tourism (e.g. airport taxes, tourism promotion), the new economy (e.g. eCommerce), and finance (e.g. financial literacy).

As the range of applications has extended over time, however, the CoPS suite of models has begun to be used in areas that have stretched their technical capabilities. The demand to employ our models in these areas came about through recognition that for many policy issues the general equilibrium implications were of key importance. However in various specialist areas (energy, water, income distribution, labour markets financial markets, transport systems, etc) our large-scale general-purpose models do not have sufficient theoretical and empirical detail to model fully the special nature of the questions asked. To overcome such problems we have employed a range of *top-down* methods in which results from a specialist model (e.g., a technological model of electricity generation and transmission) are used as exogenously imposed input to drive a CGE simulation (e.g., a simulation of the economic impacts of a tax on CO_2 emissions from fossil-fuel generation).

Top-down methods have allowed us to extend successfully the usage of our models, but they have limitations. Perhaps, the most critical is the one-way flow of information which does not allow feedback from the CGE model to the specialised system. Advances in computing power, however, have opened up a new route to extending the frontiers of CGE modelling. This route is to incorporate the specialist modelling within the general equilibrium framework. We now are able to simulate models with many millions of equations, and so assimilation of substantial sub-modules within the main framework has become much more practicable. Incorporating specialist knowledge and data within a consistent model framework overcomes problems of model incompatibilities and difficulties of maintaining links between models that are operated by different modelling groups. Our experience to date with incorporating specialist elements in our models has been very successful. Examples are the environmental accounting installed in MMRF and the labour-market equations incorporated in MONASH.

The integration program that we have sketched out will involve a considerable research effort over many years. Specialist modules to be integrated include energy systems, water flows, environment, labour markets and households, transport systems, the health market and financial payment systems. This list will no doubt be extended as the field for general-equilibrium model applications continues to widen. However, for our integration program to progress, substantial funding to allow major model developments must be acquired. CoPS plans to achieve the necessary funding through: nationally competitive grants; industry sponsorship; and contract studies that advance the research program.

Because of the uncertainty with regards to the type, level and timing of funding the integration research program must necessarily be a flexible one. Below are four examples of how we are seeking to progress areas of the program currently.

Water policy and sustainability A 3-year ARC linkage grant, with the Departments of Primary Industry and Environmental Sustainability as industry partners, was awarded to

CoPS from 2006. The project will embed a hydrological model within the Centre's multiregional CGE model, TERM. This will create a model capable of analysing the regional, industrial and household dimensions of water policy options, including urban-rural water allocation.

Energy and the environment Over a number of years, CoPS has used funding from various projects to introduce energy-related environmental variables into MMRF. Another round of improvements began in the second-half of 2005, supported by funding from the Australian Greenhouse Office (AGO) and will be completed in early 2007. But further funding for development in later years will be necessary if the MMRF framework is to keep apace with the many developments occurring in energy markets. Currently, we are also seeking funding from the U.S. Environmental Protection Agency to link the U.S. environmental model, TEAM, with our USAGE model.

Workplace and other labour market arrangements The Centre has extensive plans for introducing increasingly sophisticated modelling of the labour market. This will involve much greater disaggregation of occupations and households and more sophisticated modelling of labour supply than has previously been undertaken. Funding over the past few years has allowed a labour-market adjustment model to be constructed and for disaggregation of workers into award and non-award categories, and into labour market status, including short-term and long-term unemployed. In 2005 the Department of Employment and Workplace Relations funded three studies that helped push this project forward (a report for the Commonwealth's submission to the Safety Net Review, an analysis of the displacement effects of different labour market programs, and an examination of the labour-market impacts of an older-aged society). The possibility of further funding from DEWR and other sources is currently being investigated.

Transport-system efficiencies The CoPS/IMPACT models have ever since the 1970s featured a regional dimension. For many years the regions modelled were at the state/territory level. In 2002 CoPS developed a multiregional model that incorporated over 50 sub-state regions (TERM). This has opened up for analysis key areas in spatial equilibrium modelling, namely the modelling of transport systems. Models of traffic and freight flows are common, and we aim to incorporate key elements of such models into TERM. This involves introducing into the general equilibrium model, activity nodes and transport linkages, specified in terms of both routes and modes. In 2006 CoPS undertook a scoping study of a project to construct such a model for the Tasmanian Department of Infrastructure, Energy and Resources. This modelling, which is planned to proceed in 2007, will also make use of developments made in a number of recent contract projects that CoPS has undertaken on transport projects - including modelling the time-path of the effects of road construction and the associated benefits of reduced travel time, accidents and vehicle operating costs (i.e. studies of Eastlink, Queensland Main Roads Program, Brisbane Airport Link and Northern Busways); and modelling the effects on NSW regions of higher mass limits.

2.1.3 Initiatives in software development

Although GEMPACK is a mature product, important developments are needed every year or two in order to allow modellers to institute their new ideas in theoretical structure,

database structure, model dimensions, provision of results and post-simulation analysis of results. GEMPACK's main rival on the international market is the GAMS software. Over recent years improvements to GEMPACK have begun to give it a clear capability edge over its rival. GEMPACK has achieved a deep penetration into the Asian market and is also widely used in other areas where CoPS' modelling methods are used.

The major new feature in Release 9 (April 2005) was the ability to carry out post-simulation manipulations in the TABLO file for the model. The major new feature in Release 10 (due towards the end of 2007) will be the ability to use 2 or more processors (now common on PCs) to reduce solution time by up to 50%.

It is difficult to plan major developments in advance since some (such as post-simulation processing) rely on the occurrence of a new idea while others (such as multi-processor software) become relevant because of hardware or external software developments. It seems highly likely that we will be able to develop new and significant productivity improvements every couple of years well into the future. Without such enhancements, the software would stagnate, leaving modellers the poorer.

There will always be many minor enhancements and improvements, either conceived of by the GEMPACK developers or suggested by users, to add; and there is always regular maintenance (bug fixes, user support) and the need to stay on top of changes made by third parties (changes in operating systems, supported Fortran compilers, hardware).

Most of the funding for the software improvements comes from licence revenue. However, as the cost of maintaining the existing software rises over time, funding from non-licence sources may become necessary. Accordingly, CoPS may seek some top-up funding for software improvements over the next few years.

2.2 Appropriate size of the Centre and recruitment strategy

CoPS has had a staff of almost twenty since the current research team joined Monash University in 1991. Over twenty years experience of the research group at CoPS and before that at University of Melbourne suggests that a group of this size has the required critical mass for a successful research group in CGE modelling. We think that the current size is about right going into the future.

However there are some reasons why we will need to recruit over the next few years. These are:

- A rapidly increasing demand for CoPS contract work.
- Need to replace senior staff who retire or cut back.
- Given the world-wide shortage of persons with the required specialized skills, we need to make a job offer when such a person is available.

Our recruiting strategy is as follows.

- To continually be on the lookout for persons with suitable skills.
- To use our contacts to alert us to such persons.
- To place job advertisements in a targeted manner.
- To seek doctoral students who may be suitable for appointment in the future.

2.3 Integration of teaching activities with other Faculty departments

CoPS is not formally responsible for any units. However, it has arrangements with the Department of Economics and the Department of Econometric & Business Statistics by which it provides teaching services for a number of units. These units are:

Undergraduate units:

ECC3650 (&ECC4365) Applied General Equilibrium Economics (Dept. Economics)
Unit leader: Dr James Giesecke
Two 1.5 hour lectures per week, 1st Semester, Clayton

ETC4430 Quantitative Economic Policy (Dept. Econometrics & Bus. Stats.)
Unit leader: Professor John Madden
Two 1.5 hour lectures per week, 2nd Semester, Clayton

Postgraduate Units:

ECC5730 Advanced Applied General Equilibrium Analysis (Dept. Economics)
Unit leader: Professor Peter Dixon
(Note: This unit has not been offered in recent years due to small number of enrolments.)

CoPS staff also assist with other units, either by assuming responsibility for a particular unit to fill a temporary gap in Department of Economics teaching resources, or to provide guest lectures in a particular unit. In recent years, the former is instanced by CoPS' Mark Picton being the unit leader for ECC3810, Public Finance, for a number of years (as sole lecturer for 3 years and with Prof. Peter Forsyth for 2 years). The latter is instanced by Professor Dixon and Dr Rimmer giving six guest lectures in ECC4660, Macroeconomics, annually.

In the main, CoPS' teaching of these subjects is satisfying a number of useful purposes:

- This makes use of the Centre's teaching resources in its area of expertise;
- It provides an opportunity for students to learn an area of applied economics that plays an important role in policy-relevant research in Australia and other countries, from leading experts in the field; and
- It allows top honours students to get a sufficient awareness of CGE modelling so that they can make an informed decision as to whether they wish to do PhD studies in this area.

We believe that the amount of teaching CoPS is undertaking is about right. In any considerations about teaching, the following need to be kept in mind:

- Given limited CoPS resources, we should only teach in our areas of specialization.
- Compensation should be adequate. Currently the amount is $10,000 per semester. While this doesn't cover opportunity costs, this is currently satisfactory provided the above purposes are being satisfied.

- Low numbers in our courses are a problem. Despite CoPS staff teaching three units, the exposure of students to CGE modelling has been limited. Student numbers in ECC3650 and ETC4430 are small, and there have been insufficient student enrolments in ETC5730 for that course to have been held in the last few years. Also, due to a change in the unit leader for ECC4660, CoPS was not invited to undertake any guest lectures in 2006.

To address the third point, we would hope that course advisers in Economics and Econometrics publicise the courses CoPS teaches as much as possible. Other possible worthwhile initiatives might be an (informal) requirement for unit leaders in certain undergraduate courses to request guest lectures from CoPS staff, and greater reference to CoPS research in undergraduate classes (particularly at the first and second year level).

