Post-2005 assistance for textiles, clothing and footwear

Analysis using the Tasman–Global model
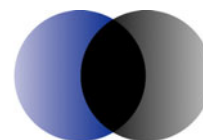
ACIL Tasman

Economics **Policy** Strategy

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Contents

Boxes, figures, tables and charts

Executive summary

The following is a report summarising the modelling of TCF assistance undertaken by ACIL Tasman.

Policy scenarios

We have undertaken five main scenarios:

1. A business-as-usual scenario that incorporates the existing schedule of tariff reductions.
2. A business-as-usual scenario that incorporates the existing schedule of tariff reductions with the removal of the SIP scheme;
3. An accelerated program of tariff reductions;
4. An alternative pathway to reform scenario.
5. An international scenario involving the removal of Multi Fibre Agreement (MFA) quotas.

Each of these scenarios is compared to a baseline projection. The base scenario considers a growth path for the economy with the current levels of tariffs, that is, apparel and household textiles remain at 25% and textiles remain at 15%. The results are reported as percentage deviations from this baseline or reference case.

The BAU scenarios (1 and 2 above) consider the impacts of further reducing TCF protection from the tariff reductions assumed in the baseline or reference case. For example, tariffs are scheduled to be reduced from 25%, 15% and 10% to 17.5%, 10% and 7.5% on 1 January 2005. In addition, the SIP program is to end in on 30 June 2005. Information on the tariff rates and SIP were provided by the Productivity Commission.

The third scenario considers an acceleration of the tariff reduction as specified by the TFIA:

- Tariffs on apparel and household textiles are reduced from 25% to 5% by 2015; and
- Tariffs on textiles are reduced from 15% to 5% by 2015.

The fourth scenario assesses the impact of alternative pathways to reform in that there would be a pause in protection to 2010, followed by an accelerated phase down to 2015. The SIP scheme would be discontinued as in scenario 2. The final scenario considers the impacts of the MFA quotas are removed in 2005.

Results

The macroeconomic results presented in indicate that each of the policies considered are not projected to provide economic benefits (in terms of real GNP) to the Australian economy relative to the reference case. Ignoring the MFA scenario, this is despite projected increased in real GDP and real consumption. This implies that the current policy approach, under the base model assumptions, parameters and without any assumptions regarding dynamic efficiency in the TCF sector, has both positive and negative impacts at the macroeconomic level, with the latter dominating.

Table 1: Projected macroeconomic results from TCF scenarios at 2015 (deviation from reference case)

Variable	1 BAU scenario without SIP removal	2. BAU scenario with SIP removal	3. Accelerated tariff reduction.	4. Alternative path scenario	5. MFA scenario
Real GNP	-0.028	-0.039	-0.079	-0.074	-0.005
Real GDP	0.009	0.005	0.014	0.016	-0.009
Real investment	0.005	-0.003	0.002	0.006	-0.024
Real consumption	0.015	0.009	0.034	0.038	-0.014
Volume of exports	0.356	0.351	0.833	0.804	-0.025
Volume of imports	0.294	0.294	0.764	0.767	-0.040
Real wage	0.032	-0.018	0.031	0.033	-0.026
Consumer price index	-0.165	-0.211	-0.461	-0.455	0.020
Nominal wage	-0.133	-0.229	-0.430	-0.422	-0.006
Rental price of capital	-0.124	-0.208	-0.392	-0.383	-0.002
Export price index	-0.103	-0.093	-0.210	-0.194	0.020
Import price index	-0.018	-0.021	-0.028	-0.020	0.023
Terms of trade	-0.085	-0.072	-0.182	-0.173	0.003
Real exchange rate	-0.148	-0.196	-0.189	-0.423	-0.004

Source: Tasman–Global projections

Positive impacts of the 'current reform agenda'

When considering scenarios 1 to 3 as indicative of the 'current reform agenda', the positive impacts are of the nature of those that have been identified in previous analysis of TCF assistance. They include, an improvement in allocative efficiency as resources shift out of TCF production into other activities. In general, the sectors that benefit most from the reallocation of resources are export (such as non-ferrous metals) and import competing (such as motor vehicles). This improvement in allocative efficiency manifests itself in an increase in real GDP relative to the reference case (see Pant et al. (2000) for a complete description of this effect). In some cases (scenarios 1 and 3), this results in an increase in investment relative to the reference case due to the increase production of capital intensive products such as non-ferrous metals.

In addition, the price of TCF products is projected to fall, leading to a projected decline in the consumer price index (CPI). Despite generating less income under the current policy approach, the decline in consumer prices results in a projected increase in real consumption relative to the reference case. Real wages, being the ratio of nominal wages to the CPI, are also projected to rise under scenarios 1 and 3. Under scenario 2, the removal of the SIP, a subsidy to production, does not result in as significant a reduction in consumer prices of TCF to result in an increase in real wages.

Negative impacts of the current reform agenda

The downside to pursuing the current reform agenda relates to two main factors. First, the reduction in nominal factor prices relative to the reference case that are necessary to reallocate resources from the TCF sector to other sectors of the economy. Second, the projected decline in Australia's real exchange rate which effectively increases the interest payments on foreign borrowings.

In terms of the reduction in factor prices, this is brought about by the shedding of labour and capital from the TCF sector which, under the standard long run assumptions on which these scenarios are based, result in a fall in labour and capital prices to maintain full employment. The most significant impact in this case is on the labour market given that TCF is a fairly significant employer. When labour is released from TCF, for example, the nominal wage rate falls which, in itself, competes with capital as a factor of production across the economy. As a result, when labour prices fall, capital rentals also fall.

These falling factor prices manifest themselves in the terms of trade measure. This measure gives an indication of the purchasing power of an economy. In the case of the current reform agenda, the terms of trade is declining quite significantly which is contributing to the projected reduction in real GNP relative to the reference case. This implies that while Australia producing more (measured by real GDP), the falling prices being received for products leaves the economy worse off.

The second contributor to our reduction in real GNP is the decline in our real exchange rate (the GDP price deflator in Table 1). As Australia imports more TCF, our real exchange rate is projected to decline making our foreign interest payments more onerous, contributing further to the projected decline in real GNP.

At the sectoral level, the reduction in assistance to the TCF sector is projected to reduce output and employment across each industry sector (Table 2), and increase imports. The adverse impacts are directly related to the size of the

tariff reduction assumed. The MFA scenario also implies adverse output impacts for the Australian TCF sector.

Table 2 Projected sectoral results from TCF scenarios at 2015 (deviation from reference case

Variable	1. BAU scenario without SIP removal	2. BAU scenario with SIP removal	3. Faster tariff reduction.	4. Alternative path scenario	5. MFA scenario
	%	%	%	%	%
Output					
Textiles	-2.25	-6.42	-9.62	-6.42	0.07
Clothing	-7.08	-9.96	-22.06	-9.82	-0.13
Footwear and leather products	-2.05	-7.97	-9.61	-8.00	-1.02
Imports					
Textiles	0.90	1.41	1.42	1.46	-0.23
Clothing	14.87	17.46	45.01	44.98	-1.59
Footwear and leather products	4.10	5.02	9.08	9.18	-0.67
Employment					
Textiles	-2.25	-6.40	-9.60	-9.61	0.07
Clothing	-7.08	-9.95	-22.05	-22.02	-0.13
Footwear and leather products	-2.05	-7.97	-9.61	-9.67	-1.02

Source: Tasman–Global projections

Overall, there is a projected shift away from TCF production, toward other sectors of the economy. Notably, export oriented sectors such as iron and steel as well as non-ferrous metals are projected to increase output slightly above reference case levels as the reallocation of resources from the TCF sector lead to a reduction in prices, particularly through a fall in the nominal wage, improving the competitive position of the sectors internationally. In addition, other import competing sectors such as motor vehicles production, also gain a competitive advantage as wage costs are reduced relative to the reference case.

Table 3   Projected changes in sectoral output at 2015 under TCF scenarios
(deviation from reference case)

	1 BAU scenario without SIP removal	2. BAU scenario with SIP removal	3. Accelerated tariff reduction.	4. Alternative path scenario	5. MFA scenario
Primary agriculture	0.03	0.04	0.08	0.04	0.13
Forestry and fishing	0.01	0.02	0.04	0.02	0.00
Coal	0.01	0.02	0.04	0.02	-0.02
Oil	0.02	0.03	0.05	0.03	0.00
Gas	0.12	0.19	0.37	0.19	-0.04
Other minerals	0.05	0.08	0.16	0.09	-0.11
Processed food	0.07	0.12	0.23	0.12	-0.19
Other light manufacturing	0.09	0.12	0.25	0.13	-0.03
Textiles	-2.25	-6.42	-9.62	-6.42	0.07
Clothing	-7.08	-9.96	-22.06	-9.82	-0.13
Footwear and leather products	-2.05	-7.97	-9.61	-8.00	-1.02
Petroleum and coal products	-0.01	-0.01	-0.02	-0.01	0.00
Chemicals, rubber and plastic	0.13	0.15	0.35	0.15	0.02
Non metallic minerals products	0.10	0.15	0.29	0.15	0.02
Iron and steel	0.30	0.47	0.91	0.46	0.22
Non-ferrous metals	0.32	0.53	1.02	0.53	0.06
Paper products and printing	0.02	0.02	0.05	0.02	-0.03
Motor vehicles	0.33	0.53	1.02	0.53	-0.03
Electronic equipment	0.31	0.52	0.99	0.51	0.14
Other manufacturing	0.24	0.37	0.73	0.37	0.14
Electricity	0.02	0.01	0.04	0.02	0.03
Water	0.01	0.03	0.04	0.03	-0.01
Construction	0.01	0.00	0.01	0.00	-0.02
Trade	0.00	0.01	0.01	0.01	0.00
Transport	0.08	0.14	0.26	0.14	-0.01
Communications	0.03	0.06	0.09	0.06	-0.04
Other services	0.00	0.03	0.04	0.03	-0.01

Source: Tasman–Global projections

Sensitivity analysis

Economic models, such as Tasman–Global, are an abstraction from reality based on certain key assumptions, data and parameters. Altering any of these attributes can result in a significant change in the results being generated by the model. In this case, it is important that appropriate sensitivity analysis be undertaken in order to assess the robustness of any result generated. ACIL Tasman has performed sensitivity analysis in the context of this analysis.

