A Computable General Equilibrium Analysis of Trade Policies in the 1930s in Australia

Mahinda Siriwardana

January 1998

UNE Working Papers in Economics No. 43

Editor Brian Dollery

Department of Economics
University of New England
Armidale
New South Wales 2351
Australia

*ISSN 1321-9081

ISBN 1 86389 468 3

A COMPUTABLE GENERAL EQUILIBRIUM ANALYSIS OF TRADE POLICIES IN THE 1930s IN AUSTRALIA*

MAHINDA SIRIWARDANA
Department of Economics, University of New England
Armidale, Australia 2351

Abstract

This paper provides a new solution to an old problem. A computable general equilibrium model of the Australian economy in the 1930s is used to analyse the effects of protection to manufacturing and the impact of a tax on wool exports at macroeconomic and sectoral levels. The results lend support to the original formulation by Marion Crawford Samuelson (1940) and the subsequent interpretation by Paul Samuelson (1981) that the policy of protection would result in a higher national income and welfare for the inter-war Australian economy. This is the effect of improved terms of trade via optimum tariff and the wage earners seemed to have benefited from that trade policy. The findings however reject the Anderson and Garnaut (1987) hypothesis that a tax on wool exports would have been a better substitute for a uniform tariff on all imports.

November 1997

---

* This research is partly funded by a grant from the Australian Research Council. Professor Peter Dixon gave valuable comments on an earlier version of the model for which I am grateful. The assistance received from Dr Bernard Attard in locating some of the historical documents is thankfully acknowledged.

I. INTRODUCTION

The Australian trade policy in the 1930s has been examined by many economists and economic historians. Australia was predominantly exporting primary commodities such as wool, wheat, butter, and mining products and imported mainly manufactured goods. This trade pattern meant that it was necessary to provide high import duties to protect the domestic manufacturing sector from foreign competition. Thus the investigations by many contemporary writers such as Brigden (1925, 1927a, 1927b), Copland (1931), Anderson (1938, 1939), Viner (1929), Giblin (1931, 1936) and Benham (1926, 1927) were almost exclusively concerned with the policy of protection which subsequently led the way toward modern international trade theory on protection and income distribution. A formal justification for the policy of protection was provided by the 1929 inquiry into the impact of tariffs (Bridgen *et al.*, 1929). The report of this inquiry known as the *Brigden Report* supported the continuation of the protection to the Australian manufacturing industry. This Australian case for protection gained a wider publicity following the formal demonstration of Brigden conclusions by Stolper and Samuelson (1941) in a neoclassical model. They concluded in reference to the Australian case that protection to the relatively labour intensive manufacturing sector would unambiguously raise the real returns to labour at the expense of the owners of land.

The assumption of mobility of two homogenous factors, land and labour, between sectors was crucial to the Stolper-Samuelson conclusion. Anderson and Garnaut (1987, pp.30-31) argue that in Australia land is non-homogenous and specific to the primary sector. Hence there is a difficulty in accepting Stolper-Samuelson results as unambiguous with regard to the income distribution effect. Furthermore, such ambiguity of the impact of tariff protection on labour also raises an important question of what was the first-best policy in redistributing income toward labour and in attracting more European settlers to Australia during the inter-war period. Anderson and Garnaut

are quite sceptical about the import duty on manufacturing as the best trade tax policy for Australia in the 1930s. Instead, they suggest that perhaps a tax on wool exports would have been a better substitute for uniform tariff on all imports. A policy of taxing wool exports is suggested to have been feasible and perhaps more appropriate since Australia was in a position to influence the international price of wool as the dominant supplier to the world market at that time.

The purpose of this paper is twofold. First it intends to provide an empirical test to different trade policy models of the 1930s Australia. Second it plans to compare the impact of a tax on wool exports of the 1930s in Australia with that of a uniform increase in tariffs. The analysis is carried out by simulating a computable general equilibrium (CGE) model of Australia in the 1930s. The model was originally developed to examine the causes of the Great Depression in Australia (Siriwardana, 1995). The model has been subsequently applied to evaluate the impact of recovery policies during the Great Depression (Siriwardana, 1997) and to examine the impact of tariffs within the *Brigden Report* framework (Siriwardana, 1996). It also proves to be an appropriate analytical tool to undertake further research into the issue of distributional consequences of protection in Australia in the 1930s. As is evident from our brief survey of literature in the next section, the issues involved have largely been examined within a theoretical general equilibrium framework without much empirical support. This paper attempts to fill this vacuum.

The paper is organised as follows: Section II presents a brief overview of the trade policy and the associated arguments concerning the issue of income distribution in the 1930s in Australia. This is followed by an evaluation of trade patterns in Australia during the inter-war period in Section III. An outline of the 1930s CGE model is presented in Section IV. Section V describes the data requirements and Section VI details the calibration procedure of the model, and assumptions underlining the

simulations. The results of simulations are presented and analysed in Section VII. Finally, Section VIII reports the main conclusions.

II. AUSTRALIA'S TRADE POLICY AND THE ISSUE OF INCOME DISTRIBUTION

The Australian trade policy debate in the 1930s was largely influenced by the view that tariffs on manufactures have protected the living standard of wage earners. The idea that tariff protection raised real wages or it created an environment where more workers could be employed at a given real wage was vital in winning a public opinion in favour of continuing protection. Brigden (1925) who advocated this view first among the Australian authors has received most of the credit for the economic thought of protectionism at that time. Later his view on protectionism and income distribution was formally documented in a report of a committee on protection headed by Brigden himself (Brigden et al., 1929). The *Brigden Report* attempted to demonstrate that the increased protection to the manufacturing sector would raise the demand for labour in the Australian economy. Thus it was argued that such an improvement in demand for labour would provide more employment opportunities for new migrants under a fixed real wage, encouraging more European settlers into Australia. It was believed that the protection on manufacturing would act as a tax on land owners, thus implying a redistribution of income towards the labouring class.

Following the *Brigden Report*, a lively debate on the Australian case of protection took place through writings by many eminent economists, which were published in the *Quarterly Journal of Economics* and in the *Economic Record.* Anderson (1938) launched a serious attack on the Australian protectionists policy and refuted many of the views that Australian economists have used to justify the importance of tariffs on manufactured goods. He concludes that free trade would maximise the national income for Australia regardless of movements of the terms of trade and says "The protection does keep something from the landlords, but it gives

nothing to labor. On the contrary, it keeps something from labor, too" (Anderson, 1938, p.101). Anderson's conclusion on the Australian tariffs ignored Australia's ability to influence the international terms of trade. The importance of Australian wool and wheat supplies to the world market and their influence on world prices were subsequently captured the attention of Marion Crawford Samuelson (1940). Her attempt to treat the matter more technically resulted in demolishing most of Anderson's conclusions in relation to Australian tariffs. It was shown that protection could change the relative prices both domestically and internationally in such a manner that would result in a higher national income and welfare.

Were their any alternative tax policies that Australia could adopt to transfer income from land owners to wage earners? This is an appropriate question to ask in light of the view that Brigden and his supporters argued for a second-best outcome. Clearly, taxation of land rent to raise the living standards of wage earners was politically a difficult issue. Viner (1929) was critical on the issue of income distribution resulting from import tariffs. He argued in favour of imposing a tax on land rent or direct income taxation to achieve the objective of redistribution in a more efficient manner. Copeland (1931) also points out the possibility of a land tax as an alternative to import duties but finally supported protection. Thus, he says "It may be looked upon as an indirect way of taxing rural land to support manufacturing industries. On grounds of expediency and ease of administration, the policy of protection may be used to bring about this transfer of income" (Copland, 1931, p.296). These alternatives to import duties were politically sensitive and hence received no attention of policy makers at that time.

The view of *Brigden Report* on tariffs and income distribution has had a significant impact on shaping the trade policy in Australia since the Great Depression. As is well known, the Stolper-Samuelson results, which drew conclusions in relation to the Australian case, provided the theoretical framework for the Brigden conclusions.

Their neoclassical model consists of two sectors, namely agriculture and manufacturing which produce tradeable goods, and two factors, land and labour. Both factors were homogenous and mobile between the two production sectors. It was concluded in reference to the Australia case that the protection of relatively labour-intensive manufacturing sector would increase real returns to labour and reduce real returns to land. Since the publication of the Stolper-Samuelson paper in 1941, the Australian case of protection was regarded to be a leading example for supporting protection in favour of redistributing income toward the labouring class in labour scarce economies.

Anderson and Garnaut (1987) have questioned the applicability of this theoretical model to the Australian situation. In particular, the factor 'land' in Australia was non-homogenous and specific to the exportable goods producing primary sector. Thus, in a country like Australia, it was very unlikely that the movement of land from unprotected export production into protected import-competing sector would have been substantial. Hence Anderson and Garnaut argue that the increase in real wages under protection in Australia would have been ambiguous and would require an empirical justification. Reitsma (1960), however, points out that land to labour ratio would have risen significantly only in exportable goods producing primary sector after protection. As a result, marginal productivity of labour would have increased by a significant proportion in that sector while the manufacturing sector's would have not fallen. Therefore, he concludes that the real wage on average must have increased.

Another controversial aspect of the applicability of the Stolper-Samuelson conclusions to the Australian case is their implicit assumption that Australia could not influence the international terms of trade. Metzler (1949) shows that in the presence of terms of trade effect, the impact of tariffs on the domestic economy may be reversed. Metzler also examined the empirical relevance of his theoretical finding in relation to Australia and noted that it could be relevant to trade policy discussions. It is reasonable to disregard the terms of trade effect that may arise from import side since Australian

imports accounted for an insignificant share of world imports. However, from the export side it is widely believed that Australian exports of wool and wheat represented a fair proportion of world supply of exports, giving Australia some degree of market power in the world market.