3 Financial and related issues

3.1 Review the University's financial support for CoPS

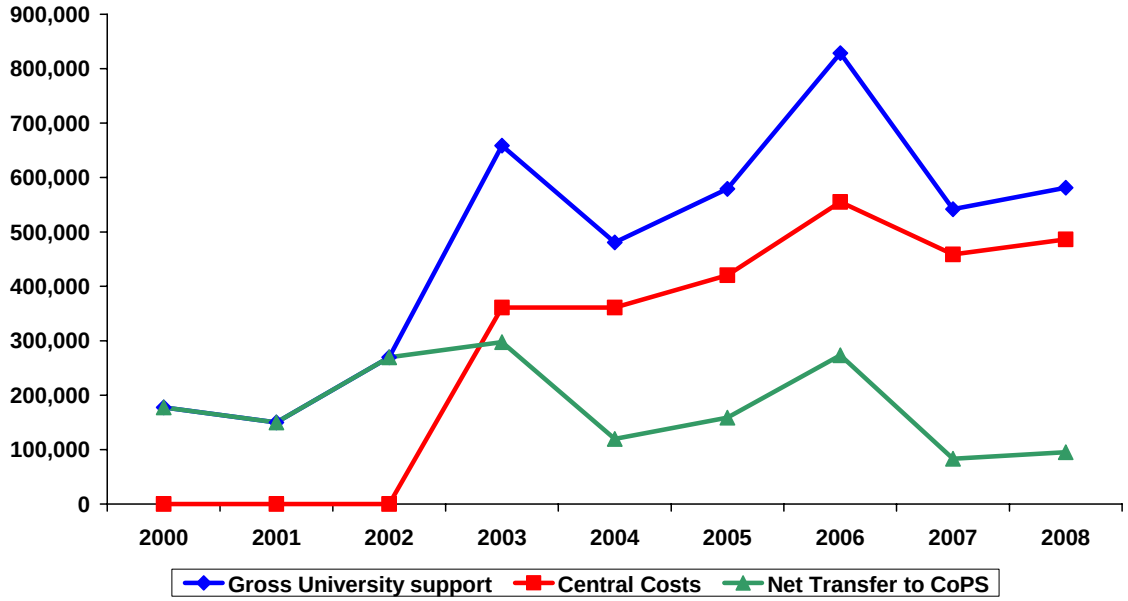
CoPS has external earnings of about $2.7 million a year. These are made up of national competitive grants; contract research income from a large number of public and private sector clients; world-wide sales of software; and institutional-grant-scheme income associated with eligible research income.

Over the years 2000 to 2006, CoPS received on average a net transfer from the University (central and faculty funds combined) of $206,000 per annum. This involved gross transfers of $449,000, partially offset by charges of a little over $242,000. In 2006 gross transfers largely comprised: strategic research grants from the Faculty of Business and Economics; central and faculty offsets against central support costs; fees for higher degree students; and the 28% contribution from central funds on nationally competitive grant income. Charges are comprised entirely of central support charges.

The pattern of University transfers has not been even, however, as is evidenced by Figure 1. During the period 2000 to 2002, before the advent of Activity Based Costing (ABC, with accompanying central support charges), CoPS received $200,000 annually from the University in both gross and net terms. In 2003 ABC was introduced. Under the scheme, academic departments (with undergraduate students) receive a higher proportion of DEST[4] payments in return for the new activity-based charges but CoPS (without undergraduate students) receives little in the way of DEST income. However, the impact of ABC central support costs in 2003 did not initially worsen CoPS net financial support from the University. The new charges were more than offset by one-off adjustment payments and a Faculty strategic grant to defray central costs. Without adjustment payments in 2004, despite a continuation of the Faculty's strategic grant to CoPS, the Centre received a severe cut in its net financial support in 2004. Following a long process of submissions and negotiations during 2005, the size of the net support returned to its 2002 level in 2006. This was particularly aided by a decision by the Deputy Vice-Chancellor (Research) to grant the Centre in 2006 $200,000 in compensation for the negative effects on it of activity-based costing.

[4] DEST payments refer to per student funds from the Department of Education, Science & Training.

Figure 1: University-CoPS Transfers
(including student fees)



However, there has been no indication as yet from the DVC (Research) of a commitment to extend this compensation beyond the 2006 year. Figure 1 reflects the situation if there is no such payment in the next two years.

Furthermore, the extent of Faculty funding is also in danger. During 2006 it was proposed that in return for access to the Dean's Research Allocation (DRA), up to now only available to departments, the Faculty's two major centres, CoPS and the Centre for Health Economics, would give up their current receipt of strategic research funding. CoPS was consulted on this initiative. The Centre was informed that a new DRA distribution formula would be introduced and that initial estimations indicated that CoPS would receive a similar amount from the Faculty as it did previously. CoPS agreed to the change, on the proviso that it did not negatively affect the amount it received. However, at a recent Faculty Research Committee meeting it was indicated that further changes were to be made to the distribution formula and it is understood that the Faculty Executive (on which CoPS is not represented) has subsequently agreed to this. This new formula, as we understand it, puts a lesser weighting on contract research income and thus is likely to disadvantage CoPS.

The University obtains substantial rewards from the activity of CoPS. These are:

(1) CoPS staff contribute: Ph. D. supervision (currently 8 students); undergraduate and graduate teaching (currently about half the load of one teaching academic); numerous academic publications; conference and seminar organisation; attendance and paper presentation at national and international conferences; refereeing of articles and grant applications; examination of theses; membership of University committees; editorial services; service to national and international professional organisations; and general community service.

(2) CoPS research is high profile and covers almost all the major issues relevant to the Australian economy. In the last three years CoPS has contributed about 170 reports. These include reports: to the Department of Foreign Affairs and Trade on the China-Australia free trade agreement; to the Department of Employment and Workplace Relations on the proposed reforms of workplace regulations and safety net review; to the CSIRO on the effects of water shortages; to the Productivity Commission on the effects of skilled immigration; to the U.S. International Trade Commission on the effects on U.S. industries and regions of import restraints; and to the U.S. Department of Commerce on the effects of the President's biomass energy policy.

In summary, the present deal between CoPS and the University is as follows: CoPS provides the services outlined in (1) and (2); the University provides accommodation, library services and management services and average annual net financial support of around $200,000 that must be fought for each year.

Two key elements to overcoming the problems that CoPS has experienced in regards to its internal funding would be:

(1) An assurance by the DVC (Research) of a continuation of the funds granted in 2006 to help offset central support costs; it would be desirable that this amount be set at 50 per cent of the central support cost charge;

(2) The Faculty of Business and Economics ensures that its support to CoPS does not decline as a result of the Centre being incorporated within the Dean's Research Allocation scheme. In practice the Faculty should commit to ensuring that CoPS receives Faculty support at least equal to 15 per cent of the Centre's external revenue averaged over the previous two years.

3.1.1 Central support charges

The deterioration in the University level of support for CoPS does not seem to have been a conscious policy decision. Rather, it has been a seemingly unintended consequence of the introduction of activity-based costing. This, nevertheless, has saddled CoPS with considerable costs ($555,000 in 2006). Whereas teaching departments can recoup much of their central support costs through formulas driven by undergraduate teaching loads, this avenue is not available to a self-funding research centre like CoPS.

To its credit the University, and particularly the Faculty of Business and Economics, have taken action to shield CoPS from much of the brunt of central support charging. However, the support to offset the impact of these charges, has been quite variable from year to year.

To give CoPS budgeting certainty, it is vital that the DVC (Research) continues to provide funds to help offset central support costs, as discussed in section 3.1 above.

3.1.2 Faculty research funding in the context of the requirement that the Faculty return a surplus of 14 per cent

The University requires the Faculty of Business and Economics to return a surplus of 14% per year or more, about three times as high as for other faculties on average. To its credit, the Faculty has not required CoPS - which has to raise its own revenue and does

not have access to the same sources of funds (e.g. overseas students) as do departments – to contribute a surplus of this magnitude. Nevertheless, the Faculty has asked CoPS to budget for a surplus of about $200,000 per year.

At the end of 2006, CoPS' accumulated surpluses will be approximately $1.5 million, but neither the Faculty nor the Centre have access to their surpluses. While, accumulated surpluses are carried over from year to year in the Centre's accounts, they can not be drawn upon without unlikely permission of the University.

While these budgetary rules apply across the University, it is important to recognize that:

- CoPS works in an environment in which it is impossible to predict income with precision from year to year.
- The Centre's accumulated surpluses should be available as a buffer against the possibility of a poor income year (rather than as an income generator for the university).
- Accumulated surpluses will be built up in good income years but should be allowed to be run down in poor income years.
- CoPS should be allowed to budget for a deficit in certain years when the Centre is going through an investment phase aimed at building its modelling capacity. [This happened during the years 2003-2005 when USA and China models were being developed.]

The Faculty has been understanding on these points and allowed the Centre to run deficits in the three years to 2005. This has been a vital factor in allowing the Centre to operate efficiently and to grow. It also should be recognised that any long term requirement for CoPS to increase its accumulated surpluses over the years will effectively diminish the University's net contribution to the Centre. Given the contribution that the Centre makes to the Faculty and the University as a whole (see see pages 27 and 28), CoPS considers it highly desirable that the Faculty:

- continue to exempt CoPS from making a long-term contribution to the surplus required by the University.
- continues to recognize that CoPS' end-of-year reserves need to fluctuate.

3.1.3 Funding of postgraduate training

The Faculty and University are very keen for CoPS to teach postgraduate research students. They require CoPS to have a minimum of 5, and encourage CoPS to take more.

CoPS is keen to train postgraduates. However CoPS must raise its own income, and so cannot teach postgraduates unless it receives adequate income to do so.

High quality training in CGE modelling is particularly time consuming. We believe that 10 students is the maximum that existing staff could reasonably handle.

In 2006, central support costs associated with the supervision of higher degree by research (HDR) students exceeded student fees coming to all HDR students in the Faculty, including CoPS. That meant we, along with the other Centre and Departments of the Faculty, were effectively receiving negative net income for teaching HDR students.

In 2007, the central support costs that the Faculty will be charged by the University for the activity, "Provide Scholarships for Research Students", will increase by $400,000 from $1.7m in 2006 to $2.1m. This is a result of a change in the driver for this particular item from "Number of Research Scholarships" to "FTE (Teaching and Research Staff (Excluding Research Only))". However, because of the change in this driver, CoPS central support charges for the activity "Provide Scholarships for Research Students" in 2007 will actually decrease significantly by around $100,000 from $120,739 in 2006 to $19,271 in 2007.

While this will mean that CoPS will receive some net income for supervising HDR students in 2007, the amount will be nowhere near sufficient to cover the cost of this activity. This is the case across the Faculty, and no doubt across the University. However, our Centre receives no income from undergraduate teaching from which to cross-subsidize postgraduate supervision, and it is important that the University recognize that CoPS must receive adequate income for each postgraduate student and that CoPS cannot be expected to train more than 8-10 postgraduates at any one time.

3.2 Operation of self-funding activities within University regulatory constraints

CoPS is a self-funding research centre. Over 80% of its income comes from external funding. Indeed, if University activity-based costs are subtracted from our internal revenue, over 90% of CoPS income comes from external sources.

This income is by and large earned in a competitive, commercial market. However CoPS is committed to open access to its products, since this is what academics do and since otherwise proper policy debate is not possible. But our commercial rivals do not operate within such constraints.

CoPS continually reviews its consultancy fees. The Centre's base charge out rate for contract research is $2,000 per day, which we judge is as high as the market currently will bear in general for economic modelling work, which carries a certain degree of research risk[5]. While such rates easily cover the costs of undertaking the actual commercial activity (labour costs related to the commercial activity, costs of preparing briefs, administrative overheads, maintenance and the like), the charge must also cover our otherwise unfunded academic activities. The additional costs we incur as an academic research centre include: preparation of publications, conference and seminar organisation, attendance and paper presentation, refereeing of articles and grant applications, examination of theses, membership of University committees, editorial services, service to national and international professional organisations, unfunded/under-funded postgraduate supervision and teaching activities, and general community service. These academic costs are substantial, but are not faced by our commercial competitors. Without University assistance helping to defray the costs of our academic responsibilities, CoPS will find it difficult to discharge properly these responsibilities and remain financially viable.

