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An Economic Analysis of Tax Policies Involving the Introduction of a Broad Based Resource Rent Tax

This report was prepared for [illegible]

[illegible] 2010

AUDIT ▪ TAX ▪ ADVISORY

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Key Findings

Origin Energy is concerned about public speculation that the Henry Tax Review may recommend that a broad Resource Rent Tax (RRT) be introduced to replace existing mining specific taxes (such as royalties) and to fund a reduction in the current company tax rate. In particular, Origin Energy is concerned that this may result in an increased tax burden on the resources sector. Against this background, Origin Energy has commissioned KPMG Econtech to:

- undertake a detailed analysis of a hypothetical "tax mix switch" policy, involving the introduction of a general Resource Rent Tax (RRT) to replace existing mining-specific taxes (such as royalties) and to fund a 5 percentage point cut in the current company tax rate;
- undertake an assessment of the impact on the results from relaxing the important traditional assumptions commonly used in this analysis;
- provide comment on the potential delays in achieving the expected benefits of a "tax mix switch", and the potential impacts for individual resource projects in the short term; and
- comment on the challenges of introducing a "tax mix switch" that involves a general RRT.

The traditional arguments in support of such a "tax mix switch" policy option are:

- taxes on immobile resources – such as taxes on land or resource rent taxes on natural resources – have a low economic cost;
- taxes on mobile resources – such as national company income tax on globally-mobile capital – have a high economic cost because of their potential to distort the pattern of economic activity; and
- narrowly-based taxes – such as production-based mining-specific taxes – may also have high economic costs by discouraging economic activity.

In line with these arguments, recent economic analysis has also sought to develop a "tax and growth" ranking of taxes. This ranking shows that company income taxes are among the most detrimental to economic growth, while taxes on consumption and immobile resources have the least impact on economic growth.[1]

In addition to efficiency considerations, there are other implications and considerations that have been raised when analysing tax policy. For example, a related argument is that a small open economy such as Australia, competing for international capital, must have regard to the international competitiveness of its company tax rate (Treasury, 2008). Further, some analysts argue that natural resource taxes could be used to finance lower taxes on other areas of the economy (such as manufacturing) to encourage activity in those sectors (Ahrend, 2006).

The traditional economic analysis uses two important assumptions.

1. *The supply of capital is perfectly mobile internationally. This leads to a conclusion that company income tax and mining-specific taxes such as royalties, which are wholly or partly taxes on capital, have high economic costs.*

[1] See Johansson et al (2008), Arnold (2008) and Myles (2009).

2. *It is possible to implement a perfectly designed RRT system that has zero economic costs.*

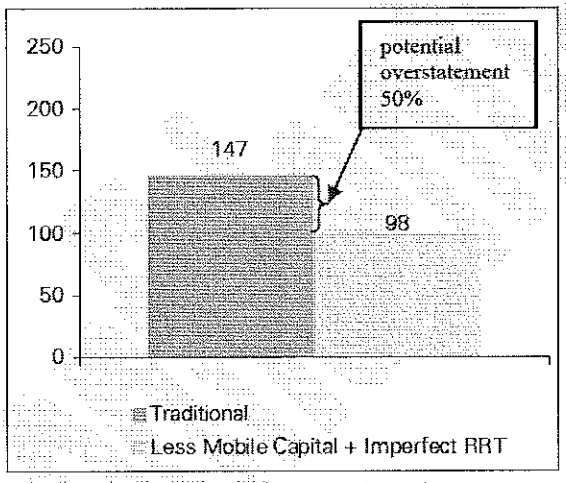
As noted above, our analysis assesses the implications of relaxing these assumptions. Our analysis concludes the following.

1. Although the "tax mix switch" policy option modelled involves a positive welfare gain, when it is taken into account that there are potential imperfections in capital mobility and in the design of the RRT, the estimated benefit is lower. Thus, the traditional analysis could overstate the benefits of the "tax mix switch" policy option. This is true for the estimated benefits to the economy as a whole, the mining sector, and Queensland and Western Australia.
2. Although there are positive impacts for Gross Domestic Product and mining sector output under this "tax mix switch" policy, under some assumptions, it has negative flow-on impacts to non-resource trade-exposed industries, such as agriculture, manufacturing and tourism. The modelling results show that this particular "tax mix switch" policy option would not encourage activity in these sectors.
3. While the impacts of the "tax mix switch" policy on employment in states such as Queensland and Western Australia are expected to be positive, employment in Victoria, South Australia and Tasmania is either unchanged or reduced. At the same time, all states are expected to receive gains in Gross State Product from the policy.
4. The potential benefits shown in the modelling refer to the long term impacts of the "tax mix switch" policy. Normal economic adjustment processes mean that these benefits may take 5 to 10 years to be fully realised. Following a tax mix switch, the development of a resource may also be delayed for a time, as a funding-constrained project developer may choose to divert capital originally earmarked for a particular project to a lower taxed project alternative in another country.
5. If the RRT is not designed perfectly, so that, in part, it does tax required returns to capital, then the "tax mix switch" policy would have a smaller positive effect on economic activity. In particular, designing a perfect broad based RRT is challenging for a number of reasons.
   - In practice, required rates of return are not uniform across the resources sector as a whole, or within individual commodity groups.
   - Difficulties in designing a RRT are exacerbated by uncertainties around future commodity price levels (terms of trade).
   - The more revenue that is required by the Government from a RRT, the more difficult it becomes to design a RRT that only taxes economic rents.
6. There may be negative sovereign risk impacts if existing and potential investors perceive that the government may alter the design of the RRT in the future, for example, by increasing the rate. This has the potential to reduce the gain in investment from the "tax mix switch", which would then have a smaller positive benefit than estimated by the traditional economic analysis.
7. A full assessment of a "tax mix switch" policy involving a broad based RRT should not only take into account the traditional analysis, but should also take into account that capital may be less than perfectly mobile, the design of the RRT may not be perfect and that sovereign risk may be an issue. All of these factors may reduce the estimated benefit, derived in the long term, from the introduction of a broad based RRT.

Our analysis relaxes two key traditional assumptions (noted above) by taking into account that capital may be less than perfectly mobile internationally and that it is difficult to design a RRT with zero economic costs, particularly if the terms of trade outcomes prove to be not as strong as currently forecast.[2] We simulate the "tax mix switch" policy option under both the traditional assumptions and this plausible set of relaxed assumptions. The main results from these simulations are presented below.

A welfare gain of $147 per capita is estimated under the traditional analysis of the "tax mix switch" policy. However, this could overstate the welfare benefits by around 50 per cent, with the result that a per capita welfare gain of $98 per capita would be achieved when it is taken into account that capital may be less than perfectly mobile and that the RRT may be imperfectly designed, as shown in Chart (i). Other economic and welfare changes under the two sets of assumptions are compared in Charts (ii) and (iii).

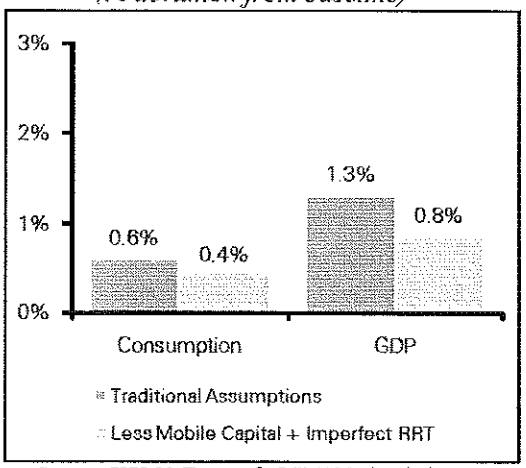
Chart (i): "Tax mix switch" – change in consumer welfare per capita ($per capita, 2009/10 terms)



Source: KPMG Econtech, MM900 simulations

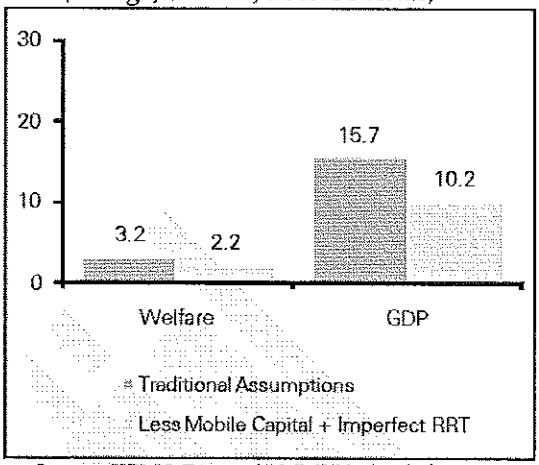
[2] A lower terms of trade increases the likelihood that a RRT will be imperfect. The baseline scenario assumes the 2005/06 terms of trade, but this forecast is uncertain. To explore the possible implications of these uncertainties, the imperfect RRT scenario refers to the case where the terms of trade are at 2004/05 levels and the RRT is imperfectly designed.

Chart (ii): Tax Mix Switch - consumption and GDP (% deviation from baseline)



Source: KPMG Econtech, MM900 simulations
Note: Traditional analysis could overstate both consumption and GDP benefits by around 50 per cent each.

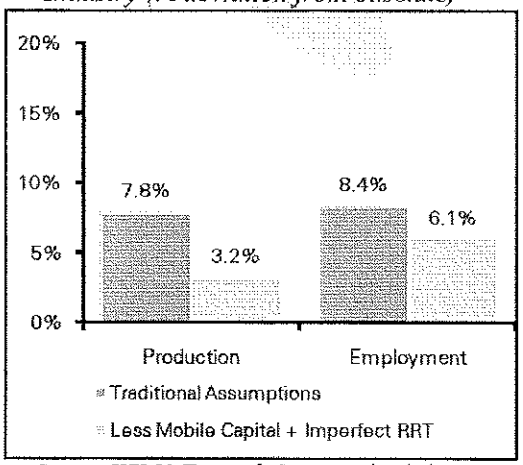
Chart (iii): Tax mix switch - consumer welfare and GDP (change, $billion, 2009/10 terms)



Source: KPMG Econtech, MM900 simulations
Note: Traditional analysis could overstate both consumer welfare and GDP benefits by around 50 per cent each.

