



The Treasury:

CGE Analysis of Part of the Government's AFTSR Response

30 April 2010
(extended 4 May 2010)

ADVISORY

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The findings in this report are subject to unavoidable statistical variation. While all care has been taken to ensure that the statistical variation is kept to a minimum, care should be taken whenever using this information.

Report Extension

At the request of the Commonwealth Treasury, this report was extended (but not otherwise changed) on 4 May 2010 to include the capital stock and employment impacts in section 5.

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1 Introduction

This report contains modelling of the economic impacts of part of the Commonwealth Government's response to the Australian Future Tax System (AFTS) review. This modelling was commissioned by the Commonwealth Treasury and was undertaken by KPMG Econtech using its MM900 model of the Australian economy.

The AFTS review recommended, among other things, that a 40 per cent resource rent tax be introduced in conjunction with a reduction in the company tax rate. The resource rent tax would replace all state/commonwealth royalties, crude oil excise and petroleum resource rent tax (PRRT).

The Commonwealth Government has adopted those particular recommendations as part of its response to the AFTS review. That is, it will introduce a resource rent tax, to be known as a resource super profits tax (RSPT), at a rate of 40 per cent. This represents a broadening of the existing PRRT under an improved design but with an unchanged rate. The Commonwealth Government will abolish all existing resource charges and taxes, including (in effect) royalties, and crude oil excise. Finally, it will cut the company tax rate from 30 to 28 per cent. These changes are referred to collectively in this report as 'the policy'. There are two caveats to this characterisation of 'the policy', but they have no impact on the economic modelling.

First, one or more state governments may continue to levy mining royalties. However, a tax credit for any such royalties will be given under the RSPT, so any continuation of those royalties will have no national economic impact and so makes no difference to the economic modelling. Hence any continuation of state royalties is not considered further in this report because it is not relevant to the modelling results.

Second, projects subject to the existing PRRT will have a one-off choice between being subject to PRRT or RSPT. However, because both taxes are modelled in MM900 as pure taxes on 'resource rents', the choices made between them make no difference to the economic modelling. Hence any continuation of PRRT is not considered further in this report because it is not relevant to the modelling results.

The Australian Treasury provided the Government's policy parameters for tax reform to KPMG Econtech who then independently modelled their economic effects. KPMG Econtech was not involved in the policy development, while the modelling was independent of Treasury. The modelling was undertaken using KPMG Econtech's MM900 model.

KPMG Econtech only has knowledge of the part of the Commonwealth Government's response covered by the policy. Therefore, its modelling of the policy necessarily uses the existing tax system as its starting point, with no allowance made for interactions with other parts of the Commonwealth Government's response that are not included in the policy.

MM900 was developed with a special emphasis on the economic impacts of taxation, making it uniquely well suited to this study. It focuses on the long run, which is appropriate because decisions about tax policy should be based on their lasting economic impacts. However, for some tax changes, especially changes affecting the taxation of capital, these impacts would take five to ten years to fully develop. Further, this long run focus also means that the modelling

results do not cover the phasing arrangements included in the Government's response. Hence, the modelling shows the economic impacts after the new tax regime is phased in and the economy has fully adjusted.

MM900's special tax-related features include that it distinguishes eight times more goods and services than other models, identifies 19 categories of taxes, captures a very wide range of economic responses to the tax system, recognises the roles of land and natural resources in production, and uses an advanced measure of changes in consumer welfare. All of these features are important for the robust modelling of the economic impacts and benefits of tax reform.

The policy would have implications for Commonwealth-State financial relations. However, this report takes a national perspective on tax reform i.e. it considers Commonwealth, State and Local Government taxes together. Further, as noted above, the RSPT includes provisions to fully offset any tax burden from any continuance of state mining royalties.

MM900 was originally used to model the excess burden and incidence of 19 Australian taxes. This provided a consistent basis under which the relative economic costs of each tax could be compared, and is the most comprehensive study of its kind to be undertaken in Australia. The results of the study are presented in KPMG Econtech's report to the Commonwealth Treasury, "CGE Analysis of the Current Australian Tax System" (KPMG Econtech, 2010). MM900 is a member of the Computable General Equilibrium (CGE) family of economic models. CGE models are the most widely used type of model, in Australia and abroad, for quantifying the economy-wide effects of economic reform.

This report is structured as follows.

- **Section two** sets out 'the policy', which is based on part of the Commonwealth Government's response to the AFTS.
- **Section three** summarises the main features of the MM900 model.
- **Section four** discusses the various taxes included in 'the policy' and how they are captured in MM900.
- **Section five** presents the economic impacts.
- **The appendix** includes more detailed results of the economic impacts of the policy.

2 The Policy

The report models part of the Commonwealth Government's response to the Australian Future Tax System (AFTS) review, referred to as the policy. The policy involves the introduction of a new resource super profits tax (RSPT) to replace existing resource charges and taxes in conjunction with a reduction in the company tax rate. Further details of the policy are as follows.

- The RSPT will be applied to coal mining, oil and gas extraction and metal ore mining. It is intended to apply to the super profits or economic rents obtained from use of natural resources, not the normal profits required to attract capital to the mining industry. The RSPT will be levied at a rate of 40 percent.
- The existing PRRT, which is made redundant by the RSPT, will be abolished (with the caveat noted below). Both taxes are levied at the rate of 40 per cent, but the RSPT is broader because it covers more of the mining industry. The RSPT also improves on the PRRT by guaranteeing that companies realise full value for carried forward losses.
- The existing crude oil excise and resource royalties will also be abolished (with the caveat noted below). These taxes generally apply to production rather than super profits, and so can discourage production.
- The company tax rate will be reduced from 30 to 28 per cent. Company tax represents a tax on capital in the form of equity, and hence can discourage investment.

For the reasons explained in the introduction, any continuation of PRRT under a PRRT/RSPT election scheme or state royalties has no impact on the economic modelling and so is not considered further in this report.

As important background to understanding the modelling results for the economic impacts of the policy, the next two sections summarise, in turn, the general features of the economic model and how each tax has been modelled.

3 The MM900 Model

The policy outlined in section two is simulated using the MM900 model. As background to understanding the modelling results, the general nature of the MM900 model is described in this section.

3.1 Key Features

MM900 was developed with a special emphasis on the economic impacts of taxation, making it uniquely well suited to this study. In particular, MM900 has five key features which make it appropriate for analysing the economic impacts of Australian taxes and tax reform.

- 1 109 industries produce 889 products (or goods and services). This represents eight times the product detail of other models, allowing for modelling that much more closely identifies the tax bases for narrow product taxes, such as those on particular forms of alcohol and specific types of insurance (*product detail*).
- 2 MM900 distinguishes 19 different categories of taxes at the Commonwealth, State and Local levels in an economy-wide setting. This has been possible by sourcing additional tax information from the Australian Bureau of Statistics (ABS) that goes well beyond that identified in the published input-output tables used in comparable models (*tax detail*).
- 3 The model captures a very wide range of economic responses to taxes, including effects on incentives to work, employment and investment decisions, and patterns of consumer spending and trade. These economic responses are important because they are the source of the costs of taxes to economic performance. However, some taxes are designed to achieve economic responses to address externalities in behaviour – for example, tobacco excise aims to restrain cigarette consumption and its associated negative impacts – and so MM900 also allows for externalities in consumption (*extensive economic responses*).
- 4 There is detailed modelling of production processes in each industry capturing the roles of labour, capital and, unlike some models, land and natural resources. This detailed production modelling is needed to model robustly taxes on land, such as local government rates and land tax, and natural resources, such as the existing petroleum resource rent tax and the resource super profits tax (*land and natural resources*).
- 5 The model also rigorously measures impacts on consumer welfare taking into account the contributions from levels and patterns of consumer spending, leisure and saving. This is more appropriate than simpler modelling that focuses on GDP or consumption effects (*advanced consumer welfare effects*).

In summary, by better capturing where particular taxes impact on the Australian economy, how it responds, and how these responses flow through to change consumer welfare, MM900 is uniquely well suited to modelling the economic impacts of Australian tax policy.

Furthermore, MM900 focuses on the long run, which is appropriate because decisions about tax policy should be based on their lasting economic impacts. MM900 is a member of the Computable General Equilibrium (CGE) family of economic models. Long-run CGE models are the most widely used type of model, in Australia and abroad, for quantifying the economy-wide effects of economic reform.

KPMG Econtech's MM900 model is the latest edition of a series of CGE models of the Australian economy focussing on tax analysis. The first edition, MM303, was developed for the South Australian Department of Treasury and Finance in the late 1990s to assist it in participating in a developing debate on indirect tax reform. That debate culminated in the introduction of the New Tax System (NTS) in July 2000. In the lead up to the introduction of the NTS, MM303 was further developed to MM600+ to assist the Australian Competition and Consumer Commission (ACCC) in its price surveillance work. In 2009, in a study for the Commonwealth Treasury to support the AFTS review, MM600+ was re-developed as MM900, extending its tax analysis capabilities from indirect taxes to also include direct taxes. The results of the study are presented in (KPMG Econtech, 2010).

The following sections summarise the main features of MM900, emphasising those that are most pertinent to this tax study. It begins by describing the structure of the model, and then moves on to summarise the behaviour of the 'economic agents' in the model – households, producers, government and the foreign sector. Lastly, it discusses the model developments undertaken for this report as well as specific assumptions used in areas such as the mobility of capital.

3.2 Structure

MM900 follows a widely accepted CGE policy modelling approach, which is summarised below.

- MM900 is based on a long-run equilibrium, that is, it shows the economic outcome after the economy has fully adjusted to any shock. In this outcome, all markets are assumed to have achieved equilibrium, including the markets for six factors of production and for the 889 goods and services that are produced.
- The equilibrium outcomes in MM900 are under optimising behaviour, with businesses maximising profits and households maximising their utility.
- MM900 recognises government and private budget constraints. That is, both governments and households must live within their means.

There are four key economic agents in MM900 – households, producers, the government sector and the foreign sector. The following are brief summaries of the behaviours of these agents. More details can be found in section 4 of KPMG Econtech (2010).

3.3 Households

In MM900, a representative household maximises utility, which depends on leisure, saving and current consumption of products, subject to a budget constraint. From this behaviour, relationships for labour supply, total consumption expenditure, and its spread across 889 products are derived. Under this approach, households can be thought of as making three economic decisions, which are discussed in turn below.