[5] The Centre charges an increased rate in a number of circumstances, such as short deadlines, periods of high demand, and low research interest. The Centre's base rate charge is under constant review. CoPS' contract research strategy is outlined in Appendix 7.

CoPS staff work in the University (rather than in a consulting firm) because of they value the academic environment and its associated activities and its ways of assessing outputs and its commitment to peer review.

One significant problem is that the University expects us to conduct our business as if we were a teaching department. The University administrative rules, regulations and procedures are imposed across the university without regard to the different functions of teaching departments and research centres. This "one size fits all" approach causes us significant problems. Some of these problems are dealt with in the sections below.

3.2.1 Research contract signing arrangements

The Centre undertakes a substantial number of contract research projects each year – usually between 60 and 70 in total. Many of these require formal contracts. The signing of these contracts can take a considerable time and is often only done after the project is completed.

Many of the delays arise because the client insists that their standard contract be the starting point. These contracts often contain unacceptable clauses on matters such as intellectual property, indemnity, insurance, confidentiality and moral rights.

We are asking the University Solicitor's office to prepare standard clauses which can be attached to override such offending clauses.

Some clients would be happy with an exchange of letters. It would be very helpful if the Director of CoPS were authorized to sign such letters in appropriate circumstances.

3.2.2 Purchasing requirements

Monash has a detailed set of purchasing policies which have created problems for CoPS, particularly in relation to the purchase of computer equipment.

The University rules constrain us both in the type of personal computers we can purchase and the list of suppliers we can acquire them from. Under these rules the Centre is prevented from purchasing high-end PCs with particular features necessary for it to maintain its lead in large-scale economic modelling and to test new versions of GEMPACK. While permission was granted in 2006 from the relevant authorities (Financial Services and Business & Economics IT) to purchase four non-standard PCs, this has involved substantial delays and much time in argument.

After that discussion, we received permission on a case-by-case basis to go outside the agreed suppliers. But still the procedures are complicated and time consuming and the argument must be made each time.

We believe that CoPS, having established its need to purchase high-end PCs frequently, and having established that it does so only when appropriate, should be allowed to purchase special-purpose research PCs with specifications CoPS judges to be appropriate, and from suppliers CoPS chooses, without requiring special approval each time.

3.2.3 Administrative overheads

As with all departments and centres of the University, CoPS is feeling the effects of an ever increasing administrative load.

Many administrative tasks the University requires us to do are unrelated to the smooth running of our research centre. Many reporting tasks are only relevant to departments but are imposed on centres as well. Examples are:

- Detailed inter-year budget reconciliations;
- Work-load models relevant to teaching departments.

We think that the University should take a more flexible view and, insofar as legal requirements and prudential management allow, exempt self-funding research centres from those reporting and administrative tasks which are not absolutely essential for such centres.

3.3 Business plan and financial viability

The Centre's current Business Plan is attached as Appendix 2.

A summary of CoPS' financial performance since 2000, together with a projection for the next two years is summarized by Figure 2. Over the seven years to 2006, CoPS has had end-of-year cash reserves of almost $1.4 million. These reserves are projected to increase to $2 million by 2008. The projections have been done on the basis that the DVC (Research) continues to provide an annual $200, 000 offset against central support charges).

It can be seen from Figure 2 that the size of the Centre's budget has a little more than doubled over the period 2000 to 2006, and steady growth is expected for the next two years. However, it is evident that there is some variability in CoPS' budget result over the period. In the years 2003 to 2005, the Centre invested heavily in new initiatives, particularly in the areas of internationalization and the development of multiregional sub-state modelling. The increased modelling capacity that resulted was a key factor in the sharp rise in the Centre's income in 2006. We are expecting similar profitable years in 2007 and 2008.

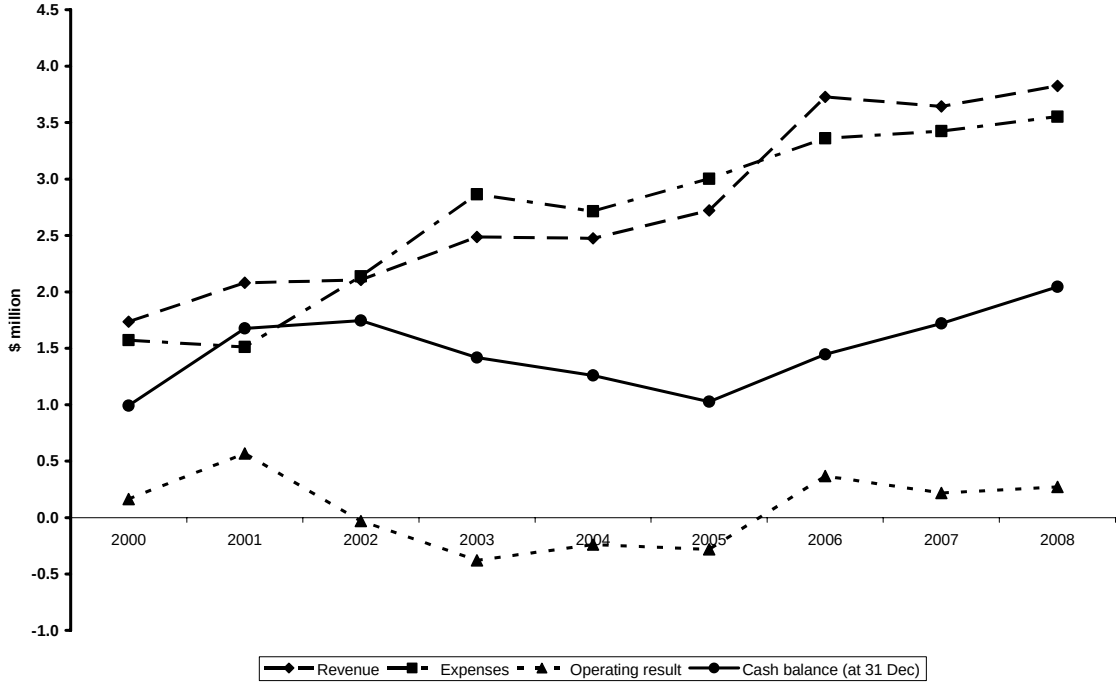
The CoPS team has had a very long history of profitable operations. There are, however, two threats to it continuing to produce publicly-available extensively-documented models. These are:

- Constraints on the availability of new research staff with the very high skill levels necessary to undertake CGE modelling; and
- A continued increase in University administrative requirements and regulatory constraints that placed too heavy a burden on the Centre's resources, diverting them from research and income generation.

The first of these constraints is currently a restriction on growth rather than a threat to the Centre's financial viability. It is being met currently by price increases that ration our available supply. However, in the medium run it is necessary that the Centre recruit staff in order to replace the staff losses that can be expected over the next decade and to grow.

The second threat is particularly serious. See section 3.2.3 above for details.

Figure 2: Summary of CoPS' Financial Outcomes 2000-2006, plus projections to 2008



APPENDIX 1

Centre of Policy Studies Staff

DIRECTOR
Professor Philip D. Adams
Ph.D (Melb)

DEPUTY DIRECTOR
Professor John Madden
Ph.D (Tasmania)

SIR JOHN MONASH DISTINGUISHED PROFESSOR
Professor Peter B. Dixon
Ph.D (Harvard), FASSA

DIRECTOR GEMPACK SOFTWARE
Professor Ken Pearson
Ph.D (Adelaide), FASSA

EMERITUS PROFESSOR
Professor Alan A. Powell, AM
Ph.D, (Sydney) Fellow of the Econometric Society, FASSA

SENIOR RESEARCH FELLOWS, LEVEL D

Dr James Giesecke
Ph.D (Adelaide)

Dr Mark Horridge
Ph.D (Melbourne)

Dr Tony Meagher
Ph.D (Monash)

Dr Maureen Rimmer
Ph.D (La Trobe)

SENIOR RESEARCH FELLOWS, LEVEL C

Dr Yin Hua Mai
Ph.D (ANU)

Dr Glyn Wittwer
Ph.D (Adelaide)

RESEARCH FELLOWS

Dr Michael Jerie
Ph.D (La Trobe)

Mr Mark Picton
B.Ec (Hons)

Dr Ashley Winston
PhD (Monash)

COMPUTING PROFESSIONALS

Mr Colin Thompson
M Sc (Liverpool)

ADMINISTRATIVE SUPPORT

Ms Louise Pinchen
Executive Officer and GEMPACK Business Manager

Mrs Frances Peckham
Secretary

Mrs Elvine Sullivan
Secretary

APPENDIX 2

Business Plan 2007
Centre of Policy Studies
Faculty of Business and Economics
(September 2006)

1. Operational Review of 2006

Achievements:

Around **sixty** grant-supported and commissioned studies are being undertaken by the Centre of Policy Studies (CoPS) in 2006. Some highlights are:

- CoPS' undertook a study on the economic benefits of a strong biomass industry for the United States Department of Commerce, which formed an input to the White House's new energy policy deliberations.
- A joint report by CoPS and CSIRO "Without Water", received major coverage in newspapers and television.
- As part of a joint research project between CoPS and Hunan University, the Centre has held two training courses in China, the first a Practical GE modelling course in February and a dynamic computable general equilibrium (CGE) modelling course in September.

For the third time in five years a CoPS-supervised doctoral student took out the Mollie Holman medal for the best Ph.D. thesis in the Faculty of Business and Economics. The 2005 medal has been awarded to Xiujian Peng.

Professor Pearson was elected as a Fellow of the Academy of the Social Sciences in Australia, bringing to three the number of CoPS' members who are Fellows.

Performance against initiatives proposed: CoPS' major initiatives for 2006 mainly concentrated on an extension of its international focus. Instances of the achievement of CoPS' targets are:

- The U.S. Departments of Agriculture and Commerce joined the U.S. International Trade Commission in funding CoPS projects. The Centre's funding from Washington increased by around 35 per cent to $US345,000, including $80,000 for the Biomass project.
- CoPS developed a CGE model of Indonesia with an AusAID grant of $140,000. Project title "Increasing the participation of a regional public university in national and Regional Policy Making through capacity building in modelling the distribution impact of economic policies".
- CoPS was awarded around $A700,000 in grants and contracts from all foreign sources in 2006, up by around 45 per cent on the previous year.
- A substantial increase in off-shore courses. Courses were held in São Paulo (Brazil), Hunan University (China) and Washington, DC in 2006, while a CoPS staff member was an instructor at the GTAP course in Mumbai.

Areas of Concern:

In 2006 CoPS received $200,000 from the Deputy VC (Research) to help ameliorate central support costs which had escalated by over 50 per cent in the two years to 2006. Whether the Centre continues to receive continued funding of this type in 2007 has yet to be determined.