Paul Samuelson (1981a) later demonstrated the connection between protection and the terms of trade with geometric expositions and concluded that Marion Crawford Samuelson (1940) was correct in her explanation of the impact of Australian tariffs. Paul Samuelson (1981a) drew conclusions in reference to the 1925 Australian and American cases of protection and compared the outcomes with British experience in 1815 Corn Laws. In Paul Samuelson's word "Clearly, the "cost" of the optimal tariff to Australia is negative.... Only when the tariff is much "too high" as Brigden et al. evidently suspected the 1929 Australian tariff to be, will there be a positive cost of the tariffs" (Samuelson, 1981a)[1].

If Australia did have some influence over the primary export prices internationally, would it justify a policy of export tax rather than tariffs to reallocate resources from primary sector to manufacturing. Neoclassical trade theory suggests that export tax is a superior policy to import duties when the country is small in the international trade context. However, in the large-country case the outcome is ambiguous due to the influence of relevant trade elasticities. In Australia if it was politically desirable to have import duties rather than export taxes, it would imply that those protected manufacturing industries were using resources which were close substitutes for those resources used by exportable goods producing sectors. If such relationship did exist, then gains from tariffs in Australia would largely depend upon the price elasticities of export demand as usually established in the optimum tariff literature.

---

[1]. Paul Samuelson's contribution to the debate at this stage was inspired by Manger (1976) who attempted to give a belated recognition to Marion Crawford Samuelson on her analysis of the Australian case for protection. See also Manger (1981a, 1981b) and Samuelson (1981b).

The policy of protection in Australia in the 1930s was largely geared to ensure that a significant change in income distribution in favour of wage earners. However, the attitude toward such need has gradually diminished over last three decades. Hence it may be questioned whether the strong historical public support for protectionism in Australia distracted policy makers' attention from more efficient trade policy alternatives (Anderson and Garnaut, 1987, p.31). One could only hope that this was not the case but more research is needed prior to establishing any professional opinion on this controversial issue. The present contribution may assist clarifying some of the issues involved.

III. AN OVERVIEW OF THE STRUCTURE OF THE AUSTRALIAN TRADE

Australia's trade pattern during the inter-war period is a good reflection of its close association with the United Kingdom. Table I shows the direction of the Australian trade between 1920 and 1945. It is apparent from the table that the United Kingdom dominated the Australian trade, accounting for Australia's major share of exports and being a principal supplier of imports. In consequence, the prosperity of the Australian economy was mostly determined by economic conditions in the United Kingdom. As Table I indicates, other European countries and the north America (i.e., the United States and Canada) also played a significant role in trade with Australia. Other important feature of the direction of Australia's trade revealed by data in Table I is that only about a quarter of Australia's exports was reaching the rest of the world while a similar proportion of Australia's imports was sourced from them.

Table II reports the commodity composition of Australia's exports of primary goods from 1920 to 1945. During this period exports were mainly primary commodities and Australia did not export a significant proportion of its manufactured goods until the 1950s. Wool was the principal export commodity for Australia during

TABLE I
DIRECTION OF AUSTRALIA'S TRADE, 1920 TO 1940 (%)

	Exports						Imports					
	1920	1925	1930	1935	1940	1945	1920	1925	1930	1935	1940	1945
UK	56	43	44	52	64	33	39	47	41	43	38	34
Other Europe	10	29	25	14	9	2	6	11	12	10	7	0
USA and Canada	8	6	5	4	6	22	27	25	26	21	25	43
Japan	5	7	7	12	4	0	4	3	3	6	5	0
Other Asia	8	4	8	7	4	15	17	11	12	13	1	15
New Zealand	5	4	4	3	7	5	2	1	1	2	19	1
Other countries	8	7	7	8	6	23	5	2	5	5	5	7

Source: Vamplew (1987).

the inter-war period. It accounted for 35% of total primary exports in 1920, with the share rising to 39% in 1925. By 1945 the share of wool fell to 32%. Wheat also occupied a significant but rapidly declining share (21% in 1925 to 6.3% in 1945) in total exports. Another important aspect of the commodity exports has been the contribution of butter and mining products to export income of the country though their shares have been somewhat volatile during the period under consideration.

The most crucial trade statistics relevant to the trade policy debate in the 1930s are presented in Table III. The data in this table clearly indicate Australia's relative position in world trade. Australia accounted for 1.8% of world exports in 1929 and the share grew very slowly over the next decade, reaching a 2.1% mark in 1938. With regard to imports, Australian share in world imports varied from 1.9% in 1929 to 2.3% in 1938. These imports were largely manufactured goods against which high tariff

TABLE II
THE COMPOSITION OF AUSTRALIA'S PRIMARY EXPORTS, 1920 TO 1945 (%)

Year	Wool	Wheat	Butter	Mining products	All other primary products
1920	35.0	15.7	2.3	6.6	40.4
1925	39.3	21.5	6.2	6.8	26.2
1930	37.2	10.2	7.1	8.0	37.5
1935	37.9	11.2	9.2	5.6	36.1
1940	37.9	5.0	10.6	8.4	38.1
1945	31.8	6.3	5.3	7.0	49.6

Source: Vamplew (1987).

barriers were mounted over the decade. There has been a remarkable decline in imports coming to Australia during the depression years (1930 to 1933). Australia's overall position as a world trader is depicted by the aggregate trade (exports plus imports) share presented in column four of Table III. It is seen that Australia's total trade as percentage of world's total trade ranged between 1.2% and 2.2%. By any standard, this is a small proportion of world trade and there is no doubt that Australia was a small country in international trade in terms of its aggregate export and import shares.

A different picture of Australia's position in export trade emerges when main exports are disaggregated and compared with world exports of those commodities. This is undertaken for three main primary exports, namely wool, wheat and butter, in last three columns of Table III. As far as wool is concerned, Australia occupied a dominant position in world exports of wool. As shown in Table III, Australian wool accounted for more than 35% of world's wool exports during the decade under consideration. The Australian share reached the highest (41.7%) in 1933. The second

TABLE III
AUSTRALIA'S POSITION IN WORLD TRADE, 1929 TO 1938 (%)

Year	Australia's total exports as % of world's total exports	Australia's total imports as % of world's total imports	Australia's total trade as % of world's total trade	Australia's wool exports as % of world's wool exports	Australia's wheat exports as % of world's wheat exports	Australia's butter exports as % of world's butter exports
1929	1.8	1.9	1.9	35.3	10.7	9.1
1930	1.6	1.6	1.6	39.9	8.7	10.5
1931	1.6	0.9	1.2	39.0	17.6	14.9
1932	2.1	1.4	1.7	39.9	19.5	18.7
1933	2.5	1.5	2.0	41.7	20.5	16.9
1934	2.1	1.7	1.9	36.2	12.7	18.7
1935	2.3	1.9	2.1	39.8	13.8	18.9
1936	2.4	2.0	2.2	36.4	14.5	13.8
1937	2.3	1.8	2.0	35.4	14.7	13.7
1938	2.1	2.3	2.2	36.0	19.1	16.9

Source: League of Nations (1933-37, 1938).

largest export income earner, wheat, also represented a fair proportion of world supply according to the trade data appeared in Table III. The Australian share of wheat in the world market was 10.7% in 1929 and almost doubled in 1933 to 20.5%. In the following year, Australia's position in world market for wheat dropped significantly but regained its significance by 1938. Australia also seemed to appear an important supplier of butter to the world market in the 1930s by securing a market share of 9% in 1929 with a growing trend as decade progressed.

Statistics also suggest that Australian output of wool represented 28% of the world production (League of Nation, 1938). Apparently, the United Kingdom was the

most important buyer of Australian wool. On average, Australian wool accounted for 43% of the wool consumed in the United Kingdom and 41% of Australia's wool exports reached this destination (Board of Trade of the United Kingdom, 1938). Australian wool was highly influential in the London wool market in determining prices. The other major competitors were the Union of South Africa, Argentina and New Zealand. These trade statistics together with market share information for wool in Table III certainly suggest that Australia had an opportunity to influence the world price of wool in the 1930s.

IV. THE CGE MODEL OF THE AUSTRALIAN ECONOMY IN THE 1930s

CGE models have become popular in the last decade or so in historical investigations even though its use is still constrained by detailed data requirements for calibrating these sophisticated theoretical models (James, 1984; Siriwardana, 1985). One of the major advantages of this technique is that it allows counterfactual simulations to be carried out under certain assumptions[2]. A fundamental aim of the general equilibrium model is to show how an economy reacts to changes in its economic environment. The model is developed to capture the optimising behaviour of consumers and producers in the market economy. As such it is neoclassical in character and includes all transactions in the 'circular flow' that occurs in the economy as a result of numerous interactions between different markets (Siriwardana, 1997).

The model used in this paper (Siriwardana, 1995) belongs to the tradition of CGE models pioneered by Johansen (1974). Its theoretical foundation is based on a large CGE model of the Australian economy, namely ORANI (Dixon et al., 1982). The model recognises the role of relative prices and substitution possibilities in domestic production and consumption activity, and in trade. The producers and consumers are

---

2. A large Johansen type CGE model formulated to analyse the impact of tariff on the colony of Victoria in 1880 is one example where the feasibility of counterfactual analysis in historical policy simulations is clearly demonstrated. See Siriwardana (1991) for details.

assumed to behave as in a perfectly competitive environment. The major goal for producers is to minimize costs whereas consumers attempt to maximise utility. The model has nine production sectors: agriculture, pastoral, other rural, mining, manufacturing, construction, transport, trade services, and other services. The outputs of the last four sectors are nontraded. There are four categories of final demands: household consumption, investment, government consumption, and exports. The producers in all sectors use two types of primary factors, capital and labour, and intermediate inputs. The intermediate inputs are derived from both domestic and imported sources.