These include the Armington assumptions which govern the substitutability of products within the model and the assumptions regarding how the labour

market clears (that is, the full employment assumption) and the dynamic gains from TCF reform are not explicitly accounted for in this analysis. It is well established that innovation and technological change can result from opening sectors up to international competition.

Table 19 shows the projected key macroeconomic results generated by altering various assumptions and parameters in the model. In this context

- Armington elasticities:
  - Australia's Armingtons are increased by 20 per cent for non-TCF products.
  - Global Armingtons are increased by 20 per cent for non-TCF products.
  - Global Armingtons are doubled
- The labour market: the nominal wage response is sluggish compared with the standard long run closure.
- Dynamic productivity gains: Productivity in TCF industries increases by 1 per cent for every 10 per cent cut in tariff protection.

Each scenario was based on scenario 3, the accelerated tariff reduction scenario described above.

The results indicate that the analysis is quite robust with respect to the key assumptions and parameters chosen. This is because, generally, the magnitude and direction of the results is consistent despite changing assumptions and parameters. For example, increasing the Armington elasticities in Australia or globally implies that the projected welfare impacts are 'better' than under the standard parameters. That is, the projected increased in real GDP and real consumption are higher, while the decline in real GNP is lower. At the same time, however, the direction of the results remains consistent. This implies that increasing the Armingtons in the model does make it easier for labour, particularly, to be redeployed across the economy (note the projected reductions in the nominal wage declines as the Armingtons are increased).

On the other hand, altering the assumption regarding the labour market to assume that full employment is not achieved in each time period, but rather after a period of around 10 years, implies a worse outcome than under the assumption of full employment. This is because it takes longer to redeploy labour from the TCF sector, the resulting unemployment leads to a projected reduction in real GDP (as less factors of production are employed). As a result, there is a projected decline in real consumption.

The assumption regarding dynamic affects of trade liberalisation, although illustrative by nature, show that any improvement in the efficiency of the TCF sector as a result of being exposed to international competition is likely to improve Australia's position in terms of increased real GDP and consumption

as well as mitigating, to some extent, the projected decline in real GNP. Any potential increase in efficiency, however, must be viewed in the context of potential scale economy losses brought about by a shrinking TCF sector.

1   Introduction and background

The Productivity Commission in undertaking an inquiry into the protection levels applying to the TCF sector post-2005. ACIL Tasman was commissioned by the Council of Textile and Fashion Industries of Australia Limited (TFIA) to analyse a range of policy scenarios in terms of their impacts on national welfare and the textiles, clothing and footwear industries. ACIL Tasman have employed their in-house global economic model, Tasman–Global, for this analysis. ACIL Tasman focussed on the economic impacts, as well as the mechanisms underpinning the results. Sensitivity analysis was undertaken to test the results against assumptions and parameters, but also to shed light on the underlying mechanisms at work.

1.1 Current assistance arrangements

The Government's current assistance arrangements for the TCF industries are as follows (Productivity Commission 2003):

*   the Textile, Clothing and Footwear Strategic Investment Program (SIP);
    –   The SIP scheme currently provides funding of $678 million over 5 years to 2005 to encourage increased investment and innovation with the objective of achieving international competitiveness.
*   a commitment to hold tariffs for TCF products at 2001 levels until 2005:
    –   at that time tariffs are legislated to reduce from 25 percent to 17.5 percent for clothing & finished textiles; from 15 percent to 10 percent for cotton sheeting and fabrics, carpet, and footwear; and from 10 percent to 7.5 percent for sleeping bags, table linen and footwear parts.
*   the Expanded Overseas Assembly Provisions Scheme, specific TCF policy by-laws and market access initiatives.

1.2 Industry overview

The TCF sector is a significant component of the Australian manufacturing sector, particularly in New South Wales and Victoria. In 2000-01, the textiles, clothing, footwear and leather mfg sector employed 66,000 persons, had turnover in excess of $10 billion a year and value added of around $3.2 billion, around 4.2 percent of manufacturing value added. [1] In 2001-02, expenditure on

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[1]   TFIA submission to Productivity Commission, Post- 2005 TCF Inquiry

clothing and footwear products accounted for 3.9 per cent of total household goods and services expenditure, down from 4.9 percent in 1991-92.

Table 4: **Manufacturing sector overview**

		Employment at end of June (thousand)	Wages and salaries ($ million)	Sales and service income ($ million)	Industry value added ($ million)	Value added/ turnover ($ million)
21	Food, beverages and tobacco manufacturing	195.1	7395	56080	14643	26%
22	Textiles, clothing, footwear and leather mfg	65.9	2031	10306	3159	31%
23	Wood and paper products mfg	66.2	2501	15731	5063	32%
24	Printing, publishing and recorded media	92.7	3811	15760	6603	42%
25	Petroleum, coal, chemical and associated manufacturing	103	4999	44040	9650	22%
26	Non-metallic minerals product mfg	39.3	1722	10780	3813	35%
27	Metal product mfg	149.8	6356	42263	14025	33%
28	Machinery and equipment mfg	215.3	9030	51412	15044	29%
29	Other manufacturing	58.5	1692	7565	2641	35%
21-29	Total manufacturing	985.7	39536	253938	74640	29%
	Share of TCF	6.7%	5.1%	4.1%	4.2%	

Source: Australian Bureau of Statistics (2002), Manufacturing Australia, Cat no 8201.0. The TFIA submission uses a figure of 80,000 employees, based on the ABS labour force survey. The difference between the employment figure from the manufacturing survey and the employment survey arises because of part time employees.

The sector is of considerable importance in regional Australia. Regional cities such Geelong, Bendigo, Devonport and Wangaratta, which are heavily reliant on the employment opportunities created by the sector. As well, the sector is a substantial employer of females. The sector employs between 15 per cent and 18 per cent of female employees in the entire manufacturing sector in the two largest States, New South Wales and Victoria.

The TCF sector has undergone significant structural adjustment over the past decade. This has been in response to declining levels of assistance, changes in consumer preferences and increased import competition from emerging industries in certain developing countries.

Over the past decade there has been a significant reduction in protection against TCF imports. As a result, the effective rate of assistance for the TCF sector fell from 86 percent in 1989-90 to 26 percent in 1999-2000.[2] (Productivity Commission 2003

Over the past decade the sector has contracted, with industry employment falling by more than 40 percent and value added falling by 34 percent. While

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[2] Productivity Commission (2003), background documents to the inquiry.

there has been a significant increase in the value of TCF imports, exports of TCF products doubled over the past decade in real terms. This indicates a significant structural change in the TCF sector.

1.3 Trends in assistance levels

The level of assistance to the TCF sector has fallen from very high levels in the 1980s to an effective rate of assistance of 26 percent in 1999-2000. The initial reductions in industry assistance made a substantial contribution to gross domestic product and to household income. Reducing industry assistance from the current levels would not be expected to have such a significant economy wide impact. This is for three reasons.

First, the inefficiencies associated with assistance to the sector are no longer as large. This is because import duties have fallen significantly over the past decade. The allocative efficiency costs associated with a tax are proportionate to twice level of the tax. This is illustrated in Figure 1. Moreover, the effective rates of assistance has become more uniform, and therefore less distortion, across individual industries within the TCF sector.

Figure 1 **The declining efficiency costs of taxes**
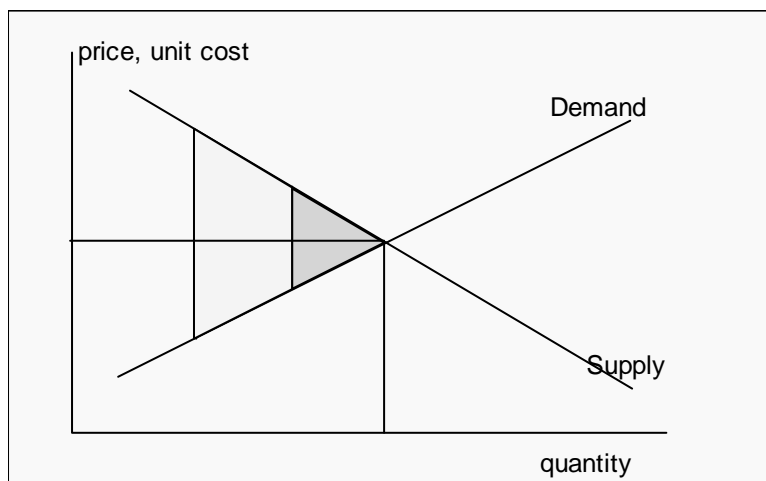
Second, the size of the sector relative to gross domestic product has fallen significantly over the pat decade. In 2001-02 the sector accounted for only 0.4 percent of GDP. The impact on consumers has also fallen, since expenditure on the products produced by the sector has fallen. In 2001-02, consumer expenditure on clothing and footwear represented 3.9 percent of consumer spending, down from 4.9 percent a decade earlier.