While the Centre's contract research funding is continuing to grow, an increase in administrative workloads in 2006 - generated by the RQF, the CoPS review and growing reporting and other university-administrative requirements – is making it very difficult for the Centre to complete contract reports within the set timeframe. If some 2006 work is prolonged into 2007, this will have implications for financial outcomes.

Student numbers: CoPS' only enrolments are postgraduate students. Numbers are steady at 8.

Research performance: Research income is expected to be around $2.4 million – around 70 % higher than the previous year.

Management of staffing needs: A new Research Fellow, Level B, commenced work at CoPS in July 2006. This appointment was made as a replacement for a Research Fellow, Level C, who retired at the end of September 2006.

Overall forecast result: Current expectations are that CoPS will have a 2006 operating result of around $540,000. The exact size of the operating result is dependent on the timing of the receipt of certain payments from overseas and their subsequent entry in SAP.

2. Operational Plan for 2007

Overall: CoPS will continue to develop two overall strategies – internationalization and increasing the breadth of economic research open to the Centre's models. The first strategy involves continued development of the Centre's model research program on the U.S. and Chinese economies, followed by increased opportunities for contract research on policy-relevant economic model applications over the next few years. It also involves further expansion into the international training market and expanding our software sales into new markets. The second strategy involves integrating the Centre's CGE models with specialist models.

Teaching: CoPS does not run any undergraduate courses. (CoPS' staff members are in charge of two units – one Dept. Economics unit and one Dept of Econometrics unit. They also give some guest lectures.) There are 8 postgraduate research students enrolled in the Centre. Two PhD students submitted and will graduate in October 2006. A Masters students is currently making minor amendments and is likely to graduate in December. The Centre expects to have two new doctoral students in 2007. Without a very substantial injection of funding, CoPS does not have the resources to increase its postgraduate student load.

Research: The Centre plans to hold its research income steady in 2007. This follows an extremely rapid expansion in 2006. While the major focus will be on consolidating research income at around the $2.3 million mark (compared with average research income of $1.2 million for the first six years of this decade), there will be a concerted

effort to increase our penetration of the United States and Chinese markets. Continued work for U.S. federal government departments is expected, while the very large audiences for presentations by Professor Dixon in Hunan and Beijing provided a strong indication of Chinese interest in CoPS modelling.

Commercial: CoPS' main revenue under this item comes from short courses. This type of income is projected to be $185,000 in 2006, up by 40 % on 2005. Short-course income is estimated at $160,000 for 2007, down on 2006, but 23 % up on the 2005 figure. This estimate is conservative. Courses held in Australia in the past few years often have substantial numbers of overseas attendees and generally have been fully subscribed (often with a waiting list), while CoPS courses overseas are also generally very popular.

Software Sales: Income from GEMPACK licenses is estimated at $270,000 for 2007, slightly up from this year.

Staffing: It is expected that a new (part-time) Research Fellow, Level B, will be engaged next year to assist with the Centre's increased contract research activities. Depending on research-income outcomes in the first half of 2007, and the availability of a person with suitable skills, CoPS may look to engage a further person in the latter part of 2007. CoPS is currently engaged in a long-run recruiting agenda, and this is likely to see the hiring of further early-career researchers in the latter part of the decade.

Goods & Services Expenditure: Operating expenses currently contribute about 11% of the Centre's budget. Around 60% of this is made up of travel expenses. Travel expenditure is budgeted to increase by 12% in 2007 to allow for the Centre's growth in the international contract research market. However, other components of operating expenses are expected to hold steady (in real terms) or decrease in 2007.

3. Faculty Operational Plan 2007-2009

International reputation: CoPS' major objective for the next two years is to build upon the Centre's mounting international profile. CoPS has enjoyed a strong international reputation for many years, which the aforementioned initiatives are enhancing. Centre staff are regarded as world leaders in large-scale computable general equilibrium models. Models based on the CoPS suite of models have been developed for over thirty countries and the use of GEMPACK software is even more wide-spread. Members of CoPS have authored 4 books in the prestigious North-Holland Contributions Series (the leading monograph series in technical economics). CoPS staff contributed the lead chapter to a North-Holland Handbook on computational economics (handbook authors are recognised as worldwide leaders in their research areas).

During the last few years the Centre's models have started to gain particular prominence in two countries, the U.S.A. and China. Several Washington Departments have contracted CoPS to undertake studies with the USAGE model that was built with funding from the U.S. International Trade Commission, following initial seed funding from the Faculty. Major studies using CoPS' modelling include a 2004 study of import restraints which formed a significant part of a major report to the Executive Office of the President, and the 2006 biomass study mentioned above. CoPS has now developed a number of models for China, and undertook a major study of the Australia-China proposed free trade agreement (FTA), which formed an important part of the feasibility study that preceded

the 2005 agreement by the Australian Prime Minister and Chinese Premier to commence FTA negotiations. In 2006 CoPS conducted two training courses in China as part of a contract with Hunan University to build their economic modelling capabilities. CoPS' aim now is to deepen the penetration of usage of their models in these two countries, plus other countries such as Indonesia for which CoPS produced a new model with AusAID funding in 2006. Our aim is to increase the exposure of policy-makers in these countries to analysis based on simulations with our models. It is hoped that this may eventually result in the sort of routine use of CoPS' models in policy analysis in foreign countries already enjoyed in this country. It is expected that our international strategy will lead to a significant increase in our world market share (for modelling work and GEMPACK), as well as increasing our international reputation more generally.

Enhancing student experience: CoPS has a fine tradition of graduate training. Students undertake research topics closely related to our specialty of CGE modelling. Office space with advanced computing facilities are provided within our Centre. There is a team atmosphere in which students receive a comparatively large amount of personal attention. The Centre provides its students with conference and research travel assistance, and also provides students with free places on its short courses. CoPS' global focus enhances the internationalization of our graduate program. Nearly all students complete their PhD successfully within about four years. [Review annotation: A complete list of graduate students from 1991 to 2006 is given in Appendix 6.]

In order that CoPS can continue to provide an enhanced student experience it is necessary at present to keep our student numbers small. Currently we have a ceiling of around eight postgraduate students.

Research profile: CoPS has a research program in place that will maintain its international lead in large-scale computable general equilibrium modelling. The Centre ranks highly in terms of research income which has grown rapidly in 2006 and can be expected to continue a steady upward course, on average, over subsequent years.

CoPS' strategy includes building the share of DEST publications in the Centre's research publications profile. All of CoPS academic and research staff are research active, and all but one ECR Level B, have a track record of publications in international journals. There is a high citation of CoPS' publications. Publications related to large-scale CGE modelling are particularly time-intensive and there are limited publication outlets. However, a substantial number of reports are produced each year that are of high quality and can be turned into journal articles. Time restrictions, however, mean that this does not occur as frequently as it might. The Centre is now making use of Faculty grants to ensure an increased number of contract research reports are turned into journal articles. A second tactic is also being introduced. For certain contract research projects temporary confidentiality conditions are delaying the possibility of publication. Such delays usually mean that articles based on the contract research are never written as it is very time consuming to resurrect complex computations after a period of time has elapsed. Efforts are being made to insert conditions in contracts more favourable to early publication of results.

4. **Conclusion and Financial Outcome summary**

The projected CoPS' surplus of around $540,000 represents a significant turn-around on the last few years. It means that investment in new models and contract research markets, undertaken in the first half of the decade, are now yielding substantial returns. On average over the past decade, CoPS has returned significant positive operating results and is expected to have accumulated surpluses of around 1½ million dollars at the end of 2006. However, due to the nature of the Centre's income, it can be expected that there may be considerable variability in CoPS operating result between individual years.

Following its extremely rapid growth in research income in 2006, CoPS plans to consolidate this gain in 2007. Indications are that the Centre will enjoy another strong year in 2007, and a research income target of $2.3 million, close to the expected 2006 figure, has been set. It is expected, that the Centre's operating result will be around $180,000 for 2007.

APPENDIX 3

Centre of Policy Studies Publications
2000-2006

Books

Dixon, P. B., Rimmer, M. T., 2002, *Dynamic general equilibrium modelling for forecasting and policy. A practical guide and documentation of MONASH*, North-Holland (Elsevier), Amsterdam.

Chapters in books

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*Elbehri, A., *Ingco, M., *Hertel, T., Pearson, K. R., 2004, Liberalizing tariff-rate quotas: quantifying the effects of enhancing market access, in M. Ingco, L. Winters (eds.), *Agriculture and the New Trade Agenda*, Cambridge University Press, Cambridge, UK.

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Adams, P. D., Dixon, P. B., McDonald, D., Rimmer, M. T., 2000, The Exchange Rate Puzzle and Forecasts for the Australian Economy from 2000-01 to 2004-05, *Australian Bulletin of Labour*, 26(4): 257-278.

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Adams, P. D., Dixon, P. B., Rimmer, M. T., 2001, The September 11 Shock to Tourism and the Australian Economy from 2001-02 to 2003-04, *Australian Bulletin of Labour*, 27(4): 241-257.

Adams, P. D., Horridge, M., Parmenter, B. R., 2001, Forecasts for Australian Regions Using the MMRF-Green Model, *The Australasian Journal of Regional Studies*, 6(3): 293-322.

Adams, P. D., Horridge, J. M., Madden, J., Wittwer, G., 2002, Drought, regions and the Australian economy between 2001-02 and 2004-05, *Australian Bulletin of Labour*, 28(4): 231-246.

Adams, P. D., 2004, Medium term prospects for the Australian economy and the impact of Kyoto-compliance, *Australian Bulletin of Labour*, 30(1): 1-15.

Adams, P. D., 2005, Interpretation of results from CGE models such as GTAP, *Journal of Policy Modeling*, 27(8): 941-959.

*Anderson, K., *Norman, D., Wittwer, G., 2003, Globalisation of the World's wine Market, *The World Economy*, 26(5): 659-687.

