

# **The Textile, Clothing and Footwear Sector from 1997 to 2020 and the Effects of Reductions in Assistance**

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## Summary

### *The MONASH model*

- This paper reports results from the MONASH model on recent developments in TCF industries and on prospects to 2020 with and without reductions in assistance in 2010.
- MONASH can be used in historical mode to estimate: changes in industry technologies including multi-factor-productivity growth; changes in household preferences between different goods; and changes in industry and household preferences between imported and domestic varieties of given goods.
- Results from MONASH historical simulations can be used in explaining the performance of an industry, for example, the extent to which employment and output growth in the industry was hindered by twists and shifts. Twists refer to changes in household and industry preferences between imported and domestic products. For example, a twist in household preferences towards imported TCF products means that households increase the import share of their TCF purchases by more than can be explained by changes in relative import/domestic prices. Shifts refer to changes in household and industry preferences towards or away from a product without regard to the distinction between the domestic and imported varieties. For example, a shift in household preferences away from TCF products means that households reduce the TCF share of their total expenditures by more than can be explained by changes in TCF prices relative to other prices and by changes in household income.
- MONASH can be used to generate forecasts that take account of: macro scenarios produced by macro specialists such as Access Economics; commodity export volumes and prices projected by ABARE; tourism numbers forecast by the Bureau of Tourism Research; and technology and preference trends extrapolated from historical simulations.
- MONASH generates the effects of proposed policy changes as deviations away from basecase-forecast paths. This enables MONASH to recognise that post-2005 assistance changes for the TCF industry will impinge on an economy with a distinctly different structure from that of the recent past. In assessing the effects of reductions in TCF assistance in 2010 for example, it is

important to recognise that the share of Australia's employment that is accounted for by the TCF sector is declining and will be significantly smaller in 2010 than it was in 1997, the most recent year for which there is a published ABS input-output table. The use of realistic forecasts as a basecase for policy analysis is also important in assessing adjustment costs. Such costs depend on whether industries that are adversely affected by a proposed policy change are likely to be growing or contracting.

### ***Macro performance and the performance of the TCF sector from 1997 to 2002***

- From 1997 to 2002, Australia achieved average annual growth rates in real GDP and consumption of about 4 per cent. Despite this, the TCF sector suffered declines in output and employment at average annual rates of about 2.5 and 6.5 per cent.
- Within the sector, the worst performing industry was Clothing with average annual rates of output and employment decline of 7.6 and 12.3 per cent. Output and employment in Footwear declined at average annual rates of 7.2 and 7.7 per cent. The only industry in the TCF sector that experienced growth in both output and employment was Textile products.
- MONASH explains the performances of TCF industries in terms of a number of factors including:
  - (a) twists in user preferences between domestic and imported varieties;
  - (b) changes in the relative purchasers' prices of imported and domestic varieties caused by changes in c.i.f. foreign-currency prices of imports, changes in the exchange rate, changes in tariffs, changes in prices of inputs to the TCF industries, and changes in quantities of inputs per unit of output (multi-factor-productivity growth);
  - (c) shifts in household and industry preferences in favour or against the use of TCF products; and
  - (d) changes in foreign demands for Australian exports of TCF products.
- Overall, our analysis of the period from 1997 to 2002 suggests that the performance of the TCF sector was strongly influenced by twists in preferences between imported and domestic varieties. Twists in preferences in favour of imported varieties were the major factor explaining the poor performances of Clothing and Footwear. It appears that supplying countries to

Australia, e.g. China, were able to make products that were regarded increasingly by Australian consumers as attractive and of good quality. These products were supplied without commensurate increases in prices, possibly reflecting improved production technologies and marketing. Clothing and Footwear also suffered from adverse shifts in consumer preferences. This is part of a long-term trend by Australian households towards casual, cheap clothing and footwear.

- Unlike other TCF industries, the expenditure elasticity of demand for the output of the Textile products industry is high. Thus, the industry benefited between 1997 and 2002 from rapid growth in aggregate consumption. The industry also benefited from shifts in consumer preferences towards Textile products and from preference twists against imported varieties of these products.
- Exports of all TCF products declined between 1997 and 2002. This had particularly adverse consequences for Leather products and Textile fibres and yarns. Exports are a major part of the sales of these two industries.
- Another negative influence on Textile fibres and yarns was deterioration in competitiveness, that is, an increase in the purchasers' price of the domestic variety relative to the purchasers' price of the imported variety.
- Apart from Textile fibres and yarns, all other TCF industries experienced improvements in competitiveness. This was mainly the result of devaluation of the Australian dollar. For Clothing and Knitting mills, improvement in competitiveness was assisted by strong multi-factor-productivity growth. For Textile products, Footwear and Leather products, improvement in competitiveness was assisted by rapid growth in c.i.f. foreign-currency prices of imports.

### ***Macro forecasts and forecasts for the TCF sector from 2002 to 2020***

- TCF employment in Australia is likely to continue to decline over the next couple of decades.
- International conditions are likely to be less favourable to the TCF sector over our forecast period, 2002 to 2020, than they were in the period 1997 to 2002. We do not expect continuing devaluation of Australia's real exchange rate or

further sharp increases in foreign currency c.i.f. prices of imported TCF products.

- Employment in the TCF sector declined at an average annual rate of about 6.5 per cent over the period 1997 to 2002. We expect a slower rate of decline over the forecast period. This forecast is based mainly on the idea that the preference twists towards imports that occurred between 1997 and 2002 were abnormally large. With preference twists more in line with historical trends from the mid-1980s, the annual rate of employment decline in the sector will be limited to about 3.9 per cent.
- Another positive factor in our TCF forecasts relative to recent history is exports. Whereas TCF exports declined over the period 1997 to 2002, we expect some growth in the forecast period. This will be in line with the experience since the mid-1980s.
- Within the TCF sector, Leather products has the best growth prospects. This industry relies mainly on export demand. The industry with the worst prospects is Footwear which produces commodities that are highly substitutable with imports from low-cost countries.

***Policy analysis: the effects of reducing TCF assistance***

- We model the effects of cutting tariffs on all TCF products to 5 per cent in 2010 and abolishing the Strategic Investment Program (SIP). We treat the abolition of the SIP as equivalent to the elimination of a production subsidy.
- Because margins (wholesale, retail and transport costs) are a major part of the purchasers' prices of TCF products, especially Footwear and Clothing, the modelled cuts in TCF assistance would have only a muted effect on the relative purchasers' prices of imported and domestic TCF products. We estimate that the modelled cuts would reduce the average purchasers' price of imported TCF products by about 2.4 per cent relative to that of domestic TCF products.
- On average, the modelled cuts in assistance would reduce employment and output in TCF industries by about 4 per cent. This means that the number of jobs in the TCF sector in 2010 would be about 1,590 less with implementation of the modelled cuts than it would be without the cuts.

- Because TCF employment is declining in our basecase forecasts, the number of TCF jobs eliminated by implementation of the modelled cuts in assistance also declines. By 2020, our analysis shows that TCF employment would be 1,080 less with implementation of the modelled cuts in 2010 than it would be without the cuts.
- Within the TCF sector, the industry that is likely to be worst affected by cuts in assistance is Footwear. Because Australian footwear is highly substitutable for imported footwear, employment and output in the industry is highly sensitive to changes in relative import/domestic prices. The modelled cuts in assistance would be likely to reduce Footwear employment by about 9 per cent.
- The TCF industries that would be least affected by cuts in assistance are Leather products and Textile products. Both these industries export a high proportion of their output.
- Outside the TCF sector, export-oriented industries (e.g. mining and agriculture) and import-competing industries (e.g. Spirits) would benefit from real devaluation associated with cuts in TCF assistance. However, the benefits would be small. In the MONASH results, none of these industries show an increase in output of more than 0.2 per cent.
- Industries outside the TCF sector that would lose from cuts in TCF assistance include Sheep, Cotton and Agricultural services. All of these industries have a significant dependence on either direct or indirect sales to the TCF sector.
- Victoria would experience a small long-run decline in employment (about 0.02 per cent) from implementation of the modelled cuts in TCF assistance. This reflects the concentration of the TCF sector in Victoria. All other States and Territories would make small long-run gains in employment.
- At the Statistical Division level, the worst affected regions would be Melbourne, Barwon and Wimmera (all in Victoria). These areas have higher dependence on TCF employment than any other Statistical Divisions. However, even for these areas, the reductions in overall employment in the long run from the modelled cuts in TCF assistance are projected to be no more than 0.04 per cent.
- The Statistical Divisions that would benefit most from the modelled cuts in TCF assistance are those specialising in agricultural and mineral exports.

These include Kimberley (WA), Pilbara (WA), Northern (SA), Goldfields (WA), and Northwest (QLD).

- The macroeconomic effects of the modelled cuts in TCF assistance would be negligible. We project a permanent reduction in aggregate consumption of about 0.01 per cent. In today's terms, this is a loss in consumption in each year of about \$41 million.
- The negative consumption effect is the net result of a negative terms-of-trade effect and a positive resource-allocation effect.
- With cuts in TCF assistance, there would be an outward movement in Australia's export-supply curves arising from real devaluation. Because Australia faces downward sloping demand curves for its products, the resulting increase in exports volumes would reduce foreign-currency export prices and consequently reduce the terms of trade. This would have a small negative effect on Australia's standard of living.
- On the other hand, cuts in TCF assistance would improve resource allocation in Australia, with a resulting positive effect on standards of living. Resource allocation is improved when capital and labour are moved away from activities in which output per unit of input, valued in international prices, is low towards activities in which the opposite is true. In theory, this happens when resources are moved from protected import-competing industries to unprotected export-oriented industries. However, we estimate that gains from improved resource allocation would be very small. This is for two reasons. First, the modelled cuts in TCF assistance would be operating on assistance levels that are already quite low. Second, in 2010 and in the following decade, imports are likely to have the major shares of sales in most parts of the Australian TCF market, even without the modelled cuts in assistance. In these circumstances, cuts in TCF assistance would cause little additional movement in resources out of the TCF sector. Put more technically, once imports occupy a large share of the market, the elasticity of demand for imported TCF products will be quite low so that cuts in TCF assistance would have limited stimulatory effects on TCF imports.
- Whether the negative terms-of-trade effect outweighs the positive resource-allocation effect depends on the elasticity of foreign demand for Australian exports. In the present context, for the positive resource-allocation effect to win, the export demand elasticities would need to be very high. With values

that we think are realistic, e.g. -4, the negative terms-of-trade effect dominates the positive resource-allocation effect.

- In studying adjustment costs, we compare results under two treatments of the labour market. In the first treatment, we assume that cuts in TCF assistance will have no effect on aggregate employment. Thus we introduce wage flexibility into the MONASH simulations such that reductions in TCF employment are immediately offset by gains in employment in the rest of the economy. In the second treatment, we assume that wages are sticky in the short run. Under this assumption, policy changes that reduce (increase) the value of the marginal product of Australian workers cause short-run reductions (increases) in aggregate employment.
- Because TCF employment is falling, adjustment in the TCF sector to lower rates of assistance will require retrenchments, not simply lower rates of hiring. However, analyses conducted under the assumption of fixed aggregate employment are unlikely to reveal large adjustment costs. Costs imposed on people who lose from elimination of TCF jobs are likely to be offset by benefits accruing to people who gain from extra jobs outside the TCF sector.
- Adjustment cost become non-negligible under the assumption of sticky wages. Reductions in employment in the TCF industries cause direct losses of income in the TCF industries and in supplying industries. This in turn causes reductions in consumption and further reductions in employment. With sticky-wage responses and an effective loss in labour productivity (terms-of-trade losses outweighing allocation gains) these reductions in employment are not immediately accompanied by compensating economy-wide employment-creating cost reductions. Recovery in aggregate employment must wait until wages eventually fall. Under the sticky-wage assumption we estimate that one-off adjustment costs in 2010 (the implementation year for the modelled cuts in TCF assistance) in the form of increased unemployment could be about \$100 million.
- The analysis in this paper does not provide support for the modelled cuts in TCF assistance. However, the scope of the paper is limited. For example, it does not encompass the possible effects of Australia's TCF policies on the trade policies of other countries or on productivity in Australia's TCF sector. Because the net cost of cuts in TCF assistance arising from the factors we have

identified is small, it would not be surprising if cuts could be justified via arguments outside our scope.

## **1. Introduction**

This paper analyses three aspects of the Australian TCF sector: recent history; prospects to 2020; and effects of proposed cuts in assistance.

The paper is organised as follows. Section 2 discusses the performance of the sector from 1997 to 2002. We use an historical simulation with the MONASH model to deduce recent trends in TCF technology and in household and industry preferences for imported and domestic TCF products. Section 3 presents results for the TCF sector from a MONASH forecast simulation for the period 2002 to 2020. The forecasts in section 3 are the basecase for policy analysis presented in section 4. The policy analysis is concerned with the deviations away from the basecase that would be caused by reducing all TCF tariffs to 5 per cent in 2010 and by eliminating the SIP. Results presented in section 4 cover: employment and output in the TCF sector; employment and output in the TCF industries; output in non-TCF industries; employment in States and Territories and in sub-state regions; the macro economy and aggregate welfare; and adjustment costs. An appendix to section 4 contains a discussion of export-demand elasticities. Concluding remarks are in section 5. These are brief because a comprehensive summary of the paper including results has already been presented.

The paper relies heavily on MONASH simulations. MONASH is a large dynamic model embracing many economic mechanisms. The model has been documented in detail in Dixon and Rimmer (2002). However, we do not require readers to have any knowledge of MONASH. Throughout the paper we provide explanations of all major results in terms of mechanisms that will be familiar to economists. In many places these explanations are supplemented by back-of-the-envelope calculations.

## 2. Macro performance and the performance of the TCF sector from 1997 to 2002

### 2.1. Macro performance

The first column of Table 1 shows average annual growth rates for a selection of macro variables for the period 1997 to 2002. Table 2 shows TCF variables for the same period.

Table 1 indicates that our historical period (1997 to 2002) was one of rapid growth, with GDP, employment and capital increasing at average annual rates of 3.85 per cent, 1.91 per cent and 3.79 per cent. Real private consumption and investment increased at even faster rates, 4.04 per cent and 6.07 per cent. The input of primary factors (a weighted average of labour and capital inputs with weights of 0.7 and 0.3) grew at an average annual rate of 2.47 per cent ( $=0.7*1.91+0.3*3.79$ ). With GDP growing at an annual rate of 3.85 per cent, annual primary-factor-productivity growth was 1.38 per cent ( $=3.85-2.47$ ).

Because, in the long run, rates of return on capital are determined by world rates of return, we would expect all of primary-factor-productivity growth to accrue eventually to labour in the form of higher wages. Thus, primary-factor-productivity growth at the rate achieved in the historical period is sufficient to support long-run growth in the average real wage rate of 1.97 per cent ( $=1.38/0.7$ , recall that 0.7 is the labour share in GDP). Further sustained growth in real wage rates is made possible by favourable terms-of-trade movements. In the historical period, the average annual rate of increase in the terms of trade was 0.84 per cent. With exports being about 20 per cent of GDP, this rate of terms-of-trade improvement generates potential for long-run wage increases at the rate of 0.24 per cent ( $=0.84*0.2/0.7$ ). In combination, we would expect the improvements in primary-factor productivity and the terms of trade that took place in the historical period to generate growth in real wage rates of 2.21 per cent a year ( $=1.97+0.24$ ). The actual rate of growth in real before-tax wage rates was only 1.63 per cent a year.

Relatively slow growth in the real before-tax wage rate is consistent with the introduction of the GST package. This involved a switch towards indirect taxes and away from direct taxes. The substitution of indirect taxes for direct taxes has the effect of lowering real *before-tax* wage rates. It also seems likely that subdued wage growth in the historical period was associated with increased rates of return in Australian businesses. This is consistent with observed strong growth in investment.

*Table 1: Macro economic indicators, 1997-2020, average annual growth rates, per cent*

	1997-02	2002-20
Real GDP	3.85	3.16
Employment	1.91	1.30
Capital stock	3.79	3.89
Real consumption	4.04	3.07
Real investment	6.07	3.34
Real government expenditure	3.64	2.74
Real exports	4.09	5.92
Real imports	5.49	5.85
Real devaluation	1.93	-0.74
Terms of trade	0.84	-0.14
Real wages	1.63	1.50
Consumer price index	2.89	1.86
Exchange rate	-3.38	0.24

## 2.2. TCF performance

To assist in the analysis of recent developments in TCF industries, we conducted a MONASH historical simulation for the period 1997 to 2002. In an historical simulation we force the model to reproduce observed outcomes for a wide range of both macro and industry variables. For the TCF industries our historical simulation reproduced observed outcomes for:

- output;
- employment;
- investment;
- import prices and quantities; and
- export prices and quantities.

In historical simulations we equip MONASH with sufficient flexibility to track history by allowing the model to adjust variables describing changes in tastes, changes in technologies and shifts in demand curves. In this way, our historical simulations provide estimates of movements in these unobservable variables.

By giving the model data for the period 1997 to 2002 on supplies (output *plus* imports *minus* exports) of TCF products to the domestic market, we enable it to generate estimates of shifts in consumer preferences and industry technologies in favour or against these products. As mentioned in the summary, a shift in household preferences away from TCF products means that households reduce the TCF share of their total expenditures by more than can be explained by changes in TCF prices relative to other prices and by changes in household income.

By giving the model data on supplies of domestic (output *minus* exports) and imported TCF products, we enable it to generate estimates of twists in user preferences in favour or against imported varieties. As mentioned in the summary, a twist in household preferences towards imported TCF products means that households increase the import share of their TCF purchases by more than can be explained by changes in relative import/domestic prices.

By giving the model data on outputs and inputs (via data on employment and investment) we enable it to generate estimates of changes in multi-factor productivity. This refers to changes in output per unit of input where input is a combination of labour, capital and materials.

Finally, by giving the model data on export volumes, we enable it to generate estimates of shifts in foreign demand curves for Australian TCF products.

Estimates of shifts, twists, multi-factor productivity and demand movements not only become the basis for discussing the historical performance of an industry, but also play an important role in forecasting. In forecasting, we treat each of these factors as an independent force. Then in making forecasts we think about each factor separately, trying to decide whether it will operate more or less strongly than in the past or at the same level.

Table 2 shows data for the TCF sector and component industries for the period 1997 to 2002 and results for this period from the historical simulation. In the remainder of this section we discuss the TCF sector for period 1997 to 2002, starting with the sector as a whole and then moving to individual industries.

*The TCF sector, 1997 to 2002*

<b>Output, average annual percentage growth</b>	<b>-2.45</b>
<b>Employment, average annual percentage growth</b>	<b>-6.55</b>
<i>Negative factors</i>	
<b>Strong twist in user preferences towards imports</b>	
<b>Slight shift in household preferences against TCF</b>	
<i>Positive factors</i>	
<b>Improvement in price competitiveness from devaluation, multi-factor productivity growth &amp; rapid growth in foreign currency (\$f) import prices</b>	
<b>Rapid growth in aggregate consumption but low expenditure elasticity</b>	

Despite rapid growth in GDP and consumption, 1997 to 2002 was a period of decline in the TCF sector. As can be seen in Table 2, output and employment contracted at average annual rates of 2.45 and 6.55 per cent. By the end of the period, TCF employment was nearly 30 per cent less than at the beginning of the period.

The MONASH historical simulation identifies two factors as explaining the weak performance of the sector. First, for most of the sector's products there were strong twists in user preferences in favour of imports and against domestic varieties. These twists reduced the rate of growth of domestic demand for domestic TCF products by 10.7 percentage points a year (row 5, Table 2).<sup>1</sup> It appears that supplying countries to Australia, e.g. China, were able to make products that were regarded increasingly by Australian consumers as attractive and of good quality.

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<sup>1</sup> Preference twists do not affect the overall demand for TCF products. In the absence of relative price changes and other changes affecting demand for TCF products, the percentage changes in the demand for domestic and imported TCF products (d and m) satisfy the equations  $S_m * m + (1 - S_m) * d = 0$  and  $m - d = \text{twist}$ , where  $S_m$  is the share of imports in TCF sales in Australia. From these two equations, we obtain  $d = -S_m * \text{twist}$ . In the historical simulation the annual twist in favour of imported TCF products was about 25 per cent and the import share in TCF sales in 1997 was 43 per cent. Thus the twist in favour of imports reduced the growth in domestic demand for domestic TCF products by about 11 percentage points a year ( $= 0.43 * 25$ ).

