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# The Effects of Government Size on Economic Performance: A Quantitative Assessment of a Budget Reduction

## Abstract

A question featuring prominently in policy debates over the last few years is whether Australia can gain from having smaller government. Proponents have stressed beneficial impacts on the supply side of the economy; opponents have stressed the deflationary impact from possible reductions in demand. This article provides a quantitative assessment of this essentially empirical question, namely, whether supply or demand responses would dominate. It suggests that over the short term, demand contraction may be important. In the longer term, increased incentives can expand Australia's productive capacity, although incentives to work longer appear less important than incentives created for capital accumulation. But the longer term expansion may be crucially dependent on foreign investor acquiescence to increased involvement in the Australian economy.

## 1. Introduction

One of the issues in Australia's last federal election campaign was the size of government. The case for smaller government was put forward by a number of political and business groups. The arguments suggested that only with reductions in government spending and taxation, perhaps together with tax reform packages, could the government tiger be tamed, and Australia's future prosperity assured. These arguments tended to stress beneficial impacts on the supply side of the economy through incentives for private investors to expand the nation's capital base and for workers to work longer or harder.

Counterarguments were raised at the time concerning the possible deflationary impact of matched reductions in government spending and taxation. The counterarguments tended to point to demand factors which might contribute to this deflationary impact. It was pointed out that household demand tends to be more import intensive than government demand, so that a switch in demand away from government towards the household sector could reduce net export demand. Alternatively, some of the boost to household after-tax incomes

could be absorbed through higher saving rather than spending, leading to a reduction in net demand from domestic sources.

Would demand or supply responses dominate? This is at least partly an empirical question. It requires a quantitative assessment of the effects of matched reductions in government spending and taxation using a framework which incorporates reasonably realistic and policy relevant assumptions about both supply and demand responses in the economy.

This article provides a quantitative assessment using a framework that is rich in detail on the demands for various commodities by various categories of consumer or user. The framework also recognises that the output supply of the economy is a function of the availability of the primary factors of production, labour and fixed capital, and the way these are allocated across the different traded and non-traded sectors of the economy.

The quantitative assessment therefore encompasses both the macro-economic effects of a balanced budget reduction, and its implications for the performance of individual industries. The framework is a multisectoral general equilibrium model of the Australian economy – the ORANI model – which has been extended to contain government expenditures, taxes and transfers in a fully integrated set of government accounts, and to explain in some detail the factors influencing labour supply.<sup>1</sup>

<sup>1</sup> The views expressed in this article do not necessarily reflect those of the Industries Assistance Commission. An earlier version was presented to the 16th Conference of Economists, Surfers Paradise, 23-27 August 1987. I would like to thank David Vincent, Rob McDougall, Ross Chapman and Tony Meagher for helpful comments. Remaining errors are my own.

For brevity the article considers the impact of only one type of matched budget reduction, one which combines an across-the-board reduction in income tax rates (both personal and corporate) with an across-the-board reduction in government consumption spending. It does not examine the separate impact of different income tax reform options or changes in the tax or spending mix, though these can be readily examined with the extended ORANI framework.

The results suggest that in the short run, the type of balanced budget reduction considered here could be contractionary. The reason is that short-run factor supply responses tend to be limited. Additional capital takes time to install and existing capital is often industry specific and immobile. With real wage rigidity and slack labour markets, labour supplies may respond but they will tend to affect unemployment, with employment being demand determined. Under these conditions, the impact on income of a balanced budget reduction is dominated by the fall in net demand from both domestic and foreign sources.

The balanced budget reduction obviously hurts the public sector and related industries in the short term. Despite the fall in aggregate demand, the real exchange rate also appreciates because the relative demand switch towards the household sector causes the consumer price index (and hence indexed labour costs) to rise. Thus the balanced budget reduction also impacts adversely on the traded goods sectors in the short term.

Over the longer term, a balanced

budget reduction may increase income if it sets in motion forces to encourage investors to expand capital stocks or workers to work longer. The model helps to identify the channels through which these forces might work. The results suggest that the impact on labour supply is small. This is partly because real wage increases have offsetting effects on the participation decisions of those not in the workforce and the hours-of-work effort decisions of those employed, but it is mainly because work effort on both fronts drops off as real income increases.

More critical to the long term effects of a balanced budget reduction appears to be the response of the capital stock and the way it is financed. The matched reduction in government spending and taxation increases the after-tax rates of return to capital in at least some industries, through mechanisms that are explained in more detail shortly. In the 'base case' this attracts additional investment which, over the longer term, adds to capital stocks and to Australia's productive capacity.

Crucial to this base case is the assumption that foreign investors are willing to help finance the additional capital and increase their Australian involvement without requiring a quick pro quo in the form of a higher after-tax return. Capital can therefore be financed in the growth industries to the point where returns have fallen to their previous levels. The reason foreign involvement is required is because the domestic savings response appears to be insufficient to fully finance the additional capital domestically, given household behaviour

and the assumptions about the way that the balanced budget reduction is implemented. In terms of specific industry impacts, the balanced budget reduction continues to generate a small real appreciation in the longer term, under the base case of no adverse foreign reaction. The industries which continue to suffer are the public sector industries and some of the traditional export industries, including agriculture.

Both the expansion in income and the pattern of industry response can easily be reversed if the price for higher foreign involvement in the Australian economy is a higher after-tax rate of return. An alternative scenario is examined for comparison purposes, although it is not intended to represent a best guess of what foreign investor reaction would be in such circumstances. These model results indicate that a 10 per cent increase in required after-tax rates of return would be more than sufficient to reverse the base case results.