A complete listing of equations of the model in linear percentage change form is given in Table A.1 in the Appendix. The variables are defined in Table A.2 and coefficients are described in Table A.3 in the Appendix. Notice that Table A.1 gives model equations under five main headings. A non-mathematical treatment of their derivations is given in the remainder of this section[3].

Final demands

This part of the model contains equations relating to four final demand categories. Consumers maximise utility subject to a budget constraint. They generate income by selling their factors of production and use that income to consume most preferred bundle of goods which will maximise their utility. The utility function is of a two-level nested form. At the first level, consumers derive utility from effective or composite units of commodities. It is assumed that households behave as if the effective units are nonsubstitutes in consumption, i.e., the underlying utility function is in the Leontief form. The effective units of commodities are the Cobb-Douglas aggregation of imported and domestic goods that belong to the same commodity group. This implies that at the second level, consumers have the opportunity to substitute between domestic and imported goods of the same type according to the Cobb-Douglas function. We have

---

3. Mathematical derivations of the model equation system can be found in Siriwardana (1995).

used the conventional Armington specification in modelling the choice between domestic and imported sources of different commodities. This utility maximisation problem gives household demand functions for domestic and imported commodities which are given by equation 1.1 in Table A.1 of the Appendix.

Each industry in the model is assumed to use industry-specific capital goods. The capital units for use in individual industries are produced in a perfectly competitive environment using a constant returns to scale production technology. There are two levels in the production process. At the first level, industry *j* chooses effective intermediate inputs to minimise the total cost of capital creation subject to a Leontief production function. At the second level of the production process, industry *j* chooses its inputs for capital formation from domestic and imported sources to minimise costs subject to a Cobb-Douglas production function. This industry cost minimisation behaviour in capital goods production leads to input demand functions for capital formation which are given by equation 1.2 in Table A.1.

Each export commodity faces a less than perfectly elastic demand curve. The relevant export demand functions of the model are represented by Equation 1.3 in Table A.1. Indeed, exporters of different goods face export demand curves with different degree of elasticity. This will capture the idea of how far Australia possessed market power in the world market for its primary exports in the 1930s. Goods consumed by the government are obtained from both domestic and imported sources and are explicitly recognised in the model. However, there is no particular theory to explain the government demand. The appropriate demand functions in relation to government consumption are given by Equation 1.4.

Industry demands for inputs

A common production technology is available to all producers in a given sector of the economy. Production process requires intermediate inputs and primary inputs

(i.e., capital and labour), which cannot be substituted for each other. Producers are assumed to minimise the production costs subject to a two-level constant returns to scale nested production function. The first level contains the constant returns to scale Leontief production technology. This fixed proportions production technology does not allow for substitution between different types of intermediate inputs and primary factor inputs. This implies that producers choose effective intermediate inputs and effective inputs of primary factors in order to minimise the total cost subject to a Leontief production function. At the second level in the production process, producers substitute between domestically produced intermediate inputs and imports, and between different types of primary factors (i.e., capital and labour) according to a Cobb-Douglas technology. Cost minimisation subject to this production technology allows us to derive demand functions for intermediate inputs and primary factors as given by Equations 1.5, 1.6 and 1.7 in Table A.1.

Zero pure profits

The model represents a constant returns to scale competitive economy. As such, the competitive pricing behaviour in each of the economic activities ensures that zero pure profits are earned in equilibrium. Equation 1.8 defines the sectoral output price as a weighted sum of imported and domestic intermediate input prices, wage rate, and rental rate on capital. Similarly, Equation 1.9 gives price of unit of fixed capital. Equation 1.10 represents the relationship between the domestic price of exports and the respective world price. It simply shows that the domestic price of exports is equal to the world price times the exchange rate, plus any export subsidies (or less any export taxes). Australia is considered to be a small country in the case of imports, taking world prices as determined in world markets independent to its own purchases. Equation 1.11 indicates that the domestic price of imports is given by the world price times the exchange rate plus import duties. In fact our main aim is to assess the impact of an exogenous change in export tax on wool, and import duties on the domestic economy.

Market clearing

The equilibrium requires that there are no shortages or surpluses in both product and factor markets of the Australian economy, i.e., demand equals supply for each commodity and each factor. Accordingly, Equation 1.12 indicates market clearing equilibrium for domestically produced goods by showing that each sectoral output supply must equals demand. In the case of factor markets, Equation 1.13 implies that the employment of labour is equal to the demand for it and Equation 1.14 states that supply equals demand for fixed capital. The model allows intersectoral mobility of labour. The fixed capital is industry specific, giving market clearing rental rate for each sector in equilibrium.

Miscellaneous equations

This section refers to various other relationships of the model most of which are self-explanatory. Equation 1.15 represents the consumption function of the model. The characteristics of a Keynesian type consumption function are embodied in this equation. Equation 1.16 defines real aggregate consumption and equation 1.17 gives the aggregate real investment. The capital accumulation of the economy is modelled by equation 1.18. This equation shows the variables that affect the capital stock at the end of one period are the current capital stock, the depreciation rate and the current level of investment. The consumer price index of the model is given by Equation 1.19. Import volumes in domestic currency terms are specified in equation 1.20. Equations 1.21 and 1.22 give total import bill and export revenue in terms of foreign currency respectively. The balance of trade of the Australian economy is defined by equation 1.23. Equation 1.24 describes a flexible way of handling wages by indexing money wages to the consumer price index. The aggregate tariff revenue is given by equation 1.25 and the aggregate export subsidies are denoted by equation 1.26. Equation 1.27 facilitates the model to project the changes in real gross domestic product (GDP). The ratio of real aggregate consumption to real investment is defined by equation 1.28.

V. DATA AND EMPIRICAL IMPLEMENTATION OF THE MODEL

The empirical implementation of the model requires numerical values for a large number of structural coefficients and parameters. They range from sales, cost, and revenue shares to estimates of the elasticity parameters such as household demand elasticities, capital-labour substitution elasticities, and export demand elasticities. The share coefficients are normally calculated from the input-output table of the benchmark year and elasticities are obtained from econometric estimations. The model described in this paper has been calibrated to a database of 1934-35. It is obtained from a benchmark input-output database compiled for the Australian economy in 1934-35. Australian economy has been disaggregated into nine sectors and domestic and import commodity flows are recorded separately in this input-output table[4].

As noted above, the model also contains behavioural ealsticities. The use of Leontief and Cobb-Douglas functional forms in the derivation of the theoretical model allows almost all the elasticity parameters to be derived from the input-output table. One exception is the export demand elasticities which are to be adopted from outside information. Several attempts have been made to estimate export demand elasticities for different countries of the inter-war period. In a survey of estimates of export demand elasticities, Cheng (1959) lists 42 such studies of which 36 were published during post-war period. Methodologies involved in these estimations vary substantially and have attracted considerable criticisms. Six studies reviewed in Cheng's survey contains export demand elasticity estimates relating to Australia. Among these, Horner (1952) provides reasonable estimates of export demand elasticities for wool, wheat and butter in relation to Australian exports. Based on data from the 1930s, Horner arrived at values for the elasticity of demand for three Australia's main export commodities: for

---

4. M. F. Rola provided an excellent research assistance in constructing this historical input-output table for 1934-35. More details of the database are available from the author on request. Siriwardana (1987) gives further details on procedutres and problems associated with the compilation of historical input-output tables.

wool between 1.59 and 2.15; for wheat between 2.87 and 5.20; and for butter 2.10 and 3.18.

Australia was the world's largest wool producer in the inter-war economy. During the early 1930s, Australia accounted for little more than a quarter of world's wool output and about three per cent of the wheat production. It has been the conventional belief that the export demand elasticity for Australian wool was small, giving a degree of monopoly power in the world market for Australian exporters. According to trade statistics, the United Kingdom was the principal buyer of Australian wool and wheat.

Given the fact that the United Kingdom was the main purchaser of Australia's two main export commodities, we attempted to obtain an alternative estimate of export demand elasticities for these two commodities, using the method explained in Freebairn (1978). After assigning plausible values for the two key parameters, price elasticity of demand in the consuming country and the price elasticity of world supply, we have concluded that export demand elasticity for Australian wool might have been within the range of 0.5 and 3.3 during the 1930s. Similarly, our estimates for wheat show that the relevant elasticity would have been in between 1.5 and 8.0[5].

For the purpose of model simulations, three export demand elasticity scenarios are adopted on the basis of the literature survey and with reference to our own estimates of such elasticities for Australian wool and wheat exports. The three elasticity scenarios chosen are 'low', 'medium' and 'high'. In the case of 'low' elasticity scenario, a common value of 0.5 is adopted for three main export commodities (i.e., agriculture,

---

5. The formula used in Freebairn (1978) to estimate the value of the export demand elasticity (*EDE*) is

$$EDE = [\ \eta + (S/D)\ \varepsilon\ ]\ D/X$$

where η is the price elasticity of demand in the consuming country, ε is the price elasticity of world supply, D is rest of world demand, S is rest of world supply and X is Australian exports. In the estimation of elasticities for our purpose, the supply elasticity (ε) varies from 0.2 to 0.7 for wool and 0.2 to 2.0 for wheat. The demand elasticity (η) varies from 0.1 to 1.0 for wool and 0.2 to 0.4 for wheat.

pastoral, and mining) in the model. For other commodities, export demand elasticity is set at a value of 20.0. The simulations under 'medium' scenario are carried out with export demand elasticities of 2.0 for agriculture, pastoral, and mining, and 20.0 for other sectors. A uniformly high value of 20.0 is used for all the commodities under the 'high' elasticity scenario. Throughout all the simulations, agriculture, pastoral, and mining exports are treated endogenous whereas the exports of remaining six commodities exogenous. Thus it is important to notice that the values of export demand elasticities adopted in the latter group have no actual impact on the simulation results reported in the paper.