**Table 2 Performance of TCF industries, 1997-2020**

	Fibre & yarn	Fibre & yarn	Textile prod.	Textile prod.	Knitting mills	Knitting mills	Clothing	Clothing	Footwear	Footwear	Leather prod	Leather prod	TCF	TCF
<i>per cent, average annual</i>	1997-02	2002-20	1997-02	2002-20	1997-02	2002-20	1997-02	2002-20	1997-02	2002-20	1997-02	2002-20	1997-02	2002-20
1. Industry output	-0.20	<b>1.78</b>	5.20	<b>2.26</b>	1.50	<b>0.25</b>	-7.60	<b>-1.97</b>	-7.20	<b>-5.24</b>	-2.40	<b>2.79</b>	-2.45	<b>0.48</b>
2. Labour input	-7.00	<b>-5.38</b>	5.30	<b>-0.46</b>	-3.20	<b>-4.98</b>	-12.30	<b>-6.68</b>	-7.70	<b>-5.88</b>	-2.30	<b>1.62</b>	-6.55	<b>-3.92</b>
3. Capital	0.70	<b>0.02</b>	5.82	<b>6.42</b>	2.41	<b>1.08</b>	-0.15	<b>-2.16</b>	0.72	<b>-0.65</b>	2.80	<b>6.74</b>	1.93	<b>3.14</b>
4. Multi-factor productivity	1.18	<b>0.83</b>	-0.28	<b>-0.01</b>	0.81	<b>0.65</b>	0.74	<b>0.59</b>	0.04	<b>0.05</b>	-0.13	<b>0.00</b>	0.60	<b>0.45</b>
5. Impact of dom/imp twist <sup>(a)</sup>	-0.38	<b>-0.38</b>	-2.49	<b>-2.49</b>	-5.95	<b>-5.95</b>	-19.14	<b>-10.00</b>	-21.94	<b>-10.00</b>	-5.88	<b>-5.88</b>	-10.70	<b>-5.95</b>
6. Taste/technology shift <sup>(b)</sup>	1.36	<b>1.36</b>	1.00	<b>1.00</b>	2.53	<b>2.53</b>	-1.84	<b>-1.84</b>	-1.52	<b>-1.52</b>	-0.91	<b>-0.91</b>	-0.22	<b>-0.16</b>
7. Purchasers' price, domestic	8.91	<b>0.95</b>	3.51	<b>1.68</b>	4.30	<b>1.26</b>	5.29	<b>1.30</b>	5.65	<b>1.96</b>	8.48	<b>1.80</b>	5.60	<b>1.37</b>
8. Purchasers' price, imports	7.69	<b>-0.04</b>	5.42	<b>1.26</b>	6.13	<b>1.09</b>	6.21	<b>1.09</b>	6.69	<b>0.85</b>	8.69	<b>1.24</b>	6.81	<b>0.87</b>
9. Imports, volume	-4.30	<b>1.78</b>	2.30	<b>6.55</b>	4.10	<b>6.86</b>	9.50	<b>1.65</b>	5.20	<b>1.70</b>	-1.40	<b>1.74</b>	2.97	<b>2.57</b>
10. Exports, volume	-8.10	<b>-1.59</b>	-3.20	<b>4.64</b>	-4.10	<b>6.43</b>	-2.90	<b>4.74</b>	-0.30	<b>2.14</b>	-3.10	<b>4.30</b>	-5.38	<b>2.23</b>
<b>\$m</b>	1997	<b>2002</b>	1997	2002	1997	2002	1997	2002	1997	2002	1997	2002	1997	2002
Output	2994	<b>3133</b>	1689	<b>2710</b>	931	<b>1125</b>	4206	<b>3453</b>	599	<b>532</b>	903	<b>960</b>	11322	<b>11912</b>
Value added	756	<b>995</b>	540	<b>953</b>	304	<b>341</b>	1172	<b>935</b>	214	<b>189</b>	141	<b>204</b>	3127	<b>3617</b>
Labour	542	<b>473</b>	387	<b>625</b>	225	<b>239</b>	943	<b>616</b>	181	<b>153</b>	126	<b>141</b>	2404	<b>2246</b>
Capital	103	<b>83</b>	75	<b>160</b>	25	<b>28</b>	80	<b>38</b>	13	<b>9</b>	7	<b>8</b>	302	<b>326</b>
Imports	1685	<b>1997</b>	673	<b>1126</b>	401	<b>670</b>	2034	<b>4381</b>	608	<b>1148</b>	541	<b>863</b>	5942	<b>10184</b>
Exports	1606	<b>1115</b>	204	<b>214</b>	81	<b>73</b>	775	<b>791</b>	64	<b>79</b>	687	<b>704</b>	3418	<b>2975</b>
Domestic sale of domestic products	1388	<b>2018</b>	1485	<b>2496</b>	850	<b>1052</b>	3431	<b>2662</b>	535	<b>453</b>	216	<b>257</b>	7904	<b>8937</b>

(a) These are the average annual impacts of twists in domestic/import preferences on domestic demand for the domestic product. They are measured as  $-S_m^*$ twist, see footnote 1 in the text.

(b) An entry of  $x$  in this row means that industries increase their use of the relevant product by  $x$  percentage points more per year than would be expected on the basis of changes in output levels and prices, and that households increase their use of the relevant product by  $x$  percentage points more per year than would be expected on the basis of changes in income, population and prices.

Second, there were shifts in user preferences against TCF products (0.22 per cent a year, row 6, Table 2). This is part of a long-term trend by Australian households towards casual, cheap clothing and footwear. The sector was saved from an even weaker performance by improved price competitiveness (compare rows 7 and 8) arising from devaluation (see Table 1) and surprisingly strong growth in the foreign-currency import prices of some TCF products.

*Clothing, 1997 to 2002*

<b>Output, average annual percentage growth</b>	<b>-7.60</b>
<b>Employment, average annual percentage growth</b>	<b>-12.30</b>
<i>Negative factors</i>	
<b>Huge twist in user preferences towards imports</b>	
<b>Shift in household preferences against clothing</b>	
<i>Positive factors</i>	
<b>Improvement in price competitiveness from devaluation</b>	
<b>&amp; multi-factor productivity growth</b>	
<b>Rapid growth in aggregate consumption but low expenditure elasticity</b>	

Within the TCF sector, the industry that experienced the most rapid declines in output and employment was Clothing with average annual rates of growth of -7.6 and -12.3 per cent. The MONASH historical simulation identifies the major reason for the contraction in the Australian Clothing industry as a strong twist in user preferences in favour of imported clothing and against domestically produced clothing. As can be seen from line 5 of Table 2, the average annual twist in favour of imports reduced growth in domestic demand for domestic clothing by 19.14 percentage points a year.

Another negative (but relatively mild) influence on the Australian clothing industry was a general shift in household preferences and industrial technologies against the use of clothing. Line 6 of Table 2 shows a shift in preferences and technologies of -1.84 per cent a year. This implies that household and industry demand functions for clothing (not distinguished by domestic and import) moved to the left by 1.84 per cent a year.

Together the shift in technologies and preferences against clothing and the preference twist against domestic clothing reduced domestic demand for domestic

clothing by 20.98 per cent a year ( $= 19.14+1.84$ ). That the rate of decline in clothing output was restricted to 7.6 per cent a year can be explained by four features of the MONASH theory and of the data for 1997 to 2002.

First, MONASH allows factors apart from changes in household and industry preferences to affect import/domestic choice. These factors include general business-cycle phenomena which favour domestic products during periods of growth decrease. We also assume that ready availability of supply operates in favour of domestic products in industries such as clothing that are contracting rapidly relative to GDP.

Second, over the period 1997 to 2002 consumer prices for imported clothing increased by 6.21 per cent a year whereas consumer prices for domestic clothing increased by only 5.29 per cent a year. The price of imported clothing was increased by devaluation of the Australian dollar (Table 1), and growth in the price of domestic clothing was restricted by growth in multi-factor productivity<sup>2</sup> (0.74 per cent a year). In MONASH, the substitution elasticity between domestic and imported clothing is 2.8. Thus the 0.9 per cent change in relative prices ( $= 6.21-5.29$ ) caused an average annual decrease in the import/domestic ratio in clothing purchases of 2.58 per cent ( $= 2.8*0.9$ ). This increased domestic demand for domestic clothing by 0.96 per cent a year ( $=0.37*2.58$ ).

A third factor that contributed positively to output growth in the Clothing industry was rapid overall growth in domestic consumption (4.04 per cent a year, Table 1). However, clothing expenditure is relatively insensitive to consumption growth. In MONASH, the expenditure elasticity of demand for clothing is only 0.25. Thus, growth in aggregate consumption has only a muted effect on consumption of clothing.

A final factor that limited the rate of decline in the output of domestic clothing was exports. Although exports contracted, the rate of contraction (2.9 per cent a year) was less than the rate of decline in domestic demand for domestic clothing (8.3 per cent a year).

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<sup>2</sup> Multi-factor-productivity growth is the difference between the rate of growth of output and the rate of growth of inputs. The rate of growth of inputs is a cost-share-weighted average of the rates of growth of inputs of labour, capital and materials.

### *Footwear, 1997 to 2002*

<b>Output, average annual percentage growth</b>	<b>-7.20</b>
<b>Employment, average annual percentage growth</b>	<b>-7.70</b>

#### *Negative factors*

- Huge twist in user preferences towards imports**
- Shift in household preferences against footwear**

#### *Positive factors*

- Improvement in price competitiveness from devaluation  
& rapid growth in \$f import price**
- Rapid growth in aggregate consumption but low expenditure elasticity**

The story for Footwear is quite similar to that for Clothing. Output and employment in Footwear declined rapidly (7.2 and 7.7 per cent a year). The decline in output was mainly the result of a sharp twist in user preferences in favour of imports. In addition, there was a relatively minor negative contribution from a shift in household and industry preferences against footwear (1.52 per cent a year). On the positive side, the Footwear industry benefited from an improvement in its price competitiveness (6.69 per cent increase in purchasers' prices of imported footwear compared with 5.65 per cent increase in purchasers' prices of domestic footwear). This improvement in price competitiveness was particularly valuable because the substitution elasticity between domestic and imported footwear is high, 6.8. Although the Footwear industry achieved almost no improvement in multi-factor productivity (0.04 per cent a year), the improvement in its price competitiveness (1.04 per cent a year) was about the same as that for Clothing (0.92 per cent a year). This was because the foreign currency price of footwear rose relative to that of clothing. As with Clothing, the household expenditure elasticity of demand for Footwear is low and consequently the industry benefited to only a small extent from rapid growth in aggregate consumer spending. Exports of footwear contracted, but because the rate of contraction was low (0.3 per cent a year), this limited the rate of decline of the industry's output.

### *Knitting mills, 1997 to 2002*

<b>Output, average annual percentage growth</b>	<b>1.50</b>
<b>Employment, average annual percentage growth</b>	<b>-3.20</b>
<i>Negative factors</i>	
<b>Medium twist in user preferences towards imports</b>	
<b>Decline in exports</b>	
<i>Positive factors</i>	
<b>Shift in preferences towards knitting mills</b>	
<b>Improvement in price competitiveness from devaluation</b>	
<b>&amp; multi-factor productivity growth</b>	
<b>Rapid growth in aggregate consumption but low expenditure elasticity</b>	

Knitting mills is another TCF industry that suffered from a strong twist in favour of imports (with a negative impact effect on demand growth of 5.95 percentage points a year). Nevertheless, the industry was able to achieve positive output growth (1.5 per cent a year) and a relatively slow rate of decline in employment (3.2 per cent a year). Unlike Clothing and Footwear, Knitting mills benefited from a shift (2.53 per cent a year) in household preferences and industry technologies in favour of its products. In common with Clothing and Footwear, Knitting mills experienced an improvement in its price competitiveness (1.83 per cent average annual increase in the price of imports relative to that of domestic products, = 6.13-4.30). This improvement in price competitiveness was underpinned by growth in multi-factor productivity of 0.81 per cent a year. However, the benefit to the industry of improved price competitiveness was limited by relatively low substitutability between domestic and imported knitting mill products. Knitting mill exports declined, providing a negative influence on output growth in the industry. As with most other products in the TCF sector, the expenditure elasticity of demand for knitting mill products is low (0.25). This means that the industry derived only moderate stimulation from the rapid growth in aggregate consumption.

*Textile products, 1997 to 2002*

<b>Output, average annual percentage growth</b>	<b>5.20</b>
<b>Employment, average annual percentage growth</b>	<b>5.30</b>
<i>Negative factors</i>	
<b>Small twist in user preferences towards imports</b>	
<b>Decline in exports</b>	
<i>Positive factors</i>	
<b>Rapid growth in aggregate consumption combined with high expenditure elasticity</b>	
<b>Shifts in preferences &amp; technology towards textile products</b>	
<b>Improvement in price competitiveness from devaluation &amp; rapid growth in \$f import price</b>	

Textile products suffered from a small twist in favour of imports (with an impact effect of -2.49 percentage points a year). Despite this, the industry achieved rapid growth in output and employment (5.2 and 5.3 per cent a year). The industry was assisted by a shift in technologies and consumer preferences towards its products (1.00 per cent a year). More importantly, the household expenditure elasticity of demand for textile products is high (1.24), and consequently the industry was strongly stimulated by rapid growth in aggregate consumption. As in the case of Footwear, the Textile products industry had a relatively poor performance on multi-factor productivity (a decline of 0.28 per cent a year) but experienced an improvement in price competitiveness (1.91 per cent a year, = 5.42-3.51) via devaluation and rapid growth in the foreign currency price of competing imports. The substitution elasticity between domestic and imported textile products is relatively low (1.8), limiting the benefit to the industry of its improvement in price competitiveness. A negative influence on the industry's output was a decline in exports (3.2 per cent a year).

*Textile fibres and yarns, 1997 to 2002*

<b>Output, average annual percentage growth</b>	<b>-0.20</b>
<b>Employment, average annual percentage growth</b>	<b>-7.00</b>

*Negative factors*

**Decline in exports**

**Deterioration in price competitiveness despite devaluation, rapid growth in \$f import price & good multi-factor productivity**

*Positive factors*

**Shift in preferences and technology towards textile fibres and yarns**

**Rapid growth in aggregate consumption but low expenditure elasticity**

In the MONASH historical simulation, Textile fibres and yarns gained from: a shift in technologies and preferences towards its products (1.36 per cent a year); and strong growth in multi-factor productivity (1.18 per cent a year). The industry also gained from strong growth in aggregate consumption, but this effect was muted by a low expenditure elasticity of demand. All of these positive factors were outweighed by negative factors leaving the industry with declining output (0.2 per cent a year) and employment (7.0 per cent a year). The main negative factor was rapid contraction in exports (8.1 per cent a year). With exports accounting for 56 per cent of output (\$1,606m out of \$2,994m), the contraction of exports imparted negative growth to the industry of 4.56 per cent a year ( $= 0.56 \times 8.1$ ). The industry also suffered from deterioration in price competitiveness (1.22 per cent a year,  $= 8.91 - 7.69$ ). This was mainly a reflection of strong growth in export prices. Because exports are a major part of the industry's sales, we assume that export prices dominate the determination of domestic purchasers' prices.

The results for Textile fibres and yarns cast doubt on the validity of the price and quantity data for exports. While we expect statistics on export *values* to be reliable, it seems possible that export quantities for Textile fibres and yarns have been underestimated and export prices have been overestimated. If, in our historical simulation, we had used a rate of growth for export quantities of greater than -8.1 per cent a year and a correspondingly lower rate of growth of export prices, then our results would have been moved in the following plausible directions: less loss in price competitiveness and less shift in technologies and consumer preferences towards the

industry's products. Revision of the data on export prices and quantities would not affect the results for the industry's output, employment and imports. All of these variables are set exogenously in accordance with historical data.

*Leather and leather products, 1997 to 2002*

<b>Output, average annual percentage growth</b>	<b>-2.40</b>
<b>Employment, average annual percentage growth</b>	<b>-2.30</b>
<i>Negative factors</i>	
<b>Decline in exports</b>	
<b>Small shift in preferences against leather products</b>	
<i>Positive factors</i>	
<b>Rapid growth in aggregate consumption but low expenditure elasticity</b>	

The results for the Leather and leather products industry are broadly similar to those for Textile fibres and yarns. They imply that output for the industry was adversely affected by a decline in exports (3.1 per cent a year). This imparted negative growth to the industry of 2.36 per cent (= 3.1\*687/903). As with Textile fibres and yarns, the growth in the export price for leather and leather products is suspiciously high causing high growth in domestic purchasers' prices (8.48 per cent a year). At the same time, growth in the export quantity is suspiciously low.

**3. Macro forecasts and forecasts for the TCF sector from 2002 to 2020**

The underlying philosophy of MONASH forecast simulations is similar to that of MONASH historical simulations. In historical simulations we tell the model (via shocks to exogenous variables) everything that is known about the historical period. In forecast simulations we tell the model everything that we think we know about the forecast period. Typically in MONASH forecast simulations we set the macro scenario exogenously largely in accordance with forecasts provided by macro specialists. In the present paper, our macro forecasts are derived mainly from Access Economics. We also use forecasts from ABARE and the Bureau of Tourism Research for the prices and quantities of Australia's exports of agricultural and mineral products and of tourism services.

### 3.1. Macro forecasts

The second column of Table 1 shows forecasts of average annual growth rates for macro variables for 2002 to 2020. Forecasts of TCF variables for this period are given in Table 2.

The macro forecasts imply continued strong growth for the Australian economy, but at a slower rate than in the historical period (1997-2002). GDP, employment and consumption are projected to have annual average growth rates of 3.16, 1.30, and 3.07 per cent, down from 3.85, 1.91, and 4.04 per cent. The rate of growth of investment is projected to be 3.34 per cent compared with 6.07 per cent in the historical period. Nevertheless, the forecast rate of growth of capital is 3.89 per cent, up from 3.79 per cent. Faster growth in capital despite lower growth in investment is explained by the initial conditions. In 1997, at the start of the historical period, the investment/capital ratio for the economy was lower than in 2002, at the start of the forecast period (7.8 per cent compared with 8.5 per cent).

The main cause of the forecast growth slowdown is reduced growth in employment. Rather than the historical average annual rate of employment growth of 1.9 per cent, the forecast rate of employment growth is 1.3 per cent. This is consistent with demographic factors including the expected gradual ageing of the population.

With the forecast rate of growth for GDP being 3.16 per cent and with primary-factor input growing by 2.1 per cent ( $=0.7*1.3+0.3*3.89$ ), the implied economy-wide rate of primary-factor-productivity growth is 1.07 per cent, down from 1.38 per cent in the historical period. A slowing in primary-factor-productivity growth is consistent with the gradual increase in the share of the economy's resources that are used in service industries where measured productivity growth is low.

The terms of trade is forecast to decline at a slow rate (0.14 per cent a year), consistent with continuing long-run decline in the prices of primary products relative to those of manufactures.

The forecast rate of growth in the real wage rate is 1.5 per cent a year. This is consistent with our forecasts for primary-factor-productivity growth and the terms of trade ( $1.5 = 1.07/0.7 - 0.14*0.2/0.7$ ).

We expect Australia's international trade to grow faster than GDP. Exports and imports are both shown in the second column of Table 1 with growth rates of close to 6 per cent a year, nearly twice the rate of growth of GDP. In the forecast period, rapid growth in international trade is likely to be facilitated by the same forces

that have operated since the early 1980s: reductions in protection around the world; reductions in transport costs; and cheaper and more effective communications.

### **3.2. Forecasts for the TCF sector**

The main assumptions underlying our TCF forecasts are the following.

- Shifts in consumer preferences and industry technologies in favour or against TCF products will be at the same rate in the forecast period (2002 to 2020) as in the historical period (1997 to 2002). As can be seen from row 6 of Table 2, at the sectoral level the taste/technology shift variable has a different growth rate in forecast than in history (-0.16 compared with -0.22). This reflects different relative sizes of the TCF industries in the two periods.
- For most TCF products, twists in import/domestic preferences will have the same impact on domestic demand for the domestic variety in the forecast period as in the historical period (row 5, Table 2). For Clothing and Footwear the estimated impacts (-19.14 and -21.94) of the twists for 1997 to 2002 are extreme, much higher than in earlier MONASH historical simulations. In these circumstances, we felt justified in forecasting twists against domestic clothing and footwear that have the effect of reducing their domestic demand by about half the rate implied by our historical simulation for 1997 to 2002. This still implies that the Clothing and Footwear industries will suffer badly from preference twists in favour of imports but that the damage to these industries will be consistent with trends since the mid-1980s.
- Rates of labour-, capital- and material-saving technical change in the TCF industries will be similar to those estimated in the historical simulation for 1997 to 2002. Nevertheless, there are noticeable differences between the forecast and historical rates of multi-factor-productivity growth in TCF industries. These are mainly a reflection of changes in the weights of labour, capital and materials in the costs of TCF industries.
- Rates of growth of export quantities for TCF products will be in accordance with projections provided by the Productivity Commission based on a combination of previous trends. The Commission's forecasts largely ignore developments in TCF exports for 1997 to 2002. This seems reasonable because, as explained in section 2, we are suspicious of the 1997-2002 price and quantity data for two of the main TCF exports, Textile fibres & yarns and Leather products. The Commission's forecasts for export volumes imply a considerable improvement over the recorded

TCF export performance of 1997 to 2002, but nevertheless imply that TCF export growth will be at a slower rate than for exports as a whole.