Labour Supply versus Leisure

In MM900 households face a choice of how to divide the time in which they could be working, between work and discretionary leisure. The amount of time they devote to work depends on the after-tax real wage that is available from working. The higher the after-tax real wage, the more labour that households will supply, and the less time that they will spend in leisure.

MM900 makes full allowance for the taxes that influence this work-leisure choice. Taxes may reduce the economic return to work by reducing the nominal wage received and/or increasing consumer prices. For example, company tax is likely to be eventually largely passed on to households, through higher consumer prices or lower nominal wages. This would reduce real after-tax wages, and the consumer purchasing power generated by a given work effort would be eroded. This acts as a disincentive to work.

Importantly, explicitly including leisure in the analysis helps to make the estimates of welfare changes more robust. For example, continuing the example above, increasing company tax will reduce the after-tax real wage inducing a reduction in labour supply. On the one hand, reduced labour supply will reduce consumer welfare through lower wage earnings and therefore lower consumption and saving. However, on the other hand, reduced labour supply means that there will be more leisure taken, which partly offsets the reduction in utility from the lower consumption levels. Without the inclusion of leisure in the utility function, the consumer welfare loss from company income tax would be overstated.

Given the amount of labour that households choose to supply, they will receive a certain income. The next choice is how to divide this income between consumption and saving.

Consumption versus Saving

Modelling saving behaviour poses an issue for long run models such as MM900. In particular, saving (i.e. sacrificing present consumption for future consumption) can appear artificially attractive. This is because, if saving rates are increased, long-run model results will show the gain in future consumption, but not the sacrifice of present consumption. To avoid this problem, households' propensity to save is constant in MM900. This saving generates welfare on the basis that it represents future consumption of the same products that are consumed in the present.

Assuming a constant propensity to save means that MM900 is not useful for estimating economic costs for taxes that primarily affect household saving behaviour. These taxes include personal income tax on income from assets, including the franking credit system, and taxes on superannuation earnings and benefits.

Having determined the split of income between consumption and saving, the next choice is how to divide consumption between the various products.

Pattern of Consumption

MM900 allocates total consumption expenditure between the 889 products (or goods and services) in the model using a consumer demand system that can be split into two-tiers. The two tiers are as follows.

- In the first tier, the consumer decides between 17 different broad groups of products.
- In the second tier, MM900 allows for substitution between individual products within these 17 broad groups, with the degree of substitutability able to vary from one group to the next, adding extra sophistication.

This level of detail in consumer decisions means that MM900 will produce high quality estimates of welfare changes. For example, MM900 treats beer, wine and spirits as separate products, and they are all substitutable in consumption. Less disaggregated models treat all alcohol products as a single product group, and will therefore miss the economic costs of taxing substitutable alcoholic beverages at different rates.

3.4 Producers

In MM900, production occurs in 109 industries that produce 889 products. Within each industry, a representative business operating under perfect competition chooses inputs and outputs to maximise profit subject to a production technology. Apart from the unusually large number of products in MM900, this approach is typical of CGE models.

For its production, each industry uses products produced by other industries as well as primary factors of production. In MM900 there are six primary factors, which are as follows:

- lower-skilled labour;
- higher-skilled labour;
- capital – structures;
- capital – other;
- land; and
- other fixed factors such as natural resources.

This detail is important for robustly modelling the economic costs of certain taxes levied on these primary factors, such as company tax, petroleum resource rent tax and motor vehicle registration. This is because each industry's demand for primary factors depends on the relative price of each factor. In each industry, the representative producer first chooses a mix of the three broad primary factors – labour, capital and fixed factors – taking into account their relative prices. Next, for each broad primary factor, they choose a mix between two types. For example, for capital, they choose a mix between structures (including buildings and engineering constructions) and other capital (such as machinery, vehicles, computers and other equipment), taking into account their relative prices. These mixes vary from one industry to the next.

Demand for these six primary factors is driven by producer decisions, while supply depends on the factor considered. Due to their immobile nature, the supply of land and other fixed factors is constant. Labour is more mobile, and its supply depends on the decisions of households, which were discussed above. Capital supply depends on the international supply of funds, which is assumed to be highly mobile, as discussed in sections 3.6 and 3.7.

More information on each of the primary factors can be found in KPMG Econtech (2010).

3.5 Government

Government sector spending accounts for part of final demand for various products, and is fixed in real terms in MM900. This spending is financed by a range of Commonwealth, State and Local taxes. The taxes included in MM900 are listed in Table 3.1 below.

Table 3.1 Key Taxes

General	By industry	By product
Labour income tax	Payroll tax	GST
Corporate income tax	Land taxes	Alcohol excise and WET
	Municipal rates	Tobacco excise
	Resource rent tax	Luxury car tax
	Motor vehicle registration	Import duties
		Fuel taxes
		Royalties and crude oil excise
		Gambling taxes
		Conveyancing stamp duties
		Motor vehicle stamp duties
		Stamp duties (other)
		Insurance taxes

Note: WET refers to the Wine Equalisation Tax.

The Government has a budget constraint, so that it must always pay its way in the long run. For simplicity, in MM900 the government is assumed to always balance its budget. To achieve this, a budget policy instrument must be selected that, instead of being an input to the model, automatically adjusts to balance the budget. This can be either a hypothetical lump-sum transfer, GST or labour income tax. For this report, the instrument chosen is the hypothetical lump-sum transfer. The automatic adjustment of lump-sum transfers to balance the budget has no effect on the economy, except to transfer income between the government sector and households. The change in transfers can be interpreted as a measure of the overall budget impact of the policy, as a positive budget impact translates to an increase in transfers from government to households.

3.6 Foreign Sector

Australia's interactions with the global economy are important for the domestic economy. As a small country, Australia is generally considered to be close to being a 'price taker' on world markets. That is, it cannot influence the price at which it imports capital and goods and services. In MM900, Australia is also close to being a price taker for most exports.

In a world of highly mobile capital, Australia is assumed to be a price taker in world capital markets. This means that the world supplies capital to Australia at a fixed real after-tax rate of

return. On the demand side, as explained in section 3.4, industries generate demand for structures and other capital following profit-maximizing behaviour. They do not differentiate between local and foreign-owned capital. The supply of locally-owned capital is determined by saving behaviour, while remaining capital demands are met by foreign-owned capital. The case where capital is less than perfectly mobile, where Australia is less of a price taker, is discussed in section 3.7 below.

Similarly, the rest of the world supplies Australia, as a small open economy, with as much imports as demanded at the world price, that is, import supply is perfectly elastic. On the demand side, consumers and producers perceive imported and locally produced goods to be different from one another, and choose their mix of imported and locally produced goods and services depending on their relative prices.

For exports, Australia's status as a small open economy is again recognised, but this time by assuming that Australia is close to being a price taker, but has a small degree of pricing power. That is, export demand is highly elastic but not perfectly elastic. This pricing power may arise through product differentiation or by supplying a large share of the world market. For most goods, export demand elasticities in MM900 are set to a very responsive -12¹. For goods where Australia is considered to have some market power, export demand elasticities are lower. The smallest elasticity is for wool, where the value is -4, in recognition of our large share of the world market. The same elasticity is used for tourism, which takes into account the product differentiation between the tourism services that Australia offers compared with those offered by other countries.

3.7 Perfect and Imperfect Capital Mobility

In the economic literature, it is widely accepted that taxes on capital, such as company income tax, are among the most inefficient taxes. For example, in recent work for the OECD, Johansson et al conclude that "Corporate taxes are found to be most harmful for growth" (Johansson et al. 2008). This conclusion is because capital is highly mobile around the globe. Given this central role of capital mobility, it is important to consider the modelling assumptions made about international capital mobility.

As explained in section 3.6, the default MM900 modelling results make the common assumption that capital is perfectly mobile. That is, in MM900, an industry can access as much capital as it needs so long as it can achieve the after-tax real rate of return required by international investors. This means that the required after-tax rate of return on capital is effectively fixed on world capital markets in the long run. Stocks of structures and other capital adjust in each industry until this rate of return is achieved.

As noted, it is the *after tax* rate of return on capital that is determined on world capital markets and governs the terms on which capital is supplied to Australia. This means that any tax that is applied to capital in Australia will increase the required *before tax* rate of return to offset the tax impost, and keep the *after tax* rate of return on capital unchanged. To achieve this, capital will flow out of the country until its greater scarcity leads to an increase in its before tax rate of return. The resulting lower capital intensity of production will reduce the productivity, and

¹ Export demand elasticities are the percentage change in exports resulting from a one percentage increase in the export price. The higher (more negative) the elasticity, the more of a price taker that Australia is, because international demand will react more to price increases. An elasticity of -12 corresponds close to a price-taking position.

therefore the incomes, of other factors of production, including labour, land and natural resources.

However, it is also considered in the economic literature that capital may not be perfectly mobile internationally. That is, foreign investors may only be willing to raise their exposure to Australia in return for some premium in Australian investment returns. This may come about for a number of reasons, listed briefly below.

- Capital markets may be segmented, so that there may be a pool of investment funds that is directed to each type of industry or sector, with each pool being somewhat separate from the rest of the capital market. This would imply that the cost of capital would increase with the amount of investment in an industry.
- Home investor biases may be present. Foreign investors may be reluctant to invest in Australia because of a lack of information on Australia and risk averse attitudes. This would imply that the return to capital invested in Australia would need to increase to attract more foreign investment.
- Non-tax factors make investment in Australia attractive relative to other countries. These include benefits such as access to markets; a predictable and non-discriminatory legal and regulatory framework; macroeconomic stability; skilled and responsive labour markets; and well-developed infrastructure. These factors may mean that capital is less mobile, and a tax on capital in Australia may not lead to a fall in investment as large as expected under perfect capital mobility.

Therefore, the policy modelled in this report is run a second time, but assuming imperfect capital mobility. The degree of imperfect capital mobility used assumes that Australia's net foreign liability position adds 0.5 percentage points to our country risk premium. This implies that if Australia had zero net foreign liabilities, the rate of return required to attract additional capital would be 0.5 percentage points lower. This is broadly consistent with studies on country risk premiums and the sensitivity of foreign investment to rates of return.