In 2001-02, the estimated effective rate of assistance for the sector was 26 percent and the sector had a value added on $3.2 billion. If the effective rate calculation is accurate, this means that the sector's value added would have been $652 million lower in the absence of assistance. Value added consists of returns to labour and returns to capital. In 2000-01, wages and salaries accounted for 64 percent of sector value added. A measure of the allocative efficiency cost is the difference between what these resources earned in the TCF sector, $652 million, and what the resources could have earned if re-deployed elsewhere in the economy. For example, if rates of return to these resources were 10 percent higher than in the TCF sector, the loss in gross domestic product would be around $60 million.

In 2000-01, the share of value added in turnover was 31 percent for the TCF sector compared with 29 percent for non-TCF manufacturing. The impact on measured GDP of reductions in assistance depends on where the additional resources employed in the TCF sector would be re-deployed and the productivity of labour and capital in those other sectors of the economy.

In competitive labour markets, the wages rate should equal the value of marginal product of labour. The average wage rate in the TCF sector in 2000-01 was $30,819 per year compared with $40,110 for the manufacturing sector as a whole. This is a reflection of the relatively low levels of skills of labour employed in the TCF sector. This labour would be redeployed to occupations or sectors requiring relatively low skilled labour. It is therefore not appropriate to assume that the labour would be re-deployed at the average manufacturing wage or where it would generate the same value added per worker. A shortcoming with many computable general equilibrium models, including the Tasman Global model, is that there is only, average one class of labour.

It is important to distinguish between the impacts of import protection economic welfare. This is not the same as the impact on gross domestic product. Welfare is measured by the sum of producer and consumer surplus. The impact of a tariff, t, is illustrated in the figure below. A focus on consumers overstates the loss of welfare or efficiency to the economy as a whole. The loss in consumer surplus is equal to the sum of all of the shaded areas. However, not all of this loss is a loss to the economy. Producers gain in surplus because they receive a higher price and they can therefore expand production. The gain in producer surplus is illustrated by the brown shaded area. Tariffs also raise tax revenue equal to the tariff rate times the volume of imports. This is illustrated by the brown shaded area. Subtracting the increase in producer surplus and the increased tax revenue from the loss to consumers gives the net welfare loss equal to the sum of the two yellow triangles.

The welfare loss is equal to:

$$WL = 0.5 \, p^*t(\Delta S + \Delta D)$$

Where the terms inside the bracket are the change in the volume supplied by domestic firms and the quantity demanded by domestic consumers respectively. The welfare loss depends on the responsiveness of supply and demand. If demand is not very responsive to price changes, his reduction in demand will be small and the corresponding welfare loss will be smaller. If supply is not responsive to price, the welfare loss will also be smaller.

Figure 2 **Welfare losses associated with tariffs**
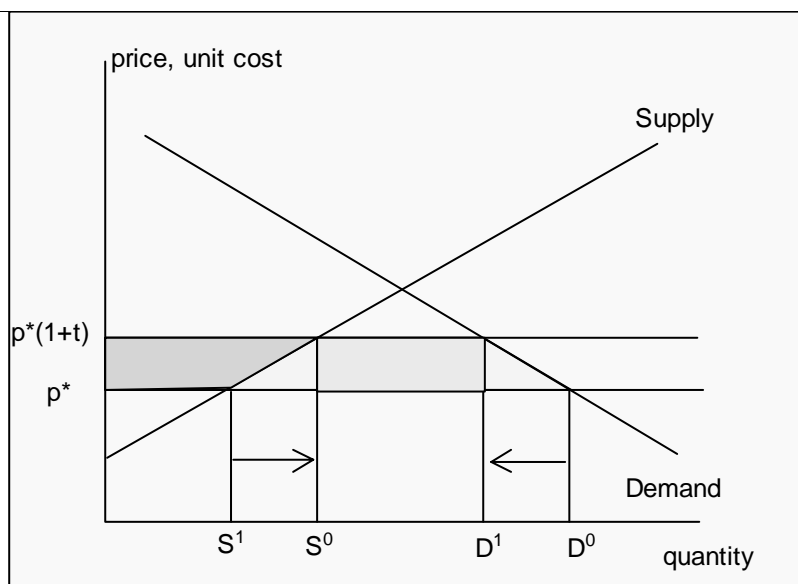
1.4 Previous review

According to the Productivity Commission (1997):[3]

> Modeling by the Centre of Policy Studies for the Commission indicates that there would be gains for the rest of the economy from the recommended reduction in assistance. The annual net real consumption gain to the community is estimated conservatively at around $110 million in the long run.

This is based on the reduction in tariffs from their levels in 1997 to their levels in 2000. The consumer gain from further reduction in tariffs from their current levels would therefore be correspondingly less. For example in 1995-96

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[3] Productivity Commission (1997), The Textiles, Clothing and Footwear Industries, Volume 1, Report No. 59, 9 September , page XLVIII

the trade weighted average tariff for the TCF industry was 14 percent, down from 25 percent in 1990-91.

Appendix N of the Commission's 1997 report examines the impact of tariff reductions on economic welfare in 2013-2014. CoPS estimates a percentage gain on base case GDP of 0.024 percent. Deducting the increase in payments to foreign owned capital reduces the total gain to Australians of 0.021 percent of GDP. Deducting the effects of a small decline in the terms of trade, the increase in gross national product (GNP) was estimated at 0.019 percent. As private consumption accounts for about 60 per cent of GNP by that year, this calculation shows that an increase of 0.019 per cent in GNP allows an increase of approximately 0.032 per cent in household spending. Further adjusted for a decline in consumer prices relative to the GDP deflator, this gain leads to a total increase of 0.036 per cent in real consumption. This is equivalent to around $100 million additional consumption in 1996-97.

As an input into the Commission's 1997 inquiry, Econtech was commissioned to undertake of the same tariff reductions using the F4 model. The estimated gains produced by Econtech of reductions in TCF assistance were of a smaller magnitude than those produced by CoPS. For example, Econtech estimated that reducing TCF tariffs would increase real consumption by $64 million, or 0.025 per cent compared with the $100 million estimated by CoPS. In addition, Econtech estimated that there would be 11,400 job losses from the TCF sector (offset by gains in other sectors by assumption) and that these job losses would be concentrated in Victoria (around 7,100). Tariff revenue was estimated to decline by $427 million.

2 Framework of analysis

Tasman–Global is a large-scale, applied general equilibrium model that has been designed to undertake projections, scenario and policy analysis of issues in an international context. The model, based on detailed input-output accounting for several regions, captures the interactions between various markets and detailed interactions within economies between industries, consumers, investors, exporters and importers.

The model is an extension of the Global Trade Analysis Project (GTAP) model constructed at the Centre for Global Trade Analysis at Purdue University in the United States (Hertel 1997). Tasman–Global builds on this model's equation structure and database by adding three important features: detail for the States and Territories of Australia, dynamics and international capital mobility. The dynamics are similar to those of the MONASH model developed at the Centre for Policy Studies at Monash University and the Global Trade and Environment Model developed at the Australian Bureau of Agricultural and Resource Economics (ABARE 1996).

The following is an outline of the key features of the model in the context of the analysis undertaken below. A more thorough documentation of the model can be found on the ACIL Tasman website (www.aciltasman.com.au).

It is important to bear in mind that when considering any analysis based on economic models, such as Tasman–Global, is that the model is an abstraction from reality. It is based on certain key assumptions, data and parameters to which any alteration can result in a significant change in the results being generated by the model. In this case, it is important that appropriate sensitivity analysis be undertaken in order to assess the robustness of any result generated. ACIL Tasman has performed sensitivity analysis in the context of this analysis that is discussed below.

2.1 The database

A key advantage of Tasman–Global is the level of detail in the database underpinning the model. The database is derived from the Version 5.0 of the GTAP database. This database contains information for 57 commodities and 66 regions from a base year of 1997. Each country in the database is linked through trade and investment flows. The database itself is used by hundreds of researchers worldwide and is fully documented in Dimaranan and McDougall (2002).

In Tasman–Global, the regional and sectoral coverage for any particular application is 'aggregated' to ensure computing tractability. When deciding on an aggregation it is important that the maximum amount of relevant detail is available in the model. In the case of this exercise, the sectoral and regional detail is presented in Table 1. This aggregation contains the maximum level of TCF detail available in the GTAP database, as well as Australia's key export and import competing industries. The database used for this application includes those regions most affected by the Multi-Fibre Agreement (MFA).

In terms of the level of detail, the TCF sector in Tasman–Global is comprised of the three sectors with the ANZSIC classification in parenthesis:

- Textiles:
  - Textile fibre, yarn and woven fabric manufacturing (221)
  - Textile product manufacturing (222)
  - Knitting mills (223)
- Clothing:
  - Clothing manufacturing (224)
  - Footwear and leather products
- Footwear and leather products
  - Footwear manufacturing (225)
  - Leather and leather product manufacturing (226)

The classification presented above is based on that assumed in the GTAP database. This classification tends to differ from the standard classification used in Australia that considers Knitting mills as a component of the Clothing sector. This can result in inconsistencies between protection rates calculated in Australia compared with those produced for the GTAP database.