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APPENDIX 4

SUMMARY OF RESEARCH INCOME

2004

Project Title	Type (eg grant, contract, scholarship)	Name of all CIs, incl those not associated with this unit/centre (marked with *)	Source of research income	SAP Fund #	2004 Research Income	
					Total $	$ attributed to this unit/centre
Examining the impact of software piracy on the Aust. Economy	Contract	Philip Adams	Allens Consulting	1780077	16500	16500
Medium term economic forecasts for the Barwon region	Contract	James Giesecke	G21 Geelong Region Alliance	1780086	4000	4000
Long-term future prospects for the Vic. Economy	Contract	Philip Adams	Dept of Premier & Cabinet	1780085	10000	10000
Impact of existing national parks and future acquisitions on regional economies in Western NSW	Contract	John Madden, Philip Adams	National Parks & Wildlife Service	1780089	27500	27500
Labour market and supply of resulting labour market forecasts	Contract	G.A. Meagher	Victorian Workcover Authority	1780078	27500	27500
ABARE: Development and preparation of a regional database for the ABARE Australian model	Contract	Glyn Wittwer	ABARE	1780091	22000	22000
Economics effects of a proposed LNG plant	Contract	James Giesecke	Allen Consulting	1780077	22000	22000
Effects of alternative means of financing infrastructure spending in NSW, QLD and Vic	Contract	James Giesecke	Allen Consulting	1780077	15000	15000
Economic modelling to support the Dept of Defence's Estate project	Contract	Philip Adams	Department of Defence	1780096	72600	72600
Water accounts in CGE Model	Contract	Glyn Wittwer, Philip Adams & Mark Horridge	Productivity Commission	1780072	17500	17500
Investment in horse racing industry NSW	Contract	Glyn Wittwer	Allen Consulting	1780077	6000	6000
Impacts on the Goulburn economy DWER Programs in Shepparton	Contract	John Madden	Dept of Transport & Regional Services	1780097	9900	9900

Impact of existing national parks and future acquisitions on regional economies in Western NSW	Contract	John Madden	NSW Dept of Environment & Conservation	1780089	10000	10000
Impact of the post 2005 assistance package	Contract	Peter Dixon, Maureen Rimmer	Dept of Industry Tourism & Resources	1780099	40000	40000
Labour market and supply of resulting labour market forecasts	Contract	G.A. Meagher	WA Dept of Education & Training	1780078	9350	9350
Refereeing of Vic Dept of Treasury & Finance on economic modelling national competition policy	Contract	John Madden	Dept of Treasury & Finance	1780090	1500	1500
Refereeing of Vic Dept of Treasury & Finance paper on economic modelling of productivity	Contract	John Madden	Dept of Treasury & Finance	1780090	1500	1500
Improved energy efficiency of housing in Victoria	Contract	Philip Adams	Allen Consulting	1780077	6600	6600
Free trade agreement between AUS & US with special emphasis on the WA economy	Contract	Philip Adams	Allen Consulting	1780077	7500	7500
SEAV's NEET program – revised projections	Contract	Philip Adams	Allen Consulting	1780077	15840	15840
New plane component manufacturing plant in Vic – revised projections	Contract	Philip Adams	Allen Consulting	1780077	5000	5000
Improved energy efficiency for housing in Victoria – revised projections	Contract	Philip Adams	Allen Consulting	1780077	5500	5500
Labour market and supply of resulting labour market forecasts	Contract	G.A. Meagher	Dept of Further Education, Employment, Science & Technology	1780078	27500	27500
Labour market and supply of resulting labour market forecasts	Contract	G.A. Meagher	Office of Training & Tertiary Education	1780078	9900	9900
Labour market and supply of resulting labour market forecasts	Contract	G.A. Meagher	Australian National Training Authority	1780078	22000	22000
Economic impact of various options to expand Alumina smelting in the NT	Contract	Philip Adams	ACIL Consulting	1780102	20000	20000
Economic impact of an expansion to their NT smelter	Contract	Philip Adams	Alcan Pty Ltd	1780103	15000	15000
Prospects of greenhouse gas emissions in the Australian economy	Contract	Philip Adams	Australian Greenhouse Office	1780104	45000	45000
Modelling of payment systems and performance of GTAP simulation papers	Contract	Peter Dixon	Network Economics Consulting Group	1780105	20000	20000
Water accounts on CGE Model and Modelling Regional impacts of expanding water trade	Contract	Glyn Wittwer, Philip Adams, Mark Horridge	Productivity Commission	1780072	15500	15500
Economic impacts of the Rugby World Cup	Contract	John Madden	URS Australia Pty Ltd	1780087	4950	4950

Economic impacts of a significant earthquake in the Perth Metropolitan area	Contract	Glyn Wittwer	Geoscience Australia	1780108	25000	25000
The effects of terms of trade changes	Contract	Peter Dixon, Maureen Rimmer	Commonwealth Bank of Australia	1780106	1500	1500
Development of a new economic model for analysing water issues and an application of the model in order to prepare an update report to CSIRO	Contract	Glyn Wittwer	CSIRO Land & Water	1780100	13000	13000
CRC for automotive research	Contract	Philip Adams	Allen Consulting	1780077	5000	5000
Accreditation scheme for builders	Contract	Philip Adams	Allen Consulting	1780077	11000	11000
Victorian Greenhouse challenge for energy	Contract	Philip Adams	Allen Consulting	1780077	35000	35000
Refereeing of Commission's modelling work for the review of NCP arrangements inquiry	Contract	John Madden	Productivity Commission	1780116	15000	15000
Economic effects of changes in the Australian telecommunications sector since 1997	Contract	James Giesecke	Allen Consulting	1780077	21500	21500
Economic impacts of options for the ORD river scheme	Contract	Philip Adams	Allen Consulting	1780077	5500	5500
Economic impacts of various options for the Argyle diamond mine	Contract	Philip Adams	Allen Consulting	1780077	22000	22000
Economic impacts of an Alumina refinery expansion in Qld	Contract	Philip Adams	Allen Consulting	1780077	19250	19250
Copyright rules in Australia	Contract	Peter Dixon	Allen Consulting	1780077	17500	17500
Economic impact of the new pulp mill	Contract	Philip Adams	Dept of treasury Tasmania	1780119	15000	15000
Exotic plant pest incursions	Contract	Glyn Wittwer	Plant Health Australia	1780075	75000	75000
Economic effects on Vic, SA and Australia of two alternative sites for the proposed Iluka Resources processing plant	Contract	James Giesecke	Economics Consulting Services	1780118	15000	15000
Economic research on model development and simulations with WAYANG	Contract	Glyn Wittwer	Australian National University	1780122	3000	3000
Economic impacts of development scenarios for the south-west coast region minerals for energy development study	Contract	Philip Adams	Sleeman Consulting	1780121	39930	39930
Impact of a new plane component manufacturing plant in Victoria – revised further projections	Contract	Philip Adams	Allen Consulting	1780077	2200	2200
Short and long-term effects of road investment in Queensland	Contract	John Madden	Queensland Dept of Main roads	1780107	24750	24750
Broadband telecommunications in NSW study	Contract	Glyn Wittwer	Allen Consulting	1780077	5000	5000
Economic impact of the institute for Molecular biosciences	Contract	Philip Adams	Allen Consulting	1780077	16500	16500

Effects on South Australia of a program of additional electricity infrastructure development under alternative financing arrangements	Contract	James Giesecke	Allen Consulting	1780077	15000	15000
The effects of financial literacy	Contract	Peter Dixon	Commonwealth Bank of Australia	1780123	25000	25000
Impacts of an Australia-China FTA	Contract	Yin Hua Mai	Dept of Foreign Affairs & Trade	1780115	50490	50490
Impact of a FTA agreement between China and Australia	Contract	Yin Hua Mai	Hassall & Associates International	1780114	23760	23760
Potential benefits of an Australia-china FTA – additional work	Contract	Yin Hua Mai	Dept of Foreign Affairs & Trade	1780115	22770	22770
Assessment of the convergency hypothesis in the context of a multi-country computable general equilibrium model	Contract	Peter Dixon	Australian Greenhouse Office	1780033	36000	36000
Economic modelling for Australia and the USA: forecasts, policy analysis and comparative labour studies of technology and labour market adjustment ARC Linkage Grant Project ID: LP0348928	Research Grant	Peter Dixon	Productivity Commission	1780074	22000	44000
Evaluating the sources of growth and decline in Australia's state economies via historical/decomposition simulations with a dynamic multiregional fiscal model. ARC Discovery Linkage Grant	Research Grant	Peter Dixon, James Giesecke	ARC	1780076	88199	88199
					TOTAL	1225989

2005

Project Title	Type (eg grant, contract, scholarship)	Name of all CIs, incl those not associated with this unit/centre (marked with *)	Source of research income	SAP Fund #	2005 Research Income	
					Total $	$ attributed to this unit/centre
Economic effects of implementing the ACTU's 2005 safety net review claim	Contract	John Madden, Peter Dixon & Maureen Rimmer	Dept of Employment & Workplace Relations	1780124	40700	40700
Labour market and supply of resulting labour market forecasts	Contract	G.A. Meagher	Dept of Employment & Workplace Relations	1780078	27500	27500
Research and model development to support a project conducted by PWC for Vic forests	Contract	Philip Adams	Price Waterhouse Coopers	1780125	11000	11000
Labour market and supply of resulting labour market forecasts	Contract	G.A. Meagher	Dept of Further Education, employment, Science & Technology	1780078	27500	27500
Remodelling the impacts of the Queensland Institute for Molecular-Bioscience	Contract	Philip Adams	Allen Consulting Group	1780077	4400	4400
Enhancing wine market intelligence through economic research	Contract	Glyn Wittwer	Grape & Wine Research & Development	1780128	69520	69520
Analysis into the Economic Impacts of AWD Project	Contract	Philip Adams	Dept of Innovation Industry & Regional Development	1780127	11000	11000
Research, model development and application to support a project by Allen Consulting on the viability of a third water pipe to residential housing	Contract	Philip Adams	Allen Consulting Group	1780077	16500	16500
Economic research into the operation of the Australian labour market and supply of resulting labour market forecasts, briefings and related services – 1/1/04 – 31/12/04	Contracts	G.A. Meagher	Queensland Treasury	1780078	55000.00	55000.00
Economic research into the operation of the Australian labour market and supply of resulting labour market forecasts, briefings and related services – 1/1/04 – 31/12/04	Contracts	G.A. Meagher	Victorian Workcover Authority	1780078	27500.00	27500.00
Applied economic research and report on economic impacts of Gold Coast film industry	Contract	Glyn Wittwer	Allen Consulting Group	1780077	10000.00	10000.00

Applied economic research and report on urban and rural water in Australia to 2030	Contract	Glyn Wittwer	Water Services Association of Australia	1780120	34500.00	34500.00
Applied economic research, including model development, to produce a research paper examining the economic affects on South Australia and Australia of the proposed Iluka mineral sands processing plant	Contract	James Giesecke	Allen Consulting Group	1780077	11000.00	11000.00
Applied economic research on 2005 Safety Net Review – additional work: preparation for AIRC hearings, rejoinder to critic, extra sensitivity simulations, notes and meetings	Contract	John Madden	Dept of Employment & Workplace Relations	1780124	16,625	16,625
Economic research into the operation of the Australian labour market & supply of resulting labour market forecasts as described in the DET Project Brief for the Provision of Economic and Employment Forecasts dated 25th May 2004. Dec '04 to May '05	Contract	G.A. Meagher	WA Dept of Education & Training	1780078	9350.00	9350.00
Research and model development to support a project to examine an assessment of skill shortages and the amphibious ships project	Contract	Philip Adams	ACIL Tasman	1780129	25000.00	25000.00
Economic research into the operation of the Australian labour market forecasts, briefings and related services. June '04 to Dec '04	Contract	G.A. Meagher	Office of Training & Tertiary Education	1780078	9900.00	9900.00
Research and model development to support a project to produce a research paper examining the economic effects on Tasmania of rapid growth in the University of Tasmania	Contract	James Giesecke	University of Tasmania	1780131	33000.00	33000.00
Applied economic research including model development to produce a research paper: "The Displacement Effect of Labour-Market Programs Estimates from the Monash Model"	Contract	Peter Dixon & Maureen Rimmer	Dept of Employment & Workplace Relations	1780124	38000.00	38000.00
Applied economic research on the effects of the Tasmania Freight Equation Scheme and the consequences of reductions in the size of the scheme	Contract	John Madden	Dept of Infrastructure Energy and Resources	1780134	19800.00	19800.00
Applied economic research into the operation of the Australian labour market & supply of resulting labour market forecasts as described in the DET Project Brief for the Provision of Economic and Employment Forecasts dated 25th May 2004. May '05 to Nov '05	Contract	G.A. Meagher	W.A. Department of Education and Training	1780078	9350.00	9350.00