While this level of capital mobility is lower than under the assumptions of perfect capital mobility, it still represents highly mobile capital. This is consistent with the view that Australia is a small open economy. Accordingly, it turns out that assuming imperfect capital mobility makes some capital-related taxes only moderately less costly in terms of economic distortions.

3.8 Developments for this Report

As noted in the introduction, KPMG Econtech originally developed MM900 to estimate the excess burden of Australian taxes for the Commonwealth Treasury. Since this original report (KPMG Econtech, 2010), however, there have been a number of further developments to the model. These are outlined below.

There has been further analysis of ABS data on land use and land rental prices for broad industry sectors. It was found that it was better to average the data on rental prices over time, rather than to use only one year of land data.

The baseline for the MM900 model is a "normalised" 2009/10 economy, which abstracts from any short term influences on the economy such as the global financial crisis and commodity

price fluctuations. For the original report, it was judged that it was appropriate to assume a long-run terms-of-trade equivalent to 2004/05 levels. However, given the continued solid recovery in commodity prices since that time, it is now reasonable to assume that commodity prices can be sustained at a higher level than assumed previously. So the “normalised” economy for the baseline scenario now has a stronger terms-of-trade, similar to the level seen in 2005/06, but still well below the peak level seen in 2008/09.

Motor vehicle stamp duty is paid both by businesses and households. In the ABS input-output tables, the business component is treated as a tax on investment in motor vehicles, while the household component is omitted, and the same approach was followed in the original report. However, for this report, the component applied to households has been included as a tax on consumption of motor vehicles, so that payments of this tax by both businesses and households are now included in the model.

The modelling in the original report corrected for certain identified irregularities in how the ABS input-output tables allocate insurance tax collections between insurance products. However, the ABS allocation of insurance taxes has been further reviewed, and as a result further irregularities have been identified and corrected. The new allocation improves on the ABS data by taking into account that workers compensation premiums are exempt from insurance tax in all states (apart from Queensland), and that general insurance products that are subject to both fire levies and stamp duties have a higher total tax burden than general insurance products that are subject to stamp duties alone.

4 The Policy Taxes in MM900

Now that the general nature of the MM900 model has been described, this section explains how the taxes that are involved in the policy enter the model. The modelling results for the policy are then presented in section 5.

The taxes involved in the policy are a new resource super profits tax, the petroleum resource rent tax, crude oil excise and resource royalties and company income tax. These taxes are now discussed in turn, focussing on the nature of each tax and how it enters MM900.

4.1 New Resource Super Profits Tax

4.1.1 Background

The Economic Basis for a Resource Rent Tax

An ideal tax from an economic efficiency perspective does not distort the pattern of economic activity and hence has no cost to consumer welfare. Some factors of production that are in fixed supply, such as land and natural resources, may receive payments in excess of that needed to keep them in their present use, reflecting their scarcity value. These excess payments are known as economic rents. Provided economic rents are location specific, as they are in the case of land and natural resources, they can be taxed without distorting economic activity.

Boadway and Keen (2009) explain the situation as follows.

“It is clear enough, for instance, why a country wishing to attract a car factory or the research headquarters of a large software company would not wish to find others offering more attractive tax regimes: the factory or research center might be established elsewhere instead. But a company cannot choose to exploit a gold deposit located in one country by building a mine in another. The potential rents to be earned from the deposit are specific to a particular location, so that standard tax theory would suggest that such rents can be taxed ... without jeopardizing the existence of the project.”

Hence the location-specific nature of natural resources underlies the economic efficiency of taxes on resource rents, compared with taxes on mobile factors of production such as capital. As long as some resource rent remains after the tax has been applied, the factor of production will remain in its present use. Such taxes are ideal from an economic efficiency perspective.

In Australia's current tax system, the main case of a tax on economic rents from natural resources is the petroleum resource rent tax (PRRT) that is discussed in section 4.2. However, as part of the Commonwealth Governments AFTS response (the policy), the PRRT is proposed to be replaced by a broader resource super profits tax (RSPT) that is to be applied across most of the mining industry. As noted above, mining resources are perfectly immobile, and so in principle the location-specific economic rents that they receive can be taxed without distorting economic activity.

The main challenge in implementing a tax on resource rents is that those rents are generally not directly observable. Instead, what is observable is the profit of resource companies. This profit mixes together both required returns to capital (or normal profit) and economic rents of natural

resources (or super profit). So to tax super profits or resource rents, it is necessary to deduct normal profit from total profit before applying the resources tax.

Brown Tax – A Tax on Resource Rents

In theory, the simplest way of taxing resource rents is known as a Brown tax. It taxes a project's cash flow each year at a constant rate, including providing a tax rebate when cash flow is negative, as is generally the case in the exploration and development years of a resources project. Under the Brown tax, the government becomes a de facto silent joint venture partner in the resource project, sharing in the losses and profits, with its share being equal to the tax rate. Because the Brown tax does not change the relative balance between the profit-making and loss-making years of a project, its effect on investment decisions is neutral. Further explanation of the economic basis for the Brown tax is given in Box 4.1.

Box 4.1: The Brown tax

The Brown tax, also known as the R-based tax or pure rent tax, taxes at a constant rate the producer's cash flow, where cash flow is calculated as all revenue from the sale of output less cash outlays for purchases of all inputs, both capital and current. When cash flow is negative, as is generally the case in the exploration and development years of a resources project, the government pays a tax rebate to the producer. Later when the cash flow is positive, the producer pays tax to the government. Thus, the Brown tax is equivalent to the government becoming a silent joint venture partner in the resource project, sharing in the losses and profits, with its share being equal to the tax rate.

The de facto joint venture nature of the Brown tax means that it has a neutral effect on business decisions. The losses made in the early years and profits made in the later years of a project are both reduced in proportion to the tax rate, reducing the present value (PV) of the project's cash flow by the same proportion. This simple re-scaling of a project's PV means that the Brown tax does not change whether the PV is positive or negative, and hence it does not change whether a project is worthwhile or not. This neutral effect on investment decisions is a key feature of the tax.

Put another way, the neutral impact of a Brown tax arises because, in present value terms, it only taxes super profits, not normal profits. For a project that only earns normal profits or its required rate of return, the present value of both its cash flow, and its payment of Brown tax (discounted using that required rate of return) will be zero. Only projects earning above the required rate of return on capital and hence making super profits or economic rents, will have a liability for Brown tax in present value terms.

In this way, the Brown tax divides the profit of resource industries into two distinct parts.

- The first part is normal profit or the *required rate of return* to capital in the industry, which includes an appropriate risk allowance. It is the minimum rate of return required to hold the capital in an industry, which includes a risk premium where investors are risk averse. This part does not generate a liability for Brown tax in present value terms.
- The second part is the *economic rents* which are derived from access to a natural resource, and take the form of super profits, which are over and above the required rate of return to capital. This part is subject to Brown tax.

The Complication of Tax Losses

The main practical problem with the Brown tax is that most governments are reluctant to pay tax rebates to resource companies in the early loss-making years of a project. However, if governments were to tax the profits on resource projects without paying out for the tax losses, this asymmetry would lead to investment in resources projects being discouraged. This concern has prompted a literature on variations on the Brown tax that do not involve the government paying tax rebates in the early loss-making years, but still eventually provide producers with full value for tax losses so that investment is not discouraged. The existing PRRT and the proposed RSPT deal with the issue of giving value to tax losses in different ways.

The PRRT

The existing PRRT gives value to PRRT tax losses in two ways. First, it allows losses from exploration expenditure to be offset against profits from other projects undertaken by the same company (Hogan, 2007). Second, remaining losses, including losses from development and operating expenditures and losses from exploration expenditure where there are no offsetting profits, are carried forward with interest as an offset against profits in future years (Commonwealth Treasury, 2008).

The issue with this PRRT approach is that there is no certainty that there will be sufficient profits in future years to fully cover the carried forward losses. To compensate for this uncertainty, the PRRT adds a de facto risk premium to the interest rate at which losses are carried forward, which is generally set at 15 per cent for exploration expenditure and 5 per cent for development and operating expenditures. This is an imperfect solution because the appropriate risk premium would vary from one project to the next, as it depends on the degree of uncertainty about whether there will be sufficient future profits to fully cover carried forward losses. Bond and Devereux (1999) explain the problem and then propose a solution.

“To obtain neutrality in this case, the government would need to give tax relief at the interest rate required to compensate for the risk that the full value of these deductions may not be claimed. This is clearly not the same as the required rate of return on the risky project. Since the government will generally not know the appropriate rate at which to give this tax relief, the only feasible way of achieving neutrality is to guarantee full payment of the deductions.”

The RSPT

This suggestion of a guarantee of full payment of carried forward RSPT project tax losses is incorporated in the proposed RSPT. In fact, the proposed Resource Super Profits Tax (RSPT) addresses the uncertainty on producers receiving full value for these carried forward tax losses in two ways. First, it broadens the loss offset provisions of the PRRT to allow all RSPT losses to be offset against RSPT profits from other projects undertaken by the same company, not just RSPT losses from exploration expenditure. In contrast, the PRRT only allows losses from exploration expenditure to be offset against profits from other projects. This broader loss offset provision reduces the amount of RSPT project losses to be carried forward. Second, it guarantees that full value will be obtained for carried forward RSPT tax losses by providing for payout of any remaining tax losses at project close.

This approach aims to remove the risk of non-payment for RSPT project tax losses by guaranteeing their full realisation. Consequently, under the RSPT a risk premium is no longer

added to the interest rate at which these losses are carried forward. As explained by Bond and Devereux (1999), “the reason the risk-free interest rate is appropriate here is that the tax is designed in such a way that these deductions are certain to be received by the firm at some point in time with guaranteed full compensation for any delay in receiving them”. Hence the proposed RSPT is designed to take into account the Bond-Devereux argument that a risk-free interest rate can be used if any remaining carried forward tax losses are guaranteed to be paid out at project close.

Sovereign Risk

Boadway and Keen (2009) raise sovereign risk as a limitation of the Bond-Devereux argument.

“Sovereign risk, however, provides an important caveat to the Bond-Devereux argument. If commitment or other problems mean that the investor is not perfectly sure that cumulated tax credits will be made good, at an unchanging tax rate, they will wish to take account of that in the discount rate applied in valuing future tax reliefs.”