Overall, the results suggest that demand contractions may be of policy relevance in the short term. Matched reductions in government spending and taxation may therefore produce a short-term decline in national income. Over the longer term, increased incentives may expand Australia's productive base, although incentives to work longer appear to be less important than the incentives created for capital accumulation. However, any longer term expansion may be crucially dependent on foreign investor acquiescence to their increased involvement in the Australian economy.

**2. A Framework for Quantitative Assessment of Matched Reductions in Government Spending and Taxation**

The framework for the quantitative assessment is the ORANI model of the Australian economy which has been extended in several ways. The standard ORANI model is a comparative static general equilibrium model which contains sets of equations to explain factor demands by industry and final demands for commodities by various categories of user. It also involves market clearing conditions and zero pure profits, the latter incorporating the assumption of perfect competition in each industry.

**2.1 Fiscal Extension**

The standard ORANI model incorporates the various government revenues derived from taxes on commodity flows, as well as government expenditures on commodity flows. It does not contain the transfer components of the government accounts - income taxes and transfer payments.

The fiscal extension introduces income taxes and transfer payments and combines all government expenditures, taxes and transfers into an integrated set of accounts. Figure 1 shows the government sector's accounting framework, along with a brief description of how the extensions are modelled.<sup>2</sup>

One feature of the revenue side is

that provision has been made for progressivity in direct taxes on labour income. These taxes correspond closely to the concept of personal income taxes, the difference being that for the self-employed they cover the taxes on an imputed return to labour

rather than on all business income. A feature of the expenditure side is that total spending on unemployment benefits or means-tested transfers depends on the number of people unemployed or not in the workforce. In practice, most wage earners gener-

**Figure 1 Government Accounts in the Fiscal Extension**

Government revenue		Government expenditure	
1. Direct taxes on labour income (by occupation and industry, progressive, can be indexed or unindexed, levied on gross labour earnings)		1. Consumption expenditure (from standard ORANI)	
2. Direct taxes on non-labour income (by industry, proportional, levied on gross operating surplus net of depreciation and investment allowances)		2. Investment expenditure (a fixed share of the total investment from standard ORANI)	
3. Payroll taxes (by industry, levied on wage bills)		3. Unemployment benefits (paid to unemployed)	
4. Property taxes (that is, rates, land tax) (by industry, levied on capital values)		4. Means-tested transfers (paid to those not in workforce)	
5. Commodity taxes on intermediate inputs, inputs to capital creation household consumption, exports, imports (from standard ORANI)		5. Non-means-tested transfers (paid to everyone)	
6. Other indirect taxes (from standard ORANI)		6. 'Other' outlays (linked to movements in nominal GDP)	
7. 'Other' revenue (linked to movements in nominal GDP)			
<b>Total government revenue</b>		<b>Total government expenditure</b>	

<sup>2</sup> An important precursor to this fiscal extension is Meagher and Parmentier (1985).

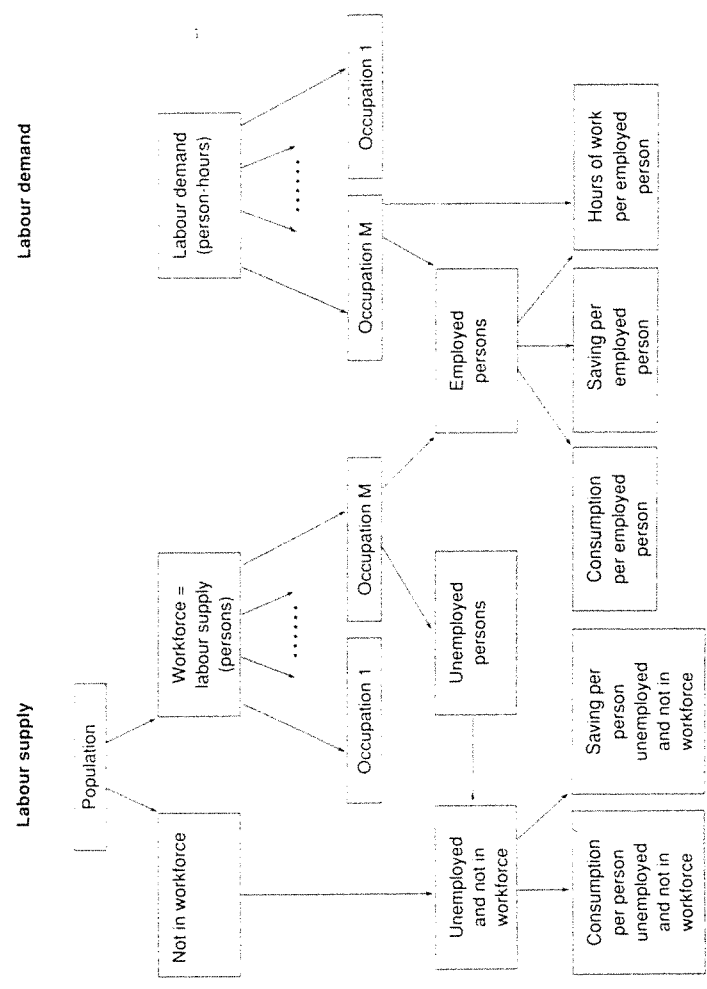
ally earn sufficient to exclude them from means-tested benefits and only about 5 per cent of these benefits are paid to those who are employed.

**2.2 Labour Market Module**

The extended model contains a labour market module which, among other things, helps to explain the number of people in each employ-

ment status category. The structure of the labour module is shown schematically in Figure 2. The labour supply decision process is shown on the left hand side and is modelled in three stages. First, there is the decision whether or not to participate. Much of the work in this area has stressed the longer term demographic influences on labour force participation and family for-

**Figure 2 Labour Market Module**



worker effect). The elasticities are based on estimates made for various demographic groups in Australia.<sup>3</sup>

For those who decide to enter the workforce, there is the decision of which occupation to pursue. Empirical work by Powell *et al.* (1984) suggests that transformation prospects are relatively limited.