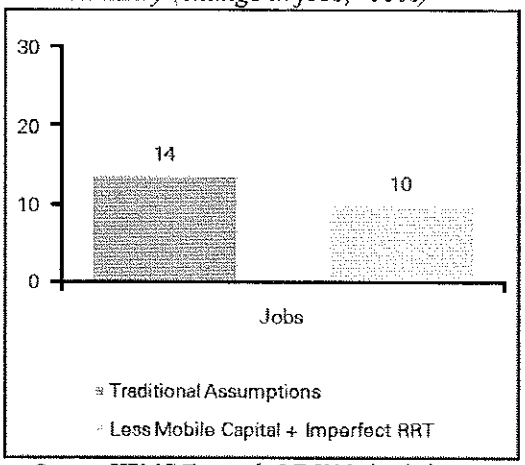
While the "tax mix switch" policy is expected to have a positive impact on the mining industry, the traditional assumptions could overstate these benefits. Under the traditional assumptions, mining industry production is estimated to be 7.8 per cent higher and employment is estimated to be 8.4 per cent higher if the "tax mix switch" policy is implemented. This can be largely attributed to the reduction in mining specific taxes such as royalties. However, these results could overstate the benefits of the policy for mining industry production and employment by around 140 per cent and 40 per cent respectively, compared to a case which relaxes the traditional assumptions. The charts below present the simulated increases the impacts on the mining industry under the two sets of assumptions.

Chart (iv): Tax mix switch - Mining Industry (% deviation from baseline)



Source: KPMG Econtech, MM900 simulations

Chart (vi): Tax mix switch – Mining Industry (change in jobs, '000s)

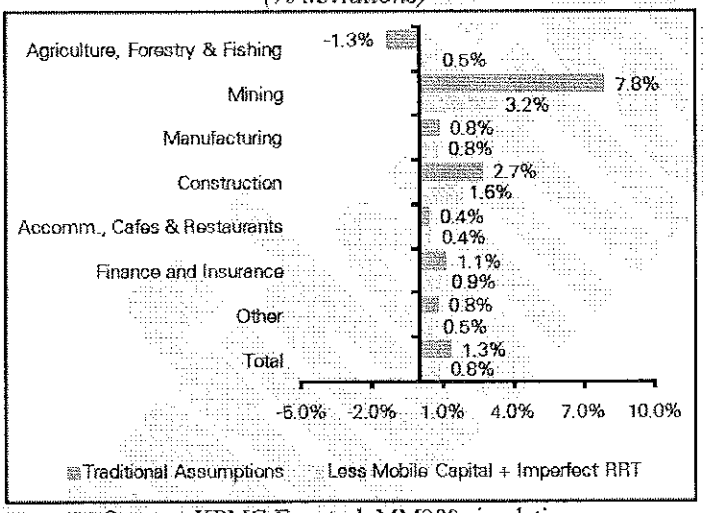


Source: KPMG Econtech, MM900 simulations

Although the "tax mix switch" policy has a positive impact on the mining industry, it is expected to have a negative impact on some other trade-exposed sectors of the economy. This is because the value of the Australian dollar is expected to appreciate under the policy because of the potential improvement in the balance of trade from higher mining exports. For example agricultural production and employment is lower by 1.3 and 2.1 per cent respectively under the traditional analysis. Employment in the manufacturing industry is flat or 0.3 percent lower.

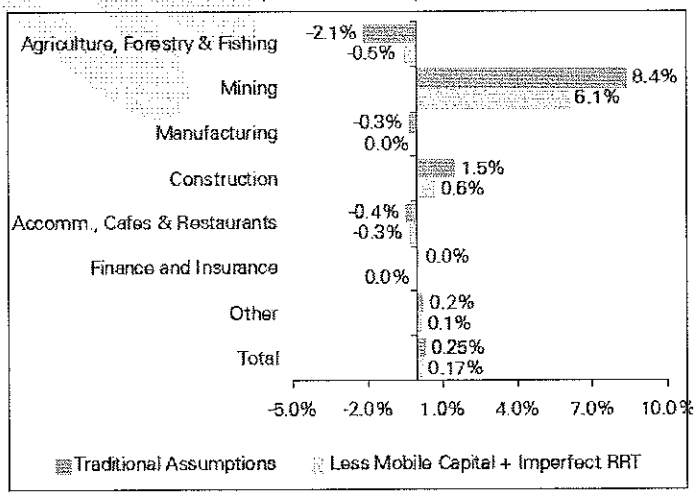
The traditional analysis could also overstate the industry production and employment results. The results under the assumptions of less mobile capital and an imperfectly designed RRT are presented in the charts below.

Chart (vii): Tax Mix Switch - selected industry production effects (% deviations)



Source: KPMG Econtech MM900 simulations.

Chart (viii): Tax Mix Switch - selected industry employment effects (% deviations)

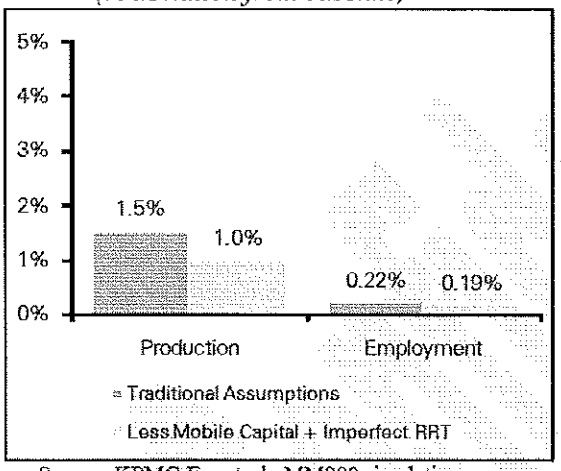


Source: KPMG Econtech MM900 simulation

Following on from these sectoral results, states with relatively large mining industries (such as Queensland and Western Australia) are expected to benefit from the "tax mix switch" policy. However, the traditional assumptions may also overstate these benefits to Queensland and Western Australian production and employment from the "tax mix switch" policy.

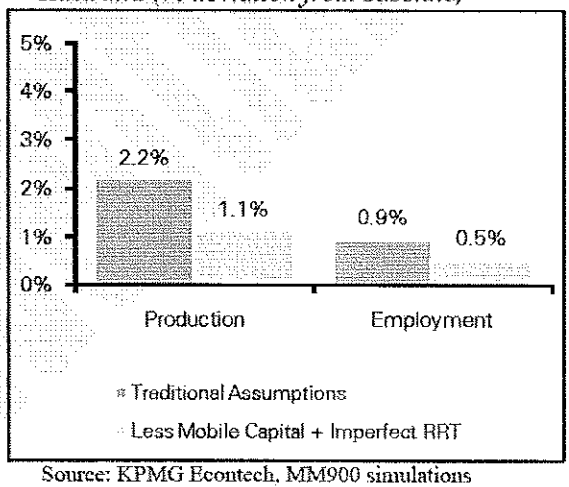
- In Queensland, the traditional analysis estimates that production and employment would increase by 1.5 per cent and 0.2 per cent respectively. This traditional analysis could overstate the gains by around 50 per cent and 15 per cent respectively (see Chart (ix)).
- In Western Australia, the traditional analysis estimates that production and employment would increase by 2.2 per cent and 0.9 per cent respectively. This traditional analysis could overstate the gains by around 95 per cent for production and around 75 per cent for employment (see Chart x).

Chart (ix): Tax mix switch – Queensland (% deviation from baseline)



Source: KPMG Econtech, MM900 simulations

Chart (x): Tax mix switch – Western Australia (% deviation from baseline)

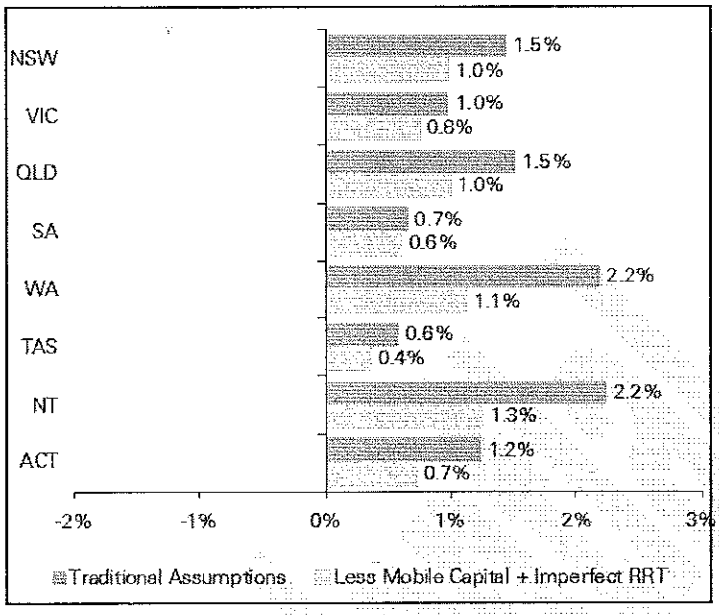


Source: KPMG Econtech, MM900 simulations

Production in all states is higher due to the "tax mix switch" policy. This is because all industries benefit from reduced taxation on capital. However, although employment in states with relatively large mining industries is higher from the "tax mix switch" policy, in some states employment is either flat or lower. For example, under the traditional analysis, Victorian employment remains unchanged and employment levels in South Australia and Tasmania are expected to be lower than otherwise by 0.3 and 0.4 percent respectively, as shown in Chart (xii) on the following page. The results under the assumptions that capital is less than perfectly mobile and that the RRT is imperfect are also shown.

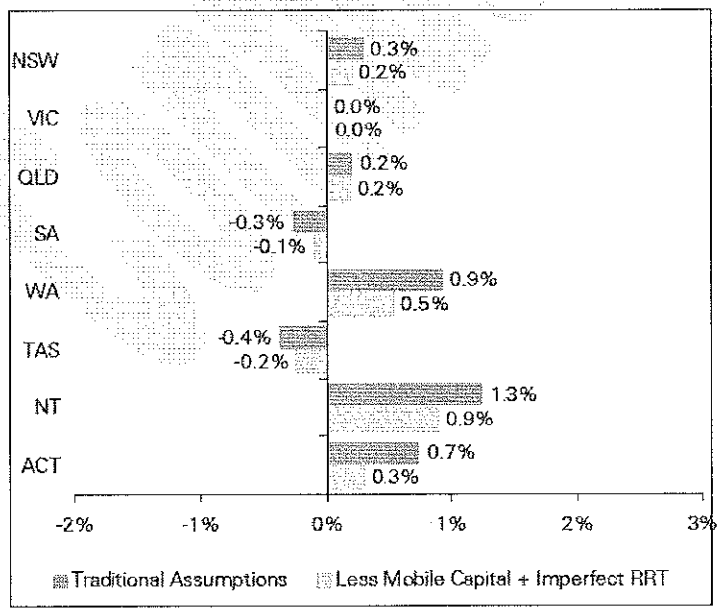
Further, these results show that this particular "tax mix switch" policy could not be used to encourage activity in some other sectors (such as agriculture and manufacturing). This is because this policy is expected to put upward pressure on the value of the Australian dollar as a result of the potential improvement in the balance of trade from higher mining exports. This, in turn, contributes pressure on trade-exposed industries and on those states where these trade-exposed industries are more prominent.