- Growth in foreign-currency prices of imported TCF products will reflect trends from the mid-1980s, implying that the \$f prices of these products will fall relative to the \$f prices of other imports. In translating \$f prices of TCF imports into \$A purchasers' prices we take account of the tariff cuts planned for 2005.<sup>3</sup>

*The TCF sector, 2002 to 2020*

	1997-02	2002-20
<b>Output</b>	<b>-2.45</b>	<b>0.48</b>
<b>Employment</b>	<b>-6.55</b>	<b>-3.92</b>
<i>Positive factors in forecast relative to history</i>		
<b>Less twist in user preferences towards imports</b>		
<b>Growth in exports</b>		
<i>Negative factors in forecast relative to history</i>		
<b>Deterioration in price competitiveness: no devaluation; historically</b>		
<b>normal growth in \$f import prices; and 2005 tariff cuts</b>		
<b>Slower growth in aggregate consumption</b>		

In the forecasts in Table 2, TCF output shows positive growth of 0.48 per cent a year rather than the historical decline of 2.45 per cent a year. While TCF employment contracts in the forecasts, the rate of contraction (3.92 per cent a year) is less than the historical rate (6.55 per cent a year). The main positive factors in the forecasts relative to the historical results are: positive growth in TCF exports rather than decline; and less extreme shifts in the preferences of Australian users in favour of imports.

There are two negative factors for the TCF sector in the forecasts relative to the historical period. The first is a gradual loss in price competitiveness, with purchasers' prices of domestic TCF products increasing by 0.50 per cent a year relative to purchasers' prices of imported TCF products (0.50=1.37-0.87). In recent history, the sector benefited from an improvement in price competitiveness of 1.21 per cent a year (=6.81-5.60). For the forecast period we are assuming a slight

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<sup>3</sup> In this translation, MONASH also takes account of forecast movements in the exchange-rate and in the costs in Australia of warehousing, transporting and retailing imported TCF products.

appreciation of the Australian dollar and we are factoring in the tariff cuts for 2005. In the historical period, there was considerable devaluation. Foreign-currency import prices for some TCF products increased quite sharply from 1997 to 2002. We assume that these increases will not be repeated in the forecast period.

The second negative factor for the TCF sector in the forecast period relative to the historical period is the growth slowdown in aggregate household expenditure (Table 1).

***Clothing, 2002 to 2020***

	<b>1997-02</b>	<b>2002-20</b>
<b>Output</b>	<b>-7.60</b>	<b>-1.97</b>
<b>Employment</b>	<b>-12.30</b>	<b>-6.68</b>
<b><i>Positive factors in forecast relative to history</i></b>		
<b>Less twist in user preferences towards imports</b>		
<b>Growth in exports</b>		
<b><i>Negative factors in forecast relative to history</i></b>		
<b>Deterioration in price competitiveness: no devaluation and 2005 tariff cuts</b>		
<b>Slower growth in aggregate consumption</b>		

Output and employment in the Clothing industry are forecast to contract by 1.97 and 6.68 per cent a year. These are slower rates of contraction than that in the historical period (7.6 and 12.3 per cent a year). The main output-enhancing factor in the MONASH forecasts relative to history is the assumed slower rate of twist in preferences towards imports (10.00 per cent damage a year rather than 19.14 per cent). A second positive factor is increased export growth (4.74 per cent a year rather than -2.90 per cent). Two output-contracting factors for Clothing in forecast relative to history are: less favourable movements in price competitiveness (an annual rate of increase in the purchasers' price of domestic Clothing relative to that of imported Clothing of 0.21 per cent a year rather than a reduction of 0.92 per cent); and slower growth in aggregate consumption.

*Footwear, 2002 to 2020*

	<b>1997-02</b>	<b>2002-20</b>
<b>Output</b>	<b>-7.20</b>	<b>-5.24</b>
<b>Employment</b>	<b>-7.70</b>	<b>-5.88</b>
 <i>Positive factors in forecast relative to history</i>		
<b>Less twist in user preferences towards imports</b>		
<b>Growth in exports</b>		
 <i>Negative factors in forecast relative to history</i>		
<b>Deterioration in price competitiveness: no devaluation; historically normal growth in \$f import prices; and 2005 tariff cuts</b>		
<b>Slower growth in aggregate consumption</b>		

Footwear output and employment are forecast to contract by 5.24 and 5.88 per cent a year. These are slower rates of contraction than in the historical period (7.20 and 7.70 per cent a year). As with Clothing, the main output-enhancing factors for Footwear are a slower rate of twist in preferences towards imports (10.00 per cent damage a year rather than 21.94 per cent) and increased growth in exports (2.14 per cent a year rather than -0.30 per cent). Output-contracting factors for Footwear in forecast relative to history are less favourable movements in price competitiveness (an annual rate of increase in the purchasers' price of domestic Footwear relative to imported Footwear of 1.11 per cent a year rather than a reduction of 1.04 per cent) and slower growth in aggregate consumption.

*Knitting mills, 2002 to 2020*

	<b>1997-02</b>	<b>2002-20</b>
<b>Output</b>	<b>1.50</b>	<b>0.25</b>
<b>Employment</b>	<b>-3.20</b>	<b>-4.98</b>
<i>Positive factors in forecast relative to history</i>		
<b>Strong export growth, but relatively unimportant</b>		
<i>Negative factors in forecast relative to history</i>		
<b>Deterioration in price competitiveness: no devaluation and 2005 tariff cuts</b>		
<b>Less growth in aggregate consumption</b>		

In common with our forecasts for other TCF industries, Knitting mills is shown in Table 2 with considerably higher export growth in the forecast period than in history (6.43 per cent a year compared with -4.10 per cent a year). However, exports are a very small share of Knitting mill sales. Consequently, increased export growth imparts little output growth to the industry. At the same time the industry faces considerable import competition. In our forecasts, import growth is stimulated relative to history by deterioration in the competitiveness of the domestic industry. Whereas in history the ratio of domestic to import purchasers' prices of knitting mill products declined by 1.83 per cent a year, in our forecasts this ratio increases by 0.15 per cent a year. With stimulation of imports, the Knitting mill industry is left with slower forecast rates of growth in output and employment than in recent history (0.25 and -4.98 per cent a year compared with 1.50 and -3.20 per cent a year).

*Textile products, 2002 to 2020*

	<b>1997-02</b>	<b>2002-20</b>
<b>Output</b>	<b>5.20</b>	<b>2.26</b>
<b>Employment</b>	<b>5.30</b>	<b>-0.46</b>
<i>Positive factors in forecast relative to history</i>		
<b>Strong growth in exports but relatively unimportant</b>		
<i>Negative factors in forecast relative to history</i>		
<b>Deterioration in price competitiveness: no devaluation, normal growth in</b>		
<b>\$f import price and 2005 tariff cuts</b>		
<b>Less growth in aggregate consumption</b>		

The Textile products industry is shown in Table 2 with output expansion in the forecast period of 2.26 per cent a year and employment contraction of 0.46 per cent a year. In the historical period, the industry's output and employment expanded by 5.20 and 5.30 per cent a year.

Relative to history, output growth in Textile products is reduced in the forecasts by an adverse movement in price competitiveness (0.42 per cent annual deterioration compared with 1.91 per cent annual improvement). The only output-enhancing factor for Textile products is exports (forecast to grow by 4.64 per cent a year compared with a contraction of 3.20 per cent a year in history). However, as with Knitting mills, exports are a small share of the sales of Textile products and the forecast of increased export growth has only a minor positive impact on the forecast rates of growth for output and employment.

*Textile fibres and yarns, 2002 to 2020*

	<b>1997-02</b>	<b>2002-20</b>
<b>Output</b>	<b>-0.20</b>	<b>1.78</b>
<b>Employment</b>	<b>-7.00</b>	<b>-5.38</b>
<i>Positive factors in forecast relative to history</i>		
<b>Slower contraction in exports</b>		
<i>Negative factors in forecast relative to history</i>		
<b>Less growth in aggregate consumption</b>		

Annual output and employment growth in the Textile fibres and yarns industry are forecast as 1.78 and -5.38 per cent, up from -0.20 and -7.00 per cent in history. The main factor underling this upgrade is a more favourable export picture (a rate of decline of 1.59 per cent in the forecasts compared with a rate of decline of 8.10 per cent in history). With exports accounting for 36 per cent of output in 2002, the assumed improved export performance is sufficient to explain the increase in output and employment growth as we go from history to forecast.

*Leather and leather products, 2002 to 2020*

	<b>1997-02</b>	<b>2002-20</b>
<b>Output</b>	<b>-2.40</b>	<b>2.79</b>
<b>Employment</b>	<b>-2.30</b>	<b>1.62</b>
<i>Positive factors in forecast relative to history</i>		
<b>Faster export growth</b>		
<i>Negative factors in forecast relative to history</i>		
<b>Less growth in aggregate consumption</b>		

Within the TCF sector, the industry with the strongest forecast output and employment growth (2.79 and 1.62 per cent a year) is Leather and leather products. Because about 73 per cent of the industry's output is exported, its growth prospects are dominated by export growth. In the export projections supplied by the Productivity Commission, the exports of Australian Leather products are projected to grow at 4.30 per cent a year, whereas in the historical period they declined by 3.1 per cent a year. The assumed turn-around in export growth is sufficient to explain the

turn-around in output growth (from -2.40 per cent in the historical period to 2.79 per cent in the forecast period).

## **4. Policy analysis: the effects of reducing TCF assistance**

In this section we report results from two MONASH policy simulation on the effects of cuts in TCF assistance. The effects of the cuts are reported as deviations away from the basecase forecasts described in section 3. As explained below, the two simulations differ in their labour-market assumptions.

### **4.1. Shocks and the key assumptions**

We are concerned with effects of cutting all TCF tariffs to 5 per cent in 2010 and simultaneously abolishing the SIP.<sup>4</sup> The cuts in assistance that we simulate for 2010 are additional to those of 2005. The 2005 cuts are built into our basecase. For the TCF sector as a whole, the cuts modelled for 2010 imply reductions in purchasers' prices of imported TCF products in Australia of about 2.4 per cent relative to the purchasers' prices of domestically produced TCF products. The key assumptions underlying our policy simulation are as follows.

#### ***Labour market***

In the first policy simulation we assume that the reduction in assistance to TCF has no effect on aggregate employment, even in the short run. This means that real wages show sufficient short-run flexibility to prevent the policy path for aggregate employment from leaving the basecase forecast path.

In the second policy simulation we assume that workers are concerned with the real after-tax wage rate, that is, the wage rate less income taxes, deflated by the CPI. If the labour market strengthens, then we assume that the real after-tax wage rate rises in response to increased worker negotiating strength. More technically, we assume that the deviation in the after-tax real wage rate from its basecase forecast level increases in proportion to the deviation in employment from its basecase forecast level. The coefficient of proportionality is chosen so that the employment effects of a shock to the economy are largely eliminated after 5 years. In other words, after about 5 years the benefits or costs of a shock, such as reduced TCF tariffs, are realised mainly as an increase or decrease in real after-tax wage rates. This labour

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<sup>4</sup> We thank Kevin Hanslow of the Productivity Commission for his technical contribution in translating the scenarios on the Commission's web site into shocks to particular variables in the MONASH model.

market assumption can be summarised as short-run real-wage stickiness and long-run real-wage flexibility. It is consistent with conventional macro-economic modelling in which the NAIRU is exogenous.

### ***Production technologies***

MONASH contains variables describing: primary-factor and intermediate-input-saving technical change in current production; input-saving technical change in capital creation; and input-saving technical change in the provision of margin services (e.g. transport, and wholesale and retail trade). In the policy simulations described in this section, all of these variables are exogenous and follow their basecase forecast paths.

### ***Rates of return on capital***

In simulations of the effects of shocks such as a reduction in TCF assistance, MONASH allows for short-run divergences in after-tax rates of return on industry capital stocks from their levels in the basecase forecasts. Short-run increases/decreases in rates of return cause increases/decreases in investment and capital stocks, thereby gradually eroding the initial divergences in after-tax rates of return.

### ***Public expenditure and taxes***

We assume that the reduction in TCF assistance makes no difference to the path of public consumption. However, we assume that there are tax adjustments to replace the net loss of revenue arising from tariff cuts and SIP abolition and to cover the changes in unemployment benefits or losses of tax revenue associated with changes in economic activity.

We experimented with two tax-adjusting variables: the rate of tax on labour income; and the rate of broad-based consumption tax. We also experimented with two broad concepts of replacement. With the first, the chosen tax adjusts to prevent policy-induced deviations in real national wealth and in the second the tax adjustment prevents policy-induced deviations in real national savings<sup>5</sup>. In the results reported in this section, we used the broad-based consumption tax and real national saving. Thus we assumed that the rate of consumption taxes is adjusted each year to ensure that the

---

<sup>5</sup> National saving is defined as private saving plus public saving. Private saving is the difference between household disposable income and private consumption. Public saving is the same as the public sector surplus: i.e. the difference between public outlays and revenue. In deriving *real* national saving we deflate by the price index for investment.

path of real national saving in the policy simulation follows the basecase forecast. Conceptually, this is similar to insisting that the policy causes no deviations in real wealth.

### *Export-demand elasticities*

Export-demand elasticities are notoriously difficult to estimate. We know of no satisfactory set of estimates for Australia. Most researchers deduce export-demand elasticities from ideas about import-demand elasticities and the related concept of import/domestic substitution (Armington elasticities). In our simulations reported in subsections 4.2 to 4.5, we assume that the export-demand elasticities for all products are -4. As demonstrated in Dixon and Rimmer (2002, section 27), export-demand elasticities of this size are consistent with plausible values for Armington elasticities.

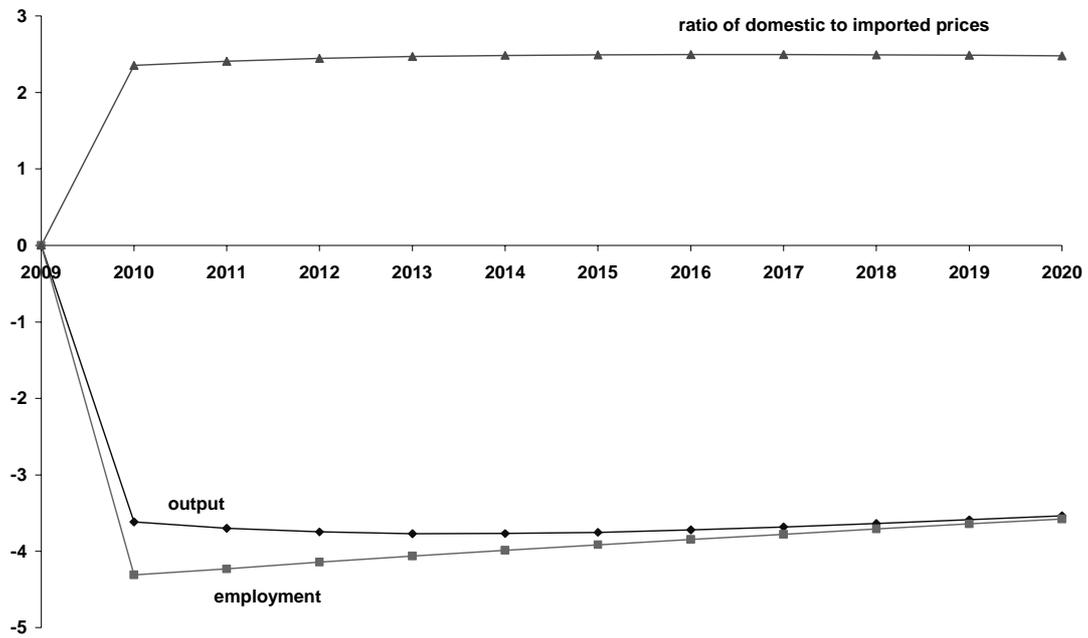
Econtech (2003) assumes much larger export demand elasticities, -12 for most products, and the Commission suggested that we conduct sensitivity analysis with elasticities of -10. As explained in subsections 4.4 and 4.6, when we used -10, MONASH produced unsatisfactory results showing signs of the “specialisation” problem. We also explain in subsection 4.6 the particular assumption used by Econtech to overcome the specialisation problem. While quite popular, we think the Econtech assumption is unrealistic.

## **4.2. Industry results**

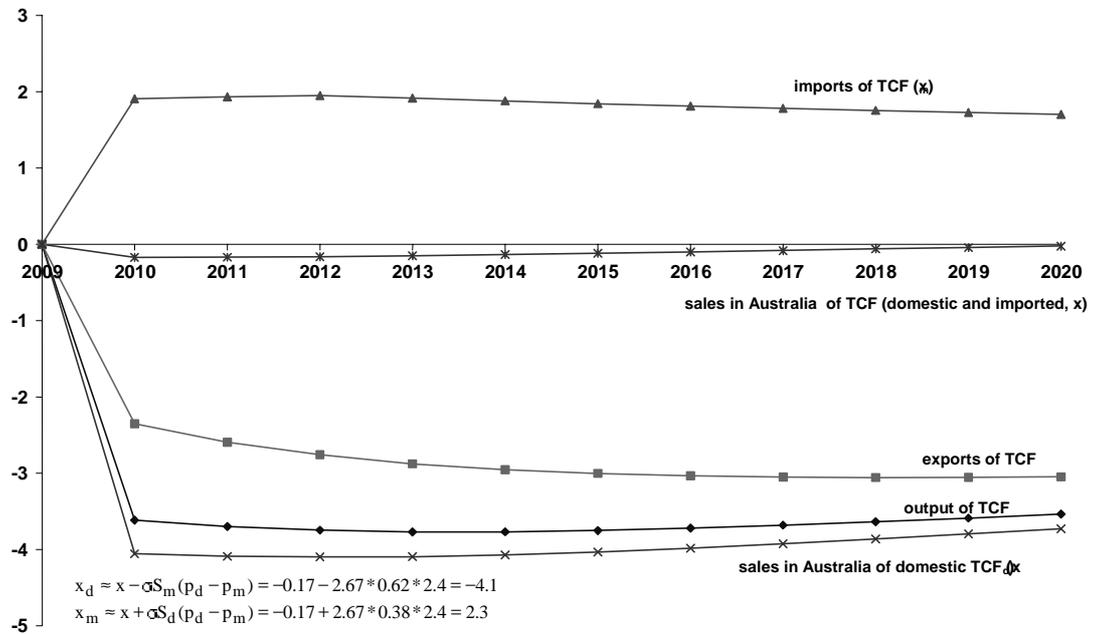
Charts 1 to 14 show the effects of the assumed cut in TCF assistance on output and employment in the TCF sector and in its component industries for the first policy simulation, in which aggregate employment is held fixed. We will not present a complete set of TCF results for the second simulation, in which wages are sticky in the short run. As we will see, results for TCF industries are determined largely by three factors: the shocks (tariff cuts and SIP abolition), the Armington elasticities and the shares of imports in Australian markets for TCF products. These factors are almost completely independent of our treatment of the labour market. Thus, the TCF results for the second policy simulation are almost identical to those in the first.

All the results in the charts are percentage deviations from the basecase forecasts described in section 3.