That is, the RSPT may adversely affect business decisions if producers believe there is a risk that government will adversely change the RSPT rules between project open and project close. Examples of such changes would include no longer refunding accumulated tax losses on project close, or increasing the RSPT rate from 40 per cent to a higher rate without adjusting past tax losses.

Sovereign risk only becomes a factor in investment decisions if investors believe that any future tax changes may apply not only to new projects, but also to existing projects i.e. projects that have opened but have not closed. This leads Sorenson and Johnson (2009) to make the following observations about sovereign risk in the context of introducing a uniform neutral resource rent tax (such as a RSPT) in Australia.

“While the proposed approach would ideally apply to new and existing projects, applying it to existing projects may create concerns over sovereign risk. The issue of sovereign risk in this regard is difficult to assess as one would expect that a uniform neutral resource rent tax arrangements may in fact reduce the chance of future ad hoc adjustments therefore reducing sovereign risk. However, if concerns over sovereign risk remain, consideration could be given to phasing in the new regime while the current arrangements are being phased out.”

Consistent with this recommendation, the RSPT is being phased in over time as a way of cushioning the impact of its introduction on existing projects.

The phased approach stops short of fully avoiding a sovereign risk event. This would require full grandfathering of existing projects so that they would continue to be taxed under the existing arrangements and be fully quarantined from RSPT. However, full grandfathering would mean lower government revenue in the short term because of the wait involved before new projects reach the stage where a RSPT generates substantial revenue, compared with the shorter wait under the existing mining royalties.

The key issue is whether investors perceive that, once the RSPT is introduced, there is a significant risk that future changes will be made that are not fully grandfathered, given that the RSPT is being introduced under a phased approach rather than a fully grandfathered approach.

Indications from government on whether any future changes in RSPT would be grandfathered may have an important influence on perceptions of sovereign risk.

Above, Sorenson and Johnson imply that, once an RSPT is introduced, perceived sovereign risk on future changes may even be less than under the existing mineral taxation arrangements. The historical record may support this view. The predecessor to the RSPT, the PRRT, was introduced at a rate of 40 per cent in 1987 (Hogan, 2003), and this rate has not been changed in the ensuing 23 years. In comparison, state royalties have been subject to considerable change over the same period. Sorenson and Johnson (2009) attribute this to the efficient nature of resource rent taxes.

4.1.2 Modelling

Definition

Resource Super Profits Tax (RSPT) will be applied to taxable company profits derived from coal mining, oil and gas extraction and metal ore mining. RSPT would not be applied to profits from downstream activities such as refineries or smelters.

RSPT will be levied at 40 percent of taxable profits. Taxable profit is defined as the excess of revenues over deductible expenditure. Deductible expenditure includes costs such as exploration, development and operating costs.

High expenditures are typically incurred in the initial stages of the project, which tend to be loss-making years. However, in calculating taxable profits, such losses can be offset against profits from other projects undertaken by the same company. To the extent that net losses remain, they are carried forward at a risk-free rate of interest, so they can be offset against future profits. If any carried forward losses remain at project close, they are paid out in full.

Factors Affecting the Economic Cost of the Tax

The mining industry can be said to be earning economic rents from its use of a factor of production which is fixed in supply: mineral resources. This means that the industry is able to make profits in excess of the required rate of return on capital which is available in other industries (after allowing for differences in risk).

The RSPT aims to tax these economic rents or super profits, after allowing for normal profits to be made. In this way, it aims to be free of any distortion to economic decision making or cost to consumer welfare, unlike most other taxes.

The RSPT aims to achieve this neutral outcome by combining two elements of tax design, which can be interpreted as a de facto joint venture and a de facto loan.

- The first element is a Brown tax, which creates a de facto joint venture between the resource company and the government as a silent partner. This joint venture sharing of risk and reward may avoid any distortion to investment decision making.
- The second element is a provision for the government's contribution to the de facto joint venture in the loss-making early years to be covered by defacto loans from the resource company to the government. The guaranteed repayment of the loan including interest,

occurs as an offset against the tax liability in the profit-making years, with any residual amount paid out at project close.

On this basis, in theory there is no economic cost to the RSPT, before implementation issues, administration costs and compliance costs are considered. The main caveat to this conclusion is investors may perceive some sovereign risk in a RSPT introduced under a phased approach, as this does not fully quarantine existing resource projects from the new tax. However, as suggested above, this sovereign risk may be no higher than under the existing mining tax regime, which itself has been subject to changes. The modelling assumes there is no change to the perceived level of sovereign risk with the change in mining tax regime.

Modelling Approach

As noted in Section 3, the inclusion of fixed factors in MM900 enhances the robustness of estimates of the economic costs of resource rent taxes. The income earned by resources industries from fixed factors introduces positive economic rents into the model. Taxes on these rents will simply erode them, rather than reduce the industry's ability to achieve the normal rate of return to capital. This results in no distortions to production choices.

More specifically, in MM900, the new RSPT is modelled as a tax on the return to mineral resources in the *coal, oil and gas, iron ore and non-ferrous metal ores* industries. In the model, this implies a zero economic cost for the new RSPT, since it will simply be a transfer of a portion of the surplus (over and above the required return on capital) from these industries to the government sector.

Economic Efficiency and Incidence

In KPMG Econtech's MM900 model, the RSPT has an excess burden of zero. This outcome rests on the modelling assumption that the RSPT only taxes the economic rents earned from immobile factors, in this case mineral reserves. If only these rents are taxed, then the investment decisions of mining companies will not be distorted. Since the tax base for RSPT will not shrink in response to the tax, activity in the mining industry will not be distorted, and there will be no economic costs associated with the RSPT in MM900.

The incidence of the RSPT is also a result of the immobile nature of the natural resources on which it is levied. Since there is no change in the supply of mineral resources, their pre-tax price will not change. Instead, the after-tax return that owners of the resources are able to receive falls by the full amount of the tax in MM900.

4.2 Petroleum Resource Rent Tax

The existing regime for mining-specific taxation includes resource royalties, crude oil excise and petroleum resource rent tax. Petroleum resource rent tax is dealt with here, while crude oil excise and resource royalties are discussed in section 4.3.

Definition

Petroleum resource rent tax (PRRT) is applied to taxable company profits derived from the extraction of crude oil, condensate, sales gas, natural gas, LPG and ethane products from Australian territorial waters. The North West Shelf and the Joint Petroleum Development Area

in the Timor Sea are both exempt from PRRT. The PRRT is not applied to profits from downstream activities such as refineries or facilities for transporting the products.

PRRT is levied at 40 percent of the taxable profits from a petroleum project. Taxable profit is defined as the excess of revenues over deductible expenditure. Deductible expenditure includes costs such as development and operating costs. It also includes expenditure associated with exploration activities undertaken in other areas by the taxpayer. Expenditures are typically incurred in the initial stages of the project, which tend to be loss making years. Therefore, in calculating taxable profits, expenditures can be carried forward to offset against future revenues. Expenditures are carried forward at specified rates of interest, by applying an annual 'uplift' factor.

Factors Affecting the Economic Cost of the Tax

The issues surrounding the economic costs of the PRRT were discussed in section 4.1 and so are summarised only briefly here.

The oil and gas extraction industry can be said to be earning economic rents from its use of a factor of production which is fixed in supply: oil and gas reserves. That is, in principle the industry is able to make profits in excess of the required rate of return on capital which is available in other industries.

The PRRT attempts to identify these economic rents and only apply the tax to them. It does this by using a Brown tax as its starting point: this would mean that it taxes the cash flow of a project, and has a neutral effect on investment decisions. However, the PRRT modifies the Brown tax in its treatment of the losses that are typical of the early years of a resources project when exploration and development expenditures are incurred. Instead of paying a tax rebate during the tax loss years, it carries these losses forward to offset against future profits. However, there is no certainty that there will be sufficient profits in future years to fully cover the carried forward losses.

To compensate for this uncertainty, the PRRT adds a de facto risk premium to the interest rate (or uplift factor) at which losses are carried forward. This risk premium is set at 15 per cent for exploration expenditure and 5 per cent for development and operating expenditures. This is an imperfect solution because the appropriate risk premium would vary from one project to the next, as it depends on the degree of uncertainty about whether there will be sufficient future profits to fully cover carried forward losses.

Under the PRRT, projects will be artificially discouraged in cases where the allowed uplift factor makes insufficient allowance for the uncertainty about whether the project's carried forward losses can be fully recovered from future profits. Conversely, projects will be artificially encouraged in cases where the allowed uplift factor makes excessive allowance for this project-specific uncertainty. This is likely to introduce a small degree of economic inefficiency into the PRRT. However, the extent of this inefficiency could only be estimated following extensive analysis of detailed data for multiple projects, which is beyond the scope of this report. Consequently, despite this apparent imperfection in the PRRT, the modelling makes the simplifying assumption that the PRRT acts as a pure tax on petroleum rents and hence has no economic cost.

Modelling Approach

As noted in Section 3, the inclusion of fixed factors in MM900 enhances the estimates of the excess burdens of taxes such as the petroleum resource rent tax. The income earned by resources industries from fixed factors introduces positive economic rents into the model. Taxes on these rents will simply erode them, rather than reduce the industry's ability to achieve the normal rate of return to capital. This results in no distortions to production choices.

In MM900, PRRT is modelled as a tax on the return to a fixed factor for the *oil and gas* industry. This will imply a zero economic cost for the PRRT in MM900, since it will simply be a transfer of surplus from the oil and gas industry to the government sector.

Economic Efficiency and Incidence

KPMG Econtech's CGE modelling report for the AFTS (KPMG Econtech, 2010) found using MM900 that the PRRT has an excess burden of zero. This outcome rests on the assumption that the PRRT only taxes the economic rents earned from immobile factors, in this case oil and gas reserves. If only these rents are taxed, then the investment decisions of petroleum extractors will not be distorted. Since the tax base for PRRT will not shrink in response to the tax, activity in the oil and gas industry will not be distorted, and there will be no economic costs associated with the PRRT.

The incidence of the PRRT is also a result of the immobile nature of the natural resources on which it is levied. Since there is no change in the supply of oil resources, their pre-tax price will not change. Instead, the after-tax return that owners of the resources are able to receive falls by the full amount of the tax in MM900. Detailed incidence estimates can be found in KPMG Econtech (2010).