Finally, for those who find a job in their chosen occupation, there is the decision of how many hours of work per year to offer. This is modelled as occurring together with consumption, saving and leisure decisions in an interrelated framework. Consumption, saving and hours worked all depend on real after-tax wages and real disposable non-wage income. An hourly wage rate rather than an annual wage income variable is used because in this choice framework, the number of hours per year to work is not a given.

Elasticities for hours of work are taken from estimates by Tulpué (1980). These estimates suggest that hours fall with increases in real wages or with real disposable non-wage income as Australian workers pursue more leisure. Note that the wage effect here is the opposite of its effect on participation rates.

This choice framework also determines the aggregate consumption of the employed. Those unemployed or not in the workforce do not have the choice of how many hours to work but still choose their consumption and saving, based on their disposable non-wage income. In the absence of empirical work it is assumed

3 A survey is contained in Kerrison (1986).

that this group consumes all its income.<sup>4</sup> Aggregate household consumption in the economy is the sum of consumption by the employed and others.

On the labour demand side, each industry fills its required number of person-hours by choosing among the different occupations to minimise total labour costs. This aspect of the labour demand choice is part of the standard ORANI model. The labour market module assumes that industries are indifferent as to whether additional person-hours are filled by additional workers or by additional hours provided by the existing workforce.

All employed workers can work their desired number of hours per year (the module abstracts from the possibility of under-employment or unfilled overtime). Any mismatch between the supply and demand for person-hours in the face of real wage rigidity, for example, appears as a mismatch for persons.

### 2.3 Foreign Investment

Aggregate investment, whether financed domestically or by foreigners, is allocated among industries according

4 McAleer *et al.* (1979) make a similar but slightly weaker assumption, namely, that the unemployed have a marginal propensity to consume of unity. Williams (1980) assumes that the average propensity to consume of pensioners is about half-way between unity and the national average. The different assumptions reflect paucity of information, but are consistent in assuming that those not in the workforce will save less than those working.

to after-tax rates of return. In the longer term, the total volume of investment increases with the size of industry capital stocks.<sup>5</sup>

With household savings determined as part of the labour module and government savings determined in the fiscal extension, the national income accounting identity determines how much investment is financed by foreign saving. The behaviour of foreign investors is not modelled explicitly but if it were, it would have a direct bearing on the required after-tax rates of return on capital in the longer term. Currently this is normally imposed on the model by assumption.

One aspect of foreign investment is modelled explicitly, however. It is recognised that because foreigners already have a stake in some of Australia's capital stock, some portion of the after-tax return to capital is repatriated overseas. The disposable non-wage income which affects the consumption, savings and labour supply decisions of Australian households is net of that portion of the returns to capital accruing to foreigners.

In aggregate, real GNP (rather than GDP) also measures the total income accruing to Australians. The model also allows the foreign ownership share of Australian capital to change over time as foreigners finance additions to the capital stock.<sup>6</sup>

5 The form of the investment function is the same as in standard ORANI, but incorporates after-tax returns rather than before-tax returns.

6 These equations are taken, with minor modification, from Horridge (1985).

### 2.4 The Full Model

The full model contains many more variables than equations. This provides the flexibility to model different scenarios according to which variables are designated exogenous. The details of the short-run and long-run scenarios are described shortly along with the results.

The equations of the full model were implemented and solved using the GEMPACK general purpose software system for computational general equilibrium models (Pearson 1986). The process of solving the linear equations used the Hanwell sparse matrix code (Dulf 1977).

### 3. The Short-Term Effects of Matched Reductions in Government Spending and Taxation

The matched reductions examined in this and the following section comprise an across-the-board cut in both personal and corporate taxation, together with a cut in government consumption spending of an initially equal magnitude.<sup>7</sup> The crucial assumptions behind the projected short-run effects are:

- nominal pre-tax wages are fully indexed to the consumer price index, so that real wages are constant and variations in labour demand produce variations in the number of

7 The term 'initial' here refers to first-round effects, before induced general equilibrium effects are taken into account.

persons unemployed as well as numbers employed.

- although investment takes place, it does not add to usable industry capital stocks which are assumed to be fixed.

• aggregate real investment is itself held constant. The model does not have an explanation of short-run variations in its total volume. However, the allocation of this fixed real investment across industries occurs in response to after-tax rates of return.

• the progressive income tax schedule on labour income is indexed, so that the tax rates change only with real rather than nominal changes in labour income. This can be regarded as one element of tax reform that has been incorporated into the analysis.<sup>8</sup>

- changes in real competitiveness can be gauged by changes in the consumer price index, since this reflects movements in domestic relative to foreign prices.

The projected short-run macroeconomic effects of matched reductions

8 Were income taxes not indexed, the model would not be homogeneous of degree zero in the nominal exchange rate and domestic prices. Some explanation would then be required for the way in which changes in competitiveness are divided between changes in the nominal exchange rate and domestic prices in these results: the nominal exchange rate serves as numeraire.

in government spending and taxation are shown in the first three columns of Table 1. The short-run effects on the government budget are shown in the first three columns of Table 2 and the effects on industry performance in the first three columns of Table 3.

Table 1 shows that with a cut in government spending, the real income generated in Australia (measured by GDP) is projected to be 0.76 per cent lower than otherwise in the short term, believed to be after about two years (row 1, column 2). With a cut in income taxation, the real income generated in Australia is projected to be very slightly higher than otherwise in the short term (row 1, column 1). The positive impact of the tax cut is smaller than the negative impact of the government spending cut, so that the net effect of a matched budget reduction is projected to be a real income result 0.74 per cent lower than otherwise after about two years. That is, because the model is linear in percentage changes, the net effect in column 3 can be obtained by adding the results in columns 1 and 2.