Applied economic research including model development to produce a research paper: "The Displacement Effect of Labour-Market Programs: Estimates from the Monash Model" – Final Payment	Contract	Peter Dixon & Maureen Rimmer	Dept of Employment & Workplace Relations	1780133	16000.00	16000.00
Applied economic research & report on enhancing wine market intelligence through economic research – 2nd half payment 04-05	Contract	Glyn Wittwer	Grape & Wine Research & Development Corporation	1780128	25960.00	25960.00
Econ Res on Trade Liberalization Scenarios for Wool under an Australia-China FTA	Contract	Yinhua Mai Philip Adams	ITS Global	1780142	22000.00	22000.00
Applied economic research & report on Regional economic impacts of Optus rollout	Contract	Glyn Wittwer	Allen Consulting Group	1780077	10000.00	10000.00
Applied economic research & report on Economic impacts of Thredbo	Contract	Glyn Wittwer	Allen Consulting Group	1780077	5000.00	5000.00
Applied economic research & report on Regional economic modelling of economy-environment interactions & policy implications	Contract	Glyn Wittwer	CSIRO Land & Water	1780100	50000.00	50000.00
Model development and simulation to support a project by Allen consulting Group on the impacts of policies to slash greenhouse emissions in Australia	Contract	Philip Adams	Allen Consulting	1780077	27500.00	27500.00
Applied economic research including model development to produce a research paper on options for the renewable energy strategy: Economic Evaluation	Contract	Philip Adams	Sustainable Energy Authority Vic	1780144	27500.00	27500.00
Review of NZIER racing study	Contract	James Giesecke	New Zealand Department of Internal Affairs	1780146	7000.00	7000.00
Economic research into the operation of the Australian labour market & supply of resulting labour market forecasts, briefings and related services. January to June 2005	Contract	Tony Meagher	Office of Training & Tertiary Education	1780078	9900.00	9900.00
Applied economic research resulting in a report on the "Economic Analysis of Gambling"	Contract	Peter Dixon	Allen Consulting Group	1780077	14100.00	14100.00
Applied economic research and report on Modelling of the Economic Effects of Successive ACTU Safety Net Review Claims Since 1997	Contract	Peter Dixon & Maureen Rimmer	Department of Employment and Workplace Relations	1780124	20000.00	20000.00
Consultancy services for Modelling the Effects of Population Ageing on Labour Supply, Output and Employment (first instalment)	Contract	Tony Meagher & James Giesecke	Department of Employment and Workplace Relations	1780136	30000.00	30000.00

Economic research – Report on Economic Impacts of workplace Relations Reform	Contract	Peter Dixon & Maureen Rimmer	Department of Employment and Workplace Relations	1780150	70000.00	70000.00
Research on Economic impacts of a new bauxite mine and a new alumina and aluminium plants in Queensland	Contract	Philip Adams	ACIL Tasman	1780148	27500.00	27500.00
Applied economic research for model development, model application and report writing to support a project undertaken by the Allen Consulting Group examining the impacts of the Smartlink rail station project	Contract	Philip Adams	Allen Consulting Group	1780077	20000.00	20000.00
Applied economic research for model development, model application and report writing to support a project undertaken by the Allen Consulting Group examining the impacts of a new Mineral Sands mine in South Australia	Contract	Philip Adams	Allen Consulting Group	1780077	16500.00	16500.00
Applied economic research resulting in a report on Economic evaluation of policies designed to reduce the usage of plastic bags in supermarkets	Contract	Philip Adams	Allen Consulting Group	1780077	17500.00	17500.00
Applied economic research on the economic effects of a partial closure of the Pacific National rail system in Tasmania	Contract	John Madden	Department of Infrastructure Energy and Resources	1780156	12000.00	12000.00
Applied economic research including model development to produce a research paper on "Integrating Top Down and Bottom Up Stationary Energy Model"	Contract	Philip Adams	McLennan Magasanik Associates P/L	1780152	37200.00	37200.00
Applied economic research including model development to produce a research paper on "Critical Infrastructure Protection – Sydney Case Study"	Contract	Glyn Wittwer	Geoscience Australia	1780154	35000.00	35000.00
Applied economic research including model development, simulation and report writing to support a program of research examining Greenhouse Policy options for the Tasmania Government	Contract	Philip Adams	Allen Consulting Group	1780077	16500.00	16500.00
Applied economic research including model simulation and report writing to support a project examining economic contribution of the Forestry Industry to the Victorian economy	Contract	Philip Adams	Allen Consulting Group	1780077	11,000.00	11,000.00
Applied economic research including report:	Contract	Glyn Wittwer	Grape & wine Research &	1780128	25960.00	25960.00

"Enhancing Wine Market Intelligence Through Economic Research" Period June to December 2005			Development Corporation			
Applied economic research including model and report for "modelling urban-rural water trade"	Contract	Glyn Wittwer	Productivity Commission	1780145	16700	16700
Applied economic research including model development to be provided to facilitate modelling the economic impact of a series of potential reform initiatives	Contract	Philip Adams, Glyn Wittwer & Mark Picton	Department of Treasury and Finance	1780153	16500	16500
Evaluating the sources of growth and decline in Australia's state economies via historical/decomposition simulations with a dynamic multiregional fiscal model	Discovery Grant	James Giesecke & Peter Dixon	ARC	1780076	36056	36056
Economic modelling for Australia and the USA: forecasts, policy analysis and comparative labour studies of technology and labour market adjustments. ARC Linkage Grant: project ID:LP034892	Linkage Grant	Peter Dixon	ARC	1780073	53480	53480
Economic modelling for Australia and the USA: forecasts, policy analysis and comparative labour studies of technology and labour market adjustments. ARC Linkage Grant: project ID:LP034892	Linkage Grant	Peter Dixon	Productivity Commission	1780074	44000	44000
Modelling the economics of the Australian health care system for policy analysis	Grant	Peter Dixon	NHMRC	1780135	193365	193365
Purchase Order ITC-PO-04-0031 dated 23/06/04, Period 1 July 2004 to 30 June 2005 ($US70,000) Supply of economic modelling services via secondment of Ashley Winston, first payment	Contract	Peter Dixon	USITC	1780137	29583	29583
Purchase Order ITC-PO-04-0031 dated 23/06/04, Period 1 July 2004 to 30 June 2005 ($US70,000) Supply of economic modelling services via secondment of Ashley Winston, second payment	Contract	Peter Dixon	USITC	1780137	32024	32024
					TOTAL	**$1482973**

2006

Project Title	Type (eg grant, contract, scholarship)	Name of all CIs, incl those not associated with this unit/centre (marked with *)	Source of research income	SAP Fund #	2006 Research Income	
					Total $	$ attributed to this unit/centre
Economic Modelling Capacity Building to increase an Indonesian Regional Public University's Participation in National and Regional Policy Making Amount includes estimate GST 70079781	Contract	Mark Horridge	AUSAID	1780155	140,481.00	140481
Applied economic research including report on: "Economic impact of FMG/BHP Pilbara Rail Access 70079897	Contract	James Giesecke	CRA International	1780037	25000	22727
Critical Infrastructure Protection – Sydney Case Study 70080138	Contract	Glyn Wittwer	Geoscience Australia	1780154	10000	9090
Applied economic research to model the economic and regional impacts a new pulp mill in Tasmania 70080757	Contract	Philip Adams	Allen Consulting Group	1780077	21,175.00	19250
Applied economic research to model the impacts of a new car model for a large motor vehicle manufacturer in Victoria 70080759	Contract	Philip Adams	Allen Consulting Group	1780077	22000.00	20000
Purchase Order ITC-PO-04-0031 dated 23/06/04, Period 1 July 2004 to 30 June 2005 ($US70,000) Supply of economic modelling services via secondment of Ashley Winston,	Contract	Peter Dixon	USITC	1780137	30000US$	39599

Purchase Order ITC-PO-04-0031 dated 23/06/04, Period 1 July 2004 to 30 June 2005 ($US70,000) Supply of economic modelling services via secondment of Ashley Winston, third payment	Contract	Peter Dixon	USITC	1780137	23000US$	31045
Purchase Order ITC-PO-05-0067 dated 22/07/2005 Supply of US Monash Model Development of the baseline forecast for 2004 to 2009	Contract	Peter Dixon	USITC	1780137	110000US$	148533
Purchase Order ITC-PO-05-0067 dated 22/07/2005 Supply of US Monash Model ($US49875) Development of the baseline forecast for 2004 to 2009 and labour extension $US49875	Contract	Peter Dixon	USITC	1780137	64959	64959
Supply of US Monash Model (known as USAGE Project) assist USITC in economy-wide modelling against contract no. ITC-PO-02-0071 dated 09/27/2002 $US25000	Contract	Peter Dixon	USITC	1780137	32557	32557
Biomass study for the Department of Commerce – US International Trade Commission $US100000	Contract	Peter Dixon	USITC	1780137	128000	128000
Spring Racing Carnival 2005: Summary of Economic Benefits 70080889	Contract	Philip Adams	IER PTY LTD	1780157	22500	20454
Applied economic research to model the economic and regional impacts of the Iluka mineral sands mine and downstream processing facilities – Final payment 70081016	Contract	Philip Adams	Allen Consulting Group	1780077	2000	1818
Applied economic research including model and report for the estimation of the economic impacts of the Pluto LNG project 70081693	Contract	Philip Adams	Allen Consulting Group	1780077	21450	19500

Applied economic research including model development to produce a research paper on "Spring Racing Carnival 2005: Summary of Economic Benefits" (follow-up research) 70082213	Contract	Philip Adams	IER PTY LTD	1780157	22500	20454
Applied economic research modelling the expansion of the Glennies Creek mine 70083086	Contract	Glyn Wittwer	Allen Consulting Group	1780077	4000	3636
Applied economic research including model development to produce a research paper on Economic impacts of migration and population growth 70083360	Contract	Tony Meagher	Productivity Commission	1780161	66000	60000
SplitCom Project (GTAP) research into methods of Disagregating a world CGE database with limited information, leading to the development of new software for the GTAP Project	Grant	Mark Horridge	Nathan and Associates USA	1780160	64444	64444
Parallelising 3 Multi-Step Computations on Multi-Processor PCS 70083736	Contract	Ken Pearson	ABARE	1780151	38500	35000
Applied economic research including model development to produce a research paper to the dept of treasure and finance on cost of greenhouse gas abatement of a range of policies 70084077	Contract	Philip Adams	McLennan Magasanik Assoc	1780162	25200	22909
Applied economic research on the regional and national economic effects of cyclone Larry and provision of a database and model 70084757	Contract	Glyn Wittwer	GeoScience Australia	1780154	7000	6363