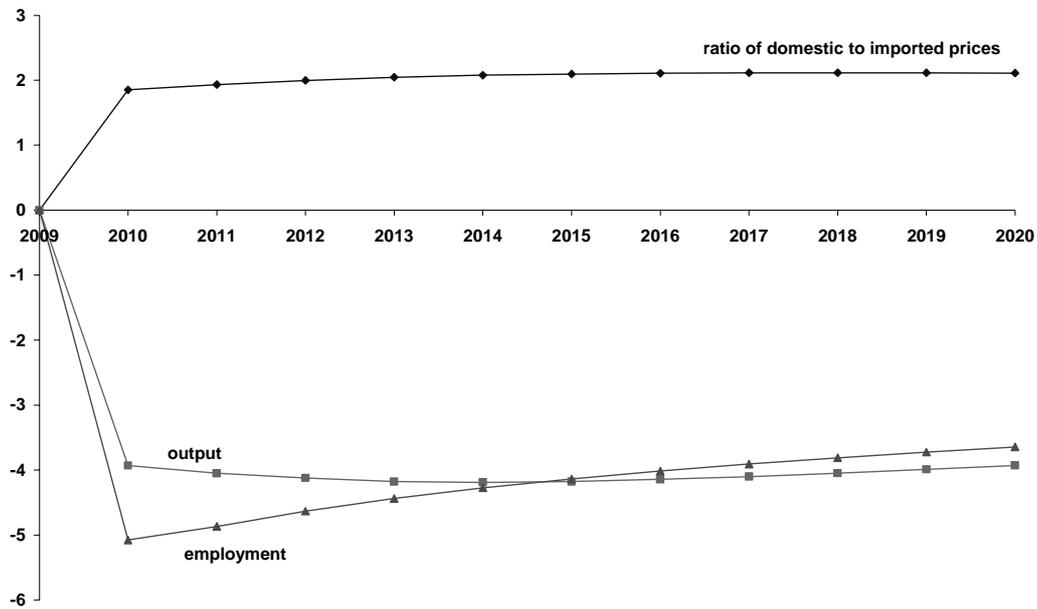
**Chart 1. Output, employment and dom/imp consumer price ratio for TCF**  
*(% deviations from basecase, fixed aggregate employment)*



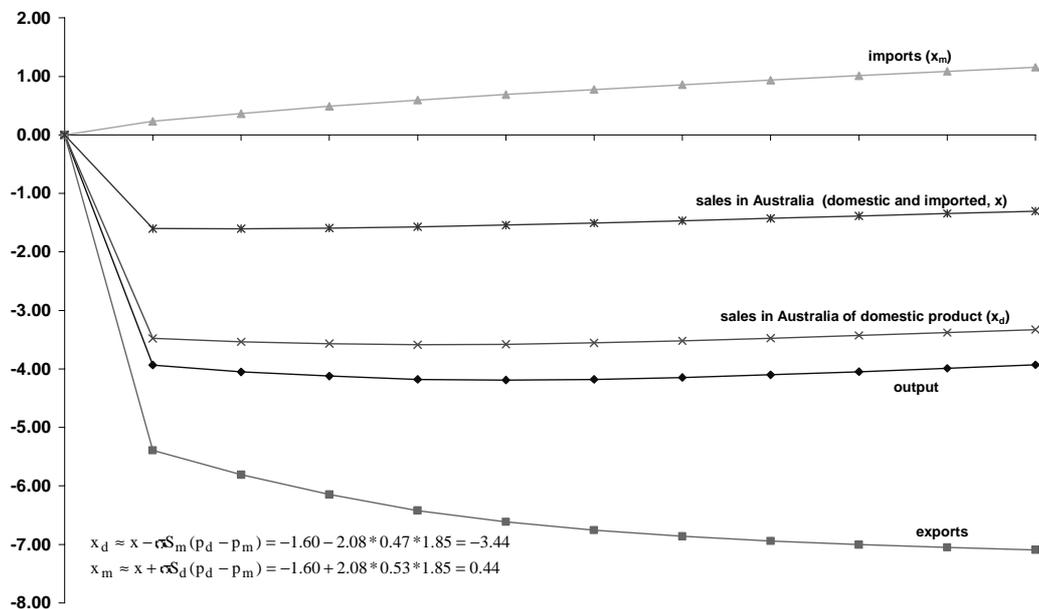
**Chart 2. Output, imports, exports and sales of TCF**  
*(% deviations from basecase, fixed aggregate employment)*



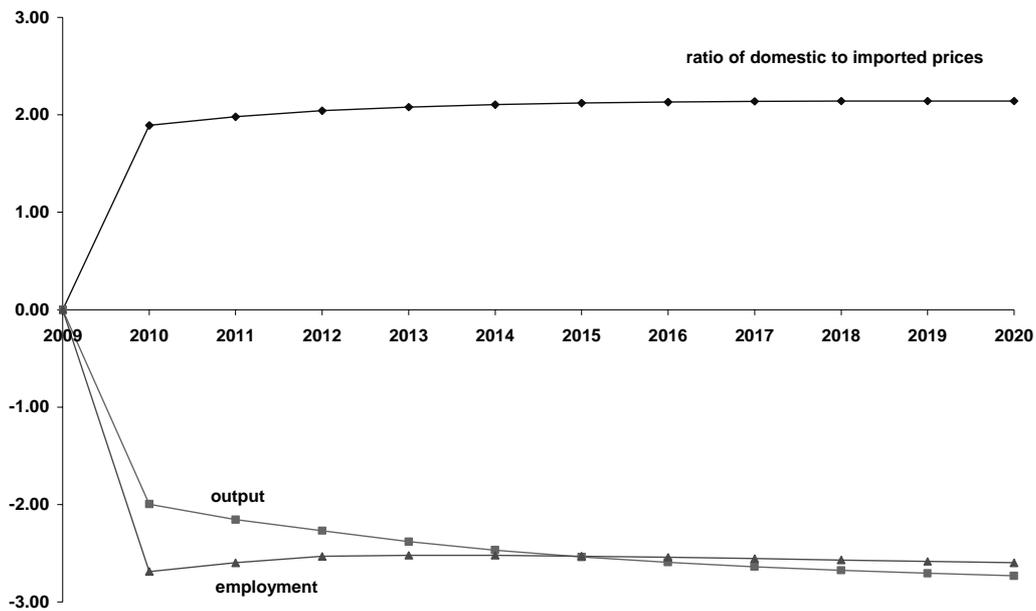
**Chart 3. Output, employment and dom/imp consumer price ratio for Textile fibres and yarns (% deviations from basecase, fixed aggregate employment))**



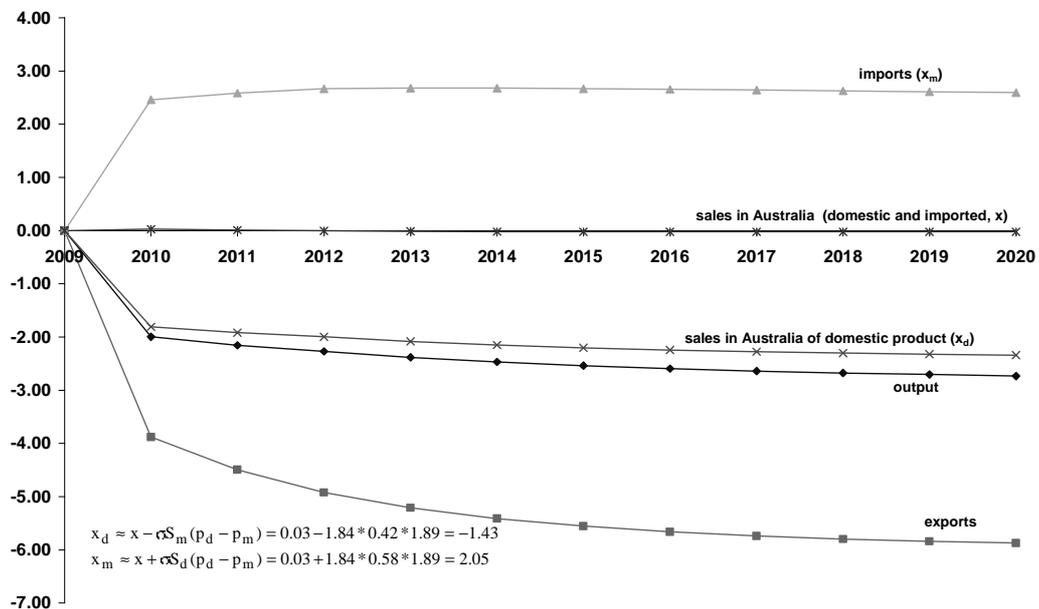
**Chart 4. Output, imports, exports and sales of Textile fibres and yarns (% deviations from basecase, fixed aggregate employment)**



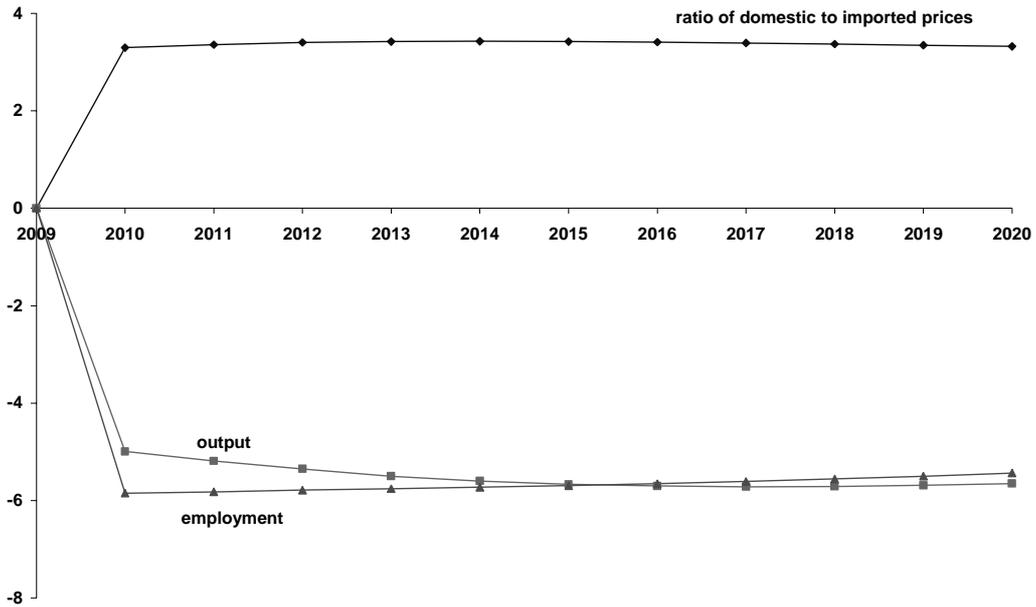
**Chart 5. Output, employment and dom/imp consumer price ratio for Textile products (% deviations from basecase, fixed aggregate employment)**



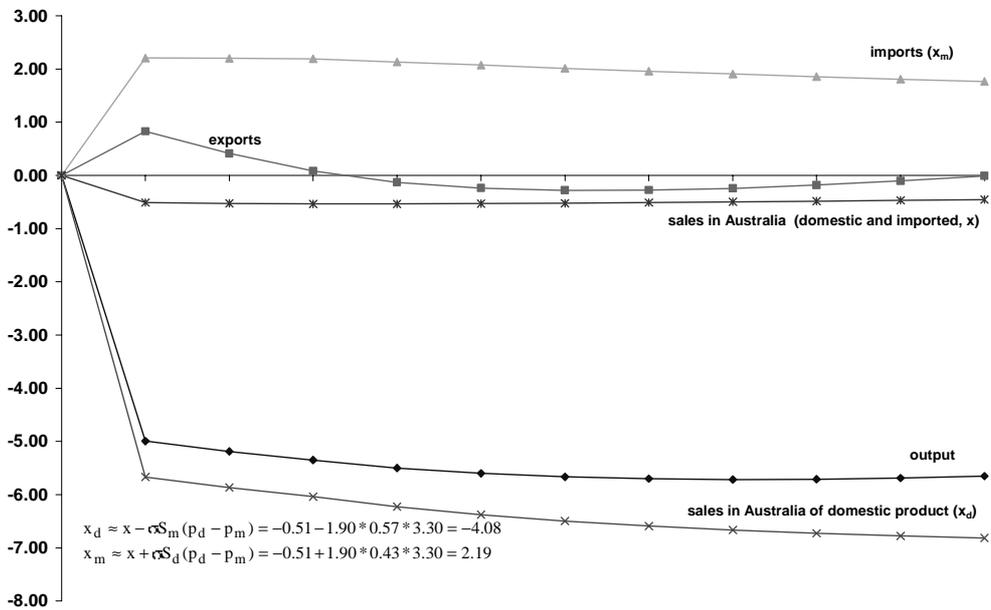
**Chart 6. Output, imports, exports and sales of Textile products (% deviations from basecase, fixed aggregate employment)**



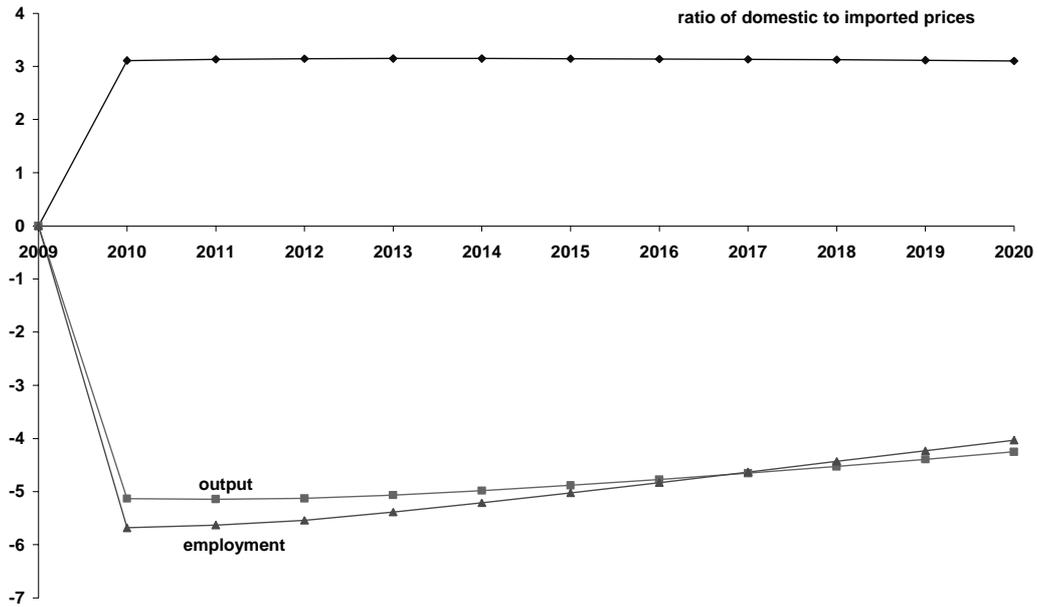
**Chart 7. Output, employment and dom/imp consumer price ratio for Knitting mills (% deviations from basecase, fixed aggregate employment)**



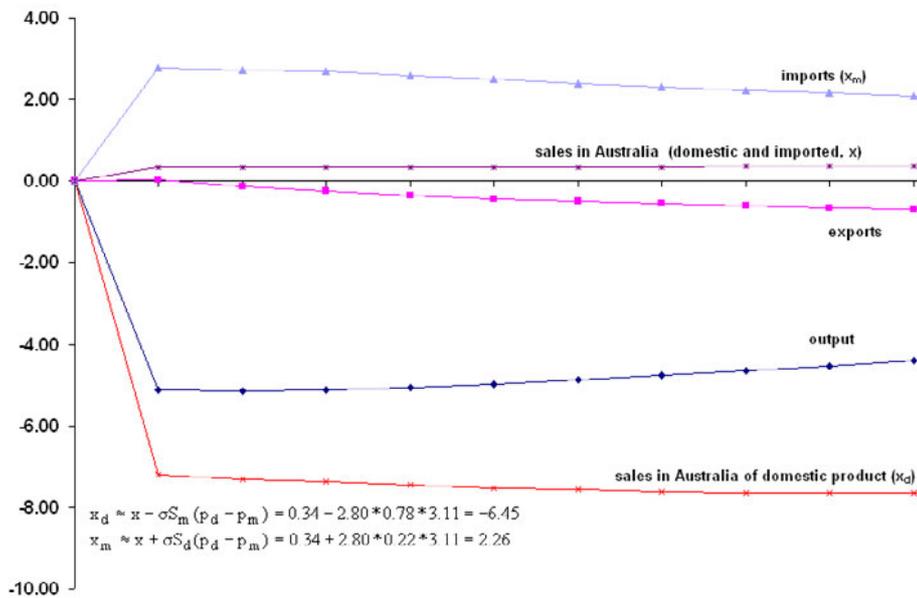
**Chart 8. Output, imports, exports and sales of Knitting mills (% deviations from basecase, fixed aggregate employment)**



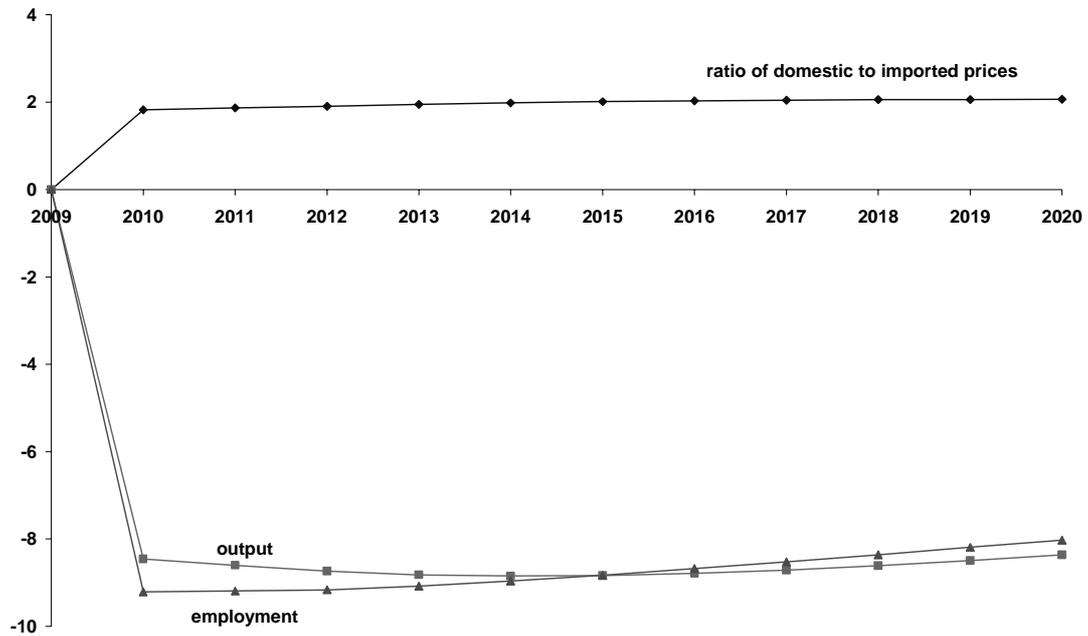
**Chart 9. Output, employment and dom/imp consumer price ratio for Clothing**  
 (% deviations from basecase, fixed aggregate employment)



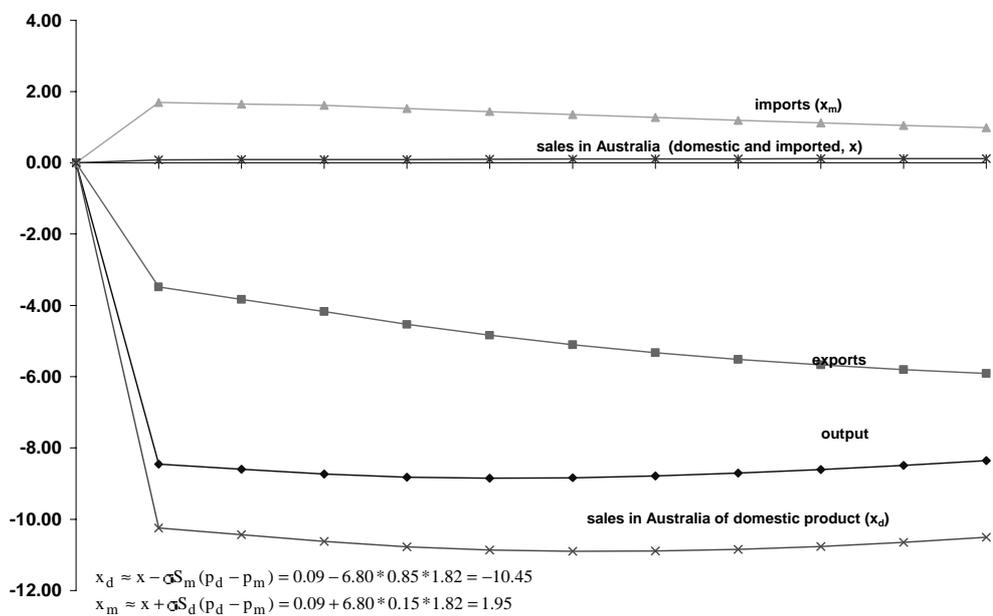
**Chart 10. Output, imports, exports and sales of Clothing**  
 (% deviations from basecase, fixed aggregate employment)