The GTAP database contains a wealth of sectoral detail, the foundation of which is the underlying input-output tables on which the database is constructed. These input-output tables account for the distribution of industry demands to satisfy industry and final demands. Industry demands, so-called intermediate usage, are the demands from each industry for inputs. Final demands are those made by households, governments, investors and foreigners (export demand). These final demands represent the demand for finished goods and services.

The other key feature of the input-output tables is that the cost structure of each industry is also represented in detail. Each industry purchases intermediate inputs (from domestic and imported sources), primary factors (labour, capital, land and natural resources described below) as well as paying taxes or receiving subsidies.

Table 5   Sectoral and regional detail in Tasman-Global

Sector number	Description	Region Number	Description
1	Primary agriculture	1	Australia
2	Forestry and fishing	2	New Zealand
3	Coal	3	China
4	Oil	4	India
5	Gas	5	Indonesia
6	Other minerals	6	Japan
7	Processed food	7	South Korea
8	Other light manufacturing	8	Rest of Asia
9	Textiles	9	United States
10	Clothing	10	Canada
11	Footwear and leather products	11	South America
12	Petroleum and coal products	12	Europe
13	Chemicals, rubber and plastic	13	Rest of the World
14	Non metallic minerals products		
15	Iron and steel		
16	Non-ferrous metals		
17	Paper products and printing		
18	Motor vehicles		
19	Electronic equipment		
20	Other manufacturing		
21	Electricity		
22	Water		
23	Construction		
24	Trade		
25	Transport		
26	Communications		
27	Other services		

A Includes mainland China, Chinese Taipei and Hong Kong

The GTAP database has been established with one of its main goals being the ability to analyse trade policy at the domestic and global levels. As such, a considerable amount of effort has gone into the protection component of the database (tariffs and tariff equivalents as well as export and production subsidies). These protection levels have been updated in a Tasman–Global reference case (discussed below).

2.2 Dynamics

Tasman–Global is a dynamic model that is solved on a year-by-year basis from the base year. The dynamics contained in the model relate to the separate accounting for stock and flow relationships over time. The main areas this relates to is investment and debt accumulation. For example, each year the capital stock in a region increases by the level of investment that occurred in the previous year less depreciation.

The dynamic nature of the model makes Tasman–Global well suited to projection work, scenario and policy analysis. In a policy analysis mode, the reference case provides projections of growth in labour, capital and productivity in each region, and the associated changes throughout the rest of the economy in the absence of the policy measures to be examined. The results of policy simulations are then interpreted as deviations from the reference case.

2.3 Factors of production

Economic activity in a given region is governed to a large extent by the employment of factors of production. In Tasman–Global, as in the GTAP model, four factors of production are accounted for: capital, land, labour and natural resources. Various assumptions can be made about the availability and accumulation of these factors of production in the context of a Tasman–Global scenario.

Capital accumulation occurs in a given region over time through changes in investment and depreciation. Given depreciation rates remain constant over the simulation period; the key determinant of capital accumulation is therefore investment. The model assumes that rates of return may differ across regions to reflect country specific differences in risk premiums. Investors are then attracted to regions where the expected rate of return looks most favourable compared with global movements. Any excess of investment over domestic savings for a given region causes an increase in net debt for the region. Borrowers service the debt at the global rate of return (interest rate).

Several different assumptions can be made regarding the labour market in Tasman–Global. The standard, long-run assumptions are that under the prevailing scenario, unemployment is equal to the so-called natural rate of unemployment for any economy – the so-called 'full employment' assumption. Any change in the demand for labour is assumed to be offset by changes in real wages sufficient to prevent any deviation of unemployment from the natural rate.

Alternately, a dynamic mechanism can be used in the model to counter for 'stick wages', a real world phenomena that assumes that changes to the real wage growth do not exactly offset demand changes and that the unemployment rate can vary over time. This mode usually assumes that the full adjustment of the labour market under a particular scenario occurs after around 10 years. In the meantime, the rate of unemployment can be above the natural rate of unemployment.

All of the model results presented to the Productivity Commission's modelling workshop on 21 March 2003, assumed full (or natural rate) employment

continuously held following the various policy shocks. This assumes that the rate of re-deployment of labour in other sectors of the economy exactly matched the rate of labour shedding by the TCF sector.

A more realistic assumption may be that displaced workers take time to find alternative employment in other sectors of the economy. This view is supported by a range evidence presented to the 1997 Productivity Commission inquiry.

Table 6   **TCF Industry Study. Labour market outcomes, 6 to 48 months after retrenchment (original data)**

Time after retrenchment	Working full time	Total working	Training	Unemployed	Not in the workforce (a)	Total
	%	%	%	%	%	%
6 months	12.6	16.8	28.7	48.5	6.0	602
12 months	16.6	24.2	33.4	34.7	7.7	596
24 months	25.0	38.1	21.8	24.1	16.0	569
36 months	33.2	47.1	12.3	20.5	20.1	527
48 months	35.4	51.8	7.2	16.6	24.4	483

a People of working age (under 60 for women, under 65 for men) who are not in the workforce. Reasons include home duties and discouragement from job seeking.
b Total does not include survey participants who were at or over retirement age in the year of interview (over 60 for females and over 65 for males).
Note: Retrenchment dates vary from 1991 to 1993.
Source: Weller 1997, unpublished data

According to the Weller (1997) study, after 48 months, only 52 percent of displaced workers found alternative employment and of these 16 percent were in part-time employment. According to the Commission, similar results were found in other studies and several submissions made similar observations about the unemployment experience of displaced TCF workers.

In the analysis ACIL Tasman first runs the model on the full employment assumption. This allows us to compare the macroeconomic results across policy scenarios and with the results of the CIE, Econtech and Monash models presented to the Canberra workshop on 21 March 2003. Later the model is run on the assumption that labour markets adjust only gradually to the reductions in industry assistance.

2.4 Producer behaviour

Producers in Tasman–Global are assumed to minimise the cost of producing a given level of output. They are assumed to operate in perfectly competitive markets using constant returns to scale technologies. The important consideration in any production function used in a model of this type is the degree of substitutability allowed among inputs. Any industry in the model

could potentially alter all intermediate inputs, from all sources as well a primary factors of production. This level of flexibility is, however, would introduce a level of complexity well beyond the scope of a large scale model of this type. In this context, Global-Tasman assumes that producers combine intermediate inputs and primary factors in fixed proportions but are free to:

- substitute between land, labour and capital to minimise the cost of achieving a given requirement for primary factors; and
- substitute between domestic and imported sources to minimise the cost of a given requirement of intermediate goods.

The model can, of course, employ some of the standard techniques available to increase its flexibility in all of these areas. For example, it is commonplace to allow certain complimentary inputs to vary for specific purposes. This is particularly true in energy where a simple alteration to the model will allow for substitution between different types of energy – that is, for producers minimising the costs of meeting their energy requirements.

2.5 National income, savings and consumption

Under the standard assumptions used by Tasman–Global, prices will be set to cover costs and all industries will generate normal profits. These returns are paid to the factors of production. A representative household in each region owns all factors of production and receives all payments made to the factors, all tax revenues and all net interregional income transfers. In some applications it is necessary to distinguish between the private and the public sector. This could be done in Global-Tasman, but for current modelling purposes this would introduce an unnecessary complication that would introduce the need for a range of assumptions about projected public investment and consumption expenditures.

The representative household allocates its net income across private and public consumption and savings. National savings are assumed to move in line with national income. That is, savings are assumed to be a fixed proportion on income, although this proportion can be varied where it is felt that this is appropriate. Total consumption expenditure is calculated as the difference between current household income and savings, with the ratio of private consumption to government consumption assumed to be constant. This representation is important when considering the welfare measure in Tasman–Global, a point that is discussed in more detail below.

Given total private consumption, the representative consumer maximises current period utility by choosing consumption levels for each consumption

good. In that decision, substitution is allowed between domestic and imported sources of commodities.

2.6 Trade

Tasman–Global accounts for bilateral trade flows of all commodities between all regions and, as has been discussed above, substitution between domestic and imported sources of commodities. In Tasman–Global, as with the majority of global models, this substitution is governed by an 'Armington' preference structure. This structure is based on the premise that a good produced in one region is an imperfect substitute for goods produced by the same industry in other regions. In other words, the same commodity from different sources can sell or trade at different prices.

Consumers allocate their demand for a commodity between a domestic product and a composite imported product according to a constant elasticity of substitution (CES) function. The demand by a region for each composite imported commodity is then allocated between sources of imports according to a further CES function. Substitution between domestic and imported commodities and between imported commodities will depend on movements in relative prices and the specified elasticity of substitution — the Armington elasticity. These elasticities are taken directly from the GTAP database.

The gains from tariff reductions depend on the degree of substitutability between locally produced and imported products. If consumers are indifferent between local and imported products, a reduction in tariffs would cause a large shift from local to imported products. The Armington elasticity is a measure of the degree of substitutability between imports and local products. It is defined as the proportionate change in the ratio of imports to locally produced products relative to the proportionate change in the ratio of local to import prices. A high value for this parameter means that for a given tariff cut there will be a large increase in output of the industry concerned and relatively large efficiency gains for the economy as a whole. In cases where the degree of substitutability between local and imported products is low, the efficiency gains from tariff cuts will also be relatively low.