### 3.1 Short-Term Effects of Income Tax Reduction

The cut in income taxes (column 1) produces the expected positive impact on private consumption (row 3), because it directly increases both real after-tax wages (row 19) and the real after-tax non-wage factor income of Australians (row 20). The latter measure is gross operating surplus less depreciation, taxes and profits paid to foreign owners.

The increases in real disposable non-wage income are more modest,

Table 1 The Short-Term and Long-Term Effects of Matched Reductions in Government Spending and Taxation on Macro Aggregates (Percentage Changes)

Macro aggregates	Short run (1) (2)		Long run (3) (4)		Short run (5) (6)		Long run (7) (8)	
	\$1 billion initial drop in income tax	Net effect (1) + (2)	\$1 billion initial drop in income tax	Net effect (3) + (4)	\$1 billion initial drop in government consumption	Net effect (5) + (6)	\$1 billion initial drop in income tax and 10 per cent increase in government consumption	Net effect (7) + (8)
1 Real GDP	0.02	-0.76	0.48	-0.74	0.23	0.71	-1.60	-1.37
2 Real GNP	0.02	-0.79	0.25	-0.77	0.28	0.53	-1.30	-1.02
3 Real private consumption	0.93	0.34	1.13	0.07	1.20	0.08	0.07	0.15
4 Real investment	0.00	0.00	3.22	0.00	4.20	0.00	6.18	-5.18
5 Real government consumption	0.00	-5.96	0.00	-5.96	-5.96	0.00	-5.96	-5.96
6 Real exports	-2.12	1.55	-3.81	4.79	0.98	4.79	-2.22	2.57
7 Real imports	0.87	-0.96	1.76	-0.76	1.03	-0.73	-1.18	-1.91
8 Trade balance/GDP ratio	-0.47	0.39	-0.87	0.86	-0.01	0.86	0.71	0.66
9 Employment (person hours)	0.06	-1.10	-0.14	-0.08	-0.22	-0.18	-0.08	-0.26
10 Real long run fixed capital stock	0.00	0.00	2.05	0.78	2.63	0.78	5.46	-4.68
11 Real domestic private and government saving	-2.09	1.74	-1.53	5.30	3.77	6.20	-6.20	-0.90
12 Local ownership share of capital stock	0.00	0.00	-2.62	1.07	-1.55	3.35	0.00	4.42
13 Population	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 Persons not in workforce	0.00	0.25	-0.06	0.06	-0.00	0.06	0.06	0.26
15 Persons in workforce	0.00	-0.14	0.03	-0.03	0.00	-0.12	-0.03	0.15
16 Persons employed	0.09	-1.05	0.03	-0.03	0.00	-0.13	-0.03	-0.16
17 Persons unemployed	-1.37	13.45	0.00	0.00	0.00	0.00	0.00	0.00
18 Real before tax wage	0.00	0.00	0.72	-0.30	0.42	-1.86	-0.30	-2.16
19 Average real after tax wage	1.42	0.01	1.43	1.96	-0.21	1.75	-0.00	-0.21
20 Real disposable non wage factor income	1.29	-0.36	0.99	1.12	2.11	0.69	1.12	1.81
21 Real disposable non wage income - of employed	1.17	-0.31	0.86	1.01	1.89	0.66	1.01	1.67
22 Real disposable non wage income - of others	0.25	1.36	0.24	0.35	0.59	0.39	0.35	0.74
23 Real consumption - of employed	1.18	-0.94	0.23	-0.03	1.41	-0.02	-0.03	-0.05
24 Real consumption - of others	0.25	1.36	0.24	0.35	0.59	0.39	0.35	0.74
25 Consumer price index	1.42	-0.91	0.51	0.73	-0.56	0.07	0.85	0.19
26 Investment price index	0.80	-0.56	0.24	0.63	-0.55	0.08	-0.01	0.36
27 Government consumption price index	1.28	-0.99	1.12	-0.82	0.30	-0.43	-0.82	-1.25
28 Export price index	0.47	-0.34	0.13	0.58	-0.61	-0.03	0.18	-0.43
29 Import price index	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30 GDP deflator	1.36	-0.92	0.44	0.90	-0.78	0.12	0.46	0.32
31 Total government expenditure price index	1.25	-0.89	0.36	0.93	-0.74	0.19	0.05	-0.68

Notes: (a) Represents 3.06 per cent reduction in 1978-79 base year revenue.  
(b) Represents 2.63 per cent reduction in 1978-79 base year expenditure.  
(c) Held fixed by assumption.

Table 2 The Short-Term and Long-Term Effects of Matched Reductions in Government Spending and Taxation on Real Fiscal Aggregates

