

**Senate Standing Committee on Economics**

**ANSWERS TO QUESTIONS ON NOTICE**

**Treasury Portfolio**

Budget Estimates, 2 June – 4 June 2009

**Question:** bet 85

**Topic:** Emissions Trading Scheme Models

**Hansard Page:** E106

**Senator Joyce asked:**

**Senator JOYCE**—I will be open. This is the most ridiculous scheme that has ever been concocted, but I have to go to it. When was the last time one of these models actually tracked a prediction with a margin of error of, say, five per cent? You must have done some stringency on this. This thing has been peer reviewed; hasn't it?

**Ms Quinn**—There have been exercises using different models as to how they track history, so I can take that question on notice and provide you with references to the historical calibration of these models.

**Answer:**

The Government's *Australia's Low Pollution Future: The Economics of Climate Change Mitigation* (ALPF) report includes results from three computable general equilibrium (CGE) models: the Global Trade and Environment Model (GTEM); the G-Cubed model; and the Monash Multi-regional Forecasting (MMRF) model. These CGE models are whole-of-economy models that capture the interactions between different sectors of the economy. GTEM and G-Cubed are models of the global economy; whereas, MMRF models the Australian economy with state and territory detail.

Using a suite of models approach provides a natural hedge against the inherent uncertainties of economic modelling. While input assumptions have been harmonised across GTEM, G-Cubed and MMRF, the projections in the three models generated for Australia are not identical. The differences arise primarily from the different structures of the models, and these differences demonstrate the uncertainty surrounding modelling estimates.

The ALPF report estimated the costs of reducing emissions by modelling five scenarios. Scenario modelling using the three CGE models does not predict what will happen in the future. Rather, it is an assessment of what could happen in the future, given the policy settings and input assumptions. Scenarios guide understanding of the impacts of policy, the relativities between different policy options, and the extent to which development paths (technology, preferences and so on) need to shift from current trends.

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However, CGE models are used extensively by researchers, academics and policy analysts to inform government policy decision making. CGE models developed by the Centre of Policy Studies (CoPS) at Monash University including MMRF are used by 400 organisations in over 60 countries. These CGE models developed by CoPS are renowned and respected internationally. For instance, in 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 ethanol competitive with petroleum.

In Australia, CGE models developed by CoPS are used extensively by State and Commonwealth Government Departments. The Productivity Commission (PC) used a version of MMRF to analyse the Potential Benefits of the National Reform Agenda (PC, 2006). CoPS and the PC have also undertaken extensive research into tariff reforms in the motor vehicle and the textile, footwear and clothing industries (CoPS, 2003 and PC, 2008).

The MMRF, G-Cubed and GTEM models have all been used extensively in the climate change policy debate. The MMRF model has recently been used for the National Emissions Trading Taskforce (NETT) to model the economic impacts of a national emissions trading scheme (CoPS, 2008). MMRF has also been used in a report commissioned by the Renewable Energy Generators of Australia (REGA) to estimate the benefits and costs of a low emission generation target in conjunction of an emissions trading scheme (MMA et al., 2007). The G-Cubed model has also recently been applied to examine climate policy issues (McKibbin, W. et al., 2008). GTEM has also been used to examine climate change policy issues relating to agriculture and low emission technologies (Ford, M. et al., 2009 and Gurney, A. et al, 2007).

The three CGE models used in the Government's ALPF report have also been used to analyse the implications to Australia of ratifying the Kyoto Protocol. In 2002, the Commonwealth commissioned two economic models, GTEM and the G-Cubed model to analyse the economic implications of ratifying the Kyoto Protocol and meeting Australia's target of 108 per cent of 1990 emissions over the period 2008-12 (ABARE, 2002 and McKibbin, W., 2002). More recently, the MMRF model has been used for the Government's official stationary energy greenhouse gas emissions projections (Australian Government, 2008).

CoPS has undertaken a historical simulation of the Australian economy to calibrate typically unobservable features of the economy's structure with past experience. A historical simulation was conducted over the period 1996/97 to 2001/02 to estimate the outcomes for sectoral variables describing unobservable features of the economy's structure such as industry production technologies and household taste changes (Giesecke, 2004). These estimates form a key input into CGE models developed by CoPS such as MMRF. The estimates are used in establishing a reference scenario calibrated to historical shifts in household tastes and industry production technologies. Treasury undertake a similar analysis in the MMRF model and estimates on

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household taste change shifts and industry production technologies were used in the ALPF report.

Recently, CoPS has undertaken research into validating a detailed, dynamic CGE model of the U.S. The aim of this research was to assess a CGE forecasting method that has been applied in policy analysis in Australia and the U.S. Data available up to 1998 was used to generate forecasts for 500 U.S. commodities for the period 1998 to 2005.

These forecasts were then compared with actual outcomes and with alternative forecasts derived from extrapolating trends from 1992 to 1998 (Dixon, P. and Rimmer, M. 2009). The paper concluded that forecasts generated by the CGE model at the 500-commodity level comfortably outperformed trends.

CGE models have also found to be useful for understanding economic shocks and how these shocks affect underlying forecasts of the world economy. The G-Cubed model was used in 1997 to analyse the Asian Financial Crisis that emerged in mid 1997. The modelling found that despite large consequences for the Asian economies, flow-on effects to the rest of the world were relatively small (McKibbin, W. and Vines, D. 2001). This finding from the model provided valuable general equilibrium insights that can add further value to partial equilibrium forecasts.

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