The absolute size of the Armington elasticities is important to modelling the terms of trade effects under various policy scenarios. The elasticities determine the impact on the prices of imported goods and the prices of export goods in response to increased import demand or increased export supply. A common assumption in macroeconomic theory is the small country assumption whereby the terms of trade are no affected by changes in Australia's import and export volumes. This assumes that Australia is small relative to world markets and that the products of different countries are perfectly substitutable. Under the

Armington structure, if Australia wishes to sell additional quantities on world markets, prices must fall to some extent. It is therefore possible to get a terms of trade effect which tends to offset changes in national income due to improvements in allocative efficiency.

All of the general equilibrium models used in the inquiry, Monash, GTAP, Tasman–Global and Econtech, have Armington or similar elasticities reflecting the sensitivity of import and export prices to changes in trade volumes. The standard Armington values used in the Monash model, the adjusted values preferred by the Commission in its 1997 TCF report and those used in the Global Tasman model are set out in the table below. The Monash standard elastiticies are based on Manion and Fallon's (1981) 'standard' elasticities which in turn are based on the econometric estimates of Alaouze, Marsden and Zeitsch (1977). Consumers face different prices to intermediate users. The Commission adjusted the standard Armingtons to take this into account. The adjustment involves multiplying the 'standard' elasticity by the ratio of the margins-inclusive commodity value to its basic price value

Table 7   **Armington elasticities**

	Standard Monash values	Adjusted Armingtons	
		Producer demand	Consumers
Wool scouring and cotton ginning	0.4	0.6	0.6
Man-made fibres, yarns and broad woven fabrics	4.7	7	7
Cotton yarns and fabrics	4.7	7	7
Woolen and worsted yarns and fabrics	2	3.2	4.1
Textile finishing	2	2.3	3.9
Textile floor coverings	2.2	2.8	3.4
Canvas, ropes and other textile products	1.6	2	2.4
Knitting mills	1.9	7	7
Clothing	2.8	4.2	6.8
Footwear	6.8	7	7

Source: Productivity Commission 1997.

The Commission (1997) noted that both the standard and adjusted estimates are high relative to more recent estimates derived from foreign data. The Commission's preferred estimates result in larger changes in import penetration and domestic output of TCF commodities than would be the case if the low estimates usually found in empirical research were used. Such estimates also imply greater gains for the economy as a whole as consumers and industry switched towards cheaper imports.

The GTAP database, upon which the Global Tasman and CIE models are based, comes with standard Armington elasticities. These elasticities are summarised in Table 8.

Table 8   Summary of Armingtons in the standard GTAP database

	Domestic vs. Imported	Imported by source
Primary agriculture	2.35	4.53
Forestry and fishing	2.80	5.60
Coal	2.80	5.60
Oil	2.80	5.60
Gas	2.80	5.60
Other minerals	2.80	5.60
Processed food	2.39	4.71
Other light manufacturing	2.80	5.60
Textiles	2.20	4.40
Clothing	4.40	8.80
Footwear and leather products	4.40	8.80
Petroleum and coal products	1.90	3.80
Chemicals, rubber and plastic	1.90	3.80
Non metallic minerals products	2.80	5.60
Iron and steel	2.80	5.60
Non-ferrous metals	2.80	5.60
Paper products and printing	1.80	3.60
Motor vehicles	5.20	10.40
Electronic equipment	2.80	5.60
Other manufacturing	2.80	5.60
Electricity	2.80	5.60
Water	2.80	5.60
Construction	1.90	3.80
Trade	1.90	3.80
Transport	1.90	3.80
Communications	1.90	3.80
Other services	1.90	3.80

The standard elasticities tend to give relatively high terms of trade changes in response to a given shock. Some would regard the magnitude of these terms of trade effects to be too high and adjustments are made to the standard elasticities. Normally this involves a doubling of the standard elasticities. ACIL Tasman has used the standard elasticities on the view that we have no basis for determining what there appropriate level should be. However, we conduct sensitivity analysis of the results in response to variations of the Armington elasticities.

2.7 Economic efficiency and welfare measurement

In estimating the impacts of each of altering TCF protection on economic welfare, it is important to understand the potential sources of efficiency gain. These include:

• productive efficiency;

• allocative efficiency; and

• dynamic efficiency.

Productive efficiency refers to the ability to produce a given level of output at minimum cost. It is also known as technical efficiency.

Allocative efficiency is the bundle of output that can be produced with a given set of technologies that maximises the value placed on it by consumers with a given set of preferences. It is more accurately known as static allocative efficiency because the analysis of it assumes that technology and the preferences of consumers are fixed.

Finally dynamic efficiency is concerned with what can happen when technology and consumer preferences change. Dynamic efficiency focuses on the level of innovation and associated investment that will maximise the rate of economic growth.

An increase in allocative efficiency is the main form of efficiency being estimated in the scenarios presented below. No assumptions are made about productive or dynamic efficiency gains in the context of the modelling due to data (and time) constraints. It is important to note that the welfare gains estimated from the reduction in TCF assistance are likely to be underestimated to some extent. However, for the purposes of comparing different policy scenarios, the underestimation of the effects on efficiency is less serious, since similar sources of efficiency gains are being ignored in each case.

In addition, the modelling also captures a number of flow on effects caused by altering TCF protection levels. In a general equilibrium model, the direct impact on allocative efficiency, and the associated flow on effects, are captured in the 'welfare measure'.

General equilibrium models contain thousands of variables, not all of which are, understandably, reported in the various reports considered. In general, standard macroeconomic variables such as real GDP, GNP and investment, as well as sectoral results such as output, prices and exports are measures of consistent concepts across models of this type.

'Economic welfare' can be a contentious issue, particularly when a variety of economic models are being used. Three common measures used in economic modelling are real GDP, real household consumption and real GNP. For transparency, all three measures are reported below.

In simple terms, real GDP is a measure of economic output and, although useful, does not provide a very valuable measure of economic welfare in this case.

Changes in real consumption resulting from the imposition of policies are used to measure changes in instantaneous national welfare. At each point in time, national income (as measured by GNP) is divided by final consumers (private and government) into consumption and savings. The consumption component of this contributes to consumer welfare at that point in time. Savings are accumulated to fund future consumption and therefore contribute to welfare in future years. Under particular assumptions, for a given period, changes in real consumption are a first order approximation of changes in national welfare resulting from a policy change (Varian 1984, p. 276).

A detailed consideration of the appropriate welfare measure to use in dynamic, global, general equilibrium models has been undertaken by Pant et al. (2000) who demonstrates, amongst other things, that real GNP is a measure of equivalent variation in this context. Following this work, we use the percentage changes in gross national product (GNP) from reference case levels to measure the aggregate economic impact of the policies being considered. GNP is equal to gross domestic product (GDP) plus foreign income transfers, and therefore provides a complete measure of the flow of income available to an economy for consumption, saving and depreciation.

GNP is a measure of welfare that incorporates many effects. In simple terms, it is the share weighted sum of household consumption, government consumption and savings. In terms of measuring the impacts of policy change, this measure considers the impacts on the amount of income a particular region has to spend on each of these three areas. It is possible, for example, for a policy to have positive impacts on real household consumption, but adverse impacts on real government consumption and real savings that result in a negative real GNP outcome.

In addition, the work of Pant et al. (2000) provides an invaluable decomposition of the real GNP welfare measure in the context of global, dynamic, general equilibrium modelling. It is demonstrated that the GNP measure can be decomposed into a GDP components (relating to the amount of production), a terms of trade component and an exchange rate component (relating to the purchasing power of a particular region). In this case, it is conceivable to implement policies that increase the productive capacity of a

region (increase GDP), but at the same time have detrimental impacts on a regions terms of trade or exchange rate, or both, that result in adverse welfare impacts.

2.7.1 The scenarios

We have undertaken five main scenarios:

1. A business-as-usual scenario that incorporates the existing schedule of tariff reductions.

2. A business-as-usual scenario that incorporates the existing schedule of tariff reductions with the removal of the SIP scheme;

3. An accelerated program of tariff reductions;

4. An alternative pathway to reform scenario.

5. An international scenario involving the removal of Multi Fibre Agreement (MFA) quotas.

Each of these scenarios is compared to a baseline projection. The base scenario considers a growth path for the economy with the current levels of tariffs, that is, apparel and household textiles remain at 25% and textiles remain at 15%. The results are reported as percentage deviations from this baseline or reference case.

The BAU scenarios (1 and 2 above) consider the impacts of further reducing TCF protection from the tariff reductions assumed in the baseline or reference case. For example, tariffs are scheduled to be reduced from 25%, 15% and 10% to 17.5%, 10% and 7.5% on 1 January 2005. In addition, the SIP program is to end in on 30 June 2005. Information on the tariff rates and SIP were provided by the Productivity Commission.

The third scenario considers an acceleration of the tariff reduction as specified by the TFIA:

• Tariffs on apparel and household textiles are reduced from 25% to 5% by 2015; and

• Tariffs on textiles are reduced from 15% to 5% by 2015.

The fourth scenario assesses the impact of alternative pathways to reform in that there would be a pause in protection to 2010, followed by an accelerated phase down to 2015. The SIP scheme would be discontinued as in scenario 2. The final scenario considers the impacts of the MFA quotas are removed in 2005.