Real fiscal aggregates	Short run (1) (2)		Long run (3) (4)		Short run (5) (6)		Long run (7) (8)	
	\$1 billion initial drop in income tax	Net effect (1) + (2)	\$1 billion initial drop in income tax	Net effect (3) + (4)	\$1 billion initial drop in government consumption	Net effect (5) + (6)	\$1 billion initial drop in income tax and 10 per cent increase in government consumption	Net effect (7) + (8)
1 Taxes on labour income	-6.35	-1.39	-7.74	-6.02	-0.87	-10.02	-0.87	-10.89
2 Taxes on non-labour income	-6.95	0.01	-6.94	-5.11	1.63	-7.53	1.63	-5.90
3 Payroll tax	-0.48	0.07	-0.41	1.05	1.12	-1.85	1.12	-0.74
4 Property tax (rates and land tax)	-0.37	0.28	-0.09	1.91	0.09	-3.91	0.09	-3.82
5 Commodity taxes on intermediate inputs	-0.88	0.31	-0.57	1.06	0.74	-1.11	1.06	-0.05
6 Inputs to investment household consumption	-0.69	0.51	-0.18	4.09	3.49	-6.36	3.49	-5.02
7 Export taxes	-0.57	-0.06	-0.63	0.78	0.22	0.60	0.22	0.82
8 Import duties	-2.41	1.82	-0.59	-4.93	7.19	-2.26	-4.93	7.19
9 Other direct taxes	0.10	-0.26	-0.16	1.59	2.26	-4.67	1.59	2.52
0 Other revenue	0.42	-0.55	-0.13	0.52	0.37	-0.89	0.37	-0.90
1 Total government revenue	0.13	-0.79	-0.66	0.19	0.65	-1.20	0.19	-1.01
2 Total government expenditure	-3.19	-0.59	-3.78	-2.31	-2.31	-5.14	-2.31	-4.85
3 Real expenditures								
4 Government consumption	0.00	-5.96	-5.96	-5.96	-5.96	0.00	-5.96	-5.96
5 Government investment	0.00	0.00	0.00	4.22	1.00	-6.18	1.00	-5.18
6 Unemployment benefits	-1.37	13.45	12.08	0.00	0.00	0.00	0.00	0.00
7 Other transfers -- means tested	0.00	0.25	0.25	-0.06	0.06	0.22	0.06	0.28
8 Other transfers -- non means tested	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 Other outlays	0.13	-0.79	0.66	0.65	0.19	-1.20	0.19	-1.01
10 Total government expenditure	-0.06	-2.34	2.40	-2.37	-2.37	-1.43	-2.37	-3.80
11 Budget outcome (\$billion)								
12 Real public sector borrowing requirement	1.021	-0.698	0.323	1.079	-0.964	1.137	-0.964	0.173
13 Real government deficit on current account	1.059	-0.726	0.333	0.849	-1.059	1.633	-1.059	0.574

Notes: (a) All results are expressed in percentage changes, except for the real public sector borrowing requirement and government deficit on current account, which are absolute changes in billions of 1978-79 base year dollars.  
(b) Represents 3.06 per cent reduction in 1978-79 base year revenue.  
(c) Represents 2.63 per cent reduction in 1978-79 base year expenditure.  
(d) Held fixed by assumption.

Table 3 The Short-Term and Long-Term Effects of Matched Reductions in Government Spending and Taxation on Industry Performance (Percentage Changes)

Industry	Short run (1)-(3)			Long run (4)-(6)			Long run (7)-(9)		
	\$1 billion initial drop in government consumption	Net effect (1)-(2)	Net effect (3)-(1)	\$1 billion initial drop in government consumption	Net effect (4)-(5)	Net effect (6)-(4)	\$1 billion initial drop in government consumption	Net effect (7)-(8)	Net effect (9)-(7)
1. Agriculture	0.62	0.20	0.42	2.47	0.32	2.15	0.03	2.18	2.18
2. Mining	0.96	0.32	0.64	-1.63	5.37	7.00	8.26	7.00	-1.26
3. Meat products, sugar	2.25	0.80	1.45	-3.29	-0.27	3.02	0.15	3.17	3.17
4. Other food products	0.38	0.18	0.20	0.35	0.50	0.15	0.15	0.30	0.30
5. Wool scouring	0.81	0.27	0.54	-1.17	1.06	1.06	-0.05	1.01	1.01
6. Textiles, clothing footwear	0.46	0.18	0.28	0.15	0.47	0.47	-0.09	0.38	0.38
7. Wood, paper, other products	0.11	0.34	0.23	0.72	1.07	0.35	-1.56	1.21	1.21
8. Chemicals	0.46	0.52	0.06	0.09	0.73	0.64	-1.11	0.64	-0.47
9. Petroleum, coal products	0.41	0.38	0.03	0.45	0.65	0.65	-1.07	0.65	-0.42
10. Basic metals, minerals	1.83	1.19	0.64	-0.35	2.83	2.83	-3.77	2.83	-0.94
11. Motor vehicles	0.81	0.60	0.21	0.53	1.97	1.44	-1.74	1.44	-0.30
12. Other machinery equipment	0.62	0.20	0.42	1.69	0.76	2.45	3.40	0.76	-2.64
13. Electricity, water, gas	0.17	0.52	0.35	0.57	0.84	0.27	-1.39	0.27	-1.12
14. Residential building	0.00	0.00	0.00	3.10	0.92	4.02	-5.87	0.92	-4.95
15. Other construction	0.03	0.12	0.09	0.00	0.88	0.88	-3.87	0.88	-4.99
16. Public administration, defence	0.02	5.51	5.49	0.06	5.38	5.44	-0.09	5.38	-0.04
17. Health, education, welfare	0.42	4.25	3.83	-0.42	-3.68	-4.02	0.37	-3.68	-3.65
18. Transport services	0.16	0.16	0.00	0.34	0.81	0.81	-1.44	0.81	-0.63
19. Other services	0.42	0.54	0.12	0.76	0.19	0.95	-0.76	0.19	-0.57
20. Ownership of dwellings	0.00	0.00	0.00	1.91	2.07	0.16	-2.81	0.16	-2.65
						Real capital stocks			
1. Agriculture	5.12	5.18	0.00	1.80	0.80	2.60	4.13	2.60	-1.53
2. Mining	3.65	5.76	2.05	0.16	6.87	6.71	-10.29	6.71	-3.56
3. Meat products, sugar	11.37	12.28	0.79	0.54	2.53	2.53	-3.08	2.53	-0.55
4. Other food products	7.67	-1.92	5.78	3.00	-0.27	2.73	-3.79	-0.27	-4.06
5. Wool scouring	2.28	5.59	3.26	1.04	0.55	1.59	-2.48	0.55	-1.93
6. Textiles, clothing footwear	3.44	0.22	3.65	2.77	0.10	2.67	-3.53	0.10	-3.63
7. Wood, paper, other products	5.04	-3.02	2.02	3.65	-0.15	3.50	-5.59	-0.15	-5.74
8. Chemicals	7.29	2.51	4.77	4.32	4.48	4.48	-3.52	0.16	-3.36
9. Petroleum, coal products	7.61	-4.04	3.60	2.59	2.88	2.88	-4.81	0.29	-4.52
10. Basic metals, minerals	-7.08	8.16	0.99	2.59	4.94	2.35	-6.90	2.35	-4.55
11. Motor vehicles	0.73	4.72	5.41	3.54	0.87	4.41	-7.46	0.87	-3.48
12. Other machinery equipment	6.33	-2.10	4.24	5.16	4.40	4.40	-7.46	0.24	-7.22
13. Electricity, water, gas	1.96	-3.63	-1.65	1.09	0.06	1.15	-6.17	0.06	-6.11
14. Residential building	2.88	-0.60	2.29	5.26	0.43	5.69	-12.41	0.43	-11.98
15. Other construction	3.12	1.31	1.82	5.12	0.35	5.47	-11.94	0.35	-11.59
16. Public administration, defence	0.68	-15.58	-14.90	0.90	-5.79	-4.89	-10.55	-5.79	-16.34
17. Health, education, welfare	5.95	-17.75	-11.78	3.71	-4.40	-0.69	-5.85	-4.40	-10.22
18. Transport services	1.52	-2.64	-1.12	1.58	0.36	1.94	-7.61	0.36	-7.25
19. Other services	4.96	-2.95	2.03	2.82	2.68	-0.14	-6.48	-0.14	-6.62
20. Ownership of dwellings	5.33	-1.90	3.47	1.91	2.07	0.16	-2.81	0.16	-2.65