Economic research into the operation of the Australian labour market and supply of resulting labour market forecasts and briefings and related services 1 January 2005 to 31 December 2005 70085004	Contract	Tony Meagher	Queensland Treasury	1780078	55000	50000
Economic research into the operation of the Australian labour market and supply of resulting labour market forecasts and briefings and related services 1 January 2005 to 31 December 2005 70085007	Contract	Tony Meagher	Dept of Employment & Workplace Relations	1780078	27500	25000
Economic research into the operation of the Australian labour market and supply of resulting labour market forecasts and briefings and related services dated 25 May 2004. December 2005 to May 2006 70085301	Contract	Tony Meagher	WA Department of Education and Training	1780078	9350	8500
Applied economic research to revise simulations for the proposed Tasmanian pulp mill (Gunns) 70085312	Contract	Philip Adams	Allen Consulting Group	1780077	5500	5000
Economic research into the operation of the Australian labour market and supply of resulting labour market forecasts and briefings and related services 1 April 2006 to 31 March 2007 70085430	Contract	Tony Meagher	Dept of Further Education, Employment, Science & Technology	1780078	27500	25000
Applied economic research including model development to produce a research paper on impacts of the State Unions' claim in the 2006 State Wage Cases 70085524	Contract	Peter Dixon	Dept of Employment & Workplace Relations	1780165	35000	31818

Economic research into the operation of the Australian labour market and supply of resulting labour market forecasts and briefings 70085684	Contract	Tony Meagher	Western Research Institute Ltd	1780078	1100	1000
Applied economic research, including model development to produce a research paper on the economic effects of Eastlink 70085700	Contract	John Madden	Allen Consulting Group	1780077	10000	9090
Applied economic research including model development to produce a research paper on Economic impacts of Migration and population growth (continuation) 70086048	Contract	Tony Meagher	Productivity Commission	1780161	22000	20000
Economic research into the operation of the Australian labour market and supply of resulting labour market forecasts and briefings 1 February 2005 to 31 January 2006 70086046	Contract	Tony Meagher	Dept of Education, Science and Training	1780078	22000	20000
Applied economic research, including model development to produce a research paper on modelling the economic impacts of a relocation of non-acute health services and aged accommodation from selected regions 70086366	Contract	John Madden	CRA International	1780163	20000	18181
Applied economic research and report on regional economic modelling of economy environment interactions and policy implications (project extension) 70086377	Contract	Glyn Wittwer	CSIRO Land & Water	1780100	50000	45454
Economic research into the operation of the Australian labour market and supply of resulting labour market forecasts and briefings January 2006 to December 2006 70086053	Contract	Tony Meagher	Office of Training & Tertiary Education	1780078	24750	22500

Economic modelling for Australia and the USA: forecasts, policy analysis and comparative labour studies of technology and labour market adjustments Project ID LP034892 70086591	ARC Linkage Grant	Peter Dixon	Productivity Commission	1780074	22000	20000
1. DCITA- Modelling of impacts of public ICT R&D in Aust. 2. AIMS-Modelling of economic impacts of AIMS 3.DEST-CRC-Modelling of economic impacts of the CRC Programme 70086663	Contract	Philip Adams	Insight Economics	1780179	31900	29000
Preliminary simulations of the effects of a 20% productivity improvement in transporting livestock to meat processors and other users in North West NSW 70086650	Contract	John Madden	CRA International	1780033	2200	2000
Applied economic research on the effects of the Tasmanian Freight Equalisation Scheme and the consequences of reductions in the size of the scheme (follow-up work) 70087148	Contract	John Madden	Dept of Infrastructure Energy & Resources	1780134	7150	6500
Applied economic research including modelling runs for CSIRO. Research under Water for a Healthy Country Flagship research program of CSIRO 70087292	Contract	Glyn Wittwer	CSIRO Land & Water	1780100	25000	31818
Applied economic research on economics impacts of TAFE 70087299	Contract	Glyn Wittwer	Allen Consulting Group	1780077	14000	12727
Applied economic research for the economic and social impacts of achieving deep cuts in Australian greenhouse gas emissions 70087302	Contract	Philip Adams	CSIRO Social & Economic Integration	1780168	15000	13636

Applied economic research modelling the economic impacts of deepening Port Philip Bay 70087303	Contract	Glyn Wittwer	PriceWaterhouseCoopers	1780167	25000	22727
Applied economic research for Terms of trade effects on neighboring countries of PRC's rapidly growing demand for natural resources and primary products First 30% 70087457	Contract	Yin Hua Mai	Asian Development Bank Institute	11780033	34485	34485
Applied economic research for MMRF modelling services Tasks 1-6 70087469	Contract	Philip Adams	Allen Consulting Group	1780077	57640	52400
Provision of consultancy services for modelling the effects of population ageing on labour supply, output and employment (final instalment) 70087592	Contract	Tony Meagher	Department of Employment & Workplace Relations	1780136	20000	18181
Applied economic research and report on Urban and rural water in Australia to 2030 (extension) 70087628	Contract	Glyn Wittwer	Water Servcies Association of Australia	1780120	25000	22727
Applied economic research including report on Enhancing wine market intelligence through economic research Period December to June 2005/06 70087783	Contract	Glyn Wittwer	Grape & Wine Research & Development Corporation	1780128	25960	23600
Applied economic research including model development to produce a report on Estimating the economic impacts of an outbreak of Moko in Australia 70091715	Contract	Glyn Wittwer	Australian Banana Growers' Council	1780158	27500	25000
Applied economic research, including additional model simulations of the effects of the Northern busway 70091714	Contract	John Madden	Connell Wagner Pty Ltd	1780033	5500	5000
Applied economic research, including model development to produce a research paper on the economic effects of the Northern Busway Part 2	Contract	John Madden	Connell Wagner Pty Ltd	1780033	27500	25000

70091712						
Applied economic research, including model development to produce a research paper on the economic effects of the Brisbane Airport Link 70091711	Contract	John Madden	Connell Wagner Pty Ltd	1780033	27500	25000
Applied economic research including model development to produce a research paper on Examining compensation for losses under emission trading 70092660	Contract	Philip Adams	McLennan Magasanik Associates P/L	1780172	10000	9090
Applied economic research including model development to produce a research paper on economic impacts of the Chalco proposal for a new Qld bauxite mine and alumina refinery 70093024	Contract	Philip Adams	Office of the Coordinator-General	1780173	16500	15000
Applied economic research including model development to produce a research paper on Economic impacts of the eastern water recycling proposal 70093028	Contract	Philip Adams	Price Waterhouse Coopers	1780174	27500	25000
Applied economic research including model development to produce a research paper on Economic implications of water restrictions for commercial users in the Brisbane area 70093031	Contract	Glyn Wittwer	Allen Consulting Melbourne	1780077	17000	15454
Applied economic research including model development to produce a research paper on Economic impacts of increased agricultural and forestry output 70093351	Contract	Philip Adams	CRC for Plant-based Management of Dryland Salinity – University of WA	1780175	11000	10000

Applied economic research including model development to produce a research paper on the economic contribution of horse racing NSW 70094006	Contract	Glyn Wittwer	Allen Consulting Melbourne	1780077	4000	3636
Applied economic research including report on the Economic Impacts of the Victorian Grand Prix in 2006 70094587	Contract	Philip Adams	Allen Consulting Melbourne	1780077	20000	18181
Applied economic research including report on the Economic impacts of a coal export terminal at Koorangang Island 70094588	Contract	Philip Adams	Allen Consulting Melbourne	1780077	20000	18181
Applied economic research for High gas-price modelling report for the WA government, development in WA 70095436	Contract	Philip Adams	Insight Economics	1780179	10000	9090
Applied economic research including report on the First-round simulations of the impacts of the Browse LNG development in WA 70095433	Contract	Philip Adams	Insight Economics	1780179	23650	21500
Applied economic research including report on the Simulations of the impacts of the Olympic Dam development in SA 70095432	Contract	Philip Adams	Insight Economics	1780179	22000	20000
Applied economic research including report on the Simulations of the impacts of the Pluto LNG development in WA 70095431	Contract	Philip Adams	Insight Economics	1780179	19800	18000
Analysing the impact of removing multi-fibre arrangements on the Chinese textiles and clothing industries and the Australian wool industry 70095658	Contract	Yin Hua Mai	Australian Wool Innovation Ltd	1780166	11000	10000

Applied economic research including model development to produce a research paper on medium-term projections for Australian stationary energy emissions 70095932	Contract	Philip Adams	McLennan Magasanik Assoc P/L	1780180	47520	43200
Modelling the economics of the Australian health care system for policy analysis	Grant	Peter Dixon	NHMRC	1780135	185865	185865
Provision of research on the U.S. economy 70096156	Contract	Peter Dixon and Maureen Rimmer	Tactical Global Managmeent Ltd	1780033	10000	9090
Applied economic research including report for Irish Telecommunication Services Industry 70096649	Contract	Philip Adams	CRA International	1780033	44000	40000
Applied economic research including model development for a research paper on the Incorporation of Northern Territory Regions into the Monash Forecasting System 70086859	Contract	Tony Meagher	Dept of Business Economic & Regional Development of the NT Government	1780033	22000	20000
Applied economic research to produce a research paper on the economic effects of the Wiggins Island Coal Terminal and associated rail infrastructure 70097714	Contract	John Madden	Connell Hatch Pty Ltd	1780033	20000	18181
Applied economic research including model development to update the MMRF Modelling framework for the PC's analysis of the National Reform Agenda 70098032	Contract	Philip Adams	Productivity Commission	1780033	166320	151200
Applied economic research including model development to produce a research paper on the economic impacts of the PNG-QLD pipeline 70098122	Contract	Philip Adams	McLennan Magasanik Associates Pty Ltd	1780177	17500	15909
Applied economic research including model development to produce a research paper on simulations for the pharmaceutical sector using the MONASH Model 70098149	Contract	Mark Picton	Allen Consulting	1780077	26500	24090
					TOTAL	**$2262830**

APPENDIX 5

Centre of Policy Studies Visitors
2000-2006

Professor Jan van Heerden: November 2006 and October 2003
From: University of Pretoria, South Africa
Interests: CGE modelling

Wawan Hermawan, Prof. Armida Alisjahbana,
Pipit Pitriyan, and Dr Kodrat Wibowo: June 2006
From: Universitas Padjadjaran, Bandung
Interests: Regional CGE modelling

Juha Honkatukia: March 2006
From: Finnish Government Institute for Economic Research (VATT)
Interests: Regional CGE Modelling, Trade policy, environment