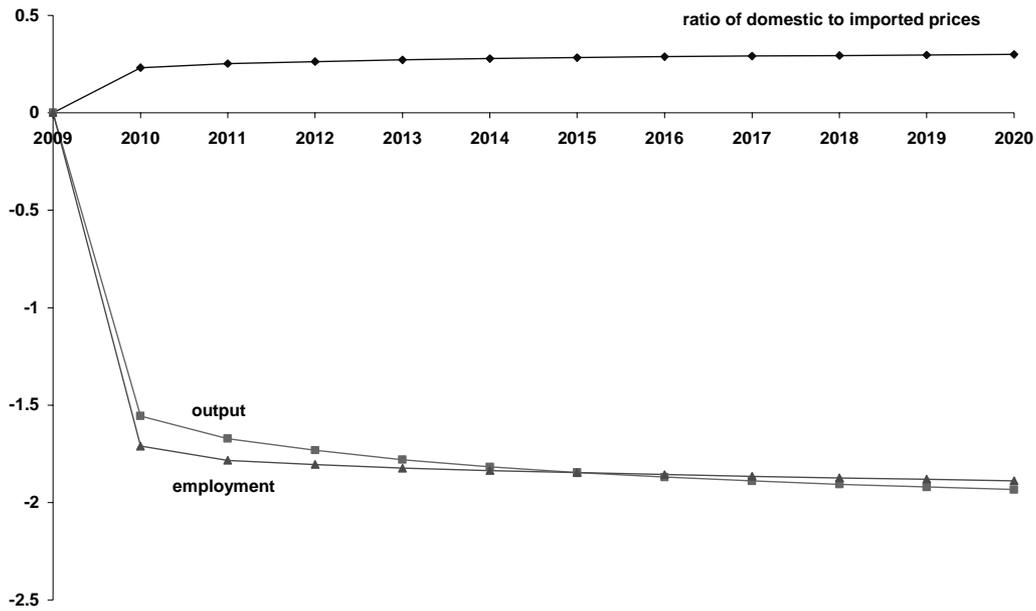
**Chart 11. Output, employment and dom/imp consumer price ratio for Footwear**  
*(% deviations from basecase, fixed aggregate employment)*



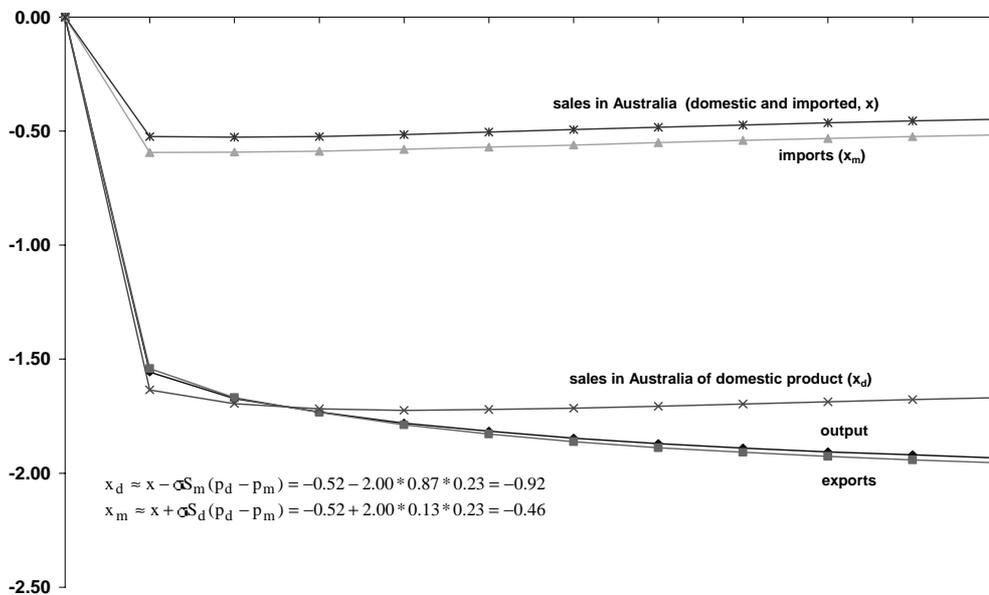
**Chart 12. Output, imports, exports and sales of Footwear**  
*(% deviations from basecase, fixed aggregate employment)*



**Chart 13. Output, employment and dom/imp consumer price ratio for Leather products (% deviations from basecase, fixed aggregate employment)**



**Chart 14. Output, imports, exports and sales of Leather products (% deviations from basecase, fixed aggregate employment)**



### ***Results for the TCF sector, fixed aggregate employment***

Chart 1 shows that the modelled reductions in TCF assistance cause an increase in the consumer price of domestic TCF products relative to that of imported TCF products of about 2.4 per cent. On average, the Armington elasticity for TCF products is about 2.67. Thus we would expect the reduction in assistance to cause an increase in the import/domestic ratio in domestic sales of TCF products of about 6.4 per cent (= 2.67\*2.4). The actual increase shown in Chart 2 is about 6 per cent.

The deviations in imports and domestic sales of domestic TCF products can be explained via the equations

$$x_d = x - \sigma S_m (p_d - p_m) \quad (4.1)$$

$$x_m = x + \sigma S_d (p_d - p_m) \quad (4.2)$$

where

$x_d$ ,  $x_m$  and  $x$  are percentage deviations in: domestic sales of domestic TCF products; imports of TCF products; and total domestic usage of TCF products;

$\sigma$  is the Armington elasticity;

$S_d$  and  $S_m$  are the shares of domestic and imported TCF products in TCF purchases; and

$p_d$  and  $p_m$  are percentage deviations in purchasers' prices of domestic and imported TCF products.

By 2010,  $S_d$  will be about 0.38. Because the overall price elasticity of demand for TCF products is small we would expect  $x$  to be small. This is confirmed in Chart 2.<sup>6</sup> Thus our two equations suggest values for  $x_d$  and  $x_m$  of about -4.0 and 2.4. These values are broadly consistent with those shown in Chart 2.

The deviation path for TCF output in Chart 2 is slightly above that of domestic sales of domestic TCF products. This is because the export path of TCF products is above that of these domestic sales. TCF exports are stimulated by tariff cuts. These slightly reduce the costs of intermediate inputs to the TCF industries and reduce the

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<sup>6</sup> That  $x$  is a small *negative* in all years is explained by the fact that a significant share of TCF products is sold as inputs to TCF industries. The assumed reduction in assistance reduces TCF output and thereby reduces intermediate sales of TCF products.

exchange rate. However, TCF exports are adversely affected by the removal of SIP.<sup>7</sup> The negative effect of SIP removal outweighs the positive effects of tariff reduction.

Chart 1 shows negative deviations in TCF employment similar to those in output.

### ***Results for TCF industries, fixed aggregate employment***

Charts 3 to 14 show the effects of the modelled cuts in 2010 in TCF assistance on the six industries in the MONASH model that make up the TCF sector. Each of these charts can be understood in terms of the mechanisms described for the TCF sector in the previous subsection. By following the back-of-the-envelope equations shown for each industry in Charts 4, 6, 8, 10, 12 and 14, readers can assess the sensitivity of our main results to assumptions concerning: the Armington elasticity ( $\sigma$ ); the domestic share in domestic sales ( $S_d$ ); and the impact of cuts in assistance on competitiveness ( $p_d - p_m$ ).

For Textile fibres and yarns, Chart 3 shows that the cuts in assistance would increase the ratio of the purchasers' price for the domestic product relative to that for the imported product by about 1.85 per cent. As can be seen in Chart 4, sales in Australia of Textile fibres and yarns fall by about 1.6 per cent, reflecting reduced demand for this product as an intermediate input to the rest of the TCF sector. With the Armington elasticity for Textile fibres and yarns being 2.08 and with the forecast domestic share in domestic sales in 2010 being 0.53, back-of-the-envelope calculations based on equations (4.1) and (4.2) give deviations in domestic demand for the domestic product and domestic demand for the imported product of -3.44 and 0.44 per cent. These numbers are close to the actual MONASH results in Chart 4. The output path for the Textile fibres and yarns industry in Chart 4 lies below that for domestic sales of the domestic product because the industry's exports are quite adversely affected by the cuts in assistance. This is because the industry has a comparatively high rate of assistance under the SIP. In Chart 3, the employment deviation is closely in line with the output deviation, with both output and employment showing negative deviations of between 4 and 5 per cent.

Knitting mills and Clothing are shown in Charts 7 and 9 with similar negative output and employment deviations (between 4 and 6 per cent) to those for Textile fibres and yarns. Knitting mills and Clothing suffer considerably greater loss in

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<sup>7</sup> By conducting separate SIP and tariff experiments we confirmed that TCF exports are adversely affected by SIP removal and positively affected by tariff cuts.

competitiveness than Textile fibres and yarns (more than 3 per cent compared with 1.85 per cent, Charts 7, 9 and 3), and they have higher import shares (57 per cent for Knitting mills and 78 per cent for Clothing compared with 47 per cent for Textile fibres and yarns). With regard to Armington elasticities, Clothing is a little higher than Textile fibres and yarns (2.8 compared with 2.08) and Knitting mills is a little lower (1.9 compared with 2.08). All of this suggests that the negative employment and output deviations for Knitting mills and Clothing should be greater than those for Textile fibres and yarns. However, Knitting mills and Clothing have more favourable movements in overall domestic demand ( $x$ ) than that for Textile fibres and yarns (compare Charts 8 and 10 with Chart 4), and this is sufficient to explain the similarity for the three industries in their employment and output deviations. The overall domestic demand deviation for Textile fibres and yarns is -1.7 per cent whereas for Knitting mills and Clothing it is -0.5 per cent and 0.4 per cent respectively. Unlike Textile fibres and yarns, Knitting mills and Clothing do not suffer significantly from contraction in intermediate demand. Clothing, which is almost entirely sold to households, has a net positive stimulation in demand reflecting lower clothing prices.

The TCF industry that is likely to be affected worst by the modelled cuts in assistance is Footwear. Chart 11 shows negative deviations for Footwear output and employment of about 9 per cent. As can be seen by comparing the back-of-the-envelope equations in Chart 12 for Footwear with those for other products, the poor outcome for Footwear follows mainly from its high Armington elasticity, 6.8.

Textile products and Leather products are the TCF industries that are least affected by the modelled cuts in assistance. For these industries, Charts 5 and 13 show negative output and employment deviations of between 1.5 and 3 per cent. Leather products relies heavily on exports and loses comparatively little assistance from the abolition of the SIP. Textile products has relatively low values for its Armington elasticity (1.84), its loss of international competitiveness (1.9 per cent) and for its import share (0.42 per cent).

The deviation in domestic demand for domestic Leather products in Chart 14 is about -1.6 per cent. This is an example of a MONASH result that is not well explained by our back-of-the-envelope equations. The equation for  $x_d$  in Chart 14 gives a value of -0.92. In looking for the reason for the apparent failure of the back-of-the-envelope calculation, we found that sales of Leather products to households have a high import share whereas sales of Leather products to industries (e.g.

footwear) have a comparatively low import share. Under the modelled reduction in assistance, intermediate sales of Leather products (which are mainly into the TCF sector) would contract and consumer sales would expand (reflecting lower prices). This change in composition of the sales of Leather products would harm domestic demand for domestic Leather products and favour imports. This compositional effect is not taken into account in our back-of-the-envelope calculations.

***Results for the TCF sector, short-run sticky wages***

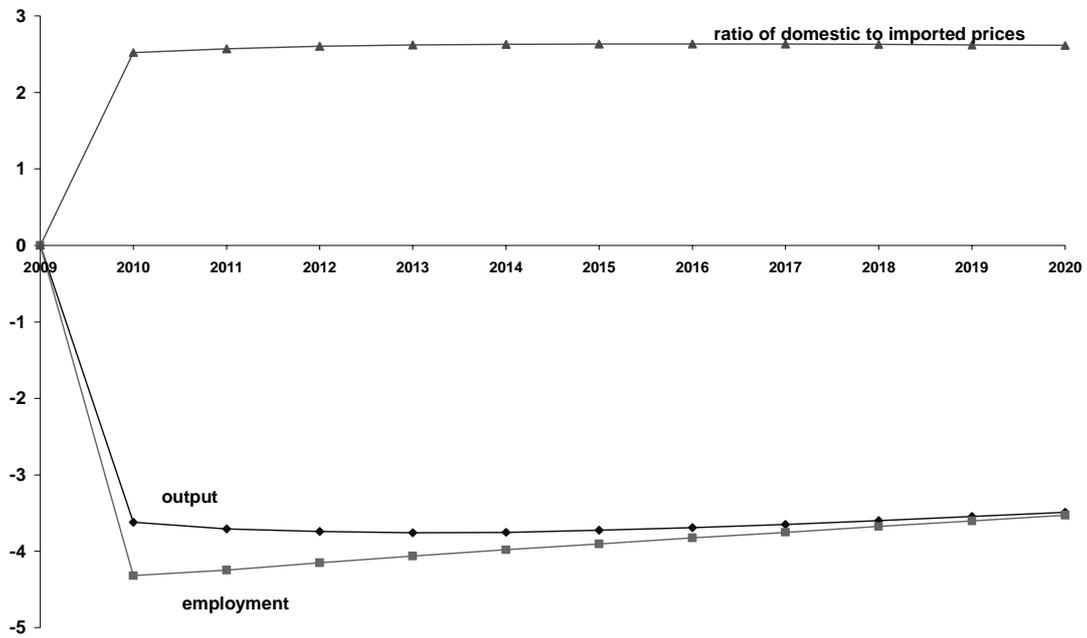
Charts 15 and 16 show sectoral results for the second policy simulation in which wages exhibit short-run stickiness. These results are almost identical to the corresponding charts (Charts 1 and 2) for the first policy simulation. We include Charts 15 and 16 to confirm our earlier assertion that the TCF results are highly insensitive to the choice of labour-market closure.

***Results for other industries, fixed aggregate employment***

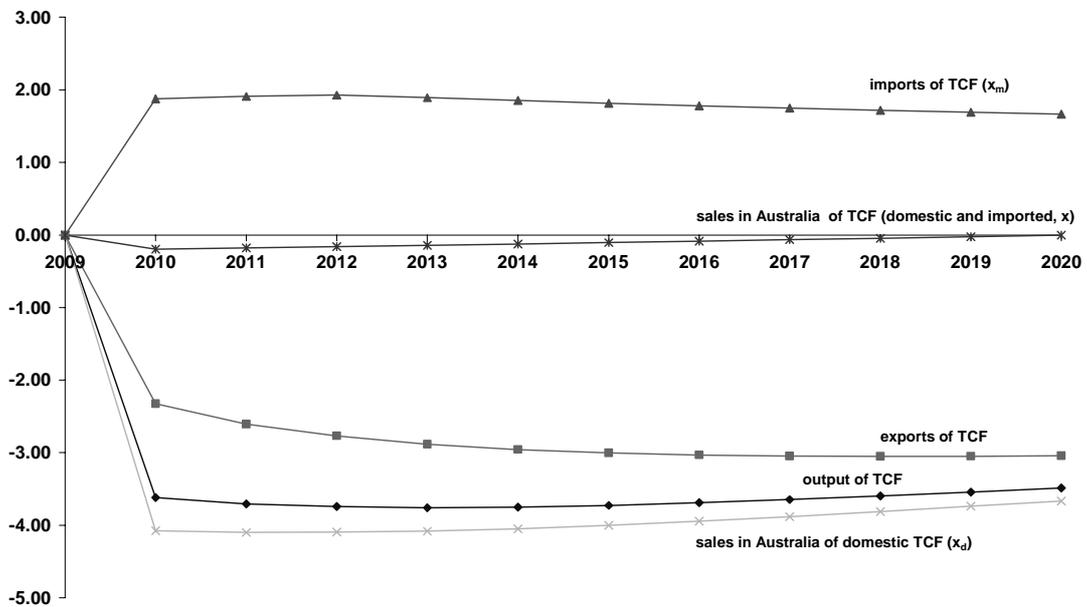
Charts 17 and 18 show output deviations from the first policy simulation (fixed aggregate employment) for the industries outside the TCF sector with the largest gains and losses from reduction in TCF assistance. As can be seen from the charts, the effects outside the TCF sector of the modelled reductions in TCF assistance are insignificant. All of the industries in Chart 17 (the largest winners) are highly trade-exposed. Iron ore, Other metal ores, Basic non-ferrous metals and Mining services have high export shares in their sales and benefit from the real devaluation that is associated with reductions in assistance to TCF industries. Spirits also benefits from real devaluation because it faces strong import competition (a high Armington elasticity and a high import share). However, because the present analysis is of a partial reduction in assistance to a small sector, the effects on the real exchange rate are negligible and the stimulation of export industries is slight. All of the output deviations in Chart 17 are less than 0.17 per cent.

Three of the five industries (Sheep, Agricultural services and Cotton) in Chart 18 (the largest losers) have substantial direct or indirect sales to the TCF sector. The other two industries are Residential building and Other wood products. Residential building loses from substitution effects (TCF becomes cheap relative to housing) and from slight negative effects of the reduction in TCF assistance on aggregate

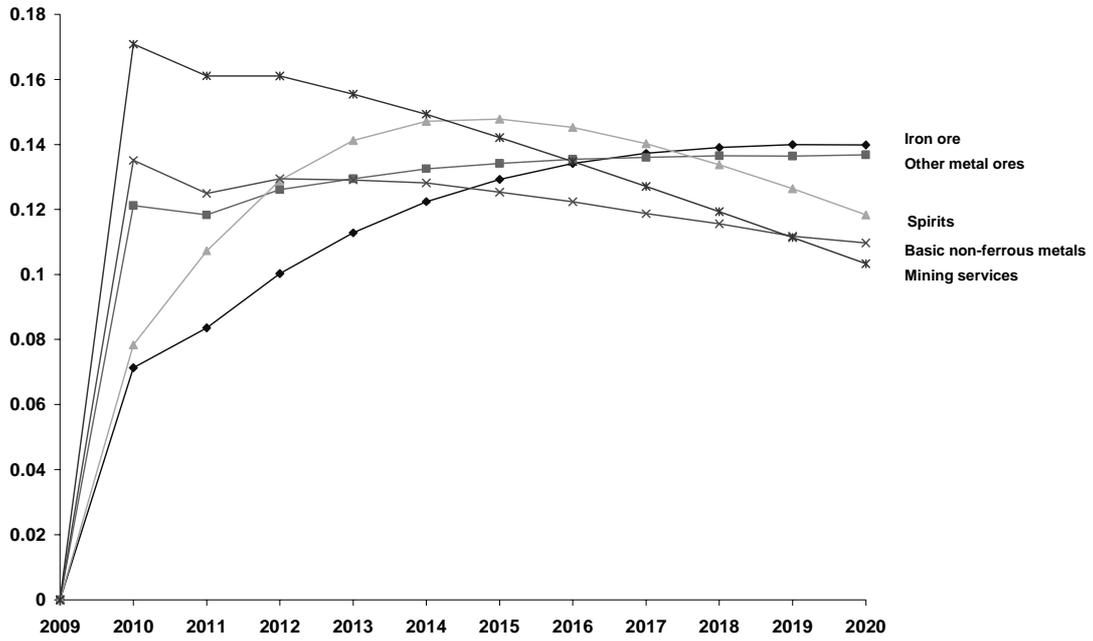
**Chart 15. Output, employment and dom/imp consumer price ratio for TCF**  
*(% deviations from basecase, short-run sticky wages)*



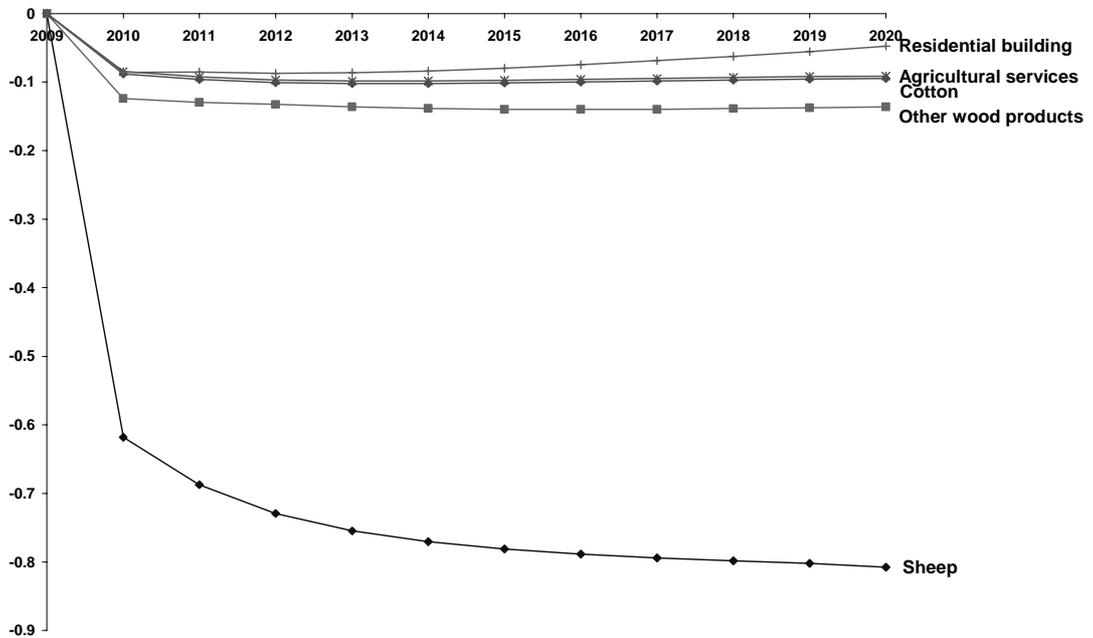
**Chart 16. Output, imports, exports and sales of TCF**  
*(% deviations from basecase, short-run sticky wages)*



**Chart 17. Industry outputs: Main winners**  
 (% deviations from basecase, fixed aggregate employment)



**Chart 18. Industry outputs: Main losers outside TCF**  
 (% deviations from basecase, fixed aggregate employment)



consumption. Other wood products loses from its connection with residential building.