2.8 Import weighted tariff rates and SIP payments

2.8.1 Tariff rates

An important consideration in this analysis is that the TCF sector in the model the aggregated tariff and SIP payments correctly. To this end, ACIL Tasman has obtained information on tariff rates from Productivity Commission (PC). This information was provided by the to the modellers employed by the Commission to analyse alternative policy scenarios

A concordance has been derived between this information and the Tasman-Global TCF sector. Import-weighted tariff rates has been calculated and are summarised in Table 9.

The PC provided us with three estimates. First the 'current rate' which is based on their latest available data (we need to confirm for which time period this is with them). Second, their estimated rate at 1 January 2005 based on the scheduled reductions. Third, their estimated rate assuming tariffs fall to 5 per cent across the board.

Table 9: Tariff rates as supplied by the PC (based on imports cif) (a)

ANZSIC sector	Current rate %	Rate at 1 Jan 2005 %	Rate at 5 per cent %
Textile fibre, yarn and woven fabric mfg	5.07	3.82	2.51
Textile product manufacturing	8.04	5.95	3.38
Knitting mills	19.38	13.60	4.62
Clothing manufacturing	20.08	14.07	4.11
Footwear manufacturing	13.75	9.20	4.72
Leather and leather product manufacturing	4.11	4.09	4.06
Total	12.46	8.90	3.69
Tasman-Global sector			
Textiles	8.34	6.08	3.12
Clothing	20.08	14.07	4.11
Footwear (and leather products)	9.63	7.01	4.44
Total	12.46	8.90	3.69

a These are based on cif import prices because this is how they go into models such as Tasman–Global and MONASH
Source: Productivity Commission

These figures compare with preliminary estimates based on TFIA (ABS) data shown in Table 3. The rates are broadly consistent but not exact. For example, the textiles rate from the PC. 8.34 percent, is higher than the rate calculated from the TFIA (ABS) data, of 4.8 percent. On the other hand, the footwear and leather products rate provided by the PC is lower, at 9.63 compared to

12.4 percent, although this is understandable give the rate in Table 10 only calculated the rate for footwear, not footwear and leather products. Differences are also likely to arise because the PC provides a cif base while the ABS data has a fob base (a priori, the rates in Table 10 would be higher).

Table 10: **Time series of TCF tariff rates (based on fob imports)**

Year	Textiles	Clothing	Footwear
1988/89	5.9%	45.0%	34.6%
1989/90	7.0%	48.1%	40.5%
1990/91	6.9%	50.5%	42.5%
1991/92	6.7%	44.7%	35.9%
1992/93	6.2%	34.6%	27.6%
1993/94	5.5%	27.1%	23.2%
1994/95	5.3%	25.7%	20.8%
1995/96	5.9%	24.2%	18.7%
1996/97	6.4%	23.5%	17.5%
1997/98	6.2%	23.0%	15.2%
1998/99	5.7%	22.0%	14.2%
1999/00	5.3%	20.9%	13.0%
2000/01	4.8%	20.8%	12.4%

Source: ABS data

Figure 3   **Trends in TCF tariffs**
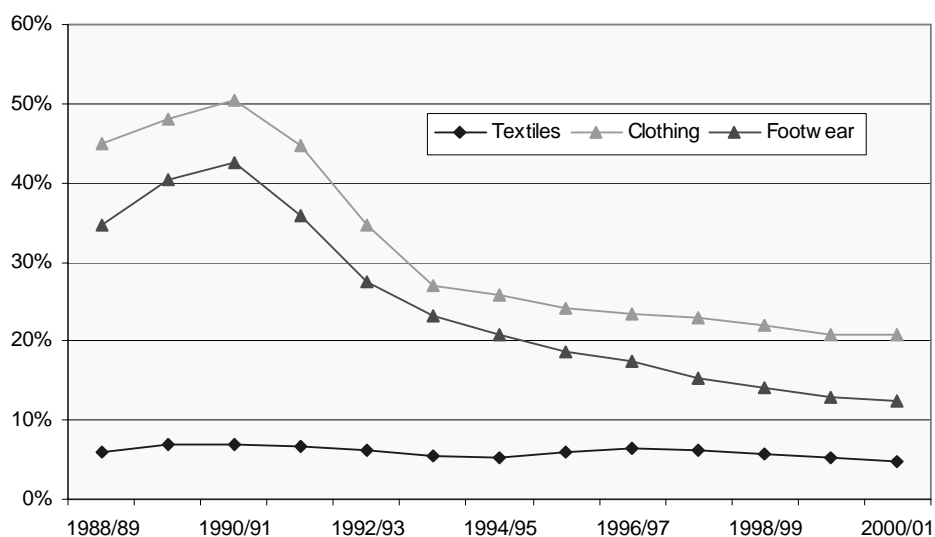
Data source: Based on data provided by TFIA.

ACIL Tasman has used estimates of current effective tariff rates based on the Productivity Commission data. Since the allocative efficiency effect is very sensitive to tax rates, as discussed earlier, the results will depend on which set of tariff estimates have been used. While the tariff estimates for clothing are close, there are offsetting differences for footwear and for textiles. However,

this is likely to be less important since our primary focus is on comparing the benefits and costs of alternative policy scenarios and a common tariff data set is used in each case. Moreover, the higher tariff rates on clothing will mean that tariff reductions in this sector will dominate the total economic effects.

The Centre for International Economics (CIE) was commissioned by the Productivity Commission to use the GTAP model, the model upon which Global-Tasman is based, to conduct an analysis of number of unilateral and multi-lateral tariff reform scenarios. Among the scenarios modelled by CIE was a removal of tariffs from TCF products and a 50 percent reduction from current levels. The results presented to the Productivity Commission workshop on 21 March 2003 were based on tariff rates from TFC and other products in the GTAP database. These tariff rates are based in 1997 and are therefore higher than the current tariff rates used in the ACIL Tasman analysis.

Table 11: **Tariff rates used by CIE and ACIL-Tasman**

	CIE	ACIL Tasman
Textiles	15.8	8.34
Clothing	27.4	20.08
Leather products/footwear	12.1	9.63

Given that CIE are reducing tariffs from a much higher base, one would expect that the CIE's estimated efficiency gains would be higher than those estimated by ACIL Tasman using current tariff levels.

Trends in tariff levels, particularly for clothing and footwear, indicate a very strong decline in average tariff levels. This means that the main benefits to reductions in tariffs have already been achieved. The analysis earlier indicated that, from a theoretical standpoint and assuming linear supply and demand functions, the allocative efficiency associated with halving a 50 percent tariff would be twice that associated with having a 25 percent tariff and four times that associated with halving a 12.5 percent tariff.[4]

2.8.2 SIP payments

The Commission also provided us with information on SIP payments as a ratio of turnover for each ANZSIC code (Table 12), and then aggregated them to Tasman–Global sectors (Table 13). Again, verification of these figures would be useful in the context of the modelling work.

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[4] A practical demonstration of this is to be had by successively folding a table napkin where the edge is the height of the tariff and counting the number of triangles created with each fold.

Table 12:   SIP payment data provided by the PC at ANZSIC level

ANZSIC code	ANZSIC Description	Grant Payments as percent of Turnover	Grant payments as a percentage of total
221	Textile Fibre, Yarn and Woven Fabric MFG	2.01%	38.26%
222	Textile Product Manufacturing	1.57%	28.66%
223	Knitting Mills	0.66%	4.66%
224	Clothing Manufacturing	0.67%	15.29%
225	Footwear Manufacturing	1.79%	8.29%
226	Leather and Leather Product Manufacturing	0.53%	3.97%
22	Total TCF	1.25%	99.13%

Source: Productivity Commission

Table 13: SIP Payments by Tasman–Global sector

GTAP commodity	Percent of Grant Payments to Turnover
Textiles	1.62%
Clothing	0.67%
Footwear and leather	1.01%
Total TCF	1.25%

Source: Productivity Commission

2.8.3   MFA tariff equivalents

The MFA has been estimated in the GTAP database as an export tax equivalent imposed by the exporting country to the country of destination. This treatment takes account of the rents accruing from the scheme to the exporting region. The estimated export tax rates are shown in Table 14. To simulate the end of the MFA, these implied export taxes were eliminated.

Table 14 GTAP export tax estimated of the MFA

	USA	Canada	EU
Textiles			
China	9.44	9.51	6.49
Korea	2.27	2.40	1.25
Indonesia	8.10	8.10	6.12
India	9.80	9.80	11.28
Rest of Asia	11.79	12.39	7.05
Clothing			
China	20.69	23.19	9.88
Korea	1.90	1.90	0.40
Indonesia	7.80	7.80	5.91
India	34.19	34.20	14.41
Rest of Asia	8.76	8.85	6.61

Source: GTAP database

2.9 Other assumptions

There are two other key types' assumptions in a Tasman–Global analysis that should be noted. The first relates to the economic environment, or model 'closure', and the second relates to any business-as-usual assumptions with respect to aggregate economic, population and labour force growth.

Any scenario undertaken with a general equilibrium model such as Tasman–Global has what is called a model 'closure'. This closure establishes the economic environment, or conditions, under which the scenario operates. The standard closure for Tasman–Global is what could be described as a long run economic environment in which:

- Labour markets are assumed to clear, or produce a level of unemployment consistent with business-as-usual assumptions, through adjustments in the nominal wage rate.

- Rates of return are equalised across each sector in the economy (while there is a tendency across regions for rates of return to converge over time).

