# 4 Alternative modelling assumptions and sensitivity testing

The scale (and potentially direction) of the results reported in the preceding chapters depend on the choice of model parameters and other assumptions. Selective testing has therefore been undertaken to gauge the sensitivity of modelled estimates to parameters and other assumptions. This chapter tests the sensitivity of estimates to:

* the assumption of ‘sticky’ interstate mobility of labour
* capital market adjustment assumptions
* alternative (higher) longer-run import substitution elasticities.

Overall, the sensitivity tests indicate that greater flexibility in product and factor markets increases production possibilities over the longer run for the economy as a whole, after a period of adjustment, from levels that may otherwise be attained.

## 4.1 ‘Sticky’ interstate labour markets

The MMRF model includes a representation of the supply of labour and the demand for labour by eight occupational groups. The model also includes a representation of the movement of labour across jurisdictions. In standard parameter settings, labour is assumed to move unimpeded between jurisdictions according to changes in the relative competitiveness of industries in each state and territory, but subject to changes in the supply of and demand for labour by occupation. Under this treatment, projected *changes* in occupation-specific wages would be the same across the country, although underlying absolute wage levels could differ.

For the purposes of testing the sensitivity of results to alternative assumptions about interstate labour mobility, an alternative parameter value representing ‘sticky’ interstate labour markets has been adopted.[[1]](#footnote-1) This alternative assumption means that changes in occupational wages as well as the deployment of labour can vary between states.

The mobility of labour between regions will influence the degree to which real wages would need to adjust to absorb labour released by the contracting industries and activities. The more constrained (or ‘sticky’) the mobility of labour across regional industries, the greater the adjustment in real wages that would be required to bring about the relocation of labour between existing activities (in the short run) and the encouragement of new activities and investment to absorb labour released from those industries that are contracting (in the longer run).

In the short run, there would be less movement of labour from Victoria and South Australia and fewer resources to expand activity in other jurisdictions. Thus, although there would be less reduction in output and employment in Victoria and South Australia, increases in output and employment in other jurisdictions would be lower relative to the case of greater interstate mobility of labour (figure 4.1).

In the longer term, the reduced movement of labour between jurisdictions limits the extent to which labour migrates to higher-valued uses and industry expansion possibilities. This will increase economywide adjustment costs relative to the case where labour can move unimpeded between jurisdictions. The constrained mobility scenario leads to a smaller projected increase in national output with the cessation of passenger motor vehicle manufacturing — less than a 0.05 per cent increase in GDP — compared to 0.1 per cent assuming the flexible movement of labour (table 4.1).

Table 4.1 Illustrative longer-run effects of closing passenger motor vehicle manufacturing plants in Australia, alternative interstate labour mobility assumptions

Percentage change

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | NSW | Vic | QLD | SA | WA | Tas | NT | ACT | Aust |
| *Flexible interstate mobility of labour* | | | | | | | | | |
| Real gross product | 0.5 | -1.9 | 1.1 | -2.3 | 1.9 | 1.0 | 1.0 | 0.2 | 0.1 |
| Employment | 0.6 | -1.8 | 1.1 | -2.2 | 1.6 | 0.8 | 0.9 | 0.2 | .. |
| Real gross expenditure per person | -0.2 | 0.4 | -0.3 | 0.5 | -0.2 | -0.3 | -0.3 | -0.1 | (+) |
| *Sticky interstate mobility of labour* | | | | | | | | | |
| Real gross product | 0.2 | -0.9 | 0.5 | -1.1 | 0.9 | 0.6 | 0.5 | 0.1 | (+) |
| Employment | 0.2 | -0.7 | 0.4 | -0.8 | 0.5 | 0.4 | 0.4 | 0.1 | .. |
| Real gross expenditure per person | -0.1 | -0.1 | (-) | -0.1 | 0.1 | (-) | -0.1 | -0.1 | (-) |

**..** No change. **(+)** Positive, between 0 and 0.05. **(-)** Negative, between -0.05 and 0.

*Source*: Commission estimates based on the MMRF‑Auto14 model.

Figure 4.1 State employment: illustrative timescale of the state effects of closing passenger motor vehicle manufacturing plants, alternative interstate labour mobility assumptions

‘000 persons

|  |  |
| --- | --- |
| **Victoria** | |
|  |  |
| **South Australia** | |
|  |  |
| **Other jurisdictions** | |
|  |  |
|  | |

*Source*: Commission estimates based on the MMRF-Auto14 model.