VI. THE DESIGN OF SIMULATIONS AND MODEL CLOSURE

This section explains the formulation of the simulation experiments and the underlying assumptions which create the economic environment under which specified simulations are carried out[6]. In order to evaluate the impact of two alternative trade policies, namely a wool export tax and an increase in general import tariffs, it is necessary to simulate the CGE model, by imposing changes in relevant export tax and import tariff variables as exogenous shocks to the Australian economy. After a careful review of the tariff schedule of the period and relevant literature (Carmody, 1952), it was considered appropriate to raise the existing tariff rates in the early 1930s Australia by 20 per cent exogenously. In order to evaluate the impact of this exogenous shock on the economy, we have assigned a 20 per cent change in variable t in the model (see equation 1.11 in Table A.1 in the appendix). When such tariff increase is imposed on the model exogenously, we can examine its effects on the economy through the projected values of endogenous variables which show how they differ from the values that would have resulted in the absence of the tariff shock.

---

6. The model described here was implemented and solved using the Version 4.2 of GEMPACK (Codsi and Pearson, 1988). This version allows the use of multi-step sollution approach which minimizes the Johansen linearisation errors of the model.

Now, to be able to investigate the implications of a switch from import duties to a tax on wool exports, we need to reformulate the simulation experiment by imposing an alternative exogenous shock. In the model, the effects of export tax policy on domestic prices are captured by the equation,

$$p^{*}_{(i1)}+v_i+\phi=p_{(i1)} \qquad (1)$$

where $p^{*}_{(i1)}$ is the foreign currency export price, v_i is the export subsidy, ϕ is the nominal exchange rate, and $p_{(i1)}$ is the domestic price of exportable good received by exporters. In equation (1), negative of the export subsidy term (v_i) is defined as the export tax. Following Corden (1974), we have defined tariff equivalent export tax for the experiment. The 20% tariff equivalent export tax rate on wool is computed to be 16.7%. The simulation is carried out by a 16.7% exogenous change in variable v_2 where 2 refers to the commodity 'pastoral'. In our database, wool is the main item in this commodity group.

The CGE model is simulated to evaluate the impact of tariffs and a tax on wool exports under a number of assumptions regarding the macoeconomic environment. There are five main assumptions which govern the model closure for the simulations reported in the next section. They are: (1) industry-specific fixed capital in use are exogenous; (2) real wages are constant; (3) real private consumption varies with real disposable income; (4) shares of real private consumption, real government consumption and real investment in total real domestic absorption remain unchanged; and (5) the nominal exchange rate is exogenous. Assumption (1) indicates that the projected results imply the short to medium-term impact of tariff policy and the export tax policy on wool. A slack labour market is assumed under assumption (2). This is to capture the labour market of the Great Depression period which featured large unemployment. It has been estimated that about 20 per cent of the labour force was unemployed by 1932 in Australia. Under assumptions (3) and (4), the real domestic

absorption is endogenously determined in all model simulations. This allows us to deviate from conventional closure rule of many CGE models where either the balance of trade or the real domestic absorption is treated exogenous. Assumption (5) defines the numeriare of the model.

VII. SIMULATION RESULTS

To understand the general equilibrium effects of an export tax policy and a policy of uniform increase in protection, six counterfactual simulations were conducted under the three export demand elasticity scenarios. In regard to the simulation results, it is important to emphasise the difference between each scenario at the outset. In the 'low' elasticity case, for example, the gains from either an export tax or import tariffs represent the optimum tariff argument in the international trade literature. Under the 'low' elasticity scenario, the introduction of an export tax on wool or an increase in tariffs would expand national income via the terms or trade effect. Since Australian primary commodity exports accounted for a substantial proportion of world's primary exports, any significant reduction in supply of such commodity exports under either the export tax policy or tariffs would increase their world prices. As import prices were unaffected by the changes in Australian demand (i.e., assuming no retaliation), it was most likely that the terms of trade would have shifted in Australia's favour.

A fairly elastic demand curves for Australian exports are assumed under the 'medium' elasticity scenario. The implication is that exporters cannot pass on cost increases arising from tariffs to foreign buyers without experiencing a reduction in export sales. Similarly, a reduced supply of wool for exports through an export tax would not raise the foreign price substantially. The 'high' elasticity scenario treats Australia a small country which is almost a price taker in the world market for its exports. The simulation results under this scenario may provide an interesting empirical basis for a comparison of two alternative trade policies in a typical small country situation.

The macroeconomic effects of alternative trade policies

The effects of an export tax on wool and the imposition of an across-the-board increased in tariffs on the macroeconomy are reported in Table IV. Results are given under the three export demand elasticity scenarios. The first two columns of the table give projections when two respective trade policies are adopted with the intention of exploiting the terms of trade via the monopoly power in the world market for Australia's primary exports. Imposing an export tax on wool (equivalent to imposing an import duty on imports) appears to be an interesting policy option though the respective outcome differs significantly from what would have been if import duty was raised. The key to understand the results is to examine the effects on terms of trade. As intended, the export tax on wool has produced an improvement in the terms of trade (0.14%) for Australia but it is well below the 17.9% improvement observed under the tariff policy. These results are followed by the real GDP and employment projections. Under the export tax policy, the real GDP declines by 1% compared to the growth of 6.2% under protection. Similarly, the aggregate employment in the economy (i.e., the demand for labour) declines by 1.9% whereas the policy of protection generates a substantial employment gains (6.2%). These results perhaps are helpful to shed some light on the trade policy puzzle of the 1930s in Australia which some economists have recently resurrected. If Australia possessed some degree of monopoly power in the world market for wool, what would have been the most appropriate trade policy? Clearly, it was the policy of protection which may appear to have been far more superior than taxing wool exports, according to the present findings. Naturally, tax on wool exports would result in diverting some of the wool outputs from exports to domestic market. This tends to drive down the domestic price level and it is apparent from the 7.8% reduction in the consumer price index in our results. The price of wool

TABLE IV
PROJECTED MACROECONOMIC EFFECTS OF AN EXPORT TAX ON WOOL AND IMPORT TARIFFS[a]

Variable	'Low' elasticity (I)		'Medium' elasticity (II)		'High' elasticity (III)	
	16.7% tax on wool exports	20% tariff on imports	16.7% tax on wool exports	20% tariff on imports	16.7% tax on wool exports	20% tariff on imports
Real GDP	-1.09	6.27	-0.70	0.89	0.56	-2.60
Terms of trade	0.14	17.91	-0.49	5.51	-0.18	0.95
Real domestic absorption	-2.10	7.34	-1.78	1.87	-0.39	-1.52
Aggregate exports[b]	0.07	8.08	0.48	-5.51	3.36	-13.73
Aggregate imports[b]	-7.15	19.09	-6.53	0.56	-2.79	-9.00
Balance of trade	0.94	-0.73	0.92	-0.91	0.87	-1.16
Consumer price index	-7.85	41.45	-7.42	19.28	-3.90	8.41
Aggregate demand for labour[c]	-1.93	6.22	-1.24	0.05	0.98	-4.32
Money wages	-7.85	41.45	-7.42	19.28	-3.90	8.41
Real wages[d]	0.00	0.00	0.00	0.00	0.00	0.00
Nominal exchange rate	0.00	0.00	0.00	0.00	0.00	0.00
Real exchange rate[e]	7.85	-41.45	7.42	-19.28	3.90	-8.41

Notes: (a) All projections are in percentage changes except the balance of trade which is expressed as a percentage of base period GDP.
(b) These are in foreign currency terms.
(c) This projection shows the effective demand for labour.
(d) Calculated by deflating movements in money wages by movements in the model's consumer price index.
(e) Calculated by subtracting the percentage change in the model's consumer price index from the percentage change in the nominal exchange rate.

itself declines in the domestic market under the export tax policy, implying an improvement in relative price in manufactured goods. The improvement in the latter seems to be not large enough to mobilise resources substantially toward manufacturing. This could be the prime reason for poor employment performance observed under the wool tax.

The macroeconomic results of the 'medium' elasticity scenario for the export tax policy seem to change considerably as a consequence of the higher magnitude of the export demand elasticity used (a value of 2) in the simulation. Most interestingly, the terms of trade become unfavourable to Australia (0.4% reduction), compared to the marginal gain observed under the inelastic export demand. Though the projections of the real GDP and aggregate employment have changed in magnitude, they do not alter the qualitative picture of the outcome of the 'low' elasticity scenario. The 20% increase in tariffs in this 'medium' elasticity scenario seems to take most of the benefits projected under 'low' elasticity scenario away, according to the results reported in Table IV. For example, the positive terms of trade effect declines significantly from 17.9% to 5.5%. The rest of the macroeconomic results follow closely this movement in the terms of trade. It is apparent from the employment and real GDP projections (0.05% and 0.8% respectively) that the increase in protection becomes largely ineffective at macro level with the reduced market power for Australia's primary exports. Though the competitive advantage in the manufacturing sector improves under higher tariffs, the increased costs due to protection, especially with full wage indexation, in the domestic economy partially erode the profitability in primary exports. The results indicate a substantial reduction in export revenue, leading to a slightly higher deficit in the balance of trade.