Notes: (a) Represents 3.06 per cent reduction in 1978-79 base year revenue.

(b) Represents 2.63 per cent reduction in 1978-79 base year expenditure.

(c) These are export oriented industries.

both for the employed and for others (rows 21 and 22). This measure includes both non-wage factor income and transfer payments and the latter are assumed to be kept constant in real per capita terms. The increase in total disposable non-wage income is particularly modest for the unemployed and those not in the workforce because a major proportion of their income comes from transfers rather than post-tax profits.

The unemployed and those not in the workforce consume all of their increased income (row 24), while the consumption of the employed (row 23) reflects both their non-wage income and their after-tax wage rates. According to the elasticity estimates of Tulpulé (1980), however, their consumption is more responsive to real wage rates than to changes in non-wage income:

$$\begin{aligned} & \Delta \text{consumption of employed} \\ & = \Delta \text{number of employed (line 16)} \\ & + 0.1361 (\Delta \text{real per capita} \\ & \text{disposable non-wage income of} \\ & \text{employed}) \\ & + 0.6612 (\Delta \text{real hourly after-tax} \\ & \text{wage rate}) \\ & = 0.09 + 0.1361(1.17 - 0.09) + \\ & 0.6612(1.42) \\ & = 1.18. \end{aligned}$$

Although private consumption demand grows with the income tax cut, net export demand suffers. This is because the increased demand by households puts upward pressure on the consumer price index (row 25). This increases the cost of material inputs and labour, especially given that gross wages are fully indexed to the consumer price index. The conse-

quent erosion in the competitiveness of Australia's traditional exporters and import-competing industries is reflected in the deterioration in the trade balance (row 8). It is also reflected in the industry output results in the first column of Table 3. Output falls for traditional export industries and for many of the import-competing manufacturing industries. Overall, demand for Australian final output (also measured by GDP) grows very modestly.

The reason that demand responses dominate the overall results of an income tax cut is because in the short term, the supply response is relatively small. Industry capital stocks have not yet had time to adjust to changes in real after-tax rates of return (Table 1, row 10). The first column of Table 3 shows that after-tax returns increase for many of the non-traded sectors, and for some of those manufacturing industries which shed labour to reduce output.

In aggregate, however, the number of employed persons increases (row 16). This is partly because of the increased demand, especially in service industries which are relatively labour intensive. It is also because with higher real after-tax wages and after-tax non-wage incomes, existing workers choose to work fewer hours:

$$\begin{aligned} & \Delta \text{hours per employed person} \\ & = -0.0620 (\Delta \text{real per capita} \\ & \text{disposable non-wage income of} \\ & \text{employed}) \\ & - 0.0633 (\Delta \text{real hourly after-tax} \\ & \text{wage rate}) \\ & = -0.0620(1.17 - 0.09) - 0.0633(1.42) \\ & = -0.15. \end{aligned}$$

This is why person-hours (row 9) of employed persons increases (row 16). This is partly because of the increased demand, especially in service industries which are relatively labour intensive. It is also because with higher real after-tax wages and after-tax non-wage incomes, existing workers choose to work fewer hours:

The first column of Table 2 shows that the first-round reduction in income tax has uncompensated elasticities. The compensated wage elasticities normally used in partial equilibrium welfare measurement exercises would be larger (in absolute terms).