At the national level, the upward output effect of sticky regional labour mobility for Victoria and South Australia is more than offset by the downward output effect for other jurisdictions in the short run. Over time, after a period of adjustment, the level of output with flexible interstate mobility of labour would increase relative to the level with sticky regional labour mobility (figure 4.2, right hand panel). The differences at the national level are small relative to the overall level of change occurring (figure 4.2, left hand panel).

Figure 4.2 National output: illustrative timescale of the national effects of closing passenger motor vehicle manufacturing plants, alternative interstate labour mobility assumptions

$ billions 2012-13

|  |  |
| --- | --- |
| Trend estimates | Difference between  Flexible interstate mobility case **and** ‘Sticky’ interstate mobility case |
|  |  |
|  | |

*Source*: Commission estimates based on the MMRF-Auto14 model.

## 4.2 Alternative capital market adjustment assumptions

The modelling of the response of investment to changes in industry competitiveness — reflecting the effects of real depreciation and real wage changes — was undertaken according to three different parameter values that capture different rates of capital accumulation. In the central simulations reported in this chapter, the standard model parameter values were adopted. These standard parameter values assume that capital accumulation in an industry will occur so that the industry rate of return on capital reverts (after an economic shock) to its ‘normal’ level after seven years, all other things being equal. In the sensitivity testing, it was assumed that the adjustment period would extend over a shorter, four to five-year period and a longer, ten to eleven year period.

The capital market adjustment sensitivity tests indicate that the projected time path of change is not sensitive to the parameter value used. This suggests that factors affecting the supply of investment goods (including labour market constraints), rather than demand for those goods, are more important in determining the magnitude of impacts and pace of adjustment to the scenario modelled.

## 4.3 Import substitution elasticities

Traditionally, in computable general equilibrium modelling, the scope for producers and consumers to substitute between domestic and imported supplies has been considered greater in the longer run than from year-to-year. These differences might be due to such factors as the need to assess the relative value of products from alternative sources of supply, re-commit to new supply contracts and develop supply chains. The exact magnitude of these effects on the model parameter values is uncertain, although early studies into import substitution (Armington) elasticity values in Australia indicated that longer-run import substitution elasticities could be twice, or more than twice, the short-run elasticity values (Dixon et al. 1982). To illustrate the impact of higher elasticity values on the estimated longer-run impacts of the shutdown of passenger motor vehicle manufacturing in Australia, the prevailing year-to-year elasticities that have been adopted for the base case have been increased by a uniform factor of two (appendix A).

If such higher elasticity values are to represent substitution possibilities, the projected longer-run impacts of the shutdown of passenger motor vehicle manufacturing plants are broadly similar (albeit slightly higher when measured in terms of gross national expenditure) at the national level than implied by the modelling results based on the benchmark year-to-year elasticity values. If higher elasticity values were to apply, the lower real wage costs would flow through the economy to enable import competing activities in Victoria and South Australia and other jurisdictions to expand more than otherwise. This would offset some of the negative effects of the closure of passenger motor vehicle manufacturing plants — but the impact is negligible. On the other hand, the increase in output and employment in import competing activities would moderate the projected increase in the output of export-orientated activities, such as those located in Queensland and Western Australia. The net effect is set out in table 4.2.

Table 4.2 Sensitivity of longer-run effects of closing passenger motor vehicle manufacturing plants in Australia to higher import substitution elasticities

Percentage change

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | NSW | Vic | QLD | SA | WA | Tas | NT | ACT | Aust |
| Standard elasticities |  |  |  |  |  |  |  |  |  |
| Real gross product | 0.5 | -1.9 | 1.1 | -2.3 | 1.9 | 1.0 | 1.0 | 0.2 | 0.1 |
| Employment | 0.6 | -1.8 | 1.1 | -2.2 | 1.6 | 0.8 | 0.9 | 0.2 | .. |
| Real gross state expenditure per person | -0.2 | 0.4 | -0.3 | 0.5 | -0.2 | -0.3 | -0.3 | -0.1 | (+) |
| *Difference between Higher elasticities case and Standard elasticities cases* | | | | | | | | | |
| Real gross product | (+) | (+) | (-) | (+) | (-) | (-) | (-) | (-) | (-) |
| Employment | (+) | (+) | (-) | (-) | (-) | (-) | (-) | (-) | .. |
| Real gross state expenditure per person | (-) | (-) | (+) | (+) | (+) | (+) | (+) | (+) | (+) |

**..** No change. **(+)** Positive, between 0 and 0.05. **(-)** Negative, between -0.05 and 0.

*Source*: Commission estimates based on the MMRF‑Auto14 model.

1. The flexible movement of labour between states and territories is represented by a transformation parameter value of 20, while sticky interstate mobility is represented by a parameter value of 1. [↑](#footnote-ref-1)