The simulation results in last two columns of Table IV compare the macro-outcomes of the two trade policies, assuming Australia a typical small country in the international trade. The results are remarkably consistent with the predictions of the standard trade theory. As would be expected, the export tax policy on wool turns out to

be superior to the policy of protection if Australia were to be classified a small country in terms of the export demand elasticity (i.e, 'high elasticity' scenario) for its primary exports. In this small country scenario, the macroeconomic results are largely driven by what happens to the domestic cost structure with export tax and import tariffs. Naturally, export tax has a tendency to reduce the domestic costs whereas the higher import duties increase costs. A casual observation of the results proves that this is indeed what happens. The consumer price index shows 3.9% decline under the export tax policy compared to the 8.4% increase under higher tariff protection. The welfare gain of export tax in this case can be measured in terms of the expansion in real GDP by 0.5% and the improved employment demand almost by 1%. The opposite to these take place with the policy of protection which projects 2.6% contraction in Australia's real GDP accompanied by a 4.3% reduction in employment. The reduced domestic costs under the wool tax in fact improves the profit margin for exporters of non-wool primary exports. This enhance such exports leading to an improvement in the balance of trade.

The sectoral effects

The effects of wool export tax and the uniform increase in protection on the industry outputs and employment levels of the Australian economy are given in Table V. It is also useful to consider in conjunction with these projections the results showing the impact of the two trade policies on foreign currency price of Australia's primary exports and export volumes which are reported in Table VI. It is observed from Table V that the sectoral results are very sensitive to the variation in the magnitude of export demand elasticities. As intended, the export tax on wool reduces the output and employment levels in the pastoral sector. The impact is relatively lower when export demand is price inelastic ('low' elasticity scenario). However, the adverse effects on pastoral output and employment are magnified as we move from 'low' to 'high' elasticity scenario. The main gainers of the export tax policy are the non-wool producing primary sectors

TABLE V

PROJECTED SECTORAL EFFECTS OF AN EXPORT TAX AND IMPORT TARIFFS[a]

Sector	'Low' elasticity (I)		'Medium' elasticity (II)		'High' elasticity (III)	
	16.7% tax on wool exports	20% tariff on imports	16.7% tax on wool exports	20% tariff on imports	16.7% tax on wool exports	20% tariff on imports
Outputs:						
Agriculture	1.05	-2.87	3.35	-6.87	9.65	-15.14
Pastoral	-1.37	-3.99	-2.32	-4.60	-4.17	-2.61
Other rural	-0.37	2.54	-0.14	1.20	0.52	-0.03
Mining	1.01	-4.10	4.40	-11.21	9.30	-17.50
Manufacturing	-0.10	2.22	0.15	1.44	0.79	0.39
Construction	-2.10	7.34	-1.78	1.87	-0.39	-1.52
Transport	-1.39	4.69	-1.00	0.57	0.39	-2.32
Trade services	-1.84	6.23	-1.49	1.26	-0.06	-1.98
Other services	-1.91	6.67	-1.60	1.66	-0.29	-1.47
Employment:						
Agriculture	1.34	-3.68	4.30	-8.83	12.39	-19.15
Pastoral	-6.32	-17.52	-10.71	-21.21	-19.24	-11.67
Other rural	-0.88	6.05	-0.33	2.82	1.23	-0.09
Mining	1.34	-5.45	5.88	-14.98	12.43	-22.89
Manufacturing	-0.26	4.65	0.32	2.99	1.66	0.81
Construction	-2.78	9.77	-2.36	2.46	-0.51	-2.00
Transport	-1.48	5.00	-1.06	0.61	0.41	-2.47
Trade services	-3.49	12.08	-2.83	2.41	-0.11	-3.74
Other services	-2.98	10.55	-2.50	2.60	-0.45	-2.29

Note: (a) All projections are in percentage changes.

(agriculture and mining) which experience a reduction in costs induced by the obvious deflationary effects of this particular trade policy stance. The performance of the manufacturing sector under the export tax is largely determined by the resource reallocation effect. Though this sector shows some improvement in output and employment as Australian exports become price elastic, it is clear that a tax on wool exports would have obviously been a bonus to non-wool primary producers in Australia at that time.

The impact of tariffs on sectoral outputs and employment level reveals a different outcome to the above findings. The export sectors (agriculture, pastoral, and mining) are adversely affected by the increased protection levels. Again the impact varies between the elasticity scenarios. The higher tariffs impose a profit squeeze on exporters. The CGE model incorporates a variety of ways in which costs rise with tariffs. Tariffs cause the costs of imported inputs as well as the prices of some of the domestically produced goods to increase. With full wage indexation, tariffs also raise the wage costs of the economy. The success of the export goods producers thus depends on their ability to cope with these cost increases under protection. The magnitude of the export demand elasticity determines the strength of passing increased costs to foreign buyers of exports by way of higher prices. Results show that the adverse impact on the export sectors of the increased domestic costs is less severe when export demand curves are price inelastic. However, the exporters suffer dramatically from protection under the high elasticity scenario. The obvious gainer from tariffs (i.e., manufacturing) is also affected by the variation in export demand elasticities
in the model. As can be seen from Table V, the output and employment gains experienced by the manufacturing sector gradually diminish with the move from inelastic to elastic export demands. The clear implication of this finding is that it was essential for Australian exporters to have monopoly power in the world market if Australia was to succeed from the policy of protection.

TABLE VI
PROJECTED EFFECTS ON EXPORT VOLUME AND PRICES OF A WOOL EXPORT TAX AND IMPORT TARIFFS(a)

	'Low' elasticity (I)		'Medium' elasticity (II)		'High' elasticity (III)	
	16.7% tax on wool exports	20% tariff on imports	16.7% tax on wool exports	20% tariff on imports	16.7% tax on wool exports	20% tariff on imports
Foreign currency price of exports:						
Agriculture	-7.62	40.50	-6.74	17.83	-2.03	5.10
Pastoral	4.71	27.34	2.35	5.70	0.48	0.27
Mining	-7.56	39.93	-6.13	16.00	-1.19	2.77
Export volume:						
Agriculture	3.81	-16.94	13.49	-35.66	40.51	-71.06
Pastoral	-2.36	-12.06	-4.71	-11.40	-9.60	-5.38
Mining	3.78	-16.74	12.27	-32.00	23.72	-45.65

Note: (a) All projections are in percentage changes.

The effects of export tax and import duties on the nontrading sectors (i.e., construction, transport, trade services, and other services) are largely determined by the general performance of the economy as indicated by the projections of real GDP. The sectoral output and employment results for these sectors reported in Table 5 under the tax on wool exports reveal two important implications. First, such policy is generally unfavourable to nontrading sectors in the economy. Second, the impact is relatively severe if Australian primary exports were price inelastic. The tariff increase on the other hand seems to impact upon the nontrading sectors differently compared to the introduction of a wool tax. Considerably large output and employment gains of these

sectors under the 'low' elasticity scenario imply that the generally healthy performance of the macroeconomy is an important determinant of their success. These gains gradually diminish with the elastic export demand curves for primary exports and indeed reverse when Australia is treated as a small country.

The above conclusions on sectoral projections are largely dependent upon what happens to exports and their foreign currency prices in different elasticity scenarios. Table VI shows the performance of the three main primary exports in the economy under two different trade policies when export demand elasticities vary from low to high. Both export tax and import duties are capable of raising foreign currency price of pastoral exports by reducing the volume of exports under the 'low' elasticity scenario. The most important finding here is that the latter policy has a greater impact on the export price. What this implies is that the policy of protection may have been a superior trade policy instrument to a wool export tax if Australia was to exploit the gains from optimum tariff in the 1930s.

Effects on real incomes

The effects of the two alternative trade policies on real incomes accruing to labour and capital employed in various sectors are presented in Table VII. The table also reports the aggregate impact on factor incomes for labour and capital. A comparison of these projections under each elasticity scenario provides a clear picture of the distributional consequences of the export tax on wool and the uniform increase in protection. The income projections of the 'low' elasticity scenario for the export tax policy indicate that there is an income loss for both capital and labour in the economy, though the latter experiences a slightly less reduction. The disaggregated results for individual sectors reveal that except agriculture and mining, all other sectors are projected to lose income. It may therefore be concluded that, if wool exports were subject to a tax, there could have been an income transfer toward other main primary

TABLE VII

CHANGES IN REAL INCOMES ACCRUING TO LABOUR AND CAPITAL IN DIFFERENT SECTORS DUE TO AN EXPORT TAX ON WOOL AND IMPORT TARIFFS[a]

Sector	'Low' Elasticity				'Medium' Elasticity				'High' Elasticity			
	16.7% tax on wool exports		20% tairiff on imports		16.7% tax on wool exports		20% tairiff on imports		16.7% tax on wool exports		20% tairiff on imports	
	Labour	Capital	Labour	Capital	Labour	Capital	Labour	Capital	Labour	Capital	Labour	Capital
Agriculture	1.05	0.30	-2.87	-1.03	3.35	0.95	-6.89	-1.94	9.66	2.73	-14.94	-4.45
Pastoral	-1.39	-4.93	-3.85	-17.35	-2.36	-8.35	-4.67	-16.54	-4.23	-15.00	-2.57	-9.61
Other rural	-0.37	-0.51	2.54	4.41	-0.14	-0.19	1.18	1.64	0.52	0.72	-0.04	-0.06
Mining	1.01	0.34	-4.09	-1.72	4.41	1.47	-11.24	-3.74	9.32	3.11	-17.17	-6.05
Manufacturing	-0.10	-0.11	2.23	3.04	0.15	0.17	1.43	1.56	0.80	0.86	0.39	0.44
Construction	-2.11	-0.67	7.42	2.94	-1.79	-0.57	1.87	0.59	-0.39	-0.12	-1.52	-0.51
Transport	-1.39	-0.09	4.70	0.38	-1.00	-0.06	0.57	0.04	0.39	0.02	-2.32	-0.16
Trade services	-1.82	-1.68	6.28	7.28	-1.47	-1.36	1.25	1.16	-0.06	-0.05	-1.95	-1.89
Other services	-1.91	-1.07	6.75	4.77	-1.60	-0.90	1.66	0.94	-0.29	-0.16	-1.46	-0.87
All sectors	-1.11	-1.46	3.97	0.61	-0.57	-1.80	0.02	-1.97	1.04	-2.17	-2.97	-2.33

Note: (a) All projections are in percetange changes.

export goods producing sectors (i.e., agriculture and mining) from rest of the economy. Results indicate that labour employed in agriculture and mining would gain relatively more compared to capital.