The measure of non-wage income used in the computation of participation responses is an estimate for persons aged 55 and over, reflecting their mix of non-wage income and transfers. Preliminary estimations in Kerrison (1986) suggested that re-employment decisions are the important participation decisions at the margin over a two-year horizon.

come tax rates induces further adjustment in income tax and commodity tax revenues as these respond to changing activity levels. The expenditure results show how total unemployment benefits and means-tested benefit payments (Table 2, rows 13 and 14) change with the number of persons unemployed or not in the workforce (Table 1, rows 14 and 17). Overall, the income tax reduction would lead to a real increase of \$1.021 billion in the 1978-79 base year's public sector borrowing requirement (Table 2, row 18).<sup>11</sup>

**3.2 Short-Term Effects of Government Spending Reduction**

The second columns of Tables 1 to 3 show the effects of an across-the-board reduction in government consumption spending equal to the first-round income tax cut of column 1. At the macro level, the reduction in government demand reduces national income (Table 1, row 1). The government reduction is reinforced by a fall in household demand (Table 1, row 3). This is produced by falling profits and non-wage incomes, especially from the service industries (Table 1, row 20 and Table 3). The fall in private household and government demands puts downward pressure on the consumer price index (Table 1, row 25). This improvement in competitiveness subsequently helps

to increase net exports and provides some offsetting effect on demand. The output performance of the export industries is enhanced by the improvement in competitiveness (Table 3). Some import-competing industries such as motor vehicles also gain from the fall in domestic production costs. The public service industries (public administration, health, education and welfare) decline following the spending cut. Other industries such as wood and paper which are important suppliers to the public sector also decline.

On the supply side, the important feature to note is the large increase in the number of persons unemployed following the government spending cut. The public sector industries are important employers so that a given cut in government spending releases a significant number of people. They do not find alternative employment in the short run, especially given the squeeze on alternative job prospects produced by the fall in private consumption and the fact that real wages are fixed. The increase in the number of unemployed discourages some job seekers, persuading them to leave the workforce (Table 1, rows 14 and 15). Nevertheless, since employment also falls with the decrease in aggregate demand a substantial number of people remain unemployed.

In terms of its effects on the government budget (Table 2), the cut in spending on goods and services translates to a reduction in total expenditure, but not by as much since unemployment benefits increase. Total real tax revenue falls slightly because of the reduction in economic activity. Overall, the real public sec-

ing cuts, the consumer price index increases relatively more strongly than other indices. Since this is the index to which nominal wages are tied in the short term, the feedback effects on wage costs exacerbate the price growth.

The small net increase in domestic relative to world prices as shown by the consumer price index indicates an appreciation of the real exchange rate. Thus the industry impact of a balanced budget reduction in the short term is not only a reduction in activity in the public sector and related industries, but also a net reduction in output for the traded goods sectors.

The contraction of social services industries and the large rise in unemployment may be mitigated if, as public funding of health or education declined, these services came to be provided by the private sector. The model ignores any direct dependence between the allocation of private sector spending and the type or level of goods and services provided by government. However, private provision and purchase of social services may increasingly occur. A switch in private sector spending towards more labour-intensive activities would moderate the short-term rise in unemployment following the government budget reduction, although no attempt has been made to quantify this effect.

An agreement to trade the real post-tax wage increases for pre-tax reductions could also offset the short-term contractionary impact of a budget reduction. Lower pre-tax labour costs would improve competitiveness, while real post-tax labour incomes would be insulated because

of the income tax reductions. Additional simulations, not reported here, indicate that a 1.29 per cent reduction in real pre-tax wages would be sufficient to reverse the short term decline in GDP, while still allowing a 0.43 per cent rise in real post-tax wages.

**4. The Long-Term Effects of Matched Reductions in Government Spending and Taxation**

The second three columns of Tables 1 to 3 give the projected long-term macroeconomic, fiscal and industry effects of matched reductions in government spending and taxation. The crucial assumptions underlying these 'base case' projections are:

- real wages are flexible, and adjust to prevent the number of unemployed people from rising relative to the population. It is therefore assumed that over the long term, the 12 per cent net increase in the number of unemployed that occurred in the short run would not be sustained. Real wages fall, but are assumed to fall equiproportionally across all occupations and industries, to keep unemployment at its natural rate.
- a sufficient period of time has elapsed for investment to have added to industry capital stocks. In the base case it is assumed that capital is accumulated (or decumulated) in each industry by the amount required to keep after-tax rates of return at the levels they would have had in the absence of

the budget changes. For the purpose of matching savings behaviour in the interim to changes in the ownership of the new capital stock, the length of this longer term horizon is assumed to be ten years.<sup>12</sup>

- although in the short term the total volume of real investment was assumed to be fixed, in the long term it is assumed this volume will change as the size of industry capital stocks increases or decreases, in order to cover the depreciation on these new stocks. In the long term, industry investment grows in line with industry capital stocks and after-tax returns are held fixed.
- as in the short run, progressive personal income taxes are assumed to be indexed.

The main differences between the long-term and short-term projections are the different assumptions about the availability of primary factors. Capital is no longer fixed while unemployment is prevented from increasing.

**4.1 Long-Term Effects of Income Tax Reduction**

A reduction in personal and corporate income taxation expands national income by more in this long-run scenario than in the earlier short-run scenario (Tables 1 to 3, column 4). Private consumption demand still increases as after-tax wages and after-tax non-

13 See Horridge (1985).

12

The general conclusions relating to prices and incomes are not dependent on the assumption that the tax and spending cuts are equal ex ante rather than ex post. The interested reader can verify that when the results in the income tax column are rescaled by a factor of (0.698/1.021) to produce an ex post effect on the real PSBR of equal but opposite magnitude to the ex post effect of the spending cut, the net effects of the combined, PSBR neutral cuts on both real GDP and the consumer price index are the same as reported here.



wage incomes rise. The wage rise attracts more people into the workforce, although rising non-wage incomes induce existing workers to work fewer hours. The net effect on labour supply is that although more people are employed, fewer person-hours are supplied.