Chart (xi): Tax Mix Switch - state production effects
(% deviations)



Source: KPMG Econtech MM900 simulations.

Chart (xii): Tax Mix Switch - state employment effects
(% deviations)



Source: KPMG Econtech MM900 simulations.

The changes in the Northern Territory and the Australian Capital Territory shown in the charts above are relatively large in percentage terms, but because of the low population levels in these territories, this result is not a large change in absolute terms.

Executive Summary

The Commonwealth Government has commissioned a panel of experts to undertake a review of Australia's Future Tax System, headed by Dr Ken Henry and termed 'the Henry Tax Review'. The review panel has delivered its report to the Government and the Government has announced that it will release it, along with a preliminary response, before the 2010 May Budget.

Of particular concern to Origin Energy is the public speculation that the Henry Tax Review may recommend that a broad resource rent tax (RRT) be introduced to replace existing mining specific taxes (such as royalties) and to fund a reduction in the current company tax rate. In particular, Origin Energy is concerned that this may result in an increased tax burden on the resources sector. Against this background, Origin Energy has commissioned KPMG Econtech to:

- undertake a detailed analysis of a hypothetical "tax mix switch" policy, involving the introduction of a general Resource Rent Tax (RRT) to replace existing mining-specific taxes (such as royalties) and to fund a 5 percentage point[3] cut in the current company tax rate;
- undertake an assessment of the impact on the results from relaxing the important traditional assumptions commonly used in this analysis;
- provide comment on the potential delays in achieving the expected benefits of a "tax mix switch", and the potential impacts for individual resource projects in the short term; and
- provide comment on the challenges of introducing a "tax mix switch" that involves a general RRT.

The "tax mix switch" has been supported by the traditional economic analysis of RRT, company income tax and existing mining-specific taxes, such as royalties. Briefly, traditional analysis concludes (on the basis of a number of key assumptions) that while a RRT would have zero economic costs, company tax and existing mining-specific taxes such as royalties have a high economic cost. These conclusions are based on the following traditional analysis.

- The expected zero cost of a perfectly designed RRT arises from its aim to tax the returns of an immobile factor – natural resources. Natural resources have a scarcity value meaning that *economic rents*[4] can be earned on their extraction. The traditional analysis assumes that a RRT can be designed to tax only these rents. Such a RRT would, therefore, not alter decisions to develop the resource as the required rate of return to capital would still be available in the industry. Therefore, under this assumption, as the economy remains unchanged by the RRT, there would be no economic cost from its implementation (Boadway and Keen, 2009) – the only result would be a shift in income from the resource owners to the government.

[3] Origin Energy have chosen a 5 percentage point reduction because they believe that this would bring Australia's statutory company tax rate to just below the current OECD average, thus making it internationally competitive.

[4] In the resources sector, *economic rents* are derived from access to a natural resource. They are any profit in the resources industry over and above the required rate of return to capital.

- The high cost of company income tax and mining-specific taxes such as royalties arises from taxing the returns of a factor which is highly mobile internationally – financial capital. Under the assumption of perfect capital mobility, investors would respond to an increase in the company income tax rate by withdrawing funds from Australia, and this would continue until the pre-tax return on investment in Australia had risen by the full amount of the tax. This means that the capital stock in Australia would shrink, reducing production in the affected industries, and resulting in an economic cost.

Recent work by the OECD has built on this analysis and sought to examine the relationship between tax structures and economic growth.[5] Johansson et al (2008, p.2) reached the following conclusion.

> *Corporate taxes are found to be most harmful for growth, followed by personal income taxes, and then consumption taxes. Recurrent taxes on immovable property appear to have the least impact. A revenue neutral growth-oriented tax reform would, therefore, be to shift part of the revenue base from income taxes to less distortive taxes such as recurrent taxes on immovable property or consumption.*

While this study defines immovable property as land and buildings, natural resources could also be considered to fall in this category, because natural resource deposits are location-specific. However these OECD studies do not specifically consider a RRT.

Concerns about the international competitiveness of Australia's company tax rate have also been presented as a reason for reducing the tax rate.[6] This argument is also related to assumptions about the international mobility of financial capital. The more mobile capital is, the more it would respond to changes in Australia's company tax rate relative to that of other countries. Thus, if the company income tax rate is reduced, the traditional analysis would expect an inflow of foreign investment funds until the after tax rate of return on Australian capital is returned to the rate required on global markets.

Further, some analysts argue that natural resource taxes could be used to lower taxes on other areas of the economy to encourage activity in those sectors (such as manufacturing) (Ahrend, 2006).

Although the "tax mix switch" policy option modelled involves a positive welfare gain, this study finds that when it is taken into account that there are potential imperfections in capital mobility and in the design of the RRT, the estimated benefits are lower. Thus, the traditional analysis could overstate the benefits of the "tax mix switch" policy option. It also shows that, while there may be a positive impact on the mining sector, under some assumptions, there may also be negative impacts on other trade-exposed sectors of the economy. This is because the value of the Australian dollar is expected to increase under the policy, as a result of the potential improvement in the balance of trade from higher mining exports. This appreciation will discourage exports from other industries and encourage imports.

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[5] For example, see Johansson et al (2008), Arnold (2008) and Myles (2009).

[6] For example, see Australia's Future Tax System, Consultation Paper, December 2008

Production in all states is higher due to the "tax mix switch" policy because all industries benefits from reduced taxation on capital. However, while employment in states with relatively large mining industries (such as Queensland and Western Australia) benefits from the "tax mix switch" policy, employment in a number of other states does not.

The results presented show the long run (or lasting) impacts of the "tax mix switch" policy option. These are the lasting effects of the policy, and are the most important results for judging any policy option. However, there are transitional issues that mean that the full impacts may only be realised in the longer term. For example, the benefits of the policy stem from an inflow of investment, which may take a number of years (5 to 10) to be realised. In addition, if the "tax mix switch" increases the tax levied on a resource project now under consideration (and consequently reduces its after tax return), its development may be delayed.

This study investigates how the economic benefits estimated under this analysis for the "tax mix switch" policy depend on the following traditional economic assumptions:

1. *the supply of capital is perfectly mobile internationally; and*
2. *it is possible to implement a perfectly designed resource rent tax system.*

The first assumption is commonly relaxed in tax modelling. This is because capital may be less than perfectly mobile due to market segmentation, the *home investor bias* and other non-tax factors may reduce the international mobility of capital.

The second assumption is also a topic of debate in the economic literature. For some analysis, it may be appropriate to use the traditional assumptions and conclude that a perfectly designed RRT is achievable. However, it may be difficult to implement a perfectly designed RRT for the following reasons.

- The economic cost of a RRT depends on the specific design of the tax. In this report, we consider both the case where the RRT is perfectly designed *and* where it is imperfectly designed.

- The more revenue that is required from the RRT, the more difficult it is to implement a perfectly designed RRT. The policy options modelled in this report involve a large revenue yield from the tax, and so it is important to compare the cases where the RRT used is perfectly or imperfectly designed.

- A fall in the terms of trade would increase the adverse impact that an imperfectly designed RRT can have on the economy. With a lower terms of trade, each project would have a smaller economic rent, which would increase the likelihood that an imperfectly designed RRT would tax the normal returns to capital.

Our report finds that relaxing the assumptions listed above reduces the expected benefits estimated under the traditional analysis from a policy which uses revenue from a broad based RRT to fund the abolition of mining-specific taxes and a cut in the company tax rate by 5 percentage points.

- If it is assumed that capital is not perfectly mobile, then there would be a lower economic benefit associated with reducing company income tax and existing mining-specific taxes such as royalties.
- If the RRT is imperfect and therefore taxes the required return to capital, then it will not have a zero economic cost; instead it will produce some of the negative effects associated with a corporate income tax.

Thus, traditional analysis may overstate the benefits of the "tax mix switch" policy when compared to an analysis which takes into account the potential imperfections in capital mobility and in the design of the RRT. These issues are discussed further below.

Is capital really that mobile?

In the traditional analysis of company tax, it is commonly assumed that capital is perfectly mobile internationally. That is, it is assumed that Australia can attract as much capital as it needs, as long as investment opportunities have a rate of return equivalent to the global after tax required rate of return. Since Australia is a small, open economy and cannot influence the rate of return available on global markets, the traditional analysis treats the rate of return on capital as a fixed rate that is not dependant on domestic conditions. However, Zodrow (2009) has highlighted that this is a point of debate as illustrated below.

> *The empirical literature as a whole suggests that international capital is quite mobile and significantly affected by tax factors, although the degree of responsiveness is not as large as would be implied by a perfectly elastic supply of internationally mobile capital (Zodrow, 2009, p.4).*

There are a number of reasons that capital may not be perfectly mobile and, thus, the rate of return for capital in Australia may need to increase as the level of investment increases. These include those listed below.

- Capital markets may be segmented, so that 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, and there would be a less than perfectly mobile supply of foreign funds.

- As noted by Henry (2009), *home investor biases* may be present. Investors may be reluctant to invest overseas because of a lack of information on the destination country and risk adverse attitudes. In this situation, domestic investment would be, to some extent, determined by domestic savings, rather than international investment flows.

- 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. As long as these other factors that influence investment decisions remain unchanged, a change in the company tax rate may have little impact on the decision to invest in Australia. For example, Görg et al (2008) found that countries with

higher taxes and higher social welfare spending are actually more successful in attracting overseas investment.

Overall, Zodrow concludes that while there is "general agreement that capital is mobile and has become increasingly mobile over time…There is, however, far less agreement as to whether capital is sufficiently mobile that it is reasonable to assume perfect international capital mobility" (Zodrow, 2008, p.43)"

If capital flows are not fully mobile between countries, reducing tax on this capital (through lowering company income tax or mining-specific taxes such as royalties) would lead to a smaller inflow of funds to Australia compared to the results established under the perfectly mobile capital assumption. This would mean that reducing these taxes would lead to a smaller increase in the capital stock in Australia than assumed under the traditional analysis. This smaller increase in capital stock would, in turn, lead to a smaller increase in production and, thus, a smaller economic benefit from reducing company income tax and mining-specific taxes such as royalties than assumed under traditional analysis.

Pitfalls of a resource rent tax

The traditional analysis of a RRT centres around the idea that profit in the resources sector is divided into the following two distinct parts:

- the after tax *required rate of return* to capital in the industry (which is fixed at the global rate of return to all capital in the traditional analysis); and
- "*economic rents*" which are derived from access to a natural resource. These are any profit in the resources industry over and above the required rate of return to capital.