- The exchange rate in each region serves as the regional numeraire (the price against which all relative prices move).

- There is no explicit constraint on the government sector budget requirement given the specification of the 'super household' in the model.

3 Results

The analysis presented below considers three main sets of scenarios: the existing, and possibly further, reduction of TCF tariff rates, the cessation of the SIP scheme and possible reforms to the Multi-Fibre Arrangement.

The macroeconomic results of the policy scenarios are presented in Table 15. The first point to note about the results is the relatively small economic impact of each of the policy scenarios. This is because the TCF sector is only a small part of the economy and because the level of tariffs and SIP payments is already quite low compared to levels that prevailed in the past.

The second point to note is that each of the policies considered are not projected to provide economic benefits (in terms of real GNP) to the Australian economy. Ignoring the MFA scenario, this is despite projected increases in real GDP and real consumption. This implies that the current policy approach, under the base model assumptions, parameters and without any assumptions regarding dynamic efficiency in the TCF sector, has both positive and negative impacts, with the latter dominating.

Table 15 **Projected macroeconomic results from TCF scenarios at 2015 (percentage deviation from reference case)**

Variable	1 BAU scenario without SIP removal	2. BAU scenario with SIP removal	3. Faster tariff reduction.	4. Alternative path scenario	5. MFA scenario
Real GNP	-0.028	-0.039	-0.079	-0.074	-0.005
Real GDP	0.009	0.005	0.014	0.016	-0.009
Real investment	0.005	-0.003	0.002	0.006	-0.024
Real consumption	0.015	0.009	0.034	0.038	-0.014
Volume of exports	0.356	0.351	0.833	0.804	-0.025
Volume of imports	0.294	0.294	0.764	0.767	-0.040
Real wage	0.032	-0.018	0.031	0.033	-0.026
Consumer price index	-0.165	-0.211	-0.461	-0.455	0.020
Nominal wage	-0.133	-0.229	-0.430	-0.422	-0.006
Rental price of capital	-0.124	-0.208	-0.392	-0.383	-0.002
Export price index	-0.103	-0.093	-0.210	-0.194	0.020
Import price index	-0.018	-0.021	-0.028	-0.020	0.023
Terms of trade	-0.085	-0.072	-0.182	-0.173	0.003
Real exchange rate	-0.148	-0.196	-0.189	-0.423	-0.004

Source: Tasman–Global projections

The key macroeconomic impacts, in dollar terms, are presented in Table 11. These estimates indicate the magnitude of the impacts at a given point in time, 2015, as well as over the period 2003 to 2015 (shown as a net present value figure). Under the unilateral removal of protection scenarios (1 through 4), real

consumption and GDP are projected to increase at 2015 and over the 2003-2015 period. Real GNP, on the other hand, is projected to decline. Removing the MFA is projected to incur economic costs on the Australian economy as measured by the three macroeconomic variables presented in Table 17.

Table 16: **Projected impacts on key macroeconomic variables presented in dollar terms**

$ million	1 BAU scenario without SIP removal	2. BAU scenario with SIP removal	3. Accelerated tariff reduction.	4. Alternative path scenario	5. MFA scenario
$ value at 2015a					
Real GNP	-272	-379	-776	-724	-49
Real GDP	83	52	132	150	-88
Real consumption	91	51	202	226	-81
NPV 2003-2015					
Real GNP	-1,168	-1,818	-2,422	-1,975	-482
Real GDP	638	676	851	720	-268
Real consumption	690	465	739	544	-383

a In 1997 dollars

b In 2003 dollars using a 7 per cent real discount rate

3.1 Positive impacts of the 'current reform agenda'

When considering scenarios 1 to 3 as the 'current reform agenda', the positive impacts are of the nature of those that have been identified in previous analysis of TCF assistance. They include an improvement in allocative efficiency as resources shift out of TCF production into other activities. In general, the sectors that benefit most from the reallocation of resources are export (such as non-ferrous metals) and import competing sectors (such as motor vehicles). This improvement in allocative efficiency manifests itself in an increase in real GDP relative to the reference case (see Pant et al. 2000 for a complete description of this effect). In some cases (scenarios 1 and 3), this results in an increase in investment relative to the reference case due to the expansion of capital intensive products such as non-ferrous metals.

In addition, the price of TCF products is projected to fall, leading to a projected decline in the consumer price index (CPI). Despite generating less income under the current policy approach, the decline in consumer prices results in a projected increase in real consumption relative to the reference case. Real wages, being the ratio of nominal wages to the CPI, are also projected to rise under scenarios 1 and 3. Under scenario 2, the removal of the

SIP, a subsidy to production, does not result in a sufficiently large reduction in consumer prices of TCF products to result in an increase in real wages.

3.2 Negative impacts of the current reform agenda

The downside to pursuing the current reform agenda relates to two main factors. First, the reduction in nominal factor prices that are necessary to reallocate resources from the TCF sector to other sectors of the economy. Second, the projected decline in Australia's real exchange rate, which effectively increases the interest payments on foreign borrowings.

In terms of the reduction in factor prices, this is brought about by the shedding of labour and capital from the TCF sector which, under the standard long run assumptions on which these scenarios are based, results in a fall in labour and capital prices to maintain full employment. That is, to induce expansions in the other sectors a reduction in the costs of the inputs of these sectors is needed. The most significant impact in this case is on the labour market given that TCF is a fairly significant employer. When labour is released from the TCF sector, for example, there is an excess supply of labour on the market. For labour markets to clear a reduction in the nominal wage rate is required. Labour competes with capital as a factor of production across the economy. As a result, when labour prices fall, capital rentals must also fall. Since the economy derives income from the returns to its factors of production, the fall in wages and in capital rentals will cause a fall in national income, as measured by GNP.

The economy is subject to a range of accounting identities that must hold at all times. GNP is equal to GDP less payments to the owners of factors of production employed in the Australia economy (that is interest and dividend payments on foreign investment). Australia has a floating exchange rate. This means that the exchange rate continuously adjusts so as to clear foreign exchange markets and to maintain a zero balance of payments.

The balance of payments is equal to the sum of net exports, net capital inflows and net interest payments abroad. The increase in interest payments on foreign debt, due to the depreciation of the exchange rate, must be matched by an equal and opposite movement in the other components of the balance of payments, either the trade account or the capital account.

The reduction in tariffs in the TCF sector reduces the prices of imports relative to locally produced TCF products. This has several effects. First, there is contraction in the TCF sector, an increase in unemployment and a reduction in wages. Second, the increase imports will result in a tendency for the balance of payments to become negative and the exchange rate must depreciate so as to

restore balance. The depreciation of the exchange rate, supported by the reduction in wage rates, will enhance the competitiveness of import competing and export competing sectors of the economy. This effect on the current account will partly offset the initial deterioration in the current account due to increased TCF imports. The depreciation in the exchange rate will also increase the value of Australia's foreign debt and the size of interest payments on that debt.

Global-Tasman adopts an Armington preference function, described earlier. This means that our products are not perfect substitutes for those of other countries. The expansion of the export sectors will reduce prices received on world markets. These price falls are required to induce foreign consumers to buy the Australian exports. Similarly, the increase in Australian demand has a small effect on the price of imported goods.

The terms of trade is defined as the ratio of export prices to import prices. Since export prices fall and import prices rise, the terms of trade falls. The terms of trade gives an indication of the purchasing power of an economy. In the case of the current reform agenda, the terms of trade is declining quite significantly which is contributing to the projected reduction in real GNP relative to the reference case. This implies that while Australia producing more (measured by real GDP), the falling prices being received for products leaves the economy worse off.

The second contributor to our reduction in real GNP is the decline in our real exchange rate (the GDP price deflator in table). As Australia imports more TCF, our real exchange rate is projected to decline making our foreign interest payments more onerous, contributing further to the projected decline in real GNP.

Another significant result from the analysis above is that reforming the MFA also has adverse impacts on the Australian economy. This is because reforming this Agreement allows countries such as China, India and Indonesia to export more TCF to countries such as Europe and the United States. This is at the expense, to some extent, of Australian exporters who lose market share. The resulting decline in output (at the sectoral level and measured by real GDP) is projected to have a slight adverse impact on economic welfare relative to the reference case.

3.3 Sectoral impacts

The impact of the policy scenarios on the TCF sector and on other sectors of the economy are summarised in Table 17 and Table 18.

Table 17 **Projected sectoral results from TCF scenarios at 2015 (deviation from reference case**

Variable	1. BAU scenario without SIP removal	2. BAU scenario with SIP removal	3. Faster tariff reduction.	4. Alternative path scenario	5. MFA scenario
	%	%	%	%	%
Output					
Textiles	-2.25	-6.42	-9.62	-6.42	0.07
Clothing	-7.08	-9.96	-22.06	-9.82	-0.13
Footwear and leather products	-2.05	-7.97	-9.61	-8.00	-1.02
Imports					
Textiles	0.90	1.41	1.42	1.46	-0.23
Clothing	14.87	17.46	45.01	44.98	-1.59
Footwear and leather products	4.10	5.02	9.08	9.18	-0.67
Employment					
Textiles	-2.25	-6.40	-9.60	-9.61	0.07
Clothing	-7.08	-9.95	-22.05	-22.02	-0.13
Footwear and leather products	-2.05	-7.97	-9.61	-9.67	-1.02

Source: Tasman–Global projections

All of the policy scenarios have significant implications for the TCF sector's output and employment. Predictably, the worst outcome for the sector is under the faster tariff reduction scenario. This is projected to result in significant reductions in employment in the sector. Under this scenario, employment in the clothing industry falls by 22 percent relative to the reference case compared to a reduction of just under 10 percent in the slower tariff reduction scenario.