4.3 Crude Oil Excise and Resource Royalties

As noted above, the existing regime for mining-specific taxation includes resource royalties, crude oil excise and petroleum resource rent tax. This section discusses crude oil excise and resource royalties, which are both similar in nature in that they are levied on production.

Definition

The **crude oil excise** is levied using a progressive rate scale on the value of crude oil production from onshore petroleum projects and the North West Shelf. The excise is collected on a per barrel basis, and the first 30 million barrels are exempt. There is also an annual exemption of 3.1 million barrels once the 30 million barrel limit has been reached (Commonwealth Treasury, 2008).

States and territories levy a range of **resource royalties** on the extraction of various natural resources. Unlike the PRRT, mineral royalties tend to be applied to the output of mining activity rather than to the profit earned from mining. They may be levied as ad valorem taxes on the value of production, or a constant amount per physical unit of production.

- Some royalties are calculated on an ad valorem basis, that is, as a proportion of the gross invoice value of the mineral less any allowable deductions. Ad valorem royalties generally apply to high value mining activity.

- Other royalties are calculated on a volumetric basis. This type of royalty tends to apply to low value commodities, such as clay and sand.

Resource royalties contribute significantly to the revenues of some state governments, particularly Western Australia and Queensland. For example, the amount of mineral and petroleum royalties collected by Queensland in 2008/09 was estimated to be \$3.3 billion. For the same year, in Western Australia, royalty collection was estimated at \$2.6 billion, and in New South Wales it was \$1.4 billion. However, resource royalty collections in 2008/09 were unusually high because they were boosted by record commodity prices.

Factors Affecting the Economic Cost of the Tax

An important distinction between a RSPT and the mining production taxes discussed here (crude oil excise and resource royalties) is that, while a RSPT aims to tax super profits, mining production taxes are applied to production values or volumes. Therefore, these mining production taxes raise the cost of each unit of production, driving a wedge between producer and consumer prices. This reduces the rate of return on each successful resources project, which may reduce output in the industry.

- Some projects may never go ahead. Resource deposits that would have been marginally profitable without crude oil excise and resource royalties may no longer go ahead in the presence of these taxes.
- Some projects may close at an earlier date. As the resource becomes more depleted, it may become more expensive to extract. With the added cost of crude oil excise and resource royalties, the extent to which extraction can continue without the costs being larger than the revenues may be reduced. Therefore, more resources might be expected to be left unutilised in the presence of these taxes.

In these ways, crude oil excise and resource royalties can reduce the production of the mining industry. This entails an economic cost. The more responsive output is to these mining-specific production taxes, the greater will be the economic cost.

As taxes on production, crude oil excise and resource royalties can also be thought of as a tax on the returns to labour, capital and natural resources employed in the mining industries. Capital in general is highly mobile between countries, so crude oil excise and resource royalties are likely to reduce investment in the Australian mining industry. Therefore, the main source of the economic cost of these taxes comes through their nature as taxes on the returns to capital in the mining industry. The portion of royalties applied to physical capital in the mining industry reduces the after-tax return to capital. This leads to capital flowing out of the sector, through the effects listed above, which carries an economic cost. The higher the mobility of capital, the greater will be this capital flight, and the greater will be the economic cost of crude oil excise and resource royalties.

Since the crude oil excise and resource royalties are mostly levied on an output basis, and accordingly there are minimal allowances for offsetting losses in the event of unsuccessful exploration activity, this tax can be considered asymmetrical. Therefore, unlike the RSPT, the crude oil excise and resource royalties can be expected to discourage exploration activity. This is because they reduce the expected gains if exploration is successful, but do not reduce the loss if it is unsuccessful, making exploration less economic.

Modelling Approach

As noted above, both the crude oil excise and resource royalties can be thought of as taxes on production. Therefore, in MM900 they are modelled as such, on each of the 15 relevant mining products. Each of these mining products attract tax at product-specific rates. These rates are calculated using revenue data from government budget papers and production data from ABARE.

Economic Efficiency and Incidence

KPMG Econtech's CGE modelling report for the AFTS (KPMG Econtech, 2010) found that crude oil excise and resource royalties have a high economic cost. This compares unfavourably with the low economic cost of resource rent taxes. This is because the resource royalties and crude oil excise are based on production volumes or values, as discussed above, rather than on super profits.

As noted above, a major reason for the high economic cost of crude oil excise and resource royalties is that they act partly as taxes on capital, which is highly mobile and flows out of the sector in response to these taxes. This distortion to capital supply is particularly costly for the mining sector for two reasons.

- The mining sector is capital intensive compared to the rest of the economy. Thus, taxes on capital are likely to result in output losses that are greater in relative terms for the resources industry than for other industries.
- Mining is a highly trade-exposed industry. Thus, it has little scope to increase output prices in response to royalties. Instead, the mining industry will respond via a contraction in production volumes. This contraction will be particularly important for the more marginal operations in the industry.

As well as taxing the returns to mobile factors of production, particularly capital, resource royalties and crude oil excise also tax the returns to immobile factors, natural resources, from which some mining sectors derive economic rents. As explained in section 4.1, the portion of crude oil excise and resource royalties that applies to these immobile factors would not have an economic cost. This would be an offsetting factor to the economic cost of these taxes.

The mobility of the factors producing mining output is also important for understanding the incidence of crude oil excise and resource royalties. As with other taxes on capital, capital owners will not bear the incidence. Instead, it will be passed on to other factors of production. For mining, natural resources are an important immobile factor, and bear much of the incidence. To a lesser extent, the land² used by the mining industry also bears some incidence. Some of the incidence is also passed through to lower real wages; in MM900 this comes about via higher prices³. Detailed incidence estimates can be found in KPMG Econtech (2010).

² Rural land is used both by mining industries, and by the agriculture, forestry and fishing industries. It is assumed that rural land is perfectly substitutable between these industries. Resource royalties and crude oil excise act as a tax on rural land used by the mining industry, but does not affect land used by the agricultural industry. This distorts the distribution of land use away from mining and towards agriculture, contributing to the excess burden of resource royalties and crude oil excise. If rural land were less substitutable between the mining and agriculture sectors, then the excess burden would be smaller.

³ The incidence of crude oil excise and resource royalties is transmitted through higher prices rather than a lower nominal wage because the nominal wages is the numeraire in MM900. However, the choice of numeraire does not

4.4 Company Income Tax

Definition

Company income tax is levied on the taxable income of Australian companies at a rate of 30 per cent. The tax also applies to incorporated and unincorporated associations, limited partnerships and some corporate unit trusts. Special rates apply to pooled development funds, certain classes of life insurance companies, credit unions and not for profit organisations.

Companies receive deductions because of capital depreciation. Research and development concessions are also available.

There are links between the personal income tax system and the company tax system. For example, Australian residents are able to offset their personal income tax liability with the company tax already paid on the dividends that they receive from ownership of Australian shares. This is done through the imputation system.

Foreign companies operating in Australia are subject to Australia's company tax. A few foreign countries offer tax credits for such tax paid overseas.

Factors Affecting the Economic Costs of the Tax

Company income taxes reduce the attractiveness of Australia as a destination for international investment funds. Thus, international capital mobility has important implications for the economic costs of company income taxes. If capital is highly mobile internationally, then the supply of investment funds to Australia will be highly elastic. This will mean that reducing company taxes will result in capital inflows to Australia. Kelly and Grazini (2005) list the potential welfare benefits from reducing company tax, including:

- "if Australia's capital stock increases, (there will be) greater labour income through increased productivity and possibly employment; and
- positive externalities or spill-overs associated with FDI (foreign direct investment) which improve labour and capital productivity, and hence labour and (residents') capital income".

However, they also note that the capital income from any FDI will accrue to the foreign investors and Australian residents will only capture a portion of this as tax revenue.

Therefore, the extent to which the capital stock would increase in response to a reduction in the company income tax is important for determining the benefits from such a policy. Generally, the supply of foreign investment funds to Australia is assumed to be perfectly elastic. This reflects economic theory that indicates that capital stocks adjust so that the after tax returns on investments are equalised across countries (after allowing for differences in risk). Under this analysis, an increase in the Australian corporate tax rate would reduce investment into Australia, increasing the before tax rate of return. This exit of capital would continue until capital was sufficiently scarce that the after tax rate of return was restored to equality with the rest of the world. However, there are a number of factors that may make the supply of foreign investment funds to Australia less than perfectly elastic, as discussed in section 3.7.

affect the real outcomes of the model, which is that the real wage falls in response to these taxes and so labour bears some of the final incidence.

Modelling Approach

As noted in Section 3.3, MM900 assumes that Australian households' propensity to save is constant. This is both to ensure that the level of domestic saving is sustainable and to avoid the problem that saving can appear artificially attractive in CGE models. The model then deduces the level of private savings (or assets) that is consistent with that saving rate.

The modelling assumption of fixed domestic savings means that any tax on the return to resident savings, such as company tax, will not have any impact on locally-funded investment levels. Therefore, in the model, the impact of reducing company tax on foreign investment in Australia will drive the estimate of the benefits from this policy.

Company tax is a direct tax in MM900 which drives a wedge between the after-tax required rate of return on international capital markets and the before tax rate of return. In MM900, the tax base for company tax is proxied by the net operating surplus of non-housing capital and fixed factors such as natural resources.

Economic Efficiency and Incidence

KPMG Econtech (2010) found that company income tax has a high economic cost. This result is largely because company income tax is applied to capital, which is highly mobile. Specifically, there are three main factors contributing to the high economic cost of company income tax.

- Foreign capital is highly mobile. This study uses the standard assumption that capital is highly mobile internationally and the supply of foreign capital to Australia very sensitive to its rate of return. Thus, when company tax is increased, the required pre-tax rate of return increases, leading to a fall in (foreign) investment.
- Capital is substitutable for other factors of production. When company tax increases the cost of capital relative to other factors of production, such as labour, firms substitute away from using capital and towards labour. This leads to production technologies that are more costly than would otherwise be the case.
- Franking credits reduce overall revenue collections. This is because Australian taxpayers can receive tax credits when they receive income in the form of franked dividend payments. So in MM900, franking credits reduce revenue from company tax without reducing its economic costs, making company tax a less efficient form of revenue raising. However, the franking credit system may encourage household saving, but MM900 does not take this into account for the reasons explained in section 3.3.