### ***Results for other industries, short-run sticky wages***

In the long run, wages are flexible in both policy simulations. Thus we would expect both simulations to generate similar long-run results. This is confirmed by a comparison of the winners and losers charts for the second policy simulation (Charts 19 and 20) with the corresponding charts for the first policy simulation (Charts 17 and 18).

In the short run, Chart 19 shows sharper peaks for the export-oriented winners than those in Chart 17. This is explained by short-run movements in the exchange rate. As we will see, with short-run sticky wages, cuts in TCF assistance generate greater reductions in investment, and consequently in the exchange rate, than they do with flexible wages (and fixed aggregate employment).

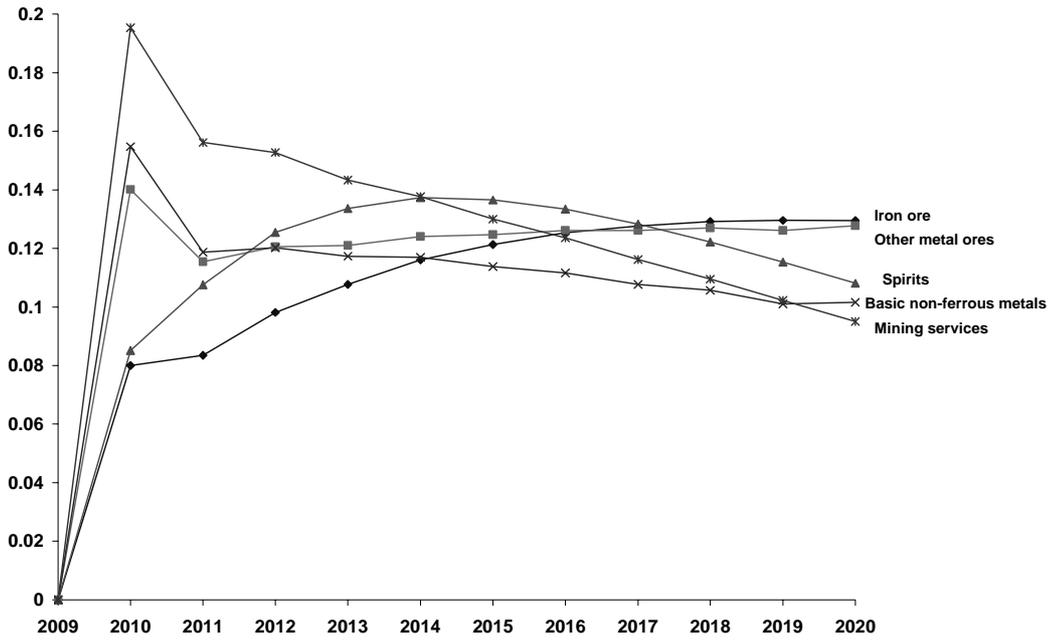
Chart 20 shows little short-run difference from Chart 18 for the losing industries that owe their negative deviations directly to TCF industries. This is because the TCF results in the two policy simulations are very similar. Residential buildings and Other wood products show noticeably weaker short-run results in Chart 20 than in Chart 18. As will be explained later, the short-run deviation in aggregate employment is negative in the second policy simulation. This has an adverse short-run effect on aggregate consumption, thereby reducing demand for consumption-related products such as Residential buildings and Other wood products.

## **4.3. Regional effects**

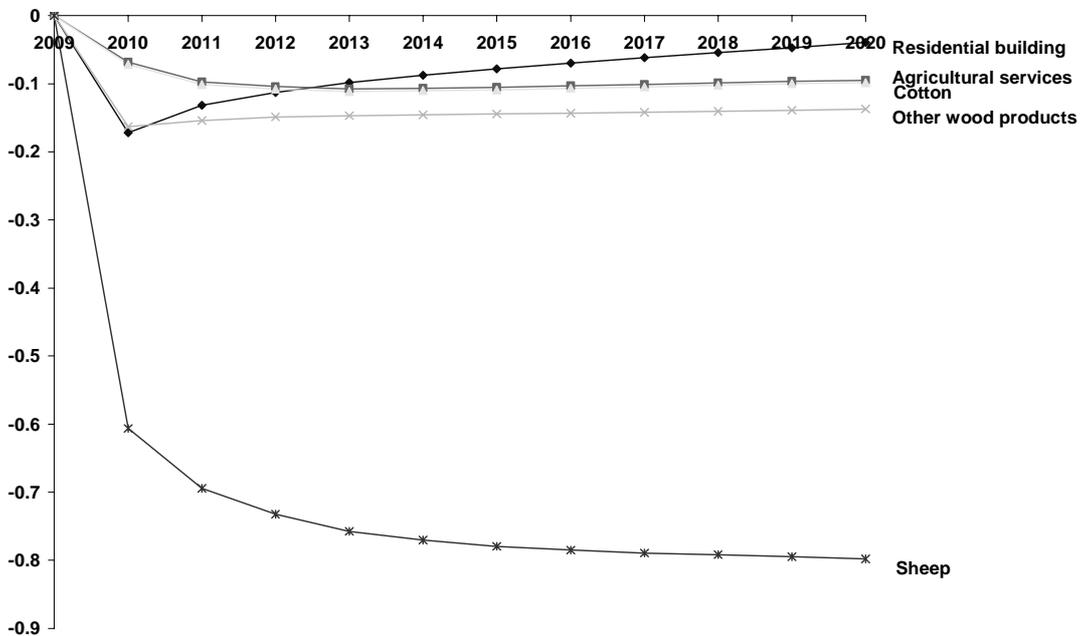
### ***Policy simulation 1, fixed aggregate employment***

Under the assumption of fixed aggregate employment, Chart 21 identifies Victoria as the only State/Territory that is likely to suffer a long-run reduction in employment from the modelled cuts in TCF assistance. This reflects the concentration of the TCF industry in Victoria. While the long-run outcome for Victoria is negative, it is small, about -0.02 per cent. At today's level of employment, this is equivalent to about 460 jobs. Western Australia (WA) and the ACT are shown as the regions with the largest long-run employment gains. WA has little TCF activity and has an over-representation of export industries that benefit from cuts in

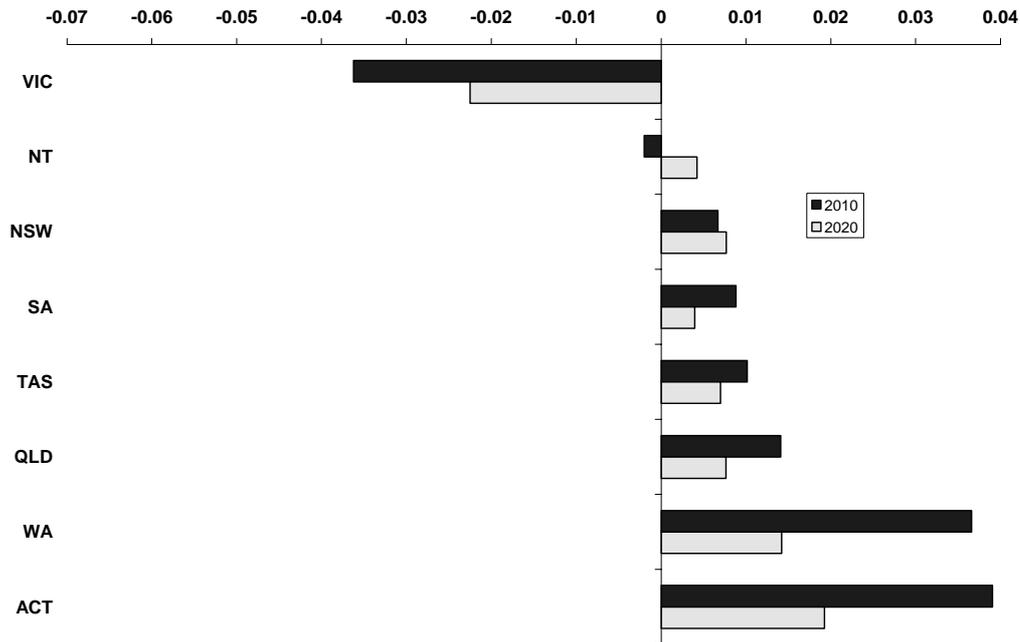
**Chart 19. Industry outputs: Main winners**  
 (% deviations from basecase, short-run sticky wages)



**Chart 20. Industry outputs: Main losers outside TCF**  
 (% deviations from basecase, short-run sticky wages)



**Chart 21. Employment by State and Territory in 2010 and 2020**  
*(% deviations from basecase, fixed aggregate employment)*



TCF assistance. Similarly, ACT has only limited TCF activity. At the same time, ACT has some export-oriented agricultural production (beef cattle) and administrative offices of some export-oriented industries (mining).

The percentage short-run effects in Chart 21 are generally larger in magnitude than the long-run effects. For example, the employment loss in 2010 in Victoria is nearly 0.04 per cent whereas in the long run it is 0.02 per cent. On average, the absolute percentage employment deviations in 2010 are greater than those in 2020 because, in our basecase forecasts, the TCF sector is larger in 2010 than in 2020. Thus, the modelled cuts in assistance have greater absolute effects on TCF employment in 2010 than they do in 2020. This causes the short-run employment deviation in Victoria to be more negative in 2010 than in 2020. Correspondingly, for most other States/Territories, the employment deviations must be more positive in 2010 than in 2020. The real exchange rate also plays a role. As will be explained in subsection 4.4, the modelled reductions in TCF assistance produce a larger real devaluation in the short run than in the long run. Real devaluation favours export-oriented States such as Western Australia relative to the more domestically oriented States such as Victoria. Thus, the behaviour of the real exchange rate accentuates

short-run relative to long-run differences between the States in the effects of cuts in TCF assistance.

Chart 22 shows the employment effects at the Statistical Division level from the modelled cuts in TCF assistance. For 2010 these range from about -0.05 per cent for Melbourne, Wimmera and Barwon (all in Victoria) to 0.12 per cent for Pilbara (in WA). Statistical Divisions at the top of Chart 22 are those having relatively high concentrations of TCF activity. Those at the bottom of the chart have high concentrations of export activity, especially mining and agriculture.

As was the case for the States/Territories, the percentage employment effects for the Statistical Divisions are generally smaller in absolute size in 2020 than in 2010.

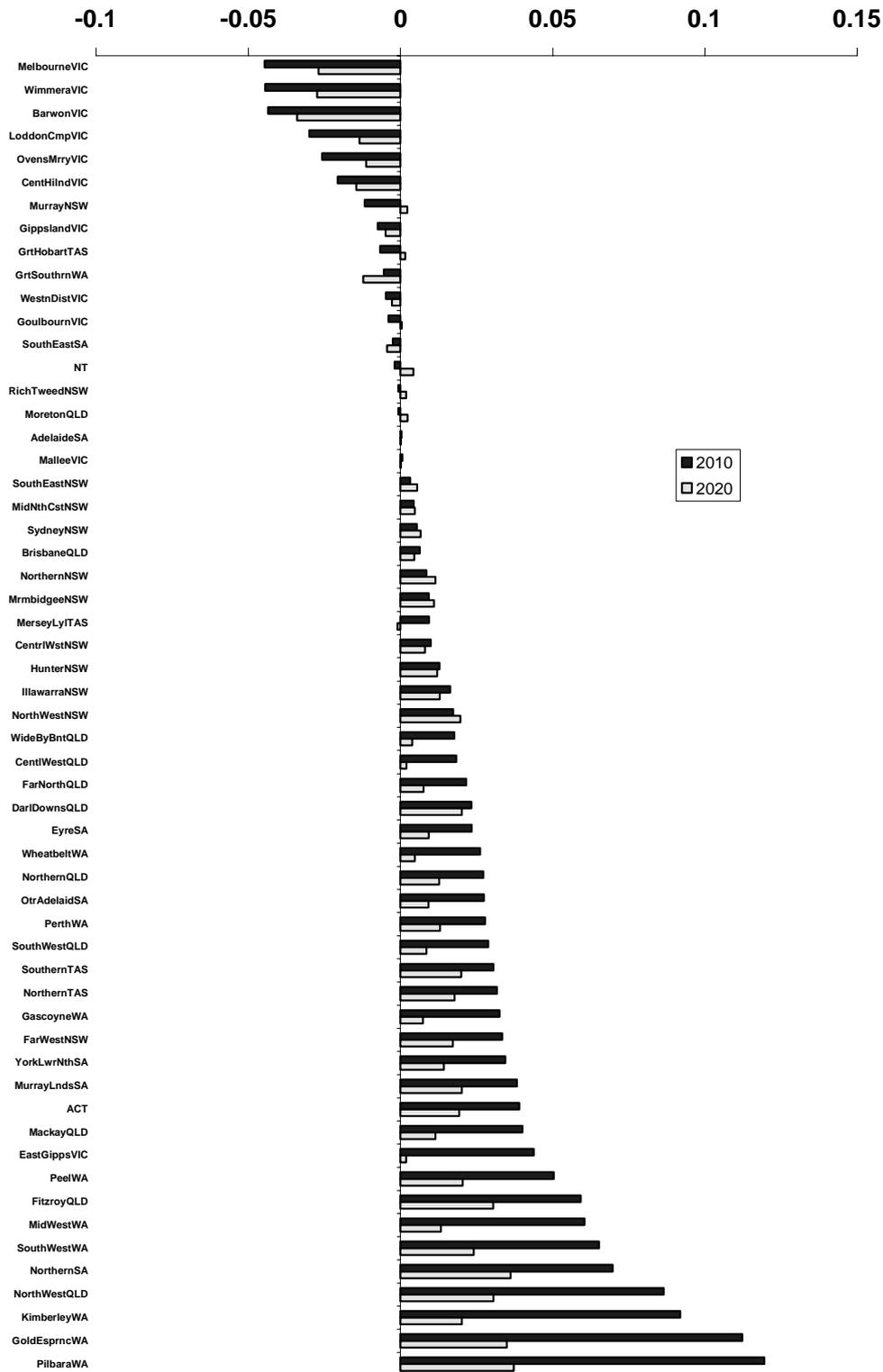
### ***Policy simulation 2, short-run sticky wages***

The regional results for the long run in Charts 23 and 24 are similar to those in Charts 21 and 22. In the long-run we have wage flexibility in both policy simulations.

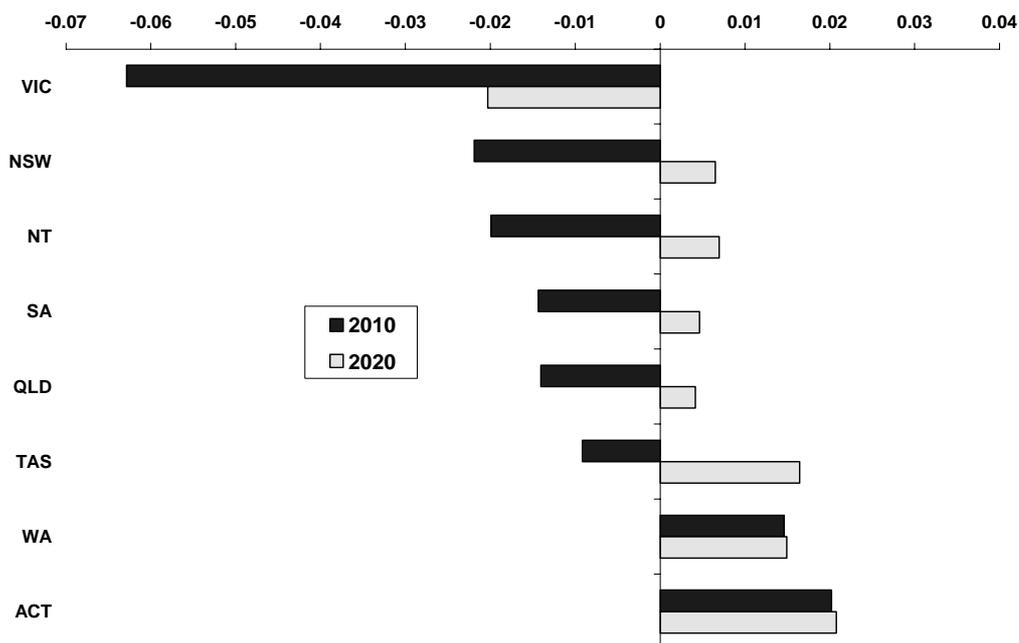
In the short run, the results for all States/Territories and all Statistical Divisions (with one exception) are less favourable under sticky wages than under fixed aggregate employment (compare the dark bars in Chart 23 and 24 with those in Chart 21 and 22). Wages in 2010 in the fixed-employment simulation are lower than those in the sticky-wage simulation. As explained in subsection 4.4, a reduction in wages was necessary in the fixed-employment simulation to maintain the basecase-level of aggregate employment. Lower wages in the fixed-employment simulation generate higher employment throughout Australia than in the sticky-wage simulation.

The exceptional result is for Goldfield-Esperance (in WA). The employment deviation for this Division in 2010 in the fixed-employment simulation is 0.112 per cent, slightly less than in the sticky-wage simulation, 0.114 per cent. As explained in the next subsection, the sticky-wage simulation produces an export spike in 2010. This favours Goldfield-Esperance which is a highly export-oriented region.