Table 18 Projected changes in sectoral output at 2015 under TCF scenarios (deviation from reference case)

	1 BAU scenario without SIP removal	2. BAU scenario with SIP removal	3. Faster tariff reduction.	4. Alternative path scenario	5. MFA scenario
Primary agriculture	0.03	0.04	0.08	0.04	0.13
Forestry and fishing	0.01	0.02	0.04	0.02	0.00
Coal	0.01	0.02	0.04	0.02	-0.02
Oil	0.02	0.03	0.05	0.03	0.00
Gas	0.12	0.19	0.37	0.19	-0.04
Other minerals	0.05	0.08	0.16	0.09	-0.11
Processed food	0.07	0.12	0.23	0.12	-0.19
Other light manufacturing	0.09	0.12	0.25	0.13	-0.03
Textiles	-2.25	-6.42	-9.62	-6.42	0.07
Clothing	-7.08	-9.96	-22.06	-9.82	-0.13
Footwear and leather products	-2.05	-7.97	-9.61	-8.00	-1.02
Petroleum and coal products	-0.01	-0.01	-0.02	-0.01	0.00
Chemicals, rubber and plastic	0.13	0.15	0.35	0.15	0.02
Non metallic minerals products	0.10	0.15	0.29	0.15	0.02
Iron and steel	0.30	0.47	0.91	0.46	0.22
Non-ferrous metals	0.32	0.53	1.02	0.53	0.06
Paper products and printing	0.02	0.02	0.05	0.02	-0.03
Motor vehicles	0.33	0.53	1.02	0.53	-0.03
Electronic equipment	0.31	0.52	0.99	0.51	0.14
Other manufacturing	0.24	0.37	0.73	0.37	0.14
Electricity	0.02	0.01	0.04	0.02	0.03
Water	0.01	0.03	0.04	0.03	-0.01
Construction	0.01	0.00	0.01	0.00	-0.02
Trade	0.00	0.01	0.01	0.01	0.00
Transport	0.08	0.14	0.26	0.14	-0.01
Communications	0.03	0.06	0.09	0.06	-0.04
Other services	0.00	0.03	0.04	0.03	-0.01

Source: Tasman−Global projections

The sectoral results are fairly standard. The reduction in assistance to the TCF sector increases the ability of other sectors in the economy to attract resources. There is an expansion in exporting industries and in import competing industries. The increased competitiveness of these sectors is reflected in the fall in the real exchange rate.

There is some debate about the expansion of the exporting industries, particularly the minerals and energy based industries. Some would question whether these sectors would expand in response to a relatively small movement in exchange rates and real wages. Projects in these sectors tend to

be run at full capacity and therefore have little flexibility to increase output and exports in the short term. Decisions to invest are based on long term considerations and projects tend to involve relatively large increments to Australian production capacity. The Global Tasman sectoral results indicate that the increase in resource exports is relatively small. If we were to constrain these export sectors, the adjustment would need to fall on other sectors. It is likely that if resource exports did not expand, a stronger decrease in the exchange rate would be required to restore external balance. This would mean a stronger stimulus to other exporting and import competing industries, including the TCF sector itself. While the sector contracts as a result of the tariff cuts, the exchange rate reduction enhances the competitiveness of the remaining TCF producers.

3.4 Sensitivity of results

From the description above, it is clear that the decline in factor prices is a significant determinant of the projected welfare declines under the 'current reform agenda' scenarios. These factor price falls are governed by key parameters and assumptions in the model that are explored below. These include the Armington assumptions which govern the substitutability of products within the model and the assumptions regarding how the labour market clears (that is, the full employment assumption).

Another factor to recognise is that the dynamic gains from TCF reform are not explicitly accounted for in this analysis. It is well established that innovation and technological change can result from opening sectors up to international competition.

Table 19 shows the projected key macroeconomic results generated by altering various assumptions and parameters in the model. The sensitivity analysis conducted altered the assumptions regarding:

- Armington elasticities:
  - Australia's Armingtons are increased by 20 per cent for non-TCF products.
  - Global Armingtons are increased by 20 per cent for non-TCF products.
  - Global Armingtons are doubled
- The labour market: the nominal wage response is sluggish compared with the standard long run closure implying.
- Dynamic productivity gains: Productivity in TCF industries increases by 1 per cent for every 10 per cent cut in tariff protection.

Each scenario was based on scenario 3, the accelerated tariff reduction scenario described above.

Table 19 **Sensitivity analysis**

Variable	3. Accelerated tariff reduction.	Higher Australian Armingtons for non-TCF	Higher Armingtons world wide for non-TCF	Double Armingtons all worldwide for all products	Labour market	Dynamic productivity gains
Real GNP	-0.08	-0.071	-0.060	-0.036	-0.113	-0.049
Real GDP	0.01	0.015	0.017	0.048	-0.078	0.034
Real investment	0.00	0.004	0.008	0.038	-0.081	0.025
Real consumption	0.03	0.037	0.042	0.080	-0.075	0.061
Volume of exports	0.83	0.766	0.811	1.433	0.253	0.799
Volume of imports	0.76	0.710	0.764	1.368	0.244	0.743
Real wage	0.03	0.038	0.043	0.049	0.059	0.074
Consumer price index	-0.46	-0.438	-0.407	-0.459	-0.162	-0.426
Nominal wage	-0.43	-0.400	-0.364	-0.410	-0.103	-0.353
Rental price of capital	-0.39	-0.362	-0.327	-0.344	-0.074	-0.328
Export price index	-0.21	-0.192	-0.175	-0.219	-0.064	-0.199
Import price index	-0.03	-0.025	-0.022	-0.026	0.001	-0.026
Terms of trade	-0.18	-0.167	-0.153	-0.192	-0.065	-0.173
Real exchange rate	-0.19	-0.402	-0.370	-0.411	-0.158	-0.385

Source: Tasman–Global projections

The results indicate that the analysis is quite robust with respect to the key assumptions and parameters chosen. This is because, generally, the magnitude and direction of the results is consistent despite changing assumptions and parameters. For example, increasing the Armington elasticities in Australia or globally implies that the projected welfare impacts are 'better' than under the standard parameters. That is, the projected increased in real GDP and real consumption are higher, while the decline in real GNP is lower. At the same time, however, the direction of the results remains consistent. This implies that increasing the Armingtons in the model does make it easier for labour, particularly, to be redeployed across the economy (note the projected reductions in the nominal wage declines as the Armingtons are increased).

On the other hand, altering the assumption regarding the labour market to assume that full employment is not achieved in each time period, but rather after a period of around 10 years, implies a worse outcome than under the assumption of full employment. This is because as it takes longer to redeploy labour from the TCF sector, the resulting unemployment leads to a projected reduction in real GDP (as less factors of production are employed). As a result, there is a projected decline in real consumption.

The assumption regarding dynamic affects of trade liberalisation, although illustrative by nature, show that any improvement in the efficiency of the TCF

sector as a result of being exposed to international competition is likely to improve Australia's position in terms of increased real GDP and consumption as well as mitigating, to some extent, the projected decline in real GNP. Any potential increase in efficiency, however, must be viewed in the context of potential scale economy losses brought about by a shrinking TCF sector.

3.5 Comparison of the results with other studies

The Productivity Commission held a modelling workshop on 20 March 2003 where various modelling groups presented the results of their analysis of TCF scenarios for comparison. The main modelling efforts, apart from ACIL Tasman's, were from Econtech, the Centre for International Economic (CIE) and the Centre of Policy Studies CoPS. Each modelling group represented used different applied general equilibrium models as the basis for the analysis of reducing TCF protection. For example, Econtech and CoPS used their respective Australian models (MM600+ and MONASH) while ACIL Tasman and the CIE presented results from global models (Tasman–Global and the GTAP model).

Each model has its own relative strengths and weaknesses for analysing alterations to TCF protection, which will not be discussed here. Rather, the following summarises the two key consistencies in the analysis presented at the workshop. First, reducing TCF assistance is projected to have an adverse impact on the sector in terms of output and employment. While each model contains various degrees of detail in terms of the representation of the TCF sector, the reduction in TCF activity was balanced, to some extent, by increased activity in the other sectors of the economy that expand to maintain full employment. This is an unsurprising result in terms of the general equilibrium modelling platforms used for this analysis.

Second, the models tended to produce similar macroeconomic impacts (this conclusion is drawn mainly from the analysis presented by ACIL Tasman, the CIE and Econtech as the CoPS analysis was preliminary and incomplete at the time of the workshop). The implications of reducing assistance to the TCF sector was to increase allocative efficiency and consumer wellbeing in general as the price of TCF was reduced. This was measured in different ways, but the underlying theme was apparent across the models. On the other hand, this positive impact was offset to some degree by a reduction in the terms of trade. Again, this was measured in different ways but consistently acted as to offset the 'first round' gains brought about by reducing TCF protection. The extent to which the terms of trade impact affected the overall welfare outcome (again, measured in different ways) differed across models. For example, ACIL Tasman's analysis showed a negative welfare outcome, while Econtech generated a slightly positive outcome and the CIE a higher welfare outcome.

Each of these results were sensitive to the choice of key parameters (such as trade elasticities).

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