As discussed in section 3.7, the default assumption in MM900 is that the international supply of capital is perfectly mobile, which contributes to the economic cost of company income tax. This assumption implies that no increase in the return to capital is required to attract additional investment into Australia. When this assumption is relaxed, then the economic benefits of reducing company income tax are smaller but are still large.

The incidence of company income tax reflects the mobility of the factor to which it is applied. Company income tax is applied to profits, or the return to (equity-financed) capital, land and other fixed factors. The fixed supply of land and other fixed factors means that they will bear the full incidence of the company tax that is applied to them.

However, capital is highly mobile internationally and will not bear the incidence of company tax that is applied to it. Instead, foreigners will reduce their investments in Australia, and this increased scarcity of capital means that the productivity of capital in Australia will increase. The supply of capital will continue to fall until the increase in its pre-tax return fully offsets the increase in company income tax.

This process may take several years so that returns to capital fall initially, but ultimately the higher cost of capital will be passed on into higher prices or lower wages. In MM900, this cost is passed on in the form of higher prices.⁴ This reduces the real wage, so part of the final incidence of company income tax is borne by labour. Put another way, the erosion of the capital stock caused by company tax makes labour less productive, reducing real wages. In the long run, company tax is not borne by capital because capital is highly mobile. Detailed incidence estimates can be found in KPMG Econtech (2010).

⁴ The incidence of company income tax is transmitted through higher prices rather than a lower nominal wage because the nominal wage is the numeraire in MM900. However, the choice of numeraire does not affect the real outcome of the model, which is that the real wage falls in response to a company income tax and so labour bears the main final incidence.

5 Economic Impacts

The section reports the results from the MM900 simulation of 'the policy' i.e. the part of the Commonwealth Government's response to the Australian Future Tax System (AFTS) review that was identified in section 2. The MM900 model and its capturing of the taxes featuring in the policy have been described in sections 3 and 4 respectively. Importantly, the results in this section are consistent with the observations on the economic efficiency and incidence of each tax made in section 4.

The economic impacts of the policy are presented under two alternative economic assumptions – perfect and imperfect capital mobility – which were discussed in section 3.7. However, the main commentary centres around the case of perfect capital mobility.

As explained in section 2, the policy involves the following four components.

- 1) A new resource super profits tax (RSPT) is to be introduced and applied at a rate of 40 per cent to coal mining, oil and gas extraction and metal ore mining. It is intended to apply to the super profits or economic rents obtained from use of natural resources, not the normal profits required to attract capital to the mining industry.
- 2) The existing petroleum resource rent tax (PRRT) is to be abolished. Both the RSPT and the PRRT are resource rent taxes, but the RSPT is broader in its coverage of the mining industry, and hence makes the PRRT redundant.
- 3) The existing crude oil excise and resource royalties are also to be abolished. These taxes often apply to production rather than super profits, and so can discourage production.
- 4) The company tax rate will be reduced from 30 to 28 per cent. Company tax represents a tax on capital in the form of equity, and hence can discourage investment.

These components can be grouped into two parts. The first part, or resource taxes part, is made of the first three components, which aim to reform taxation of the mining industry. The second part, or company tax cut part, uses the net revenue gain from the first part to fund the company tax cut. To facilitate an understanding of the contribution of each part to the economic impacts of the policy, the two parts have been simulated both separately and together.

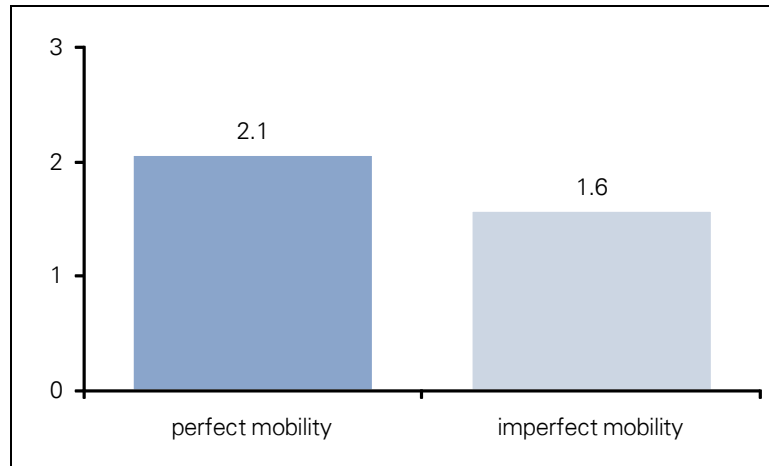
Section 5.1 presents the economic impacts of the full policy. Sections 5.2 and 5.3 identify the contributions to these economic impacts from the policy's resource taxes part and its company tax cut part respectively.

5.1 The Policy

Consumer welfare is the most important measure by which to assess the benefits of a policy. As discussed in sections 3.1 and 3.3, MM900 produces advanced estimates of consumer welfare effects. Specifically, the policy is estimated to result in an annual gain to consumer welfare of \$2.1 billion, as shown in Chart 5.1. The associated long-run gain in real household

consumption expenditure is 0.4 per cent.

Chart 5.1 Welfare Impacts (\$ billion, 2009/10 terms)



Source: MM900, KPMG Econtech simulations

As explained in section 4, the modelled welfare gain comes about because:

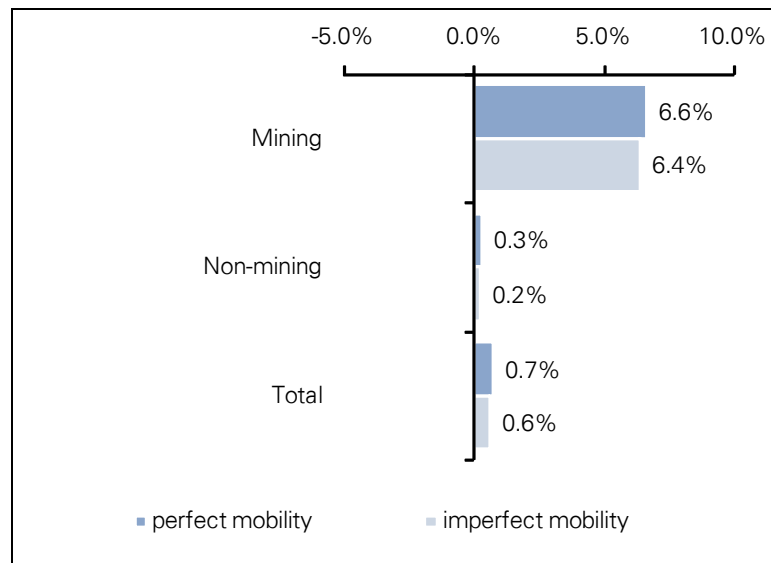
- introducing the new RSPT is assumed to have zero economic costs;
- abolishing the crude oil excise and state royalties leads to an economic gain because it encourages activity in the mining sector; and
- the cut in the company tax rate stimulates investment across the whole economy, also resulting in an economic gain.

The expected long-run impacts on production in mining and other industries is presented in Chart 5.2. Overall, total GDP is 0.7 per cent higher than would otherwise be the case.

As noted above, removing crude oil excise and resource royalties and cutting company tax is expected to lead to an expansion in mining industry production. This gain is estimated to be 6.6 per cent. Within the mining industry, the biggest gain is for coal at 14.4 per cent.

The cut in the company tax rate stimulates investment across the whole economy, leading to higher production reflected in the gain of 0.3 per cent in non-mining GDP.

Chart 5.2 GDP Impacts (per cent change from baseline)



Source: MM900, KPMG Econtech simulations

The tax reform means that the cost of living, as measured by the CPI, is 1.1 per cent lower than would otherwise be the case, raising real after-tax wages by the same amount. This fall in the cost of living occurs for both imported and domestically-produced consumer items. The appreciation of the exchange rate (on the back of an expanded mining sector) leads to lower import prices. The cut in company tax lowers the cost of capital, flowing through to lower prices for domestic production.

Capital Stock and Employment Estimates

The impacts on capital stocks and employment broadly follow the pattern of impacts on GDP. For the mining sector, the gains are 6.6 per cent for GDP, 7.7 per cent for employment and 5.3 per cent for capital. For the non-mining sector, the gains are 0.3 per cent for GDP, no impact for employment and 0.8 per cent for capital. For the total economy, the gains are 0.7 per cent for GDP, 0.1 per cent for employment and 1.3 per cent for capital.

Sensitivity Analysis for Less Mobile Capital

As can be seen in all of the charts presented, the economic benefits of the policy are less if capital is imperfectly (rather than perfectly) mobile. This is because the inflow of capital resulting from the abolition of crude oil excise and resource royalties, and the cut to company tax, will be smaller if capital is less internationally mobile, providing a smaller economic benefit. Most notably, if capital were less mobile, then the estimated gain in consumer welfare is lowered from \$2.1 billion to \$1.6 billion.

5.2 Resource Taxes Part

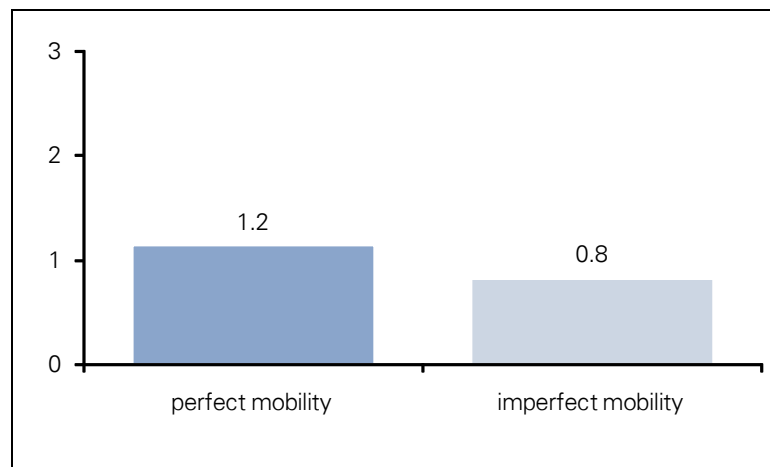
The above economic impacts of the policy reflect contributions from both its resource taxes part and its company tax cut part. To separately identify the contributions of the two parts, this section presents estimates of the economic impacts of the resource taxes part, while section 5.3 presents estimates of the economic impacts of the company tax cut part.