The more important source of expansion in industry output is the expansion in capital stocks that the upward pressure on after-tax returns generally attract (Table 3, column 4). The aggregate capital stock expands (Table 1, row 10) but domestic saving by the government and private sector declines (Table 1, row 11). Part of the reason for the saving decline is the increase in the government budget deficit on current account (Table 2, column 4).

The fall in the local ownership share of the capital stock (Table 1, row 12) indicates that domestic saving is insufficient to fully finance the increase in domestic capital. Real investment grows (Table 1, row 4) to maintain higher capital stocks, and this provides an additional source of demand to reinforce higher private consumption and sustain higher income.

Increased private consumption and investment demand puts upward pressure on prices, so the competitiveness of Australia's traditional export industries suffers in the long term, as did in the short term, in the face of the income tax cut. Fewer import-competing industries suffer, however, because those which supply investment goods are helped by the long-term increase in investment. Note that government investment is assumed to increase in line with private invest-

ment in the longer term, an assumption which may not be warranted. While the resulting government investment spending has some influence on the long-term projections for total real government spending and the real public sector borrowing requirement, its contribution to the expansion in aggregate demand is small since investment by general government (excluding that by public enterprises) is initially only about 15 per cent of total investment, which in turn only about 20 per cent of GDP.

**4.2 Long-Term Effects of Government Spending Reduction**

The fifth column of Tables 1 to 3 shows the long-term projected results of the cut in government consumption spending. This column highlights the main difference between the short-term and long-term effects of a balanced budget reduction. Where the cut in government spending reduces national income in the short term, it expands national income in the long term.

One major source of this difference lies in the behaviour of the labour market. Upward pressure on unemployment is assumed to lead to a real wage reduction in the long term. Because the public sector industries are relatively labour intensive, both a real wage cut and an increase in the capital stocks of other industries are required to ensure that the workers released by the public sector are absorbed elsewhere. In terms of person-hours, however, employment actually falls. The main contribution of the labour market to the output expansion

tion, therefore, is not an increase in labour supply but the reduction in the real wage and the boost this gives to profits and competitiveness. However, the real wage reduction would be moderated if there were a switch towards private provision of social services, and a corresponding transfer of spending towards these labour-intensive activities.

The long-term increase in capital stocks, particularly in the export sectors, is in turn encouraged by upward pressure on their after-tax returns. This is itself a product of the downward movement in prices and the consequent improvement in the competitive position of these sectors. Over the long term, this increase in competitiveness is assisted by the fall in real wages. The growth in capital and output of these industries in the long term is substantial, although the position of all other non-public sector industries also improves.

On the demand side, the fall in government demand is more than fully offset by several factors. One is the increase in investment required to maintain the higher capital stocks. Another is a small increase in household consumption that occurs, despite the fall in real wages, because non-wage factor incomes increase. Finally, the real wage and price reduction and the consequent improvement in Australia's competitiveness produces a significant increase in net exports.

**4.3 Long-Term Net Effects**

Because a cut in government spending is expansionary in the long term, the net effect of the balanced budget

reduction is expansionary (Table 1, column 6). Real national income expands.<sup>14</sup> Furthermore, the expansion occurs in an environment where the boost in after-tax wages following the income tax cut is more than sufficient to offset the real wage reduction required to redeploy government workers elsewhere. The gains are therefore spread relatively evenly across the different income earning groups.

The impact on industries is slightly less even, however, because the expansion in demand from all sources other than government puts upward pressure on prices which the boost to capital stocks and productive capacity cannot quite fully offset. The net effect is a slight real appreciation and a slight decline in the relative position of some of Australia's export industries, as well as a large decline in the public sector industries.

**5. The Long-Term Effects of a Balanced Budget Reduction with Adverse Reaction by Foreigners**

One aspect of the long-term effects of matched reductions in government spending and taxation is that the consequent growth in the Australian capital stock cannot be fully financed domestically.

The tax reduction alone leads to a relatively large increase in household consumption. Private saving also increases as wages and non-

labour income increase, but because the government deficit on current account worsens, national saving actually falls. The local ownership share of the capital stock declines. At given real after-tax returns, foreign investors' stake in the Australian economy expands.

Column 7 of Tables 1 to 3 shows what the effects of an income tax reduction would be if foreign investors instead required a 10 per cent increase (say from 10 to 11 percentage points) in the real after-tax rate of return on Australian capital in order to be willing to increase their investment. The results show that such an increase would be more than sufficient to offset the growth in capital stocks - capital would actually have to contract to generate the higher return. Despite the same beneficial effects of government spending cuts as before (column 8), the overall impact of the balanced budget reduction would then be a decline in real national income (column 9).

**6. Summary**

The quantitative assessment of initially matched reductions in government spending and taxation has suggested that although such a policy may dampen demand in the short term, it could potentially over the longer term lead to an expansion in national income. The spending and taxation cuts could both improve the profitability of at least some non-government sectors, creating incentives in the long term to expand capital stocks. The incentives for the labour supply to increase in the long term are more mixed.

One important caveat to this, long-term conclusion is that the savings incentives created by the budget cut are insufficient for the additional capital to be fully financed domestically. The willingness of foreign investors to provide the remainder may depend on Australia offering a risk premium to compensate for its increased foreign debt exposure, especially given that current debt levels are already very large. However, were the balanced reduction 'unbalanced' by reducing spending by more than taxation, this could increase the contribution of national savings, while further reducing real wages and boosting industry competitiveness.

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<sup>14</sup> As in the short run, this general conclusion is not sensitive to the assumption that the tax and spending cuts are equal ex ante rather than ex post.



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