One interesting conclusion emerges from the income projections of the tariff simulation. A 20% increase in tariffs with the export demand being price inelastic, the model projects that labour would experience almost 4% growth in income. The respective income gain for capital is 0.6%. This finding may support the policy of protection as an appropriate means of transferring income toward the labouring class in the 1930s despite the speculations about the efficacy of this trade policy. The sectoral results show how this overall income gain by labour is shared by various industry groups. According to our projections, labour income in manufacturing grows by 2.2%. However, the nontrading sectors of the economy are projected to have higher growth in labour incomes.

The above conclusions of factor incomes are changed to some extent if Australia is regarded to be a small country in international trade. Table VII reports that export tax on wool would be a better policy to transfer income toward labour if Australian exports were price elastic. Clearly, import duties would reduce income for both factors and labour would have been disadvantaged more. Compared to this, tax on wool exports implies an overall increase in labour income whereas capital loses income at a significant rate (2.1%). The disaggregated income projections of the export tax simulation show that labour employed in agriculture and mining sectors would experience considerable income growth at the expense of pastoralists.

VIII. CONCLUSION

The aim of this paper has been to investigate the effects of trade policies in the 1930s Australia within a computable general equilibrium modelling framework. Two

alternative trade policies are analysed after taking into account Australia's relatively important position in primary goods (especially wool and wheat) exports. The terms of trade argument has occupied a central role in most of the trade policy debate in the inter-war Australian case. Recently, it has been proposed by some authors that Australia could have adopted an export tax on wool instead of uniform tariffs to exploit the terms of trade effects of the optimum tariff. This study provides a quantitative assessment of these views by simulating a nine-sector general equilibrium model of the Australian economy.

The results of the trade policy analysis presented in the paper provide some justifications to Marion Crawford Samuelson's (1940) original contribution to the Australian tariff policy debate. Our empirical findings lend support to her argument that tariffs raised Australia's national income due to the terms of trade effect (i.e., under the optimum tariff). Tariffs also shifted labour out of primary industries and lowered real land rents. It would appear that the real wage would have improved, raising wage income both relatively and absolutely with the increased tariff protection. Hence as Paul Samuelson (1981a) rigorously demonstrated, the cost of the optimum tariff to Australia in the 1930s seemed to have been negative according to the results of our applied general equilibrium model.

Apart from supporting the inference of these leading theoretical pioneers of the Australian tariff debate, the findings further lead to several important conclusions which are highly relevant to trade policy discussions. As many would presume, the trade policy in the 1930s was dominated by the protectionist sentiment to a large extent due to the belief that Australia possessed some degree of monopoly power in the world market for its main primary exports. Naturally, such market power arising from inelastic demand for exports would have allowed Australia to gain from trade restrictions via improved terms of trade. Then the question is what was the best trade policy that would have been appropriate at that time to exploit possible gains from the optimum tariff.

Anderson and Garnaut (1987) alluded to an export tax on wool rather than uniform import tariffs. Our results do not support this contention. If in deed Australian exports were price inelastic, the results of this paper suggest that the policy of protection has been far better than the export tax on wool to generate higher national income and new employment opportunities for the Australian population during the inter-war period. Australia's economic progress during that period would have suffered had the policy makers preferred an export tax to import duties.

A growing scepticism on the employment and income distribution effects of tariffs had led to some economic thought concerning what was the first-best policy in redistributing income toward labour in an attempt to attract new settlers to Australia in the 1930s. What evidence does this paper provide toward this conjecture? As far as income distribution is concerned, the tariff policy seemed to have done what it was meant for at that time. In comparing the simulations under the inelastic demand for Australia's exports, it is found that an export tax on wool would have been a second-best policy to distribute income toward the labouring class.

A typical small country assumption tends to reverse the above conclusions. Given the uncertainty of the exact magnitude of export demand elasticities, simulations were repeated under the 'high' elasticity scenario mostly for illustrative purposes. Had the Australian exports were price elastic, the wool export tax would have produced marginally better outcome than the policy of protection. Indeed this is the theoretically expected result and the model supports it empirically. The review of trade data in section III, however, suggests that the small country assumption for the 1930s Australian trade is little unrealistic and may perhaps do some injustice to a most fascinating trade policy debate of this century.

REFERENCES

Anderson, K.L., "Protection and the Historical Situation: Australia", *Quarterly Journal of Economics*, LIII (1938), 86-104.

Anderson, K.L., "Comment", *Quarterly Journal of Economics*, LIV (1939), 149-51.

Anderson, K. and Garnaut, R., *Australian Protectionism* (Sydney: Allen and Unwin, 1987).

Benham, F.C., "The Australian Tariff and the Standard of Living: A Reply", *Economic Record*, II (1926), 20-42.

Benham, F.C., "The Australian Tariff and the Standard of Living: A Restatement", *Economic Record*, III (1927), 239-48.

Board of Trade of the United Kingdom, *Statistical Abstract for the United Kingdom* (London, 1938).

Brigden, J.B., "The Australian Tariff and the Standard of Living", *Economic Record*, I (1925), 29-46.

Brigden, J.B., "The Australian Tariff and the Standard of Living: A Rejoinder", *Economic Record*, III (1927a), 102-16.

Brigden, J.B., "Comment on Mr. Benham's Restatement", *Economic Record*, III (1927b), 239-48.

Brigden, J.B., Copland, D.B., Dyason, E.C., Giblin, L.F. and Wickens, C.H., *The Australian Tariff: An Economic Enquiery* (Melbourne: Melbourne University Press, 1929).

Carmody, A.T., "The Level of the Australian Tariff: A Study in Method, *Yorkshire Bulletin of Economic and Social Research*, IV (1952), 51-65.

Cheng, H. S., "Statistical Estimates of Elasticities and Propensities in International Trade", *I.M.F. Staff Papers*, VII (1959), 107-58.

Codsi, G., and Pearson, K.R., "GEMPACK: General Pupose Sofware for Applied General Equilibrium and Other Economic Modellers",*Computer Science in Economics and Management*, I (1988), 189-207.

Copland, D.B., "A Neglected Phase of Tariff Controversy", *Quarterly Journal of Economics*, XLV (1931), 289-308.

Corden, W.M., *Trade Policy and Economic Welfare* (Oxford: Clareden Press, 1974).

Dixon, P.B., Parmenter, B.R., Sutton, J. and Vincent, D.P., *ORANI: A Multisectoral Model of the Australian Economy* (Amsterdam: North-Holland, 1982).

Freebairn, J.W., "Projections of Australia's World Trade Oppotunities: Mid and Late Nineteen Eighties", IMPACT Working Paper no. I-07, University of Melbourne, 1978.

Giblin, L.F., "The Tariff - Its Costs and Effects", in D.B. Copland (ed.), *An Economic Survey of Australia* (Philadelphia, 1931).

Giblin, L.F., " Some Economic Rffects of the Australian Tariff", *The Joseph Fisher Lecture in Commerce* (Adelaide, 1936).

Horner, F.B., "Elasticity of Demand for the Export of a Single Country", The *Review of Economics and Statistics*, XXXIV (1952), 326-42.

James, J.A., "The Use of General Equilibrium Analysis in Economic History", *Explorations in Economic History*, XXI (1984), 231-53.

Johansen, L., *A Multi-Sectoral Study of Economic Growth*, 2nd edition (Amsterdam: North Holland, 1974).

League of Nations, *Statitical Year Book* (Geneva, 1933-37).

League of Nations, *Review of World Trade*, (Geneva, 1938).

Manger, G.J., "The Australian Case for Protection Reconsidered". Working Paper, The University of New South Wales, 1976.

Manger, G.J., "Summing up on the Australian Case for Protection: Comment", *Quarterly Journal of Economics*, XCVI (1981a), 161-67.

Manger, G.J., "The Australian Case for Protection Reconsidered", *Australian Economic Papers*, XX (1981b), 193-204.

Metzler, L. A., Tariffs, the Terms of Trade and the Distribution of National Income", *Journal of Political Economy*, LVII (1949), 1-29.

Reitsma, A.J., *Trade Protection in Australia* (Brisbane: University of Queensland Press, 1960).

Samuelson, M.C., "The Australian Case for Protection Re-examined", *Quarterly Journal of Economics*, LIV (1940), 143-49.

Samuelson, P.A., "Summing Up the Australian Case for Protection", *Quarterly Journal of Economics*, XCVI (1981a), 147-60.

Samuelson, P.A., "Justice to the Australians", *Quarterly Journal of Economics*, XCVI (1981b), 169-70.

Siriwardana, M., " The use of Computable General Equilibrium Models for Historical Counterfactual Analysis", Working Papers in Economic History, no. 38, Australian Nation University, 1985.

Siriwardana, M., "An Input Output Table for the Colony of Victoria in 1880", *Australian Economic History Review*, XXVII (1987), 61-85.

Siriwardana, M., "The Impact of Tariff Protection in the Colony of Victoria in the Late Nineteenth Century: A General Equilibrium Analysis", *Australian Economic History Review*, XXXI (1991), 45-65.

Siriwardana, M., "The Causes of the Depression in Australia in the 1930s: A General Equilibrium Evaluation", *Explorations in Economic History*, XXXII (1995), 51-81.

Siriwardana, M. (1996), "The Economic Impact of Tariffs in the 1930s in Australia: The Brigden Report Re-examined", *Australian Economic Papers*, XXXV (1996), 370-89.