To recap, the resource taxes part involves the following components.

- A new resource super profits tax (RSPT) is to be introduced and applied at a rate of 40 per cent to coal mining, oil and gas extraction and metal ore mining.
- The existing petroleum resource rent tax (PRRT) is to be abolished.
- The existing crude oil excise and resource royalties are also to be abolished.

It does not include the cut in the company tax rate.

Chart 5.3 Welfare Impacts (\$ billion, 2009/10 terms)



Source: MM900, KPMG Econtech simulations

As noted previously, consumer welfare is the most important measure by which to assess the benefits of a policy. Chart 5.3 shows that the resource taxes part of the policy is expected to add \$1.2 billion to consumer welfare on an annual basis. The associated long-run gain in real household consumption expenditure is 0.2 per cent.

As explained in section 4, the welfare gain comes about because:

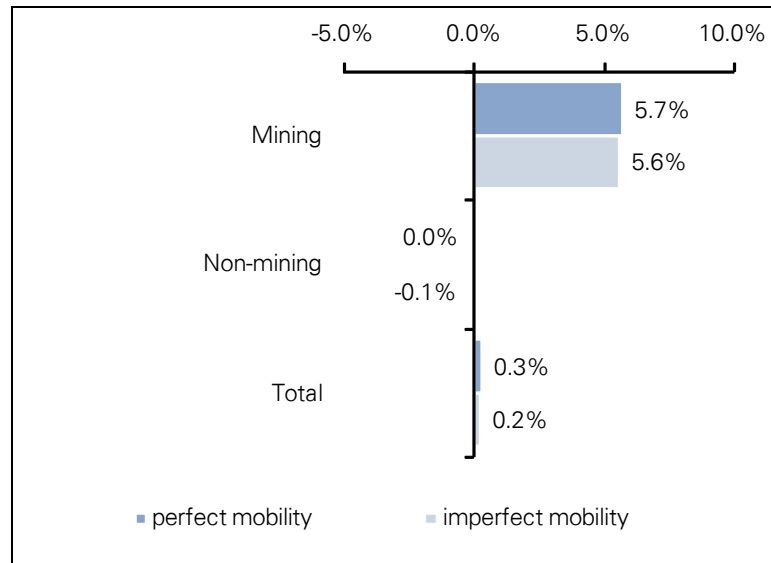
- introducing the new RSPT is assumed to have zero economic costs; and
- abolishing the crude oil excise and state royalties leads to an economic gain because it encourages activity in the mining sector.

Comparing Chart 5.3 with Chart 5.1, it can be seen that the full policy generates a larger gain in consumer welfare (\$2.1 billion) than the resource taxes part alone (\$1.2 billion). The additional

gain occurs because the cut in the company tax rate included under the full policy stimulates investment across the whole economy, leading to higher productivity.

The expected long-run impacts on production in mining and other industries under the resource taxes part of the policy are presented in Chart 5.4. Overall, total GDP is 0.3 per cent higher than would otherwise be the case.

Chart 5.4 GDP Impacts (per cent change from baseline)



Source: MM900, KPMG Econtech simulations

As noted above, removing crude oil excise and resource royalties is expected to lead to an expansion in mining industry production. This gain is estimated to be 5.7 per cent. Within the mining industry, the biggest gain is for coal at 13.1 per cent. There is no significant impact on non-mining GDP.

Comparing Chart 5.4 with Chart 5.2, it can be seen that the full policy generates a larger gain in GDP (0.7 per cent) than the resource taxes part alone (0.3 per cent). The additional gain occurs because the cut in the company tax rate included under the full policy stimulates investment across the whole economy, leading to higher production.

The appreciation of the exchange rate (on the back of an expanded mining sector) also leads to lower import prices. This means that the cost of living, as measured by the CPI, is 0.6 per cent lower than would otherwise be the case, raising real after-tax wages by the same amount.

However, the saving in the cost of living is greater under the full policy (1.1 per cent) than under the resource taxes part alone (0.6 per cent). The additional saving occurs because the cut in the company tax rate included under the full policy lowers the cost of capital, flowing through to lower prices for domestic production.

Capital Stock and Employment Estimates

The impacts on capital stocks and employment broadly follow the pattern of impacts on GDP. For the mining sector, the gains are 5.7 per cent for GDP, 7.2 per cent for employment and 4.4 per cent for capital. For the non-mining sector, the gains are no impact for GDP, no impact for employment and 0.1 per cent for capital. For the total economy, the gains are 0.3 per cent for GDP, 0.1 per cent for employment and 0.6 per cent for capital.

Sensitivity Analysis for Less Mobile Capital

As can be seen in all of the charts presented, the economic benefits of the resource taxes part of the policy are less if capital is imperfectly (rather than perfectly) mobile. This is because the inflow of capital resulting from the abolition of crude oil excise and resource royalties will be smaller if capital is less internationally mobile, providing a smaller economic benefit. Most notably, if capital were less mobile, then the estimated gain in consumer welfare is lowered from \$1.2 billion to \$0.8 billion.

5.3 Company Tax Cut Part

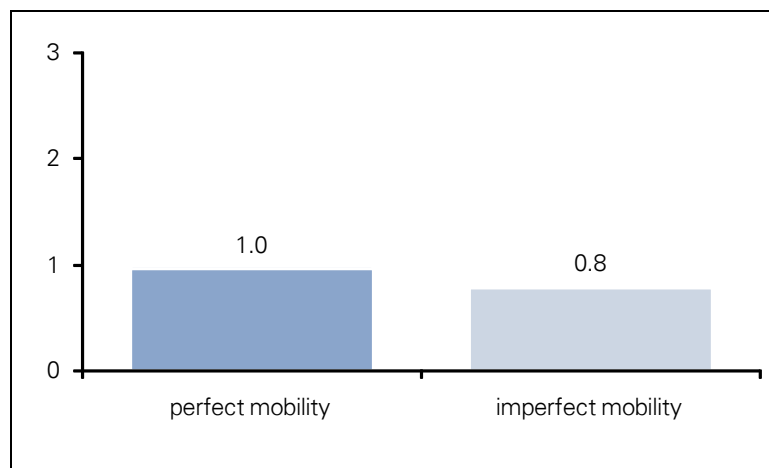
This section presents estimates of the economic impacts of the company tax cut part of the policy. The economic impacts of the resource taxes part were presented in section 5.2, while the impacts of the full policy (i.e. both parts combined) were presented in section 5.1.

To recap, the company tax cut part of the policy involves a cut in the company tax rate from 30 to 28 per cent. Company tax represents a tax on capital in the form of equity, and hence can discourage investment. This modelling of the company tax cut part of the policy does not include the resource taxes part.

As noted previously, consumer welfare is the most important measure by which to assess the benefits of a policy. Chart 5.5 shows that the company tax cut part of the policy is expected to add \$1.0 billion to consumer welfare. The associated long-run gain in real household consumption expenditure is 0.2 per cent.

As explained in section 4, the welfare gain comes about because the cut in the company tax rate stimulates investment across the whole economy, also resulting in an economic gain.

Chart 5.5 Welfare Impacts (\$ billion, 2009/10 terms)



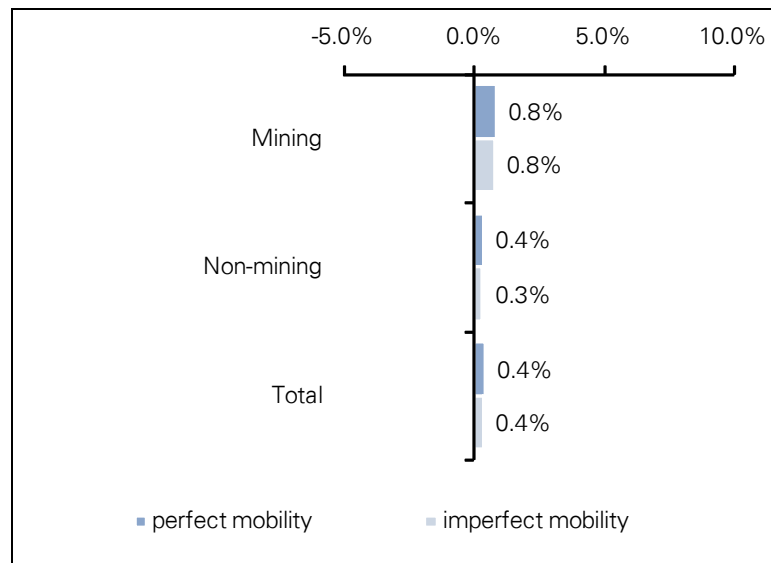
Source: MM900, KPMG Econtech simulations

The contributions of the two parts of the policy to its overall consumer welfare gain can now be seen. The resource taxes part adds \$1.2 billion (Chart 5.3), and the company tax cut part adds \$1.0 billion (Chart 5.5), approximately adding to the overall gain in consumer welfare of \$2.1 billion (Chart 5.1). So the two parts of the policy are of broadly equal importance in generating gains in consumer welfare.

Similarly, the two parts of the policy contribute 0.2 percentage points each to the overall gain in real household consumption expenditure from the policy of 0.4 per cent.

The expected long-run impacts on production in mining and other industries under the company tax cut part of the policy are presented in Chart 5.6. Overall, total GDP is 0.4 per cent higher than would otherwise be the case.

Chart 5.6 GDP Impacts (per cent change from baseline)



Source: MM900, KPMG Econtech simulations

The cut in the company tax rate stimulates business investment. The resulting additions to business capital add to production across the economy, as seen in Chart 5.6. Mining experiences a relatively large gain from lower company tax, because of its capital-intensive nature.

The contributions of the two parts of the policy to the overall gain in GDP of 0.7 per cent (Chart 5.2) can now be seen. The resource taxes part adds 0.3 per cent (Chart 5.4), and the company tax cut part adds 0.4 per cent (Chart 5.6). So the two parts of the policy are of broadly equal importance in generating gains in GDP.

The cut in the company tax rate also lowers the cost of capital, flowing through to lower prices for domestic production. This leads to the CPI being 0.5 per cent lower than otherwise, flowing through to the same gain in after-tax real wages. In section 5.2, the resources tax part of the full policy reduced the CPI by a further 0.6 per cent. Thus, in section 5.1, the full policy was estimated to lower the CPI by a total of 1.1 per cent.