**Chart 22. Employment by Statistical Division in 2010 and 2020**  
*(% deviations from basecase, fixed aggregate employment)*



**Chart 23. Employment by State and Territory in 2010 and 2020**  
*(% deviations from basecase forecasts, short-run sticky wages)*

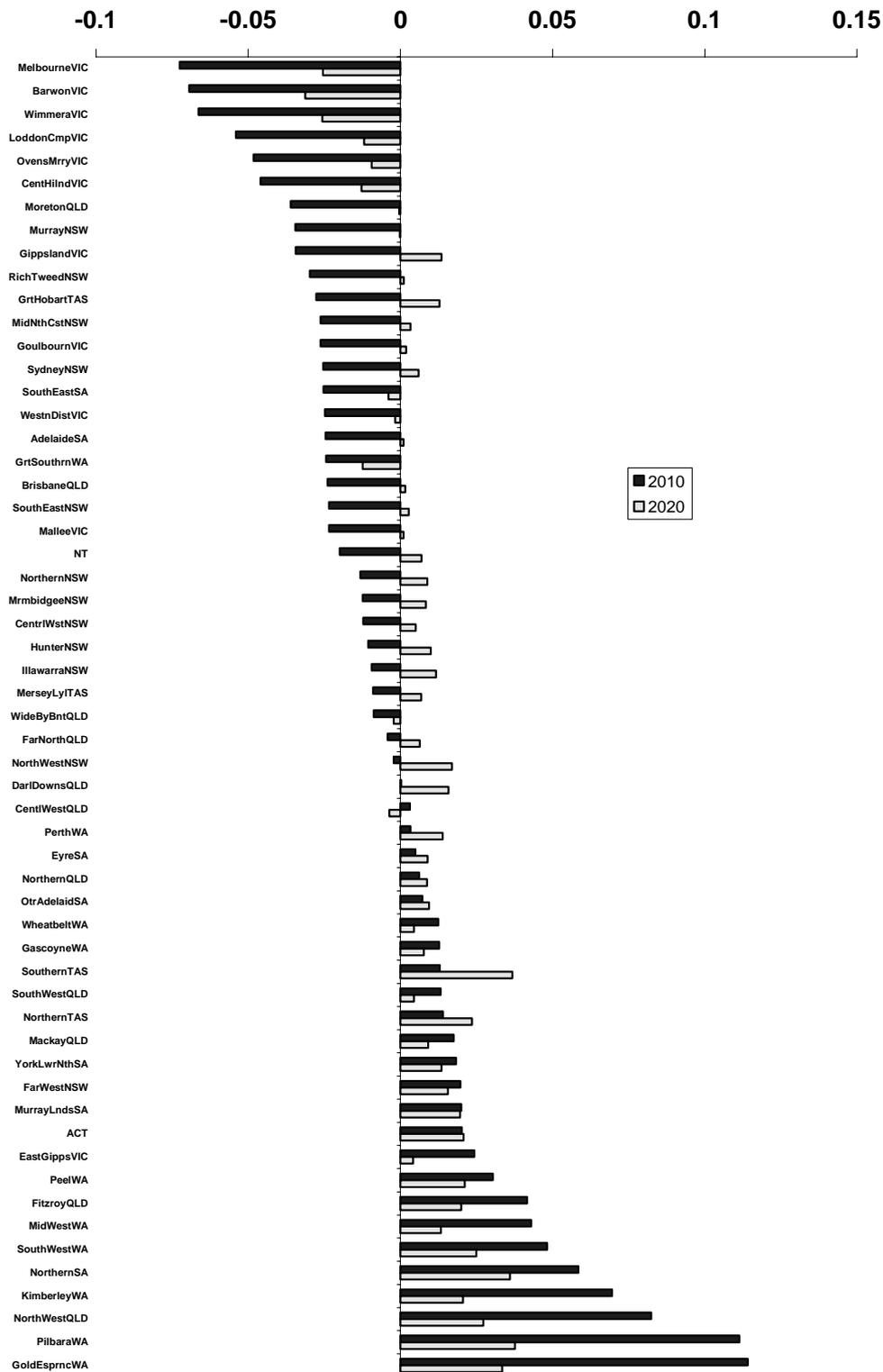


#### 4.4. Macro effects

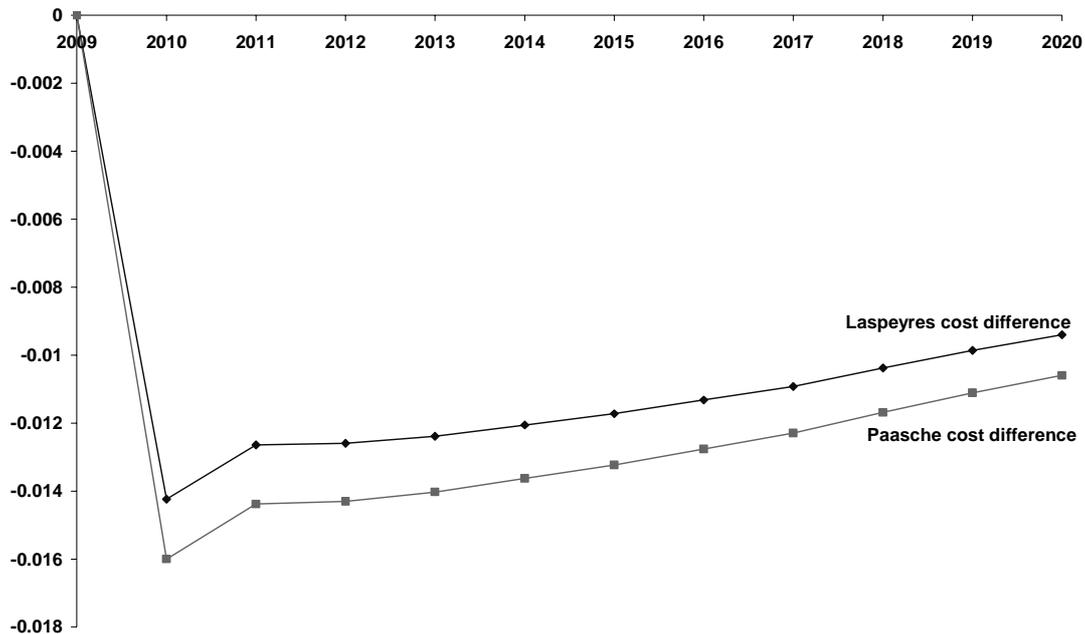
##### *Policy simulation 1, fixed aggregate employment*

Chart 25 shows Laspeyres and Paasche cost differences caused by the reduction in TCF assistance, assuming no effect on aggregate employment. The cost differences are indicators of welfare. The Laspeyres cost difference shows the percentage increase in their budget that households in the forecast situation would require to be just able to buy the policy consumption bundle. The Paasche cost difference shows the percentage reduction in their budget that households in the policy situation could suffer and still be able to just buy the forecast consumption bundle. The Laspeyres cost difference is an upper bound on the welfare effect of a policy change. If households in the forecast situation were to receive a budget boost sufficient to allow them to buy the policy bundle, then they could achieve at least the policy level of welfare. The Paasche cost difference is a lower bound on the welfare effect of a policy change. If households in the policy situation were to receive a budget cut which left them just able to buy the forecast bundle, then they could achieve at least the forecast level of welfare.

**Chart 24. Employment by Statistical Division in 2010 and 2020**  
*(% deviations from basecase forecasts, short-run sticky wages)*



**Chart 25. Welfare measures**  
*(% deviations from basecase, fixed aggregate employment)*

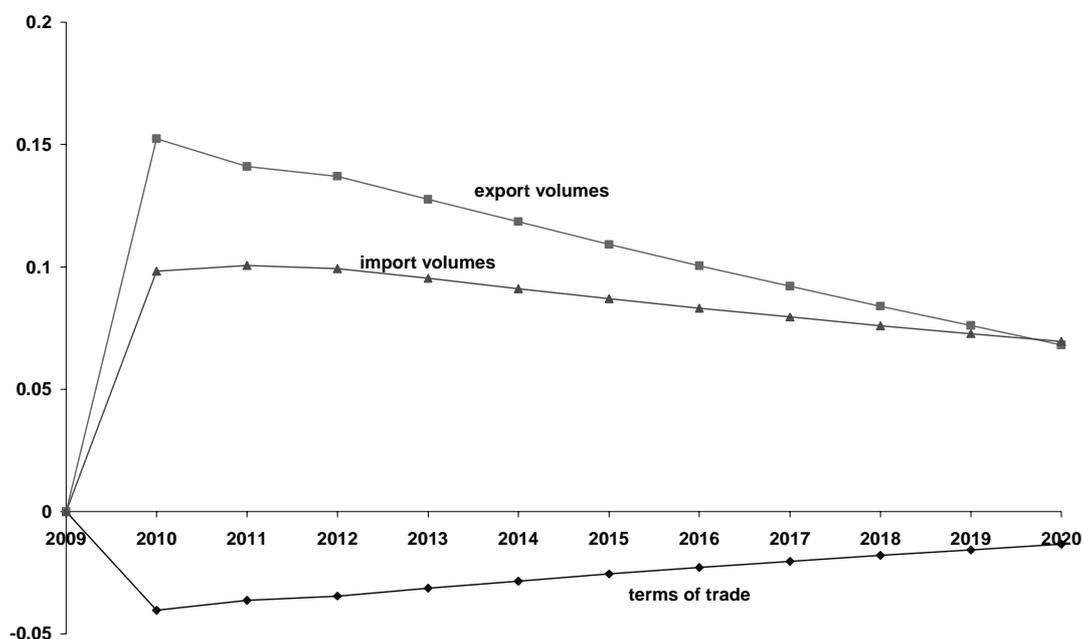


With cuts in TCF assistance, there is a weakening of the exchange rate and stimulation of Australian exports. As can be seen from Chart 26, the export deviation in 2010 is 0.15 per cent. With export demand elasticities of -4, this requires a reduction in foreign-currency export prices of about 0.0375 per cent ( $=0.15/4$ ). Because we assume that cuts in TCF assistance have no effect on foreign-currency import prices, a reduction of 0.0375 per cent in foreign-currency export prices translates into a reduction of 0.0375 per cent in the terms of trade. In 2010, Australia's exports will be about 37 per cent as large as household consumption. Thus, a 0.0375 per cent reduction in the terms of trade would reduce household consumption by about 0.014 ( $=0.0375 \times 0.37$ ). This is approximately the percentage reduction in welfare indicated by the Laspeyres and Paasche cost differences for 2010 in Chart 25.

Beyond 2010, Chart 26 shows a gradual decline in the export deviation and a corresponding gradual improvement in the terms of trade. This explains the upward slope in the cost-difference paths in Chart 25. Why does the export path slope down?

The first reason is that the import path slopes down. With less and less import stimulation, there is less and less real devaluation and consequently less and less export stimulation. Why does the import path slope down?

**Chart 26. Export and import volumes and the terms of trade**  
*(% deviations from basecase, fixed aggregate employment)*



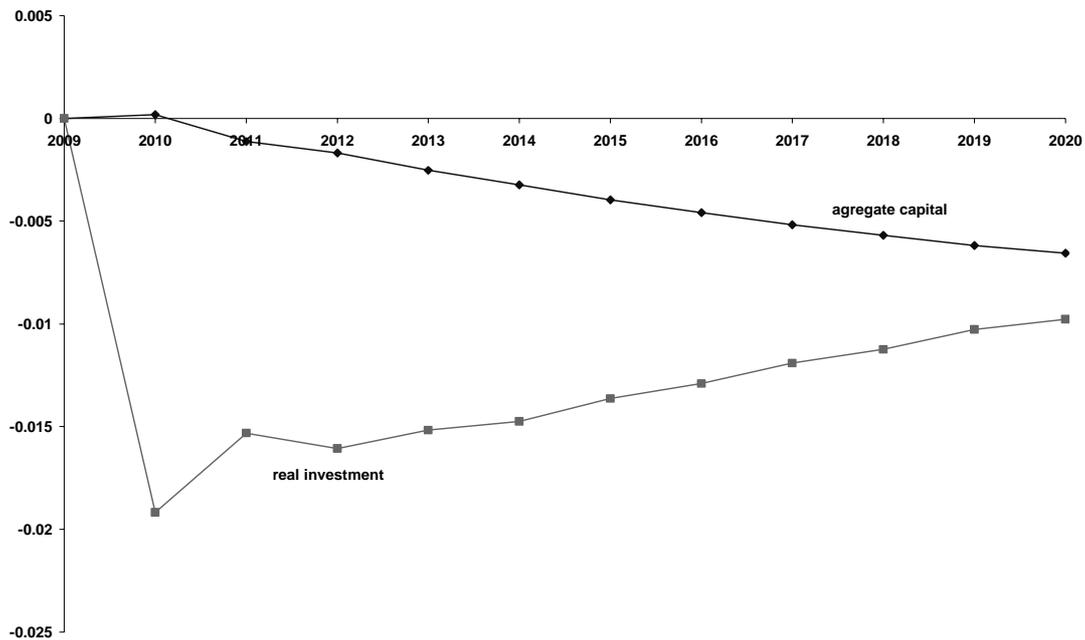
Through the simulation period, the deviation in imports caused by cuts in TCF assistance declines because the price elasticity of demand for imported TCF products declines. As can be seen from equation (4.2), the price elasticity of demand for imports of any TCF product is given by:

$$\text{Elasticity} = -\sigma * S_d \quad (4.3)$$

In our basecase forecasts, the  $S_d$ 's for TCF products fall. This causes the import-demand elasticities to fall (move closer to zero). With lower import-demand elasticities, there is diminishing stimulation of TCF imports from cuts in TCF assistance.

An additional reason for the downward path of exports, and the consequent upward paths for the terms of trade and the cost differences, is the behaviour of investment. With a deterioration of the terms of trade, Australian wages fall relative to returns on capital (in the long-run, rates of return are fixed by international conditions). This causes a downward adjustment in the K/L ratio. As can be seen in Chart 27, the adjustment to a lower K/L ratio involves a relatively sharp reduction in investment followed by a gradual recovery. The initial sharp reduction in investment causes an initial sharp real devaluation with an associated spike in exports. As investment recovers, the exchange rate strengthens causing downward pressure on exports.

**Chart 27. Aggregate capital and real investment**  
*(% deviations from basecase, fixed aggregate employment)*



At the Commission’s workshop of March 20, Econtech (2003) reported welfare results from a simulation with MM600+. In common with our first policy simulation, Econtech assumed that cuts in TCF assistance do not affect aggregate employment. Unlike our analysis, Econtech emphasised resource-allocation gains from cuts in TCF assistance. For MONASH, these gains are negligible compared with the terms-of-trade losses. We obtain much larger terms-of-trade losses than those in Econtech’s central case because we assume that export-demand elasticities are -4 whereas Econtech assumed -12 for most commodities. We obtained much smaller resource-allocation gains because MONASH generates much smaller increases in TCF imports than those in the Econtech simulations. There are three reasons for this. First, the Armington elasticities used by Econtech are higher for most TCF products than those in MONASH. For example, Econtech assumes 4.24 for Clothing whereas MONASH assumes 2.8. Second, as explained above, MONASH takes account of reductions in the price elasticity of demand for imported TCF products associated with the reductions in domestic shares ( $S_d$ ) forecast out to 2020. Econtech assumes implicitly that domestic shares remain at their levels in the 1990s. Third, Econtech assumes that the modelled cuts in assistance would generate much greater reductions in the import/domestic ratio of purchasers’ prices of TCF products than is assumed by MONASH. We suspect this reflects different treatments

between the two models in margins (retail, wholesale and transport costs). In MONASH, the effects of tariff cuts on purchasers' prices of imported TCF products is damped by our assumption that retail, wholesale and transport costs are not directly affected. These margin costs account for a large part of the purchasers' prices of some TCF products. For example, they are about half of the household purchasers' prices of imported Clothing and Footwear. Thus, in MONASH, cuts in tariffs that cause 8 per cent reductions in the landed-duty-paid prices of imported Clothing and Footwear cause only 4 per cent reductions in the purchasers' prices of these products. We are not aware of this damping mechanism being present in the Econtech model.

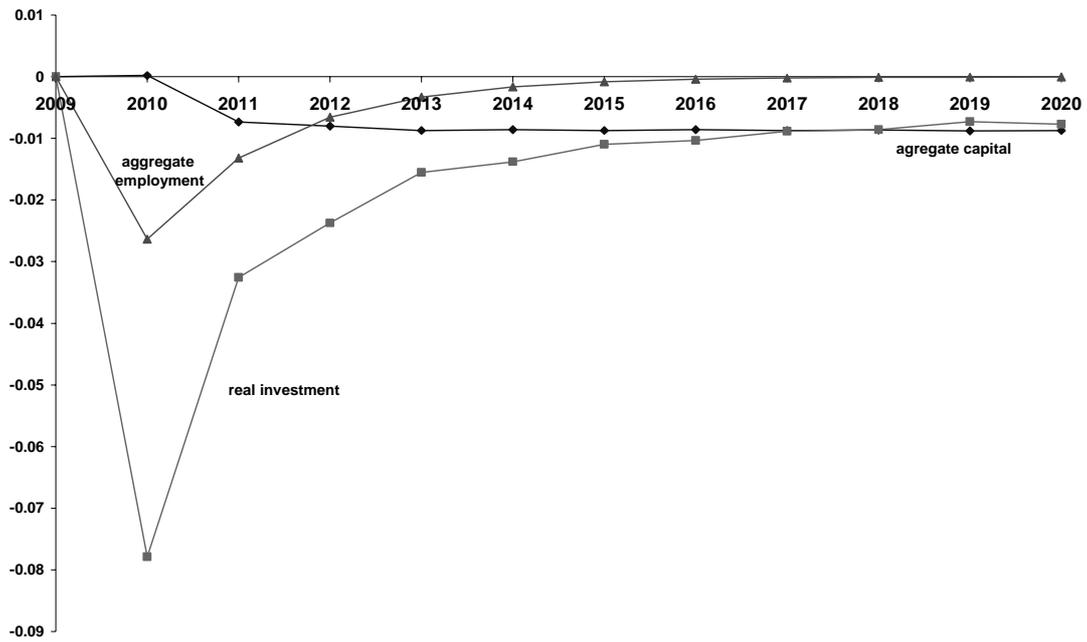
***Policy simulation 2, short-run sticky wages***

As can be seen from Chart 28, under the assumption of sticky wages, aggregate employment is reduced in the short-run by cuts in TCF assistance. This result could be anticipated from our first policy simulation. In that simulation, the terms-of-trade effects (bad news) outweighed resource allocation effects (good news), producing the equivalent of a reduction in productivity. Thus, a reduction in wages was required to maintain employment at its basecase level. Now, in our second policy simulation, there is insufficient short-run wage flexibility to prevent a reduction in employment. In the long run, wages fall sufficiently to allow employment to return to its basecase forecast path.

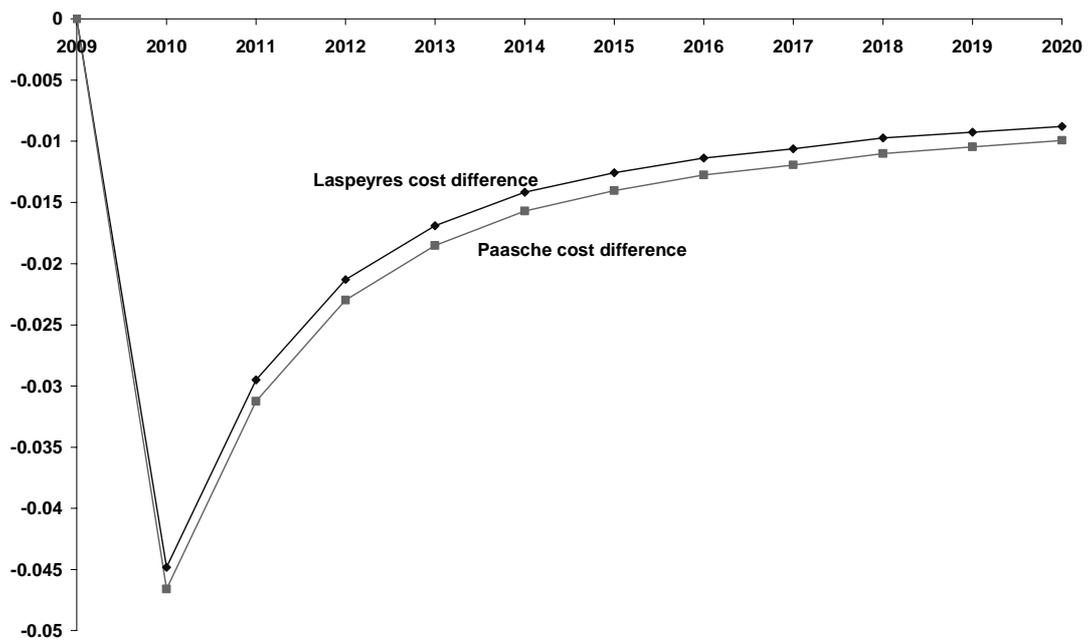
The short-run reduction in employment in the second policy simulation causes consumption in the early years of the simulation period to be considerably lower than in the first simulation. In Chart 29, the deviations in the Laspeyres and Paasche cost differences in 2010 are about 0.045 per cent (about \$185 million in present day terms). In Chart 25, the deviations in 2010 were only about 0.014 per cent (about \$57 million).

With lower employment, the second policy simulation shows larger short-run negative deviations for investment than those in the first simulation (compare Charts 28 and 27). Together, the larger negative deviations for consumption and investment cause a larger short-run negative deviation in the exchange rate in the second simulation than in the first. This explains the higher spike in exports in the second simulation than in the first (compare Charts 30 and 26). The higher spike in exports in the second simulation produces a lower trough in the terms of trade (again compare Charts 30 and 26).