Under the traditional analysis, with a perfectly designed RRT, the firm still receives its required after tax rate of return to capital. As a result, even in the presence of this RRT, a firm would proceed with a decision to extract natural resources. Boadway and Keen present this traditional analysis as outlined below.

> *...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 at up to 100 percent without jeopardising the existence of the project, and that this is so whatever tax systems are available elsewhere. (Boadway and Keen, 2009, p.12).*

Although the gold deposit in this example is fixed, the capital that may have been earmarked for its development is not. Thus, if the "tax mix switch" policy increases the tax that would be paid by a resource project now under consideration (with a consequential reduction in its after tax return), then a funding-constrained investor may respond by redirecting the capital to alternative uses. For example, the development of a resource may be delayed for a time as the funding-constrained project developer may choose to divert capital originally earmarked for this project to an alternative project in another country.

Despite these potential delays, if the tax policy still allows the project to earn at least the required rate of return to capital, then it would be expected that the project would still be developed in the long run. The traditional analysis assumes that the introduction of a perfect RRT would not alter any long run decisions to develop resources. However, in practice, designing a perfect RRT is difficult to achieve.

One approach to designing a perfect RRT is to ensure that the riskiness of a project will not be changed in the presence of the tax. A RRT reduces the profitability of an investment should it be successful. Thus, to leave the riskiness of the investment unchanged, it should also reduce the loss if the investment is unsuccessful. As suggested in the literature, this can be done a number of ways, and is advocated by ABARE[7] (Hogan, 2007, 2003). Under this approach, in order to maintain the riskiness of each project, while governments receive tax revenues from successful projects, governments would also be liable to make payments to firms with loss-making projects.

An alternative approach is to design the RRT to correctly identify economic rents as the base of the tax. However, there are a number of challenges in successfully doing this. The RRT could attempt to allow the firm to earn a required rate of return on their investments before the firm must pay any RRT. This is commonly done by allowing firms to carry forward expenditures to offset against revenues when calculating the tax liabilities. To allow a required rate of return, uplift rates are applied when expenses are carried forward.

However, setting appropriate uplift rates is difficult because the required rate of return is not uniform across resource sectors or even within specific resource sectors, but rather varies depending on the risk of each project. For example, in order to go ahead, a more risky project would require a higher after tax rate of return and, therefore, a higher uplift rate than a less risky project. This means that it is difficult to find the correct uplift rate to use for a broad RRT applied across the whole industry or, potentially, even across a specific resource sector (such as gas).

If the uplift rate were set too low, then projects not earning any economic rents would still pay some RRT. For such projects, the RRT payment would erode profits below the required rate of return and, as a result, that project would not go ahead. In this case, the RRT would act like a de-facto tax on the return to capital in the resources sector. Thus, unlike in the traditional analysis, the RRT would entail an economic cost.

Another challenge associated with the implementation of a broad based RRT is that the economic rents available in the resources sector are uncertain. This is because of uncertainties around commodity prices and the terms of trade. In times of high commodity prices, any particular project is more likely to earn economic rents. Thus, even an imperfectly designed RRT is less likely to remove the rents from that project and start eroding the required rate of return. However, in times of lower commodity prices, any particular project will earn smaller economic rents. In this case, an imperfectly designed RRT would be more likely to erode the

[7] Hogan (2007) argues that if a RRT that allows for full offset of costs could be achieved, and all costs were carried forward at the government bond rate, then this tax would involve no economic costs.

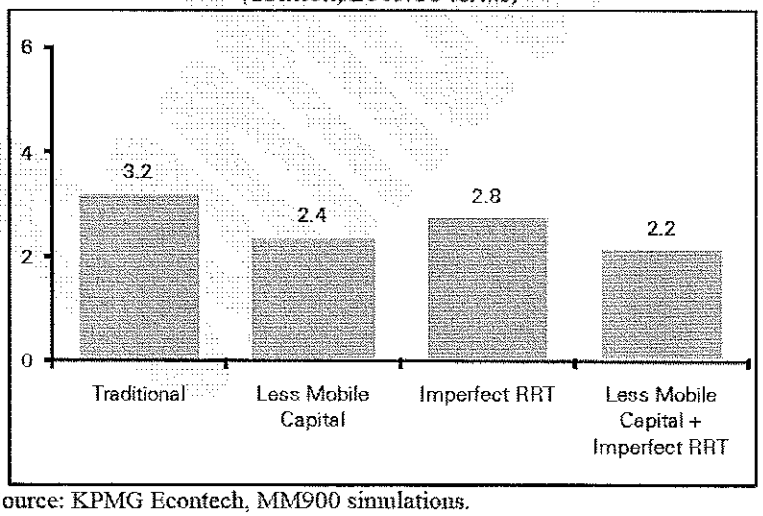
required rate of return and result in an economic cost. Therefore, a fall in the terms of trade increases the risk that an imperfectly designed RRT would entail an economic cost.

Illustrations of the arguments

Relaxing the traditional assumptions of perfect capital mobility and a perfect RRT reduces the expected benefits of a policy replacing revenue from existing mining-specific taxes and company income tax with revenue from a RRT. Difficulties in designing a RRT are exacerbated by uncertainties around future commodity price levels (terms of trade). To illustrate this, KPMG Econtech has run a number of scenarios using our industry model, MM900. This model was developed for detailed analysis of the impacts of tax on the economy, under contract to the Treasury for the Henry Tax Review.

Chart A shows the potential gain in consumer welfare from the "tax mix switch" policy resulting from abolishing existing mining specific taxes and cutting the company tax rate by 5 percentage points, funding this through a broad RRT[8]. The left most bar in Chart A shows the expected outcome under the traditional analysis. The second bar represents the gain in consumer welfare when the modelling assumption of perfect capital mobility is relaxed. The following bar then shows the results of implementing an imperfect RRT under the assumption of perfect capital mobility. The last scenario combines these two assumptions. Chart B shows the same results, but in per capita terms.

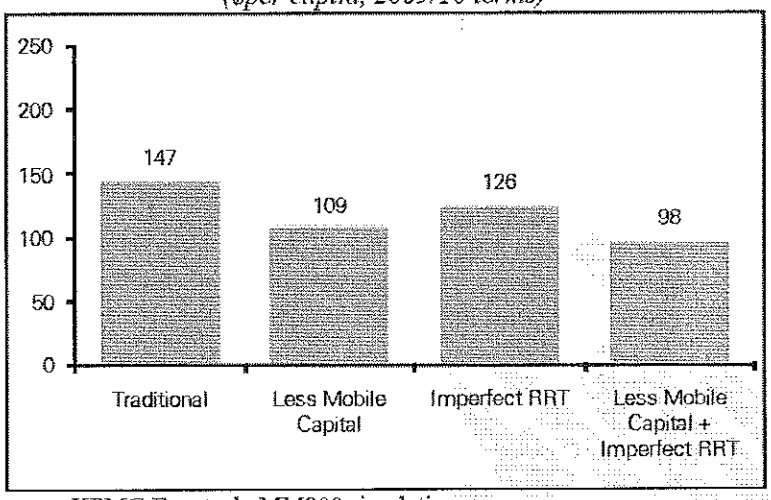
Chart A: Tax mix switch - change in consumer welfare
($billion, 2009/10 terms)



Source: KPMG Econtech, MM900 simulations.

[8] Origin Energy has chosen a 5 percentage point reduction because they believe that this would bring Australia's statutory company tax rate to just below the current OECD average, thus making it internationally competitive.

Chart B: Tax mix switch – change in consumer welfare per capita ($per capita, 2009/10 terms)



Source: KPMG Econtech, MM900 simulations.

As expected, using the traditional assumptions of perfectly mobile capital and a perfect RRT yields the highest welfare gain from this policy. Under the traditional assumptions, the welfare gain is estimated at $3.2 billion or $147 per capita per annum.

Relaxing these traditional assumptions reduced the benefits expected under the traditional analysis. Specifically:

- if it is assumed that capital is not perfectly mobile[9] then the benefits of the "tax mix switch" are smaller, at $2.4 billion or $109 per capita per annum;
- if the RRT is not perfectly designed and the terms of trade outcomes prove to be lower than currently forecast[10], then the welfare gain from the "tax mix switch" policy falls, compared to the traditional analysis, to $2.8 billion or $126 per capita per annum; and
- if capital is less mobile and the RRT is not designed perfectly (in conjunction with terms of trade lower than currently forecast), then the welfare gain could shrink relative to the outcomes of the traditional analysis, to only $2.2 billion or $98 per capita per annum.

The "tax mix switch" policy option modelled involves a positive welfare gain for all assumptions. However, the traditional economic analysis could overstate these benefits

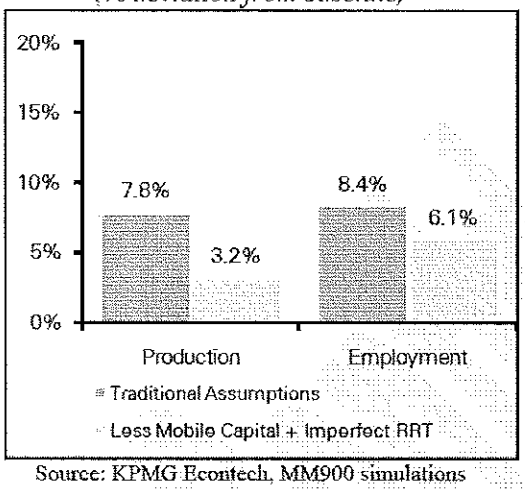
[9] The assumption used here is that the rate of return to capital needs to increase to attract additional foreign investment. Specifically, the current level of Australian net foreign liabilities means that the required rate of return is 50 basis points higher that if Australian had zero net foreign liabilities. This still reflects that capital supply is very responsive to the rate of return, but that it is less than perfectly mobile (in which case no change in the rate of return is required to stimulate additional foreign investment).

[10] The assumption used here is that the uplift factors are inadequate; resulting in some of the RRT applying to profits other than economic rents. Specifically, the modelling considers the case where 35 per cent of the revenue raised by the RRT is through a RRT applied to the return to capital in the industry. This reflects the case where the uplift factors are incorrect (within a plausible margin of error) and the terms of trade is at 2004/05 levels. This terms of trade level represents the downside risk in fluctuations in the terms of trade.

compared to an analysis which takes into account potential imperfections in capital mobility and in the design of the RRT by 50 per cent.