Capital Stock and Employment Estimates

The impacts on capital stocks and employment broadly follow the pattern of impacts on GDP. For the mining sector, the gains are 0.8 per cent for GDP, 0.4 per cent for employment and 0.8 per cent for capital. For the non-mining sector, the gains are 0.4 for GDP, 0.1 per cent for employment and 0.7 per cent for capital. For the total economy, the gains are 0.4 per cent for GDP, 0.1 per cent for employment and 0.7 per cent for capital.

Sensitivity Analysis for Less Mobile Capital

As can be seen in all of the charts presented, the economic benefits of the company tax part of the policy are less if capital is imperfectly (rather than perfectly) mobile. This is because the inflow of capital resulting from the cut to company tax will be smaller if capital is less

internationally mobile, providing a smaller economic benefit. Most notably, if capital were less mobile, then the estimated gain in consumer welfare is lowered from \$1.0 billion to \$0.8 billion.

5.4 Applicability of Results

As explained in section 3, MM900 was developed with a special emphasis on the economic impacts of taxation, making it uniquely well suited to this study. This means the estimates of economic impacts of the policy scenario are more robust than would be the case using other models. However, the following caveats apply.

- The estimates are long run impacts. For some tax changes, especially changes affecting the taxation of capital, these impacts would take five to ten years to fully develop. Further, this long run focus also means that the modelling results abstract from the phasing arrangements included in the Government's response. Hence, the modelling shows the economic impacts after the new tax regime is phased in and the economy has fully adjusted.
- The estimates are subject to margins of error because they are based on behavioural parameters that are themselves subject to margins of error. As an indication of the extent of these margins of error, the sensitivity of the results to the degree of capital mobility has been presented.
- The policy scenario involves the introduction of a new broad Resource Super Profits Tax (RSPT). The modelling of this new tax is subject to greater uncertainty than the modelling of existing taxes. One reason for this is that, while the principles of the tax are known, the implementation will also be important and needs to be taken into account in a final assessment of the reasonableness of the modelling assumption that the RSPT has no economic inefficiency cost.
- The policy would have implications for Commonwealth-State financial relations. However, this report takes a national perspective on tax reform i.e. it considers Commonwealth, State and Local Government taxes together. Further, the RSPT includes provisions to fully offset any tax burden from any continuance of state mining royalties.

6 References

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A The Policy

Table 1
National Macro Effects

	perfect mobility	imperfect mobility
<i>Welfare Impacts (\$million)</i>		
Welfare loss	-2,063	-1,572
<i>CPI and Wage Impacts (% change compared to Baseline)</i>		
CPI All Groups	-1.1%	-1.0%
Real After-tax Wage	1.1%	1.0%
exchange rate	2.2%	2.1%
<i>GDP by Expenditure (% change compared to Baseline)</i>		
Household consumption	0.4%	0.3%
General government final demand	0.0%	0.0%
Investment	2.1%	1.8%
Exports	0.7%	0.6%
less Imports	0.6%	0.5%
GDP	0.7%	0.6%

Table 2
CPI Groups (% change compared to Baseline)

	perfect mobility	imperfect mobility
Food	-0.9%	-0.8%
Alcohol and Tobacco	-1.1%	-1.0%
Clothing and Footwear	-1.3%	-1.2%
Housing	-1.1%	-0.8%
Household Contents and Services	-1.1%	-1.0%
Health	-0.6%	-0.5%
Transportation	-1.7%	-1.6%
Communication	-1.4%	-1.2%
Recreation	-1.3%	-1.1%
Education	-0.3%	-0.3%
Financial and Insurance Services	-0.8%	-0.6%
CPI All Groups	-1.1%	-1.0%

Table 3
Incidence (nominal \$m change compared to Baseline)

	perfect mobility	imperfect mobility
Tax revenue	-270	-328
After tax labour income	657	570
After tax private land income - residential	-52	-3
After tax private land income - rural	156	169
After tax private land income - urban	299	330
After tax private other rent income	-3,736	-3,750
After tax other private income	-2,762	-1,687
Change in total domestic income (\$m):	-5,438	-4,372
Change in total domestic income (% change):	-0.8%	-0.6%
Change in price essential consumption	-1.1%	-0.9%
Change in price non-essential consumption	-1.1%	-0.9%

Table 4
Production Effects - Mining (% change compared to Baseline)

	perfect mobility	imperfect mobility
Coal	14.4%	14.1%
Oil and gas	4.9%	4.7%
Iron ores	4.9%	4.8%
Non-ferrous metal ores	2.8%	2.5%
Other mining	0.0%	-0.2%
Services to mining	5.5%	5.3%

Table 5
Production Price Effects - Mining (% change compared to Baseline)

	perfect mobility	imperfect mobility
Coal	-4.8%	-4.6%
Oil and gas	-2.8%	-2.7%
Iron ores	-3.5%	-3.3%
Non-ferrous metal ores	-3.5%	-3.3%
Other mining	-1.5%	-1.3%
Services to mining	-1.2%	-1.0%

B Resource Taxes Part

Table 1
National Macro Effects

	perfect mobility	imperfect mobility
<i>Welfare Impacts (\$million)</i>		
Welfare loss	-1,153	-839
<i>CPI and Wage Impacts (% change compared to Baseline)</i>		
CPI All Groups	-0.6%	-0.5%
Real After-tax Wage	0.6%	0.5%
exchange rate	1.7%	1.7%
<i>GDP by Expenditure (% change compared to Baseline)</i>		
Household consumption	0.2%	0.1%
General government final demand	0.0%	0.0%
Investment	1.0%	0.8%
Exports	0.1%	0.0%
less Imports	0.2%	0.1%
GDP	0.3%	0.3%

Table 2
CPI Groups (% change compared to Baseline)

	perfect mobility	imperfect mobility
Food	-0.4%	-0.4%
Alcohol and Tobacco	-0.5%	-0.4%
Clothing and Footwear	-0.8%	-0.7%
Housing	-0.4%	-0.3%
Household Contents and Services	-0.6%	-0.6%
Health	-0.3%	-0.2%
Transportation	-1.2%	-1.1%
Communication	-0.5%	-0.4%
Recreation	-0.8%	-0.7%
Education	-0.2%	-0.1%
Financial and Insurance Services	-0.2%	-0.1%
CPI All Groups	-0.6%	-0.5%

Table 3
Incidence (nominal \$m change compared to Baseline)

	perfect mobility	imperfect mobility
Tax revenue	2,609	2,563
After tax labour income	309	255
After tax private land income - residential	-24	8
After tax private land income - rural	-266	-256
After tax private land income - urban	-17	5
After tax private other rent income	-4,415	-4,427
After tax other private income	-1,122	-435
Change in total domestic income (\$m):	-5,534	-4,850
Change in total domestic income (% change):	-0.8%	-0.7%
Change in price essential consumption	-0.6%	-0.4%
Change in price non-essential consumption	-0.6%	-0.4%

Table 4
Production Effects - Mining (% change compared to Baseline)

	perfect mobility	imperfect mobility
Coal	13.1%	12.9%
Oil and gas	4.3%	4.3%
Iron ores	4.3%	4.2%
Non-ferrous metal ores	1.8%	1.7%
Other mining	-1.0%	-1.1%
Services to mining	4.5%	4.4%

Table 5
Production Price Effects - Mining (% change compared to Baseline)

	perfect mobility	imperfect mobility
Coal	-4.2%	-4.1%
Oil and gas	-2.3%	-2.3%
Iron ores	-3.0%	-2.9%
Non-ferrous metal ores	-3.0%	-2.9%
Other mining	-0.6%	-0.4%
Services to mining	-0.5%	-0.4%

C Company Tax Cut Part

Table 1
National Macro Effects

	perfect mobility	imperfect mobility
Welfare Impacts (\$million)		
Welfare loss	-970	-792
CPI and Wage Impacts (% change compared to Baseline)		
CPI All Groups	-0.5%	-0.5%
Real After-tax Wage	0.5%	0.5%
exchange rate	0.5%	0.4%
GDP by Expenditure (% change compared to Baseline)		
Household consumption	0.2%	0.1%
General government final demand	0.0%	0.0%
Investment	1.1%	1.0%
Exports	0.6%	0.6%
less Imports	0.4%	0.4%
GDP	0.4%	0.4%

Table 2
CPI Groups (% change compared to Baseline)

	perfect mobility	imperfect mobility
Food	-0.5%	-0.4%
Alcohol and Tobacco	-0.6%	-0.5%
Clothing and Footwear	-0.5%	-0.4%
Housing	-0.6%	-0.6%
Household Contents and Services	-0.5%	-0.4%
Health	-0.3%	-0.3%
Transportation	-0.5%	-0.4%
Communication	-0.9%	-0.8%
Recreation	-0.5%	-0.5%
Education	-0.2%	-0.1%
Financial and Insurance Services	-0.6%	-0.5%
CPI All Groups	-0.5%	-0.5%

Table 3
Incidence (nominal \$m change compared to Baseline)

	perfect mobility	imperfect mobility
Tax revenue	-2,991	-2,997
After tax labour income	336	305
After tax private land income - residential	-28	-11
After tax private land income - rural	429	431
After tax private land income - urban	316	323
After tax private other rent income	855	851
After tax other private income	-1,684	-1,307
Change in total domestic income (\$m):	224	592
Change in total domestic income (% change):	0.0%	0.1%
Change in price essential consumption	-0.5%	-0.4%
Change in price non-essential consumption	-0.5%	-0.5%

Table 4
Production Effects - Mining (% change compared to Baseline)

	perfect mobility	imperfect mobility
Coal	1.1%	1.0%
Oil and gas	0.5%	0.5%
Iron ores	0.6%	0.6%
Non-ferrous metal ores	0.9%	0.9%
Other mining	1.0%	0.9%
Services to mining	1.0%	0.9%

Table 5
Production Price Effects - Mining (% change compared to Baseline)

	perfect mobility	imperfect mobility
Coal	-0.7%	-0.6%
Oil and gas	-0.5%	-0.4%
Iron ores	-0.5%	-0.5%
Non-ferrous metal ores	-0.5%	-0.5%
Other mining	-1.0%	-0.9%
Services to mining	-0.6%	-0.6%