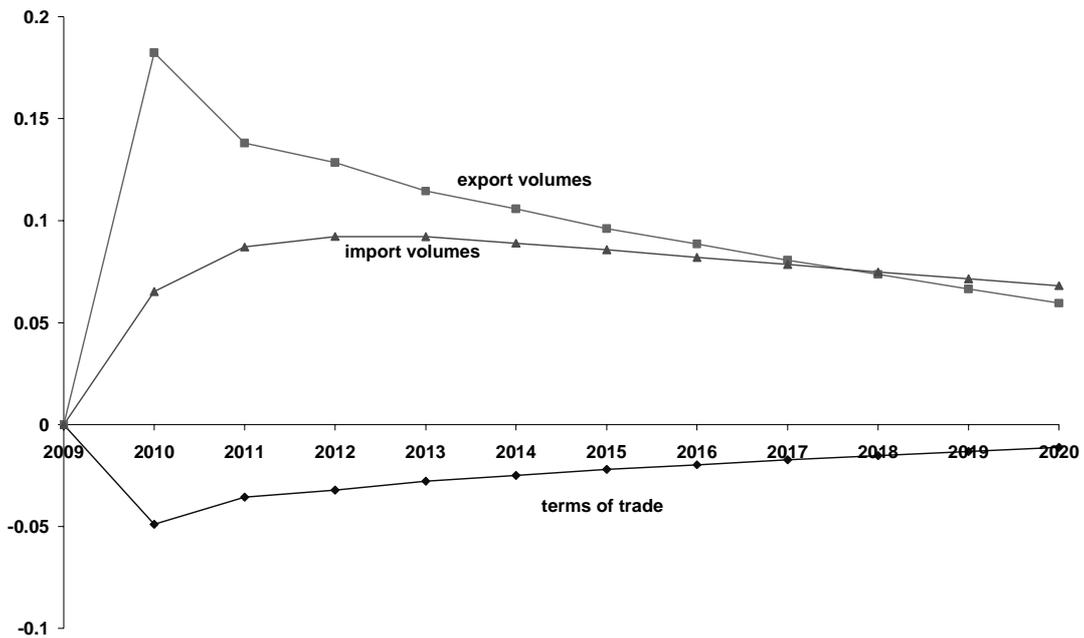
**Chart 28. Aggregate employment, aggregate capital and real investment**  
*(% deviations from basecase, short-run sticky wages)*



**Chart 29. Welfare measures**  
*(% deviations from basecase, short-run sticky wages)*



**Chart 30. Export and import volumes and the terms of trade**  
*(% deviations from basecase, short-run sticky wages)*



#### 4.5. Adjustment costs

Changes in technology, world commodity prices, investor confidence and many other factors cause continuous background or basecase changes in the industrial, regional and occupational employment. Thus, there are ongoing adjustment costs in the form of lost labour input through retraining and through unemployment during transitions between jobs or transitions from employment to long-term involuntary unemployment. Changes in economic policy cause deviations in industrial, regional and occupational employment away from their basecase paths. Thus, changes in economic policy can either increase or reduce adjustment costs by moving training needs or unemployment away from their basecase levels.

In addition to lost labour input, there are several other dimensions of adjustment costs. These include loss of self esteem for the unemployed, moving costs, poverty imposed on families of the unemployed and crime related to unemployment. Adjustment costs also include premature scrapping of capital equipment.

With the MONASH model, we measure just two aspects of adjustment costs: loss of labour input through unemployment and loss of labour input through retraining. In most applications of MONASH we have found that policy-induced changes in retraining have a minor cost. On the other hand, we sometimes find that

policy-induced changes in unemployment can be significant. For example, in the current study we find under the sticky wage assumption that the modelled cuts in TCF assistance could cause a loss in labour input in 2010 through unemployment worth about \$100 million. We expect other dimensions of adjustment costs (loss of self esteem etc.) to be approximately proportional to the loss of labour input through unemployment. Thus, users of the MONASH measure of policy-induced adjustment costs should feel free to multiply our cost estimates by a factor which reflects their judgement of the value of adjustment dimensions that we do not take into account.

***Policy simulation 1, fixed aggregate employment***

Our results in subsection 4.2 (Chart 1) for the first policy simulation imply that implementation of the modelled cuts in TCF assistance would reduce employment in the TCF sector by 4.3 per cent in 2010. In our basecase forecasts, TCF employment in 2010 is about 37,000 jobs. Thus, 1,590 people ( $= 4.3 \times 37,000$ ) would be displaced from the TCF sector in 2010 by the modelled policy. Under the fixed-aggregate-employment assumption, MONASH is forced to show a policy-induced increase of 1,590 jobs in 2010 outside the TCF sector.

With zero impact on aggregate employment, we can expect MONASH to imply that policy-induced net adjustment costs are small. In the current context, costs imposed on people who suffer from the loss of 1,590 TCF jobs are likely to be approximately offset by benefits accruing to people who gain from the creation of 1,590 jobs elsewhere.

Under the assumption of zero impact on aggregate employment, MONASH can, however, show non-zero adjustment costs. Maximum adjustment costs occur in simulations in which industries that are harmed by the policy adjust by increased rates of firing (rather than reduced rates of hiring) and industries that are benefited by the policy adjust by increased rates of hiring (rather than reduced rates of firing). In an extreme case we can think of 1,590 people being fired from the TCF sector and moving into unemployment, and 1,590 people being hired by expanding export industries and moving out of unemployment. This maximises our measure of adjustment costs because it maximises training costs. In MONASH calculations we assume that the movement of a person from one job to another (or equivalently the movement of one person from employment into unemployment and the movement of another person from unemployment into employment) generates training costs equivalent to 0.25 labour years. In the present analysis this implies that an upper

bound on the adjustment costs in 2010 from the modelled cut in TCF assistance is the value of 397 person-years of labour (= 1590\*0.25).

In our basecase forecasts, employment in the TCF sector is falling so that the policy-induced adjustment in the sector is by firing. Nevertheless, the actual adjustment costs computed by MONASH in the first policy simulation for 2010 are only 64 person-years of labour. The reason that the computed adjustment costs are so much lower than the upper bound of 397 person-years is that adjustment in the industries that benefit from the policy is predominantly by reduced rates of firing. Employment in our basecase forecasts in the main benefiting industries (export-oriented mining and agriculture) is falling. Thus in the calculation of adjustment costs, the effects of extra firing in the TCF sector are largely offset by reduced firing in export-oriented mining and agriculture.

In Chart 25 the policy is projected to have a negative welfare effect in 2010 of about 0.014 per cent of consumption (\$57 million). Sixty four person-years of labour in present-day terms is worth \$2.5 million. Thus, under the fixed-aggregate-employment assumption, adjustment costs (measured by lost labour input) make a relatively minor negative contribution to the overall welfare effects of the policy.

By 2020, the policy-induced displacement from the TCF sector is down to 1,080 jobs. This reflects two factors: the reduction in the percentage employment deviation in the TCF sector (the upward slope of the employment line in Chart 1); and the decline in TCF employment in our basecase forecasts. This means that once the employment displacement of 2010 has taken place, no further displacement would be necessary. Thus, all of the adjustment costs associated with the modelled cuts in TCF assistance would be likely to occur in 2010.

### ***Policy simulation 2, short-run sticky wages***

In simulation 2, the cuts in TCF assistance reduce aggregate employment in 2010 by 0.026 per cent or 2,700 jobs. With short-run wage stickiness, adjustment costs are approximately those estimated under the fixed-employment assumption (64 person-years) *plus* the loss of labour input arising from extra unemployment (2,700 person-years). Thus, in simulation 2, adjustment costs in 2010 are dominated by additional unemployment. In present day terms this additional unemployment is equivalent to a loss in labour input worth about \$100 million.

The short-run loss of TCF employment in the second policy simulation is almost identical to that in the first, 1,590 jobs in 2010. That the economy-wide short-

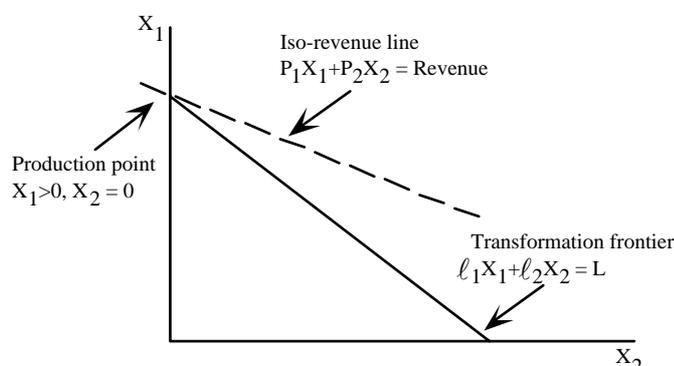
run loss of employment should be nearly seventy per cent higher (2,700 compared with 1,590) than the loss of TCF employment reflects multiplier effects. With sticky wages, the short-run operation of MONASH is similar to that of a Keynesian model. Reductions in employment in the TCF industries cause direct losses of income in the TCF industries and in supplying industries. This in turn causes reductions in consumption and further reductions in employment. With sticky-wage responses and an effective loss in labour productivity (terms-of-trade losses outweighing allocation gains) these reductions in employment are not immediately accompanied by compensating economy-wide employment-creating cost reductions. Recovery in aggregate employment must wait until wages eventually fall.

#### **4.6. Appendix on export demand elasticities and the specialisation problem**

The specialisation problem is the tendency for computable general equilibrium (CGE) models to imply that a country will export only a narrow range of commodities. In the extreme case, just one commodity is exported and all other tradeable commodities are imported. As illustrated in Figure 1, extreme specialisation occurs in models in which: (a) industries exhibit constant returns to scale; (b) there is only one factor of production, labour; and (c) changes in export volumes do not affect world commodity prices (the small country assumption).

Models such as MONASH and Econtech's MM600+ include several features that prevent export specialisation. For example, MONASH includes agricultural land. This introduces diminishing returns to scale in agriculture and ensures that the model generates an export bundle that includes a variety of agricultural products. MONASH also includes capital as a primary factor as well as labour. Because capital can eventually be produced from labour, the mere inclusion of capital does not avoid the specialisation problem in the long-run. In MONASH, investors are risk-averse and capital is supplied to industries according to upward-sloping schedules. This helps prevent over specialisation by limiting capital expansion in any one industry. However, the most important mechanism in MONASH for preventing over specialisation is limited world demand. We assume that at any given time Australia can expand its exports only by reducing its prices. By reference to estimated Armington elasticities, we deduce that a reasonable value for the elasticity of foreign demand for most Australian products is -4. With this elasticity, unrealistic expansion in the export of any particular commodity is held in check by reduction in its foreign currency price.

**Figure 1: Specialisation in a model with constant returns to scale, one factor of production and fixed prices**



Assume that output ( $X_i \geq 0$ ) of each commodity is chosen to maximise

$$\sum_i P_i X_i \quad (i)$$

$$\text{subject to } \sum_i \ell_i X_i = L \quad (ii)$$

where

$P_i$  is the world price of commodity  $i$  and is assumed to be independent of  $X_i$  (the small country assumption);

$\ell_i$  is the input of labour per unit of output of good  $i$  and is assumed to be independent of  $X_i$  (constant returns to scale); and

$L$  is the total availability of labour (the single factor of production).

The solution to this problem never requires more than one positive  $X_i$ . Only commodity  $j$  need be produced where  $j$  is the commodity which gives the maximum value for  $P_j L / \ell_j$ . This implies that only one good need be produced and exported and that all other goods can be imported. The 2-good version of model (i)-(ii) is illustrated in the figure.

Specialisation results can be obtained easily for more general models than (i)-(ii) provided that they retain properties (a)-(c) mentioned in the text. For example, if we allow for intermediate inputs, the model becomes:

$$\text{choose } Y \text{ and } X \quad (iii)$$

$$\text{to maximize } \sum_i P_i Y_i \quad (iii)$$

$$\text{subject to } X = AX + Y \quad (iv)$$

$$\text{and } \ell'X = L \quad (v)$$

where  $Y_i$  is the amount of  $i$  available for final demand;

$X$  is the vector of outputs; and

$A$  is the matrix of intermediate input coefficients.

Model (iii) to (v) reduces to:

$$\text{choose } X_1, X_2, \dots, X_n$$

$$\text{to maximize } \sum_i q_i X_i$$

$$\text{subject to } \ell'X = L$$

$$\text{where } q' = P'(I - A).$$

The model now has the same form as (i)-(ii), with  $q$  replacing  $P$ . Thus, no more than one commodity need be produced.

With export-demand elasticities much higher in absolute value than 4 [for example, 12 used for most commodities in standard applications of MM600+ or 10 suggested by the Productivity Commission for the purposes of sensitivity analysis], MONASH produces solutions that exhibit considerable instability in the commodity composition of exports. This is illustrated in Chart 31. The chart shows deviation results for

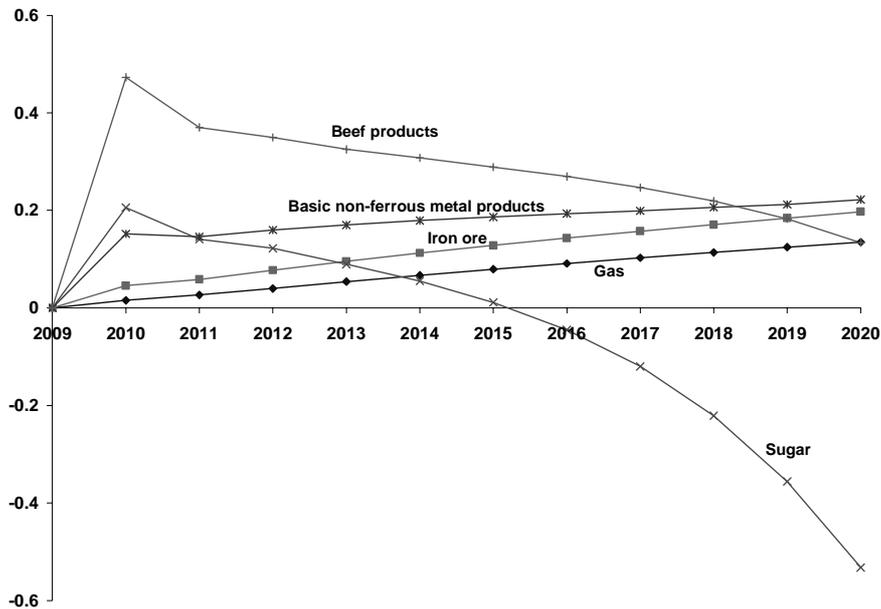
exports of several commodities in a simulation similar to that reported in subsections 4.2 to 4.5, but with export-demand elasticities set at -10.

How does Econtech avoid export instability in simulations with most export-demand elasticities at -12? The answer is that Econtech assumes that Australia produces two varieties of each commodity, one for domestic use and one for export. In the production processes assumed by Econtech, these varieties are only moderately good transformates. For all commodities, the assumed elasticity of transformation between the two varieties is 2.5. Providing there is any demand for the domestic variety, production (and export) of the export variety is assured (see Figure 2). Thus the over-specialisation problem is avoided.

Reliance on the two-variety approach does not seem realistic for Australia. For most of Australia's exports, we know of no evidence of significant distinctions between the varieties that are exported and the varieties that are absorbed in the domestic economy. The only clear example that comes to mind is fish. The variety that is exported is predominantly crustaceans from warm northern waters, while the variety that is absorbed domestically is soft fish from cold southern oceans. However, even in this case, the two-variety single product treatment is unsatisfactory. Ideally, we should have two distinct products each produced by a distinct industry. In this way, we could recognise that northern-water crustaceans are produced with a different technology (bundle of inputs) than is used for southern-water soft fish. We could also recognise that demand determinants for crustaceans are quite different from those for soft fish.

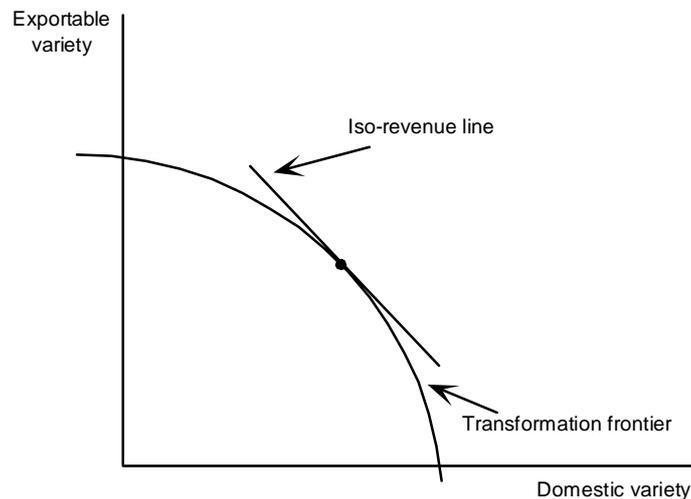
Avoiding the specialisation problem via the two-variety approach is attractive to those who wish to advocate extremely low tariffs. With the specialisation problem pushed to one side, modellers are then free to assume large export-demand elasticities. With such elasticities, terms-of-trade effects appear relatively unimportant. In this way, models such as MM600+ can show results in which negative terms-of-trade effects are outweighed by positive resource allocation benefits, even when the tariffs that are being reduced are low.

**Chart 31. Selected Exports: export elasticities set at -10**  
*(% deviations from basecase, fixed aggregate employment)*



The results in this chart exhibit symptoms of the over-specialisation problem. The deviations in export quantities induced by small reductions in TCF assistance show no sign of stabilising. The model is groping towards a more specialised, but unrealistic, export bundle.

**Figure 2: The two-variety approach to avoiding the export specialisation problem**



For a given level of inputs, industry  $i$  can produce any combination of good  $i$  for export and good  $i$  for domestic absorption that lies on the relevant transformation frontier. With higher levels of inputs, the transformation frontier moves out. By giving the transformation frontier a concave shape (concave from below), modellers can avoid corner outcomes. As long as the ratio of the domestic to export price (the negative of the slope of the iso-revenue line) stays finite, the model is likely to generate solutions in which exports of good  $i$  are positive.

In our view, Australian tariffs are already sufficiently low that negative terms-of-trade effects associated with further reductions are likely to outweigh positive resource allocation benefits. This does not necessarily mean that further tariff cuts should be opposed. However, justification for such cuts would probably need to rely on arguments concerning favourable reactions by our trading partners or favourable effects on productivity in the Australian TCF sector.

## **5. Concluding remarks**

There is a temptation in model-based studies to provide many alternative simulations. This is a form of sensitivity analysis. However, we think that alternative simulations should be used sparingly. We find that large volumes of numerical results can get in the way of understanding and digesting the messages coming out of a model on any given policy issue. Rather than using alternative simulations as the main approach to sensitivity analysis, we provide explanations of the mechanisms underlying our results supplemented by detailed back-of-the-envelope calculations. Via this approach we give readers an opportunity (a) to make informed decisions about the realism of our results and (b) to answer questions concerning the sensitivity of results to key parameters by extending our back-of-the-envelope calculations.

Consider, for example, the issue of Armington elasticities. For determining results for the TCF industries, our analysis identified these elasticities as being of major importance. The average value of the Armington elasticities for TCF products used in our study is 2.7. In the Econtech study the average value is 4.3. What would be the effect on our TCF results if we had used the Econtech elasticities rather than our own? Referring to the back-of-the-envelope equations (4.1) and (4.2) and the associated analysis in subsection 4.2, we would expect MONASH run with the Econtech elasticities to generate a reduction in TCF employment in 2010 from the modelled cuts in assistance of about 6.8 per cent or 2,530 jobs (up from the 4.3 per cent and 1,590 jobs projected by MONASH).

It has been suggested that our Armington elasticities are too low. Little formal econometric work has been done on Armington elasticities since the 1970s. In these circumstances there is considerable uncertainty as to the appropriate values. However, our historical analysis in section 2 shows that Armington elasticities are unlikely to be much higher than those used by ourselves and Econtech. With our elasticities, the MONASH historical simulation for the period 1997 to 2002 implied preference and technology twists in favour of imports that were high relative to those

obtained in historical simulations for earlier periods. Between 1997 and 2002, the purchasers' prices of imported TCF products increased relative to the purchasers' prices of domestic TCF products. Thus, if we had used significantly higher Armington elasticities in our historical simulation, then very large and unrealistic twists would have been necessary to explain the observed movements in import/domestic shares in Australian markets for TCF products.

The main model-based messages coming out of our study are as follows.

- From the point of view of employment and output, the TCF sector performed poorly over the period 1997 to 2002. This was caused mainly by the non-price factors. It appears that supplying countries to Australia, e.g. China, were able to make products that were regarded increasingly by Australian consumers as attractive and of good quality.
- Employment and output in the Australian TCF sector are likely to continue to decline over the period up to 2020.
- The rate of decline of the sector would be only slightly increased by the imposition of modelled cuts in assistance in 2010. These cuts would be likely to make TCF employment about 4 per cent less than it would be in the absence of the cuts.
- The macroeconomic effects of the modelled cuts in TCF assistance would be small. However, this does not mean that these effects are indistinguishable from zero or should be ignored. Macro effects should be judged in relation to the size of the shock (in this case a partial reduction in assistance to a small sector). Otherwise we are in danger of reaching the invalid conclusion that a welfare-reducing policy is acceptable as long as it is administered in small doses. For the modelled cuts in TCF assistance, we find, under reasonable assumptions about export-demand elasticities, that negative terms-of-trade effects dominate positive resource-allocation effects, leaving a net welfare loss of about 0.01 per cent of consumption in the long run.
- Under the assumption that wages are sticky in the short run, net labour market adjustment costs associated with cuts in TCF assistance would be mainly in the form of increased short-run unemployment. We estimate that labour input worth about \$100 million (about 2,700 jobs) could be lost in 2010, the implementation year for the modelled cuts in TCF assistance. This, of course, may not be the entire cost of the adjustments caused by implementation of the modelled cuts.

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