



Mini-Symposium / Thematic Session 6

CGE modelling applications

CGE modelling is a practical tool for policy analysis. The CoPS/IMPACT school developed a CGE model of the Australian economy in the 1970s with a focus on trade reform scenarios. Since then, CGE analysis has moved into many policy areas relevant to resource sectors. The international GTAP model has played a key role in broadening the use of CGE analysis. Applications include modelling of climate change, drought, bushfires, cyclones, floods, hypothetical plant and animal disease outbreaks, resource booms, regional labour market scenarios and trade sanctions.

This section will provide four different CGE applications from some of Australia's leading CGE practitioners. Peter Dixon has led the world in enhancing CGE modelling through theoretical developments and adaptations to practical analysis for more than 45 years. He presents on the US meat-processing sector. Peter's colleague at the Centre of Policy Studies (CoPS), Philip Adams, presents CoPS latest report on the regional impacts of decarbonisation in Australia. Tom Kompas is undertaking path-breaking modelling of climate change. He presents some of his findings on the need for transition out of fossil fuels. Finally, Glyn Wittwer, who specializes in sub-national CGE modelling, presents on development of a European TERM model.

Paper 1: Who will pay for workplace reforms in U.S. meat-processing plants? Simulation results from the USAGE model

Peter B. Dixon and Maureen T. Rimmer
Centre of Policy Studies, Victoria University

It is possible that Covid will trigger permanent changes in work practices that increase costs in U.S. meat-processing plants. These changes will be beneficial for the safety and economic welfare of meat-processing workers. However, they will have economic costs. In assessing reform options, policy makers seek guidance from analyses based on models embracing micro detail and an economy-wide perspective. In this paper we use USAGE-Food, a highly disaggregated computable general equilibrium (CGE) model of the U.S., to work out how additional processing costs would be distributed between consumers of meat products and farmers. We also calculate industry and macroeconomic effects. Despite modelling the farmers as owning fixed factors, principally their own labour, we find that the farmer share in extra processing costs is likely to be quite moderate. Throughout the paper, we support simulation results with back-of-the-envelope calculations,

diagrams and sensitivity analyses. These devices identify the mechanisms in the model and key data points that are responsible for the main results. In this way, we avoid the black-box criticism that is sometimes levelled at CGE modelling

Paper 2: Regions do matter in the economics of zero-emissions policy in Australia

Philip Adams

Centre of Policy Studies, Victoria University

This paper focuses on modelling with the Victoria University Regional Model (VURM) of the impacts on the Australian economy and its industries and regions, of achieving net zero greenhouse emissions by 2050. This is timely in the context of the Glasgow Climate Change Conference, at which Australia has committed to net-zero by 2050, albeit with little detail about how it is to be achieved and what its impacts will be on industries and regions. At the national level we find that despite the requirement for deep cuts in emissions, the economy continues to grow strongly in terms of production and employment. For industries, decarbonisation provides an impetus to some, such as industries producing renewable electricity and forestry services. But, there are some industries for which zero-emissions restrains output and employment. Examples include coal-based electricity generation and coal mining. Nationally, vulnerable industries account for less than 4 per cent of aggregate employment. However, some sub-state regions are much more heavily dependent on the vulnerable industries. We identify 9 out of 88 sub-state (SA4) regions as vulnerable in terms of potential loss of employment, including regions such as Hunter in NSW, Fitzroy in QLD and Gippsland in VIC.

Paper 3: The Role of Key Emitters in Meeting Minimal Paris Emissions Targets in a Global Trade and Energy Model

Tom Kompas

Centre of Excellence for Biosecurity Risk Analysis & Centre for Environmental and Economic Research, University of Melbourne

Meeting net-zero emissions targets in 2050 requires major and ongoing reductions in the use of fossil fuels. We focus on the role of major emitters in a large dimensional trade and energy GTAP-CGE model to meet minimal Paris Agreement targets, illustrating the path in emissions reduction and the shift in energy mix from coal, oil and gas to renewables. The model incorporates changes in energy efficiency, energy intensity, falling prices for renewables and the use of a price on carbon to reach the Paris target. Results show that the use of fossil fuels needs to be reduced substantially, by 80-95% in the USA, China and India, with a sustained transition to renewables. Globally, reductions in carbon emissions overall must decrease by at least 3% per year, on average, and coal consumption must fall continuously from 2022 forward.

Paper 4: EuroTERM: sub-national representation of Europe with an illustrative application

Glyn Wittwer

Victoria University

A number of models, notably GTAP, depict the national economies of European nations in a CGE framework. Other partial equilibrium models depict agricultural activities at the sub-national NUTS2 region. The Common Agricultural Policy Regionalized Impact (CAPRI) Model is an example. Sub-national CGE models of Europe until now have been limited to a relatively small number of sectors. EuroTERM represents the 65 sectors of the GTAP master database in 295 regions, including Europe, territorial islands and Iceland. It uses TERM theory and GEMPACK software, aiming to preserve all GTAP detail while extending to the sub-national level. It will provide a template for theoretical extensions and further sectoral disaggregation. An illustrative application concerns economic disruption in 26 Nordic regions.

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