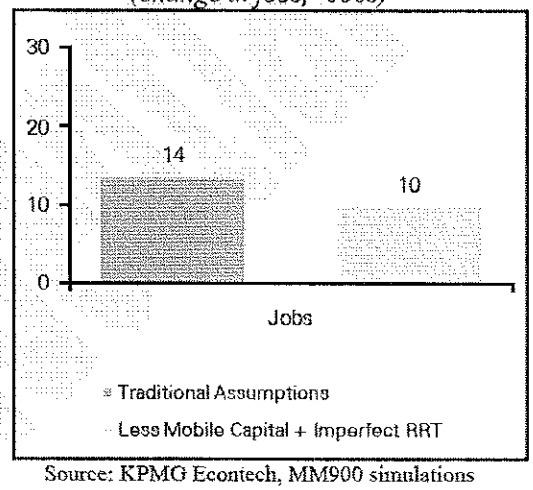
While the "tax mix switch" policy is expected to have a positive impact on the mining industry, the traditional assumptions may overstate these benefits. Under the traditional assumptions, mining industry production is estimated to be 7.8 per cent higher and employment is estimated to be 8.4 per cent higher if the "tax mix switch" policy is implemented. This can be largely attributed to the reduction in mining specific taxes such as royalties. However, these results could overstate the benefits from the policy by around 140 per cent and 40 per cent respectively, compared to a case which relaxes the traditional assumptions. The charts below present the simulated increases in production and employment for the mining industry under the two sets of assumptions.

Chart C: Tax mix switch - Mining Industry
(% deviation from baseline)



Source: KPMG Econtech, MM900 simulations

Chart D: Tax mix switch – Mining Industry
(change in jobs, '000s)

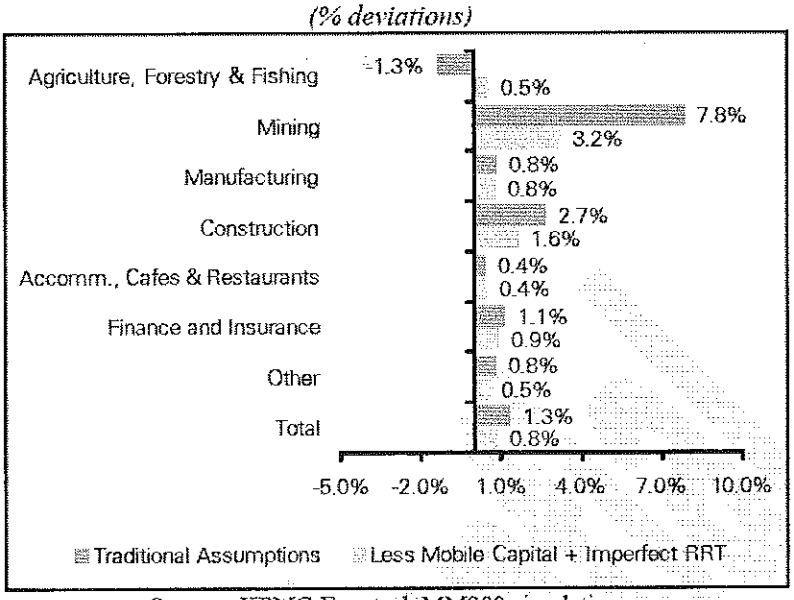


Source: KPMG Econtech, MM900 simulations

Although the "tax mix switch" policy has a positive impact on the mining industry, it is expected to have a negative impact on some other traded-goods sectors of the economy. This is because the value of the Australian dollar is expected to appreciate under the policy because of the potential improvement in the balance of trade from higher mining exports. This makes Australian exports more expensive in foreign currency terms and the resulting reduction in international demand has a particularly large impact on export-oriented industries, such as agriculture, manufacturing and tourism (with some of the tourism impacts reflected in the accommodation, cafes and restaurants industry). For example agricultural production and employment is lower by 1.3 and 2.1 per cent respectively under the traditional analysis. Employment in the manufacturing industry is flat or 0.3 percent lower, as shown in Charts E and F below.

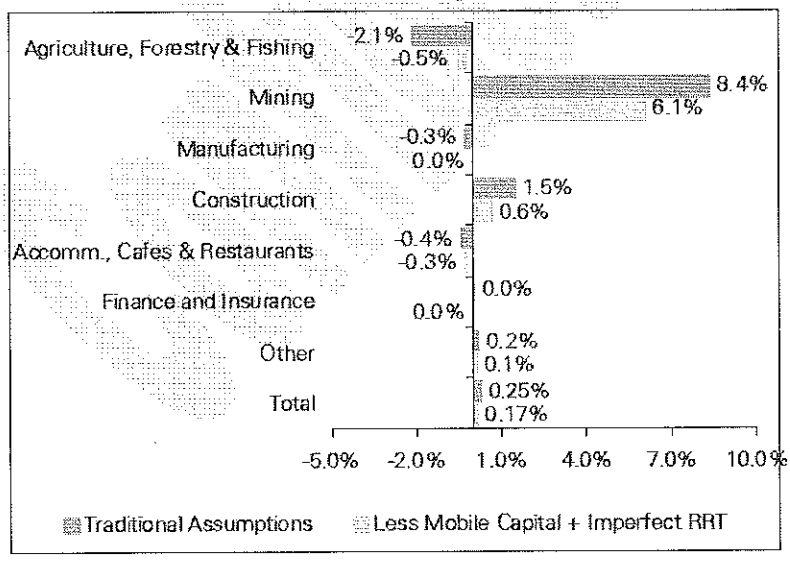
The traditional analysis could overstate the industry production and employment results for each industry. The sectoral results under both the traditional assumptions and the assumptions of less mobile capital and an imperfectly designed RRT are presented in the charts below.

Chart E: Tax Mix Switch - selected industry production effects (% deviations)



Source: KPMG Econtech MM900 simulations.

Chart F: Tax Mix Switch - selected industry employment effects (% deviations)



Source: KPMG Econtech MM900 simulation

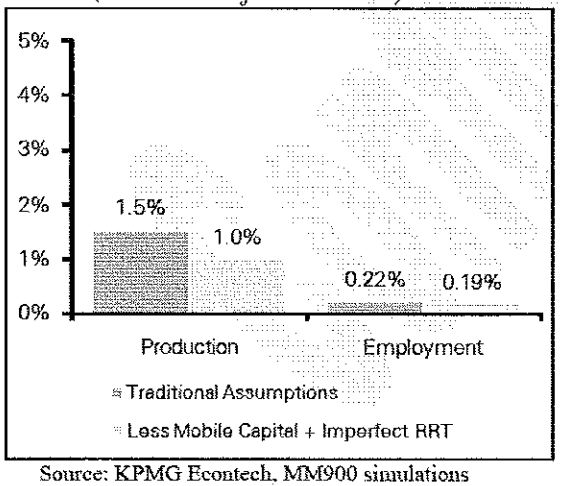
These results show that this particular "tax mix switch" policy could not be used to encourage employment in some sectors (such as agriculture, manufacturing and tourism). This is because this policy is expected to put upward pressure on the value of the Australian dollar as a result of the potential improvement in the balance of trade from higher mining exports. This, in turn, contributes pressure on trade-exposed industries and on those states where these trade-exposed industries are more prominent.

Following on from these sectoral results, states with relatively large mining industries (such as Queensland and Western Australia) are expected to benefit from the "tax mix switch" policy. However, the traditional assumptions may also overstate these benefits to Queensland and Western Australian production and employment from the "tax mix switch" policy.

If a RRT is used to fund the abolition of existing mining specific taxes and a 5 percentage point cut in the company tax rate, then under the traditional assumptions production and employment in Queensland are estimated to be 1.5 per cent and 0.22 per cent higher respectively. This compares with lower gains of 1.0 per cent and 0.19 per cent respectively if both of the traditional assumptions are relaxed. Thus the traditional analysis could overstate the production gain in Queensland by around 50 per cent and the employment gain by around 15 per cent.

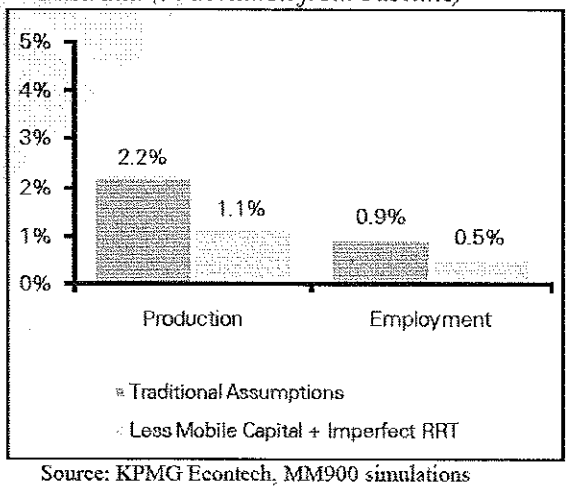
The traditional assumptions could also overstate the benefits to Western Australian production and employment from the "tax mix switch" policy option. If a RRT is used to fund the abolition of existing mining specific taxes and a 5 percentage point cut in the company tax rate, under traditional assumptions, production and employment in Western Australia could be higher by 2.2 per cent and 0.9 per cent respectively. This compares with lower gains of 1.1 per cent and 0.5 per cent respectively if both of the traditional assumptions are relaxed. Thus the traditional analysis could overstate the production gain in Western Australia by around 95 per cent and the employment gain by around 75 per cent.

