



30 September, 2011

Senator Mathias Cormann  
Chair  
Senate Select Committee on the Scrutiny of New Taxes  
PO Box 6100  
Parliament House  
CANBERRA ACT 2600

Dear Senator Cormann,

**CORRESPONDENCE WITH PROFESSOR ERGAS REGARDING TREASURY'S CARBON PRICE MODELLING.**

On 23 September, at the 13<sup>th</sup> hearing of the Senate Select Committee on the Scrutiny of New Taxes, reference was made to correspondence between Treasury and Professor Henry Ergas regarding technical aspects of Treasury's carbon price modelling. For example, there was discussion around the marginal abatement cost curves in the GTEM model:

"I have here some information that was provided to Mr Ergas since then and it says, and I am quoting here from Treasury advice: In the GTEM model the marginal abatement cost curves are used for the fugitive and industrial process emission sectors—and through these MAC curves they do not result ... in a resource cost for the industry concerned." (Page 4, Senate Select Committee on the Scrutiny of New Taxes, 23 September 2011).

For the benefit of the committee's consideration of these matters please find attached the complete set of questions and answers provided to Professor Ergas on 22 September 2011 via email (See Attachment A).

Yours sincerely

David Gruen  
Executive Director  
Macroeconomic Group

## QUESTIONS RECEIVED FROM PROFESSOR ERGAS AND ANSWERS PROVIDED BY TREASURY

### Question One

Are the marginal abatement cost curves for the GTEM model costed in the climate change modelling for the *Strong Growth, Low Pollution* report. If so, what cost is imputed - is it the same cost as in the MMRF model? How is the cost built into the GTEM model? And, is the cost in the MMRF model the emissions price?

### Answer

Information related to the use of marginal abatement cost (MAC) curves in the computable general equilibrium models used for the *Strong Growth, Low Pollution* report are documented in Appendix B of the modelling report (<http://www.treasury.gov.au/carbonpricemodelling/content/report/11appendixb.asp>).

In the GTEM model the MAC curves are used for the fugitive and industrial process emission sectors, other sectors are modelled through the technology bundle approach. The default option in the GTEM model is for the emission reductions derived through the MAC curves not to result in a resource cost for the industry concerned. This default was used for the results presented in the recently released SGLP report, the previous *Australia's Low Pollution Future* report and previous carbon pricing reports released by the Australian Bureau of Agriculture and Resource Economics (ABARE). In contrast, when an industry takes up an abatement opportunity as represented by the MAC curves in the MMRF model it pays a resource cost. The resource cost is derived as the cost implied at the relevant carbon price resulting from the relevant marginal abatement cost curve.

Treasury has undertaken sensitivity analysis around the MAC curve assumptions in the GTEM model and reported sensitivity results in the *Australia's Low Pollution Future* report (page 158). Adopting the same MAC curve costing methodology in both the GTEM and MMRF models would result in lower mitigation costs for emission-intensive trade-exposed industries within Australia and the Australian economy as a whole than reported in the SGLP report. This result arises for two reasons. First, if the GTEM model were to increase the cost of abatement for overseas industries it reduces any modelled competitiveness impacts of carbon pricing on Australian emission-intensive trade-exposed sectors. Second, raising the costs associated with the MAC curves in the GTEM model results in a lower world carbon price path to achieve any given environmental target as global high emission industries reduce emissions more quickly. This suggests the modelling methodology adopted for the SGLP report is conservative with regards to reported the impact of carbon pricing on Australian industry.

### Question Two

With respect to Canada, Japan, and other Annex 1 countries without an ETS, is it also assumed that they too have abatement costs that are lower than the assumed world price?

### Answer

Abatement costs differ across countries and regions reflecting their different economic structures and abatement opportunities. Table 3.7 of the *Strong Growth, Low Pollution* (SGLP) report shows that the domestic resource costs of a common carbon price, as represented by the GDP impacts, varies across countries/regions. The GNI costs reported in Table 3.7 are a combination of the domestic resource costs and the costs or benefits incurred from purchasing or selling abatement across national borders. The degree of abatement traded by a country reflects both the domestic cost of abatement and the assumed emission reduction target for that country. Table 3.7 suggests that the USA, Japan and EU25 have abatement costs that are lower than the world average, while Canada's abatement costs are higher.

The modelling undertaken in the SGLP report does not rely on an assumption that there is a perfectly harmonised global emission trading scheme. It does, over time, assume that countries take on emission reduction targets through some mechanism. It also assumes that, over time, countries allow individual firms or Government's themselves to trade abatement with firms/governments in other countries through some mechanism. Some such mechanisms are currently in place under the UNFCCC framework.

### *Question Three*

If unemployment goes to the NAIRU, how quickly does it reach it? Given that each year the model gets a shock as the price rises, and assuming a lagged adjustment in the labour market with a lag that is constant over time, why would the unemployment rate ever reach the NAIRU unless the adjustment took less than one year?

### *Answer*

The Monash Multi-Regional Forecasting (MMRF) model, which was used as the unifying model to assess the impact of carbon pricing on the Australian economy, assumes that capital, labour and abatement technologies take time to adjust, capturing the short-term adjustment cost mechanisms in the economy.

The MMRF model, in common with the vast majority of models used to evaluate economic policy, assumes that in the long run, in the absence of any further change in policy, real wages will adjust such that aggregate employment levels return to their pre-policy levels. This assumption reflects the majority theoretical and empirical economic view that the aggregate equilibrium unemployment rate is largely determined by labour market institutions and job search mechanisms and is unlikely to be affected over time by economic factors that alter relative demand for particular industries.

In particular, the MMRF model assumes that it takes between five and ten years for the labour market to adjust following an economic policy change. The difference in adjustment time reflects both the size of the economic policy change, but also which sectors are affected and how any change interacts with other elements impacting on the Australian economy.

If the economy is continually subject to a change, and because the adjustment takes longer than one year, the labour market in a backward-looking model would not return to its initial equilibrium level. However, after the initial introduction of carbon pricing the year to year movements in the carbon price are expected to be relatively small, allowing the labour market to work through most of the initial adjustment over time. In addition, in reality where people expect the carbon price to continue to rise to achieve the required emission reduction targets, it is likely that the labour market adjustment, together with other adjustments in the economy, will occur earlier than reported in backward looking models.