Pekka Sulamaa: March 2006
From: Finnish Government Institute for Economic Research (VATT)
Interests: Regional CGE Modelling, Trade policy, environment

Professor Seogwoong Moon: January 2005
From: Kyungsung University, Busan, Korea
Interests: CGE Modelling, Industrial Ecology

Mingtai Fan: October - November 2004
From: Chinese Academy of Social Sciences
Interests: CGE modelling

Ronglin Li: October - November 2004
From: Nankai University, China
Interests: CGE modelling

Zhaoyang Zheng: October - November 2004
From: Nankai University, China
Interests: CGE modelling

Janine Jensen: June 2004 - June 2005
From: Trinity College, Ireland
Interests: CGE modelling

Professor Chu Yugang: July - December 2004
From: The Institute of Economics, Hubei Academy of Social Sciences, China
Interests: Microeconomics

Andi Alfian: Feb - April 2004
From: University of Indonesia
Interests: CGE modelling

Kyungsoon Choi: Jan - April 2004
From: National Statistical Office, Korea
Interests: Capital stock; multifactor productivity

Shuji Kasajima: July 2003 - September 2003
From: Hokkai Gakuen University, Sapporo, Japan
Interests: International trade and investment, CGE modelling of the Asian economies

Professor Tom Rutherford: July 2003 - June 2004
From: University of Colorado, USA
Interests: International trade, economic growth, CGE modelling

Laurent Cretegny: July 2003 - June 2004
From: Department of Economics, Lausanne, Switzerland
Interests: CGE modelling

Vijayakumari [VJ] Kanapathy: June - August 2003
From: Institute of Strategic and International Studies, Malaysia
Interests: CGE modelling of the Malaysian economy

Alain Liennard: March 2003
From: CIRAD, Montpellier, France
Interests: Economy of small Pacific islands, diesel engines, CGE modelling

Michael Kohlhaas: November 2001 - June 2002
From: German Institute for Economic Research (DIW), Berlin, Germany
Interests: Dynamic and Environmental CGE modelling

Professor Joaquim Bento [Joaquim Bento.de Souza Ferreira Filho]:
January - December 2002
From: Escola Superor de Agricultural Luiz de Queiroz,
Universidade de Sao Paulo, Piracicaba, Brazil
Interests: Regional and Agricultural Economics, CGE modelling

Kaludura Abayasiri-Silva Sep 2000 -
From: Melbourne
Interests: CGE modelling

Thiep Van Ho Nov 2001 -
From: Melbourne
Interests: CGE analysis of Tourism

Judith Willis Feb 1991 -
From: Melbourne
Interests: Women in part-time employment

APPENDIX 6

Graduate Students supervised by CoPS Staff 1991-2006

PhD

Name	Topic	Supervisor/s	Year enrolled	Year graduated
Ben Buetre	Structural and technological change in the Philippines, 1985-1992	Peter Dixon, Mark Horridge, Fredoun Ahmadi-Esfahani	1992	1995
Gouranga Gopal Das	The role of absorptive capacity in technological diffusion via international trade	Alan Powell	1996	2000
Sharn Enzinger	Impact of Greenhouse policies on the electricity industry	Philip Adams	1998	2002
Edimon Ginting	The economy-wide effects of reducing Rent-seeking Activity: Tax Evasion in a Developing Country	Alan Powell	1996	1999
Thiep Van Ho	A Tariff increase offset by consumption tax cut: a CGE analysis for Vietnam	Peter Dixon	1998	2001
Serajul Hoque	A Computable General Equilibrium Model of Bangladesh for Analysis of Policy Reforms	John Madden, Peter Dixon	2002	2006
Guyonne Kalb#	Labour Supply and Welfare Participation in Two-Adult Households	Alan Powell, Tim Fry*	1994	1998
Gae Kauzi	CGE model of Papua New Guinea	Peter Dixon	1999	2004
Huey-Lin Lee	Forecasting Taiwanese CO2 emissions: A CGE analysis	Mark Horridge	1999	2003
Michael Malakellis	An intertemporal CGE Model of the Australian economy: the timing of tariff reform	Mark Horridge, Alan Powell	1991	1995

Peter Marshall	Exchange rate behaviour in practical macro models: Gruen and Gizcyki's anchoring hypothesis	Alan Powell	1996	2001
Paresh Kumar Narayan	An Econometric Model of Tourism Demand and a Computable General Equilibrium Analysis of the Impact of Tourism: The Case of Fiji Islands (awarded Mollie Holman Medal)	Peter B. Dixon and Philip D. Adams	2001	2004
Farzana Naqvi	Energy pricing and equity: a CGE analysis for Pakistan	Mark Horridge	1992	1996
Sam Otim	Inventories in CGE models	Brian Parmenter, Philip Adams	1996	2000
Sothea Oum	Welfare analysis of Cambodia's accession to WTO -- a CGE approach	Philip Adams	2005	Not yet
Daniel Pambudi	Regional CGE Modelling for Indonesia	Mark Horridge	2001	2006
Felicity Pang	An Applied General Equilibrium Analysis of Fiscal Incidence in Australia	Tony Meagher, Mark Horridge	2004	Not yet
Xiujian Peng	Population Ageing, Economic Growth and Population Policy Options in China: A Computable General Equilibrium Analysis (awarded Mollie Holman Medal)	Peter Dixon, Yin Hua Mai	2001	2005
Matthew Peter	CGE analysis of effects of Australian immigration	Brian Parmenter, Peter Dixon	1991	1995
Maheshwar Rao	Structural Change and Australian Labour Market	Tony Meagher	2006	Not yet
Louise Roos	Dynamic model for South Africa	Phillip Adams and John Madden	2006	Not yet

Jeremy Rothfield	Economics of undergrounding electricity cables	Philip Adams, Brett Inder*	2003	Not yet
Somsachee Siksamat	CGE analysis of growth in Thailand	Peter Dixon	1996	1999
Gordon Schmidt	Endogenous Economic Growth: A Dynamic Analysis (awarded Mollie Holman Medal for the best doctoral thesis in the Faculty)	P Dixon and B Parmenter	1994	2001
Tran Hoang Nhi	Impact of Trade Liberalization and WTO accession on Vietnamese labour market	John Madden, James Giesecke	2004	Not yet
Terrie Walmsley	A long-run closure of GTAP with explicit tracking of the ownership of assets - comparative steady states: the long-run effects of APEC trade liberalization	Alan Powell	1996	1999
Ashley Winston	Business Taxation, Corporate Finance and Capital Accumulation: Theoretical Development and Application in a Dynamic General Equilibrium Environment	Peter Dixon	2000	2005
Shusaku Yamamoto	Regional CGE analysis of Japanese government finances	Peter Dixon	2003	Not yet
JingLiang (Charles) Xiao	Financial CGE Modelling	Peter Dixon, Glyn Wittwer	2005	Not yet

* Department of Econometrics.

Enrolled jointly with Econometrics.

MEc/MPhil

Name	Topic	Supervisor/s	Year enrolled	Year graduated
Unchana Beadnok	Thailand's trade liberalization -- a CGE approach	John Madden, Yin Hua Mai	MPhil 2005	Thesis requirement completed 2006
Peter Mavromatis	Dynamic CGE modelling: welfare implications of imperfect capital mobility	Peter Dixon	MEc 1998	2001
Johanna Maria Kodoatie	Incentive Effects of the Personal Income Tax in Indonesia on Labour Supply	Alan Powell	MEc 1996	1997

APPENDIX 7

Centre of Policy Studies
Strategy for Contract Research

Two-thirds of CoPS' revenue comes from its contract research work. Most of the remaining income comes from nationally competitive grants, GEMPACK and short courses.

It is estimated that contract research tasks take around 45 per cent of total hours worked by CoPS research staff. The surplus over direct costs on contract research cover the costs of administrative staff and other general operating costs, and also funds various academic activities such as publication of papers, conference attendance, editorial and refereeing services, thesis examination, committee services, and other services to the academic community.

CoPS employs a number of methods for marketing its services in Australia and internationally. These involve:

Consultancy networks;
Collaborative research (including Linkage Grants);
Training courses;
GEMPACK; and
Openness via documentation, model availability and our web site.

Details of our approach are outlined below:

1. CoPS has over many years established close working relationships with a number of economic consulting firms, in particular the Allen Consulting Group and, in recent times Insight Economics. This has resulted in a sizeable and continual stream of sub-contract research projects, without bearing the normal marketing and tendering costs that economic consultancy firms must bear. Other firms for which the Centre often undertakes work include PriceWaterhouseCoopers, Acil-Tasman, Sinclair Knights Mertz, Connell Wagner, McLennan Magasanik & Associates, CRA International, KPMG and Oxera in the UK.
2. CoPS has established strong links with department and agencies of the federal governments (e.g. Productive Commission, Department of Workplace Relations) and state governments (e.g. State Treasuries particularly in Victoria and Queensland). These bodies contain a considerable number of persons trained at CoPS short courses, who naturally turn to the Centre when they wish contract research to be undertaken or consultancy advice in relation to their in-house modelling.
3. CoPS is cementing a strong relationship with a number of US Government departments, particularly the International Trade Commission where CoPS has one of its research staff located on an on-going basis for the past two years.
4. CoPS is also establishing a network of relationships in a number of Asian countries (particularly China and Indonesia), South Africa, Brazil and various European countries. These networks are enhanced by the use of CoPS' models, particularly ORANI-G, by researchers in a considerable number of developing countries.

5. The widespread use of GEMPACK by GTAP model users has enhanced CoPS' profile internationally, as of course has the prominence of CoPS-authored publications in the international CGE literature.
6. CoPS has a constantly-maintained web site that contains detailed documentation of its models, software and applied work, plus downloadable models. This site has a very high hit rate.

These methods have resulted in the Centre receiving continual approaches to undertake modelling work. CoPS has had sufficient contract projects to be working continually at full capacity over very many years.

CoPS prices its contract research work so that it has a queue of work of about three months. Research resources are arranged so that urgent quick turn-around projects can be undertaken for the Centre's regular research funders in particular. In 2006, CoPS experienced a very high level of demand for its research services, and thus the Centre charged noticeably above its base rate on various projects to avoid overloading its resources. The Centre's base rate contract-research charge has been increased steadily in recent years (as have a number of its other charges, e.g. GEMPACK fees).

The Centre has established an order of priority in undertaking contract-research projects. Projects which rate highly are those that:

1. Fit into CoPS research program - particularly those that involve the development of model enhancements in line with the Centre's plans;
2. Contain important innovations that add to the Centre's modelling capacity and professional expertise;
3. Consider questions that are important to policy-makers and the community generally (To a considerable extent, it is our contract research work that ensures that our research is directed to important real-world problems, rather than to questions of mere academic interest);
4. Are likely to lead to academic publications that advance knowledge of the functioning of economies and the state-of-the-art of CGE modelling;
5. Involve questions that CoPS' models are particularly well-equipped to answer (which has both a community benefit and keep down the cost of undertaking the work); and
6. Are high profile, or particularly profitable.