Siriwardana, M., " Exchange Rate Policy and Market power: A General Equilibrium Analysis for Singapore", *ASEAN Economic Bulletin*, XIV (1997), 57-79.

Siriwardana, M., "Can Policy-Makers Learn from History? A General Equilibrium Analysis of the Recovery Policies of the 1930s Great Depression in Australia", *Journal of Policy Modeling*, XIX (1997), 1-32.

Stolper, W.F. and Samuelson, P.A., "Protection and Real Wages", *Review of Economic Studies*, IX (1941), 58-73.

Vamplew, W. (ed.), *Australian Historical statistics*, (Sydney: Fairfax, Syme & Weldon Associates, 1987).

Viner, J., " The Australian Tariff", *Economic Record*, V (1929), 306-15.

Table A.1

EQUATIONS OF THE CGE MODEL IN LINEAR PERCENTAGE CHANGE FORM

No.	Equation	Subscript range	No.	Description
	Final demands			
(1.1)	$x^H_{(is)} = \varepsilon_{(is)}c + \Sigma^9_{q=1}\Sigma^2_{r=1}\eta_{(is)(qr)}p_{(qr)}$	$i = 1,...,9$; s=1,2	18	Household demands for commodities
(1.2)	$x^I_{(is)j} = y_j - (p_{(is)} - \Sigma^2_{r=1}\alpha^I_{(ir)j}p_{(ir)})$	$i = 1,...,9$; $s = 1,2$; $j = 1,...,9$	162	Demand for inputs to capital creation
(1.3)	$p^*_{(i1)} = -\gamma_i x^E_{(i1)} + f^E_{(i1)}$	$i = 1,...,9$	9	Export demands
(1.4)	$x^G_{(is)} = c_R h^G_{(is)} + f^G_{(is)}$	$i = 1,...,9$; s=1,2	18	Government demands for commodities
	Demand for inputs			
(1.5)	$x^O_{(is)j} = x_j - (p_{(is)} - \Sigma^2_{r=1}\alpha^O_{(ir)j}p_{(ir)})$	$i = 1,...,9$; s=1,2; j=1,...,9	162	Demand for intermediate inputs by source
(1.6)	$x^O_{(10,1)j} = x_j - [p_{(10,1)j} - (\alpha^O_{(10,1)j}p_{(10,1)j} + \alpha^O_{(10,2)j}p_{(10,2)j})]$	$j = 1,...,9$	9	Demand for labour
(1.7)	$x^O_{(10,2)j} = x_j - [p_{(10,2)j} - (\alpha^O_{(10,1)j}p_{(10,1)j} + \alpha^O_{(10,2)j}p_{(10,2)j})]$	$j = 1,...,9$	9	Demand for capital
	Zero pure profits			
(1.8)	$p_{(j1)} = \Sigma^9_{i=1}\Sigma^2_{s=1}p_{(is)}S^O_{(is)j} + p_{(10,1j}S^O_{(10,1)j} + p_{(10,2)j}S^O_{(10,2)j}$	$j = 1,...,9$	9	Zero pure profits in
(1.9)	$\pi_j = \Sigma^9_{i=1}\Sigma^2_{s=1}\ p_{(is)}S^I_{(is)j}$	j=1,...,9	9	Zero pure profits in capital creation
(1.10)	$p^*_{(i1)} + v_i + \phi = p_{(i1)}$	i=1,...,9	9	Zero pure profits in exporting
(1.11)	$p^*_{(i2)} + t_i + \phi = p_{(i2)}$	i=1,...,9	9	Zero pure profits in importing
	Market Clearing			
(1.12)	$x_{(i1)} = \Sigma^9_{j=1}\ x^O_{(i1)j}B^O_{(i1)j} + \Sigma^9_{j=1}\ x^I_{(i1)j}B^I_{(i1)j} + x^H_{(i1)}B^H_{(i1)} + x^E_{(i1)}B^E_{(i1)} + x^G_{(i1)}B^G_{(i1)}$	i=1,...,9	9	Demand equals supply for domestic goods
(1.13)	$l = \Sigma^9_{j=1}\ x^O_{(10,1)j}\ W^O_{(10,1)j}$		1	Demand equals employment of labour
(1.14)	$x^O_{(10,2)j} = k_j(0)$	j=1,...,9	9	Demand equals employment of capital

Table A.1 (continue)

No.	Equation	Subscript range	No.	Description
	Miscellaneous Equations			
(1.15)	$c = f_c + \Phi_1[\Sigma_{j=1}^{9}(p_{(10,1)j} + x^{O}_{(10,1)j})N_{(10,1)j}] + \Phi_2[\Sigma_{j=1}^{9}(p_{(10,2)j} + x^{O}_{(10,2)j})N_{(10,2)j}] + \Phi_3 t - \Phi_4 v$		1	Consumption function
(1.16)	$c_R = c - \xi^H$		1	Real aggregate consumption
(1.17)	$y_R = \Sigma_{j=1}^{9} W_j^I \; y_j$		1	Aggregate real investment
(1.18)	$k_j(1) = k_j(0)(1-G_j) - 100\Delta D_j G_j^* + y_j G_j$	j=1,...,9	9	Capital accumulation
(1.19)	$\xi^H = \Sigma_{i=1}^{9}\Sigma_{s=1}^{2} p_{(is)} W^H_{(is)}$		1	Consumer price index
(1.20)	$x_{(i2)} = \Sigma_{j=1}^{9} x^{O}_{(i2)} B^{O}_{(i2)} + \Sigma_{j=1}^{9} x^{I}_{(i2)j} B^{I}_{(i2)j} + x^{H}_{(i2)} B^{H}_{(i2)} + x^{G}_{(i2)} B^{G}_{(i2)}$	i=1,...,9	9	Import volume
(1.21)	$m = \Sigma_{i=1}^{9}(p^{*}_{(i2)} + x_{(i2)})M_{(i2)}$		1	Foreign currency value of imports
(1.22)	$e = \Sigma_{i=1}^{9}(p^{*}_{(i1)} + x^{E}_{(i1)})E_{(i1)}$		1	Foreign currency value of exports
(1.23)	$100\Delta B = (Ee - Mm)$		1	Balance of trade
(1.24)	$p_{(10,1)j} = \xi^H h + f_{(10,1)j} + f_{(10,1)}$	j=1,...,9	9	Flexible handling of wages
(1.25)	$t = \Sigma_{i=1}^{9}[\zeta_i^t t_i + p^{*}_{(i2)} + x_{(i2)} + \phi]T_i^t$		1	Aggregate tariff revenue
(1.26)	$v = \Sigma_{i=1}^{9}[\zeta_i^v v_i + p^{*}_{(i1)} + x^{E}_{(i1)} + \phi]T_i^v$		1	Aggregate export subsidies
(1.27)	$gdp = \Sigma_{i=1}^{9} V_j x_j$		1	Real gross domestic product
(1.28)	$f_R = c_R - y_R$		1	Ratio of real aggregate consumption to real investment
	Total		480	

TABLE A.2
VARIABLES OF THE MODEL IN PERCENTAGE CHANGE FORM

Variable	Subscript Range	Number	Description
x_j	$j = 1,...,9$	9	Industry outputs
$x^O_{(is)j}$	$i = 1,...,9$; $j = 1,...,9$; $s = 1,2$	162	Demands for inputs for current production
$x^O_{(10,1)j}$	$j = 1,...,9$	9	Industry demand for labour
$x^O_{(10,2)j}$	$j = 1,...,9$	9	Industry demand for capital
$x^I_{(is)j}$	$i = 1,...,9$; $j = 1,...,9$; $s = 1,2$	162	Demand for inputs for capital creation
y_j	$j = 1,...,9$	9	Sectoral capital formation
$x^H_{(is)}$	$i = 1,....,9$; $s = 1,2$	18	Household demand for domestic and imported goods
$x^E_{(i1)}$	$i = 1,...,9$	9	Export demands
$x^G_{(is)}$	$i = 1,...,9$; $s = 1,2$	18	Government demands
$p_{(is)}$	$i = 1,...,9$; $s = 1,2$	18	Price of good i from source s
$p_{(10,1)j}$	$j = 1,...,9$	9	Wage rate
$p_{(10,2)j}$	$j = 1,...,9$	9	Rental rate on capital
$p^*_{(i1)}$	$i = 1,...,9$	9	Foreign currency export prices (f.o.b.)
$p^*_{(i2)}$	$i = 1,...,9$	9	Foreign currency import prices (c.i.f.)
π_j	$j = 1,...,9$	9	Cost of units of capital
c		1	Nominal aggregate consumption
$f^E_{(i1)}$	$i = 1,...,9$	9	Export demand shift variable
$f^G_{(is)}$	$i = 1,...,9$; $s = 1,2$	18	Government demand shift variable
ϕ		1	Nominal exchange rate
v_i	$i = 1,...,9$	9	One plus the ad valorem export subsidies
t_i	$i = 1,...,9$	9	One plus the ad valorem tariffs
$k_j(0)$	$j = 1,...,9$	9	Employment of capital in each industry
$k_j(1)$	$j = 1,...,9$	9	Future capital stocks
$100\Delta D_j$	$j = 1,...,9$	9	Depreciation rate
c_R		1	Real aggregate consumption
y_R		1	Real aggregate investment
ξ^H		1	Consumer price index
$x_{(i2)}$	$i = 1,...,9$	9	Aggregate imports by commodity
l		1	Aggregate employment
ΔB		1	Balance of trade
e		1	Foreign currency value of exports
m		1	Foreign currency value of imports
$f_{(10,1)j}$	$j = 1,...,9$	9	Shift term for sectoral wages