Chart G: Tax mix switch – Queensland (% deviation from baseline)



Source: KPMG Econtech, MM900 simulations

Chart H: Tax mix switch – Western Australia (% deviation from baseline)

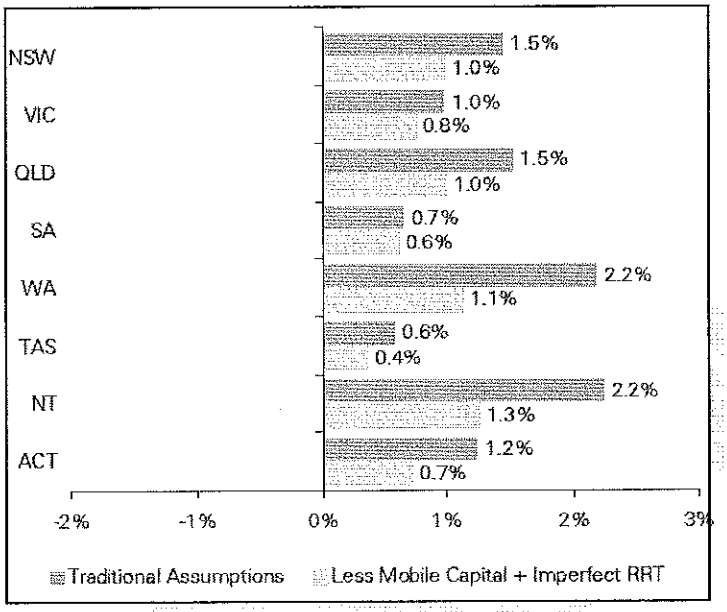


Source: KPMG Econtech, MM900 simulations

Production in all states is higher due to the "tax mix switch" policy, as shown in Chart I. This is because all industries benefits from reduced taxation on capital. However, although employment in states with relatively large mining industries is higher from the "tax mix switch" policy, in some states employment is flat or lower. For example, under the traditional analysis, Victorian employment remains unchanged and employment levels in South Australia and Tasmania are expected to be lower than otherwise by 0.3 and 0.4 percent respectively, as shown

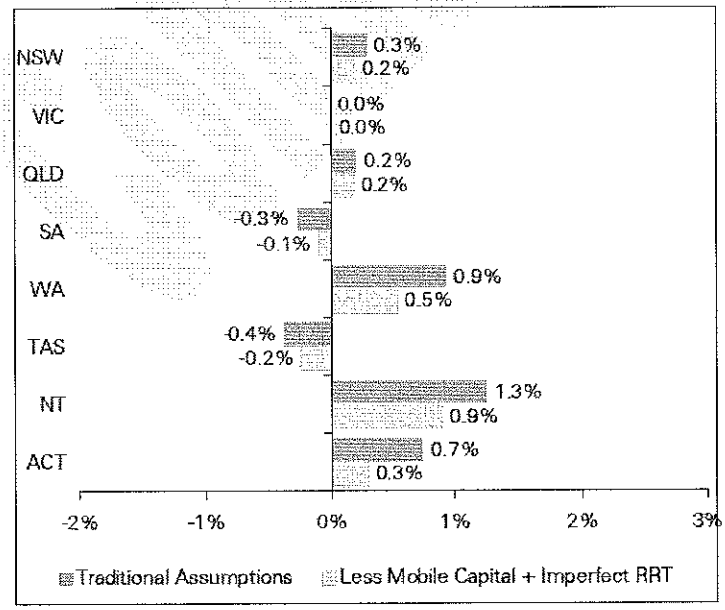
in Chart J. The results under the assumptions that capital is less than perfectly mobile and that the RRT is imperfect are also shown.

Chart I: Tax Mix Switch - state production effects
(% deviations)



Source: KPMG Econtech MM900 simulations.

Chart J: Tax Mix Switch - state employment effects
(% deviations)



Source: KPMG Econtech MM900 simulations.

The changes in the Northern Territory and the Australian Capital Territory shown in the charts above are relatively large in percentage terms, but because of the low population levels in these territories, the results do not represent a large change in absolute terms.

Policy implications

The model simulations presented above demonstrate that the estimated economic gains from the "tax mix switch" policy option are sensitive to two main assumptions.

- If capital is less than perfectly mobile, then the gains from reducing mining-specific taxes like royalties and company income tax with a broad RRT are smaller than if capital is perfectly mobile, as is traditionally assumed. This is because the less internationally mobile capital is, the smaller the capital inflow in response to the tax reduction.

- If the RRT is imperfectly designed, then it can impose a cost on the economy, rather than having a zero economic cost as is traditionally assumed. An imperfect RRT can act as a deterrent to investment, through either a failure to allow certainty in the offset of all costs or through an uplift rate set lower than the required rate of return for some projects. The extent of the adverse impact that this has on investment in the mining sector will partly depend on the terms of trade. The lower commodity prices, the higher the chance that an imperfectly designed RRT will erode the returns to capital for any particular resources project.

These considerations reduce the expected benefits estimated under the traditional analysis from a policy which uses revenue from a broad based RRT to abolish mining-specific taxes and cut the company tax rate by 5 percentage points. Thus, the traditional analysis could overstate the benefits of this "tax mix switch" policy option.

The more revenue that is required by the Government from a RRT, the more difficult it becomes to design a RRT that only taxes economic rents. To achieve higher revenue collections, either the rate of RRT would need to be higher or uplift rates would need to be lower. Both of these factors would increase the potentially harmful effects of an imperfect RRT.

A policy which funds a cut in the company income tax as well as abolishing mining-specific taxes may involve increasing the tax burden on the resources industry. For example, a 5 percentage point cut in the statutory company tax rate would require a high level of RRT collections to cover the revenue gap. This would increase the likelihood that the RRT will become a tax on both the rents and the required returns to capital in the resources industry. This would reduce the size of the welfare gain expected from this policy.

This study shows that the welfare gain from replacing the revenue from existing mining specific taxes and part (5 percentage points) of the current company tax revenue with revenues from a broad based RRT could shrink when the traditional economic assumptions are relaxed. The presented above simulations show that the welfare gain from such a "tax mix switch" could shrink from $3.2 billion ($147 per capita) to $2.2 billion ($98 per capita) when it is recognised that capital may be less than perfectly mobile, and that the RRT may be imperfectly designed. Depending on the extent to which the RRT taxes the required returns to capital, the welfare gain could be even lower.

The benefits estimated in the modelling refer to the long term impacts of the "tax mix switch" policy. Normal economic adjustment process means that these benefits may take 5 to 10 years to be fully realised. Also, following a tax mix switch, the development of a resource may be delayed for a time, as a funding-constrained project developer may choose to divert capital originally earmarked for a particular project to a lower taxed project alternative in another country.

There may be negative sovereign risk impacts if existing and potential investors perceive that the government may alter the design of the RRT in the future and apply those changes to existing projects. For example, if the government increases the rate of the RRT at some future date and does not quarantine the change to new projects, the profitability of each existing project would be adversely affected. If investors perceive this as a potential risk, it will be factored in to their decisions, and they may require a higher risk premium. This could mean that the "tax mix switch" would lead to a smaller increase in investment in the resources sector. This sovereign risk issue is particularly important for the resources sector because investments tend to be long term in nature, with high start-up costs and long lead times.

Any tax on the resources sector, including royalties and resource rent taxes, potentially involves sovereign risk problems. In particular, the introduction of a new broad based RRT may add to the perception that sovereign risk is an issue if existing projects are captured by the arrangements. However, if a new RRT is introduced, potential negative sovereign risk impacts could be reduced by credibly establishing that any further future changes in taxation in the resources sector would not apply to existing projects.

A full assessment of a "tax mix switch" policy option such as that presented in this report should not only take into account the results of the traditional analysis, but should also take into account that:

- capital may be less than perfectly mobile;
- the design of the RRT may not be perfect; and
- sovereign risk may be an issue.

Each of these factors may reduce the benefit, derived in the long term, from the introduction of a broad based RRT to fund the abolition of existing royalties and a reduction in the company tax rate.

1 Introduction

The Commonwealth Government has commissioned a panel of experts to undertake a review of Australia's Future Tax System, headed by Dr Ken Henry and termed 'the Henry Tax Review'. The review panel has delivered its report to the Government. In turn, the Government has announced that it will release this report, along with a preliminary response, before the 2010 May Budget.

Of particular concern to Origin Energy is the public speculation that the Henry Tax Review may recommend that a broad resource rent tax (RRT) be introduced to replace existing mining specific taxes (such as royalties) and to fund a reduction in the current company tax rate. In particular, Origin Energy is concerned that this may result in an increased tax burden on the resources sector. Against this background, Origin Energy has commissioned KPMG Econtech to:

- undertake a detailed analysis of a hypothetical "tax mix switch" policy, involving the introduction of a general Resource Rent Tax (RRT) to replace existing mining-specific taxes (such as royalties) and to fund a 5 percentage point[11] cut in the current company tax rate;
- undertake an assessment of the impact on the results from relaxing the important traditional assumptions commonly used in this analysis;
- provide comment on the potential delays in achieving the expected benefits of a "tax mix switch", and the potential impacts for individual resource projects in the short term; and
- provide comment on the challenges of introducing a "tax mix switch" that involves a general RRT.

Therefore, this study investigates how the efficiency impacts estimated for RRT, mining specific taxes and company income taxes are sensitive to the following assumptions:

1. *the supply of capital is perfectly mobile internationally; and*
2. *it is possible to implement a perfectly designed resource rent tax system.*

The first assumption above is commonly relaxed in company income tax modelling, to assess the impact of the traditional assumption that capital is perfectly mobile. The second assumption is also a topic of debate in the economic literature. For some analysis, it may be appropriate to use the traditional assumptions and conclude that a perfectly designed RRT is achievable. However, when considering the specific policy option mentioned above, there are two main reasons that we introduce the concept that it may be difficult to implement a perfectly designed RRT.

- First, the economic cost of a RRT depends on the specific design of the tax. In this report, we consider both the case where the RRT is perfectly designed *and* where it is imperfectly designed.

[11] Origin Energy have chosen a 5 percentage point reduction because they believe that this would bring Australia's statutory company tax rate to just below the current OECD average, thus making it internationally competitive.

- Second, the more revenue that is required from the RRT, the more difficult it is to implement a perfectly designed RRT. The policy option modelled in this report involves a large revenue yield from the tax, and so it is important to consider the case where the RRT used is imperfectly designed.

Therefore, in this report, Origin Energy has commissioned KPMG Econtech to explicitly take into account the sensitivity of the results to relaxing the two key assumptions listed above. We note that this report does not comment on the efficiency or otherwise of the current Petroleum Resource Rent tax, and only considers various outcomes for a new broad based RRT.

1.1 Report Structure

This report is structured as follows.

- Section 2 outlines the general approach that is taken in the study, including an overview of the issues addressed and the model used to illustrate the arguments.
- Section 3 discusses and models the traditional arguments in favour of abolishing existing mining-specific taxes and reducing the company income tax, along with introducing a hypothetical RRT to recover the revenues involved.
- Section 4 presents the impact of the "tax mix switch" scenarios involving the introduction of a broad-based RRT to replace existing mining specific taxes and fund a 5 percentage point cut in the current company tax rate. It presents results for selected industries as well as for each state and territory.
- Section 5 analyses the assumption made in the traditional analysis that the supply of capital is perfectly mobile. It discusses and models the effect of relaxing this assumption on the arguments presented in section 3.
- Section 6 analyses the assumption made in the traditional analysis that it is possible to design a resource rent tax with no economic costs. It discusses and models the practical challenges in implementing a RRT, and their effect on the arguments presented in section 3.
- Section 7 discusses the policy implications of the analysis.
- Appendix A presents more detailed results for the "tax mix switch" scenario involving the introduction of a broad-based RRT to replace existing mining specific taxes and reducing the company tax rate by 5 percentage points. The results are presented for the various assumptions made in the report.
- Appendix B provides more detail on the model used in this study, MM900.

2 Approach

This section outlines the approach used to undertake the economic analysis of a "tax mix switch" proposal involving the replacement of mining-specific taxes and a cut in the company tax rate funded by a broad based RRT.

The remainder of this section is structured as follows.

- Section 2.1 outlines the stages of analysis used to analyse the "tax mix switch" policy option.
- Section 2.2 details the different scenarios used to investigate how particular economic assumptions impact on the level of economic benefits estimated from the "tax mix switch" policy option.

2.1 Stages of Analysis

This study has been undertaken in a series of distinct stages. Each stage of the analysis involved drawing on the extensive economic literature in the areas of resource taxation and company income taxation. Following from the analysis of the economic literature, economic modelling was employed to illustrate the economic implications of replacing revenue from existing mining-specific taxes and a cut in the company income tax with revenue from a RRT (a "tax mix switch").

The key stages employed in our analysis are outlined below.

- Stage one of our analysis examines the traditional arguments in favour of such a "tax mix switch". Our analysis considers the relative economic efficiency of replacing revenue from existing mining-specific taxes and a cut in the company income tax with revenue from a RRT.

  Notably, the modelling in this stage is based on the traditional assumptions – that capital is perfectly mobile and that it is possible to implement a perfectly designed RRT system. The impacts of these assumptions are revisited in stages two and three.

- Following the traditional analysis of mining specific taxes, RRT and company income tax in stage one, we then proceeded to analyse the key assumptions that underpin the zero economic cost of RRT, in stages two and three, namely:

  1. *that the supply of capital is perfectly mobile internationally; and*
  2. *that it is possible to implement a perfectly designed resource rent tax system.*

- Stage two discusses the traditional assumption that the supply of funds from world capital markets is perfectly mobile. This 'perfectly mobile supply of foreign funds' has an impact on the argument that company income tax has a high economic cost. Thus, this stage also involves extending the modelling from stage one to capture the implications of relaxing the traditional assumption of perfectly mobile supply of foreign funds.

- Stage three considers the potential pitfalls in the design of a RRT. This stage discusses the main difficulties in designing a RRT with zero economic cost – difficulties in allowing the full offset of costs against revenues, challenges in finding the correct uplift rate to apply to the costs and perceived sovereign risk. In particular, this stage involves extending the modelling from stages one and two to capture the consequences of implementing an imperfect RRT that entails some economic costs.

Each stage of the analysis uses the results from a number of scenarios modelled using our newly developed CGE model, MM900.

2.2 Scenarios

As noted earlier, Origin Energy commissioned KPMG Econtech to undertake a detailed analysis of a hypothetical "tax mix switch" policy. This policy involves the introduction of a general RRT to replace existing mining-specific taxes and to fund a 5 percentage point cut in the current company tax rate under various economic assumptions. Table 2.1 (below) sets out the four scenarios that have been modelled.

Table 2.1: Tax Scenarios

Scenario	Tax Removed	Capital Mobility Assumption	RRT Assumption
Tax Mix Switch 1	Existing mining specific taxes / 5% Company Income Tax	Perfectly Mobile	Perfect RRT
Tax Mix Switch 2	Existing mining specific taxes / 5% Company Income Tax	Not Perfectly Mobile	Perfect RRT
Tax Mix Switch 3	Existing mining specific taxes / 5% Company Income Tax	Perfectly Mobile	Imperfect RRT
Tax Mix Switch 4	Existing mining specific taxes / 5% Company Income Tax	Not Perfectly Mobile	Imperfect RRT

The scenarios modelled are each now explained.

- **Baseline Scenario**: This scenario reflects the current situation, where the tax system remains unchanged.
- **Tax Mix Switch Scenario 1**: This scenario models the abolition of mining-specific taxes and a 5 percentage point cut in the company tax rate, funded by a broad based RRT. This scenario assumes the traditional assumption of perfectly mobile capital. It also assumes that it is possible to implement a perfect RRT that only taxes economic rents.
- **Tax Mix Switch Scenario 2**: This scenario again models the abolition of mining-specific taxes and a 5 percentage point cut in the company tax rate, funded by a broad based RRT. However, under this scenario, it is assumed that a greater demand for funds comes at a

greater cost, (i.e., capital is not perfectly mobile). This scenario continues to assume that it is possible to implement a perfect resource rent tax that only taxes economic rents.

- **Tax Mix Switch Scenario 3**: This scenario again models the abolition of mining-specific taxes and a 5 percentage point cut in the company tax rate, funded by a broad based RRT. As in the Tax Mix Switch Scenario 1, this scenario assumes the traditional assumption of perfectly mobile capital. However, under this scenario, the uplift rates associated with the RRT are assumed to be inadequate so that the RRT captures more than just economic rents.
- **Tax Mix Switch Scenario 4**: This scenario again models the abolition of mining-specific taxes and a 5 percentage point cut in the company tax rate funded, by a broad based RRT. However, under this scenario, the greater demand for funds comes at a greater cost and the uplift rates associated with the RRT are assumed to be inadequate.

The differences in economic outcomes between the "Tax Mix Switch" Scenarios and the Baseline Scenario are calculated to determine the estimated economic impacts of the policy option under the various assumptions considered.

3 The Economics of Resources Rent Taxes, Existing Mining-Specific Taxes and Company Income Tax

As noted in the introduction, there has been public discussion of introducing a broad RRT to replace mining-specific taxes and fund a cut in the company tax rate. This section outlines the traditional economic arguments in favour of these policy options. Under traditional economic analysis, a perfectly designed RRT (which has zero economic costs), compares favourably to company income tax and mining-specific taxes (which have high economic costs). This would suggest that implementing a perfectly designed RRT to replace existing mining-specific taxes and fund a cut in the company tax rate would be beneficial to the economy.

However this conclusion is based on two important assumptions: perfect capital mobility and the ability to design a RRT that only taxes economic rents. The assumptions behind these traditional economic arguments will be examined more closely in the latter sections of the report. In sections 5 and 6, it is shown that relaxing these assumptions reduces the benefit from the introduction of a broad based RRT.

3.1 The Economic Costs of Taxes

Most taxes change the behaviour of households, firms or the foreign sector. For the taxes analysed in this report (RRT, existing mining-specific taxes and company income tax), the main impacts are on the behaviour of firms and the foreign sector. For example, in response to these taxes:

- firms operating in Australia may change what they produce or how they produce it; and
- the foreign sector may supply Australia with less investment funds.

Distortions such as these lead to economic costs over and above the revenue collected by the tax. This causes a loss in economic activity and in the welfare of domestic residents[12]. For the taxes analysed in this study, the most important factor behind these welfare costs is the mobility of capital. In general, the welfare cost of a tax is higher the more mobile is the tax base. Capital is recognised as a highly mobile tax base - and when its return is taxed, the capital base is likely to shrink, entailing a cost to economic activity.

These ideas are discussed further in the context of each tax below.

[12] Technically speaking, welfare is defined as the collective level of utility of Australian households, where the utility of each household is determined by the commodities and leisure they consume.

3.2 Resource Rent Taxes

A perfectly designed resource rent tax only taxes economic rents

Traditionally, economists have argued that a RRT has no distortionary impacts and no welfare costs. This argument centres around the idea that resource industries profit can be successfully divided into two distinct parts:

- the *required rate of return* to capital in the industry, which includes an appropriate risk allowance; and
- *economic rents* which are derived from access to a natural resource, which is any profit over and above the required rate of return to capital.

The concepts of the *required rate of return* and *economic rents* are now discussed in turn.

The *required rate of return* to capital is the minimum rate of return required to hold the capital in an industry, which includes a risk premium where investors are risk averse (Hinchy, Fisher and Wallace, 1989). In a perfectly competitive economy, this required rate of return would be the (risk-adjusted) rate earned in industries outside the mining sector. For example, if capital in any other industry was earning a rate of return higher than in the mining industry, then investors would transfer their investment into that other industry. In doing so, the capital stock in that industry would increase and its rate of return would fall. In a perfectly competitive economy, these adjustments in the capital stock of each industry continue until the (risk adjusted) return to capital is the same in all industries, at the 'required' rate of return[13].

While all industries earn at least the required rate of return, *economic rents* are also available in some industries. In resource industries, these rents are available because the natural resources they extract are in limited supply and, thus, have a 'scarcity value'[14]. The economic rent of a natural resource is the value of production after deducting all necessary costs, where these costs include the risk adjusted required return to the capital employed in the industry.

RRTs are designed to tax only the economic rent of firms operating in natural resource industries. As noted by ABARE (2003), "ideally, a resource tax system should be designed to ensure that the government receives through this mechanism no more than the value of the economic rent". This is because, if only economic rents are taxed, then the tax will create no distortion on a firm's behaviour (Hinchy, Fisher and Wallace, 1989). Since economic rent, as discussed above, is any return in excess of the minimum return needed to make an investment worthwhile, a tax on this rent will not cause a desirable investment to become undesirable from the firm's point of view (as long as the tax paid is not more than the economic rent). That is, so long as the economic rent is positive both before and after the tax is levied, in the long run, the firm will still decide to undertake the activity.

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[13] For this reason, the required rate of return is often called the 'normal' rate of return.

[14] The 'scarcity value' of a resource encompasses the idea that "if investors choose to extract the resource now, the value of doing so must at be least equal to the value of choosing to extract in some future period." (ABARE, 2003) Since the resource is limited in supply, or scarce, the value of extracting in the future is high, and so current prices of the resource should reflect this.

Boadway and Keen (2009) present this traditional analysis in the following terms.

> *"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 at up to 100 percent without jeopardising the existence of the project, and that this is so whatever tax systems are available elsewhere."* (Boadway and Keen 2009).

Although the gold deposit in this example is fixed, the capital that may have been earmarked for its development is not. Thus, if the "tax mix switch" policy increases the tax that would be paid by a resource project now under consideration (with a consequential reduction in its after tax return), then a funding-constrained investor may respond by redirecting the capital to alternative uses. For example, the development of a resource may be delayed for a time as the funding-constrained project developer may choose to divert capital originally earmarked for this project to an alternative project in another country.

Despite these potential delays, in the long run, if the tax policy still allows the project to earn at least the required rate of return to capital, then it would be expected that the project would still be developed. The traditional analysis argues that the introduction of a perfect RRT therefore would not alter any long run decisions to develop resources.[15]

Moreover, while resources development is inherently risky, a perfectly designed RRT will not, under the traditional analysis, affect risk-taking behaviour. For example, the returns to any exploration activity are uncertain because the size of the deposit is unknown and the price at which it can be sold is also unknown. When firms choose which site to explore, they have limited information on the actual nature and content of the site to be explored, and must take into account the risks of exploring in different areas. Usually, the firm will have to consider multiple exploration projects with differing expected economic rents. The firm will rank these projects based on their expected economic rents after adjusting for their risks, and choose the projects with the highest expected rent.