TABLE A.2 (continue)

Variable	Subscript Range	Number	Description
$f_{(10,1)}$		1	Aggregate wage shift variable
gdp		1	Real gross domestic product
t		1	Aggregate tariff revenue
v		1	Aggregate export subsidy
f_c		1	Shift in the average propensity to consume
f_R		1	Ratio of real aggregate consumption to investment
Total variable		573	

TABLE A.3
COEFFICIENTS OF THE MODEL

Coefficient	Description
$\varepsilon_{(is)}$	Expenditure elasticities in household consumption for good i from source s
$\eta_{(is)(qr)}$	Own and cross price elasticities in household demands
γ_i	Reciprocals of the foreign demand elasticities for Australian exports of commodity i
$\alpha^O_{(ir)j}$	Share of commodity i from source r (domestic or imported) in industry j's purchases of i for current production
$\alpha^I_{(ir)j}$	Share of commodity i from source r (domestic or imported) in sector j's purchases of i for capital creation
$\alpha^O_{(10,1)j}$	Share of wages in total primary factor costs of industry j
$\alpha^O_{(10,2)j}$	Share of rentals in total primary factor costs of industry j
$S^O_{(is)j}$	Share of industry j's production costs represented by intermediate inputs good i from source s
$S^O_{(10,1)j}$	Share of industry j's production costs represented by labour inputs
$S^O_{(10,2)j}$	Share of industry j's production costs represented by capital inputs
$S^I_{(is)j}$	Share of industry j's investment costs represented by input i from source s
$B^O_{(i1)j}$	Share of the total sales of domestic good i absorbed by industry j as intermediate inputs
$B^I_{(i1)}$	Share of the total sales of domestic good i used in capital creation
$B^H_{(i1)}$	Share of the total sales of domestic good i used in household consumption
$B^E_{(i1)}$	Share of the total sales of domestic good i absorbed by exports
$B^G_{(i1)}$	Share of the total sales of domestic good i absorbed by the government demand
$W^O_{(10,1)j}$	Share of industry j in aggregate employment

TABLE A.3 (continue)

Coefficient	Description
W_j^I	Share of total investment accounted for by industry j
G_j	Ratio of gross investment to next period capital stock of sector j
G_j^*	Ratio of current capital stock to next-period capital stock of sector j
$W_{(is)}^H$	Expenditure weight of good i from source s in the consumer price index
$B_{(i2)j}^O$	Share of the total sales of imported good i absorbed by industry j as intermediate inputs
$B_{(i2)}^I$	Share of the total sales of imported good i absorbed by capital creation
$B_{(i2)}^H$	Share of the total sales of imported good i absorbed by household consumption
$B_{(i2)}^G$	Share of the total sales of imported good i absorbed by the government demand
$M_{(i2)}$	Share of total foreign currency costs accounted for by imported good i
$E_{(i1)}$	Share of total foreign currency export earnings accounted for by export good i
E	Aggregate foreign currency value of exports
M	Aggregate foreign currency value of imports
h	Wage indexation parameter
Φ_i	Share in domestic income accounted for by wage income, tariff revenue, export subsidies and capital income
$N_{(10,1)j}$	Share of industry j in total wage payments
$N_{(10,2)j}$	Share of industry j in total returns to capital
ζ_i^t	Ratio of the power of the tariff on good i to the ad valorem rate
T_i^t	Share of total tariff revenue accounted for by tariffs on good i
ζ_i^v	Ratio of the power of the export subsidy on good i to the ad valorem rate
T_i^v	Share of total export subsidies accounted for by export subsidies on good i
V_j	Share of sector j in GDP

TABLE A.4

VALUES OF EXOGENOUS VARIABLES (IN PERCENTAGE CHANGES)

Variable	Subscript Range	16.7% Export Tax on wool	20% tariff on imports
$p^{*}_{(i2)}$	i=1,...,9	0	0
t_i	i=1,...,9	0	20.0
v_i	i=2	-16.7	0
v_i	i=1,4	0	0
$x^{E}_{(i1)}$	i=3,5,6,....,9	0	0
$f^{E}_{(i1)}$	i-1,...,9	0	0
$k_j(0)$	j=1,...,9	0	0
$f^{G}_{(is)}$	i = 1,...,9 ; s = 1,2	0	0
$100\,\Delta D_j$	j=1,...,9	0	0
π_j	j=1,...,9	0	0
$f_{(10,1)j}$	j= 1,...,9	0	0
$f_{(10,1)}$		0	0
ϕ		0	0
f_c		0	0

Note: (1) Each simulation has 93 exogenous variables.

UNE Working Papers in Economics

1. Baldry, J.C. and Dollery, B.E. 1992. *Investment and Trade Sanctions against South Africa in a Model of Apartheid.*

2. Wallis, J.L. and Dollery B.E. 1993. *The Economics of Economics: a Model of Research Discourse.*

3. Schulze, D.L. 1993. *Financial Integration and Financial Development: A Conceptual Framework.*

4. Dollery, B.E. and Whitten, S. 1994. *An Empirical Analysis of Tariff Endogeneity in Australia, 1904-1978.*

5. Schulze, D.L. and Yong, Jong-Say. 1994. *Rational Expectations and Monetary Policy in Malaysia.*

6. Pullen, J.M. and Smith, G.O. 1994. *Major Douglas and the Banks.*

7. Pullen, J.M. 1994. *Toward a Mathematical Model of Malthus.*

8. Dollery, B.E. and Jackson, C. 1994. *A Note on Methodological Parallels Between Accounting and Economics.*

9. Anwar, S. and Shamsuddin, A.F.M. 1994. *Effects of Terms of Trade Changes in a Public Input Economy.*

10. Siriwardana, M. 1994. *Recovery from the 1930s Great Depression in Australia: a Policy Analysis Based on a CGE Model.*

11. Dollery, B.E. 1994. *Perspectives in Wolf's Theory of Nonmarket Failure.*

12. Harris, G. 1994. *Resolving the Productivity Puzzle: a Review of the Determinants of Research Productivity.*

13. Harris, G. 1994. *Research Performance Indicators in Australia's Higher Education.*

14. Gow, J. and Davidson, B. 1994. *A Public Choice Perspective on Agricultural Adjustment Assistance.*

15. Kaine, G. and Gow, J. 1994. *Supply Response in Grape Production to a Vine Pull Scheme.*

16. Gow, J. 1994. *An Empirical Investigation of Public Choice Theory: the Case of the Rural Adjustment Scheme.*

17. Siriwardana, M. 1994. *The Economic Impact of Tariffs of the 1930s Australia: the Brigden Report Re-examined.*

18. Taslim, M.A. 1995. *Saving-Investment Correlation and International Capital Mobility.*

19. Dollery, B. and Hamburger, P. 1995. *The Dunleavy and Niskanen Models of Bureaucracy: The Case of the Australian Federal Budget Sector 1982-92.*

20. Worthington, A.C. and Dollery, B.E. 1995. *Fiscal Federalism in Australia: Equity/Efficiency versus Public Choice Approaches in Explaining Intergovernmental Grants.*

21. Gow, J. 1996. *A Review of Drought Policy in Australia 1989-1995.*

22. Worthington, A.C. 1996. *Renters, Public Goods and Fiscal Outcomes.*

23. Wallis, J. and Dollery, B. 1996. *A Reappraisal of the Economics of Government*

24. Shamsuddin, A.F.M. 1996 *The Effect of Unionization on the Gender Earnings Gap in Canada: 1971-1981.*

25. Shamsuddin, A.F.M. 1996. *Labor Market Participation and Earnings of Female Immigrants in Canada.*

26. Anwar, S. and Shamsuddin, A.F.M. *Government Spending, Trade, Capital Mobility and Variable Returns in the Presence of Unemployment.*

27. Shamsuddin, A.F.M. and Holmes, R.A. 1996. *Cointegration Test of the Monetary Theory of Inflation and Forecasting Accuracy of the Invariate and Vector ARMA Models of Inflation.*

28. Dollery, B.E. and Worthington, A.C. 1996. *The Review Complexity Hypothesis: Issues of Variable Specification.*

29. Dollery, B. and Wallis, J. 1996. *Counteracting Agency Failure in the Public Sector Through Leadership.*

30. Dollery, B. and Fletcher, M. 1996. *Modelling Poverty Traps for Young Part-Time Workers in Australia.*

31. Barnes, N. and Dollery, B. 1996. *Section 94 of the NSW Environmental Planning and Assessment Act of 1979: Equity and Efficiency.*

32. Worthington, A.C. 1996. *Technical Efficiency in Property Finance Intermediaries: An Application Using the Australian Building Society Industry.*

33. Taslim, M.A. 1996. *Immigration, Saving and the Current Account.*

34. Holmes, R.A. and Shamsuddin, A.F.M. 1996. *Short and Long Term Effects of World Exposition 1986 on US Demand for British Columbia Tourism.*

35. Stewart, M. *Australian State and Local Government Spending & Taxing Over the Last 25 Years.*

36. Siriwardana, M. *Exchange Rate Policy and Market Power: A General Equilibrium Analysis for Singapore.*

37. Dollery, B. *South African Fiscal Federalism: An Economic Analysis of Revenue-Sharing Arrangements.*

38. Wallis, J.L. *Policy Conspiracies and Economic Reform Programs in Advanced Industrial Democracies: The Case of New Zealand.*

39. Gow, J. *Costs of Screening Bowel Cancer: A Case Study of Bowelscan.*

40. Treadgold, M.L. *Decomposing the Transformation of Malaysia's Real Resource Balance, 1982-1987.*

41. Siriwardana, M. *The Impact of the World Economic Recovery on a Small Open Economy: The Case of Singapore.*

42. Barnes, N. *How has income inequality in Australia changed?*