A perfectly designed RRT will not affect risk-taking behaviour if it is *symmetric* in its treatment of profits and losses. That is, when firms pay a percentage of their profits in tax, but in the event they make a loss, they also receive the same percentage of their loss in the form of a rebate. Under a symmetric resource tax, the expected value of a discovery is reduced by the tax rate, but the expected loss from failure to discover is also reduced by the same proportion. Therefore, the relative riskiness of different projects would be preserved after the tax is imposed and under a perfectly designed RRT there would be no impact on exploration activities.

If firms do not change their behaviour, in terms of both resource development and risk taking, then there will be no economic cost associated with a RRT. The only effect will be to transfer the economic rents from the firm to the government. However, this conclusion rests crucially on the assumption that the resource rent tax can be perfectly designed so that it only taxes the

[15] This report examines the long-run (or lasting) impacts of a policy. This means that it does not take into account transitional issues such as grandfathering or organisational constraints.

economic rents earned by each firm. That is, zero economic costs will only be possible for a *perfect* RRT.

The current Petroleum Resource Rent Tax

The current PRRT applies to all petroleum projects in offshore areas (or Commonwealth adjacent areas) under the *Offshore Petroleum and Greenhouse Gas Act 2006,* with the exception of some production licences derived from the North West Shelf. It is applied to taxable profits on the recovery of petroleum in a project including crude oil, condensate, sales gas, natural gas, liquefied petroleum gas and ethane. (ATO, 2010)

The PRRT attempts to achieve a perfect design, by taxing project income only after a 'threshold' rate of return in achieved. More specifically, the PRRT is levied at 40 per cent of "the project's net cashflow whereby exploration and general project expenditures are accumulated at some threshold rate and offset against future revenues" (ABARE, 2003). The accumulation rates or 'uplift' rates applied to expenditures when they are carried forward will determine the way that the tax defines the economic rents on a project. For the PRRT:

- general project expenditures, are accumulated at an uplift rate of the long term bond rate plus 5 percentage points;
- exploration expenditures are transferable between projects (within the same company);
- undeducted exploration expenditures are accumulated at an uplift rate of the long term bond rate plus 15 percentage points if the expenditures are incurred within five years of the date of the lodgement of data required for the granting of the production licence; and
- undeducted exploration expenditures are maintained in real terms (that is, they are accumulated at an uplift rate of the gross domestic product (GDP) inflation factor) if the expenditures are incurred more than five years before the relevant lodgement date. (ABARE, 2003)

The PRRT would, then, only tax economic rents if the uplift rates fully account for the required rate of return (including an appropriate risk premium). Under this assumption, the 40 per cent PRRT would never apply to the required return on capital, and the behaviour of firms would not be affected by the tax.

Is the perfect resource rent tax achievable?

However, in reality, there are challenges in implementing a perfectly designed RRT. As Parker (2009) noted "the more efficient these taxes are the more complex they are as well…real world resource rent taxes generally do not perfectly risk share between the private partner and the government".

There are a number of potential sources of economic costs that can be identified in the practical implementation of the PRRT. The main problems revolve around the practical challenges in accounting for risk in the resources sector. For example, one problem, considered in section 6, is that the required rates of return are not uniform across investment projects but, rather, vary

depending on the riskiness of an investment. The question of whether a zero cost RRT is achievable is revisited in section 6.

3.3 Resource Royalties

States and Territories levy a range of resource royalties on the extraction of some natural resources. Some royalties are levied on an ad-valorem basis, while others are calculated in volumetric terms. Revenue from resource royalties contributes a significant portion of total Government revenues in some States, particularly for Queensland and Western Australia. For example, the Queensland Government collected around $3.3 billion and the Western Australian Government collected $2.6 billion in 2008/09 (State Budgets).

State resource royalties are considered to have high economic costs. This is because they are applied to the full value of mining output, in either volumetric or ad valorem terms. This means that, in addition to taxing the economic rents from the natural resources, these taxes also tax the value of output attributable to capital, labour and other inputs.

These taxes can therefore be thought of as an increase in the costs of extracting mineral resources. This increase in costs can reduce the profits derived from the extraction of some resources below the rate of return required for the project to go ahead. This may have the following results.

- Some projects may never go ahead. Resource deposits that would have been marginally profitable without mining-specific taxes 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 becomes more expensive to extract. With the added cost of the resource royalty, 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.

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

Capital in general, and in the mining industry in particular, is highly mobile between countries. Therefore, the main source of the economic cost of mining-specific 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.

Importantly, a tax on capital in the resources industry entails a higher economic cost per unit of revenue than a tax on capital more generally. This is for two reasons.

- The resources industry is capital intensive compared to the rest of the economy. Thus, for a given reduction in capital stock, the resulting fall in output is greater for the resources industry than for other industries.

- The resources industry is highly trade exposed. This means that firms have little scope to pass the cost of the royalties or crude oil excise on to price of their output. Instead, firms reduce their output.

Given the high economic costs of mining-specific taxes, it can be expected that abolishing them would result in an economic benefit. However, the size of this benefit will depend on how responsive the supply of capital to the resources industry is to changes in these taxes. This issue is further developed in section 5.

As a tax on the returns to capital, company income tax also has a high economic cost. This is discussed in the following section.

3.4 Company Income Tax

The main business income tax in Australia is company income tax, which is levied on the taxable income of Australian companies at a statutory rate of 30 per cent. Company income tax 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.

Like mining-specific taxes, discussed in section 3.3, company income tax is considered, under traditional economic analysis, to have a high economic cost. Again, this cost is mostly related to the high mobility of capital between countries, but has three main components:

- The supply of foreign capital is assumed to be highly mobile. Taxing the returns to capital would reduce the after tax return on investment. Investors would, as a consequence, reduce their supply of funds in search of higher profits elsewhere. The more mobile is capital, the greater would be the capital flight in response to the tax. Under the traditional assumptions of perfect capital mobility, the reduction in Australia's capital stock continues until the pre-tax return on capital increases enough to exactly offset the company income tax. This reduced capital stock reduces the productive capacity of industries and entails an economic cost.
- Capital is substitutable for other factors of production. When company income tax increases the cost of capital relative to other factors of production, such as labour, firms will substitute away from capital towards labour in their production technologies. This leads to production being more costly than would otherwise be the case.
- The dividend imputation system reduces the overall revenue yield from the tax system. The actual revenue collections are smaller than would otherwise be the case because some revenue will be refunded in the form of personal income tax credits. The modelling does not capture domestic savings arguments in favour of the imputation system.
- These factors mean that company income tax has a high economic cost under traditional economic analysis. Therefore, it can be expected that reducing the company income tax rate would result in an economic benefit. However, the size of this benefit will depend on how responsive the supply of capital to the Australian economy is to changes in these taxes. If capital is less mobile, a reduction in the company income tax rate would not provide as large an increase in investment into Australia. If this is the case, then the economic benefits of a

cut in the company tax rate would not be as large as anticipated under the traditional analysis of this tax

This issue is further developed in section 5.

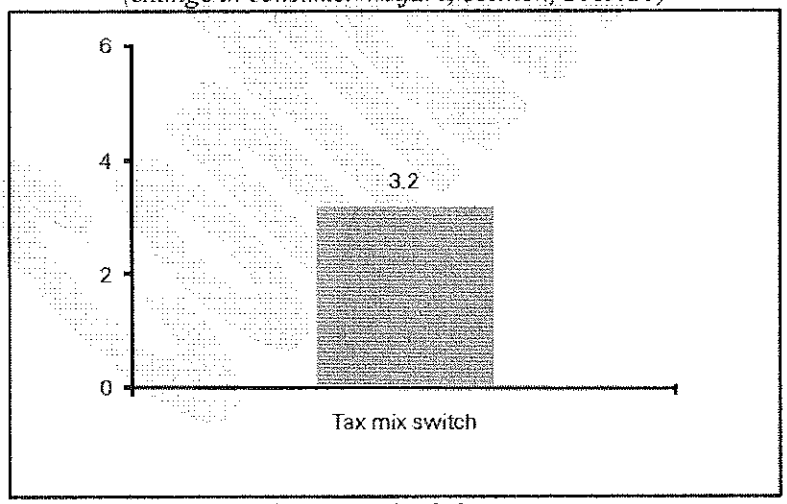
3.5 Policy Implications – Under Traditional Assumptions

As discussed earlier, under the traditional assumptions:

- a perfectly designed RRT would have no economic cost, because it is a tax purely on immobile natural resources; and
- company tax and existing mining-specific taxes such as royalties would have high economic costs, because they are taxes that apply on highly mobile capital.

Under this analysis, there is expected to be a welfare gain from abolishing existing mining-specific taxes and reducing company income tax by 5 percentage points[16] and replacing the revenue with a perfectly designed RRT. To illustrate the size of the gain, this "tax mix switch" policy has been examined, as presented below. This scenario uses the traditional assumptions of perfectly mobile capital and a perfectly designed RRT.

Chart 3.1: Tax mix switch under traditional assumptions, (change in consumer welfare, $billion, 2009/10)

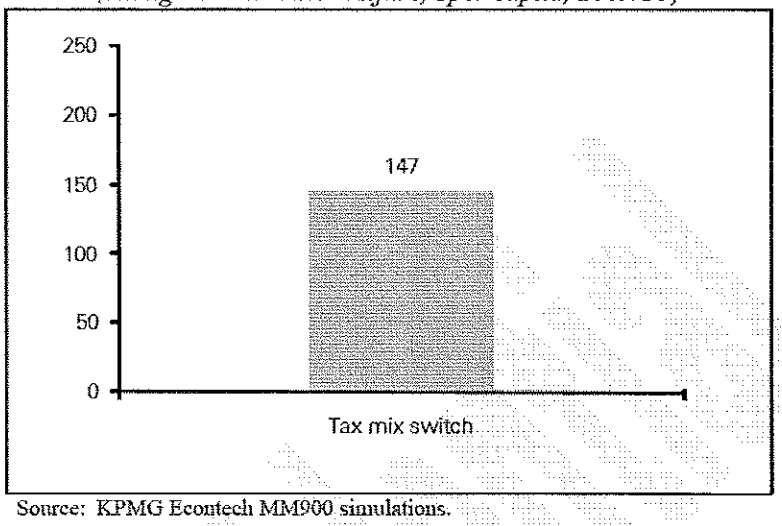


Source: KPMG Econtech MM900 simulations.

[16] Origin Energy has chosen a 5 percentage point reduction because they believe that this would bring Australia's statutory company tax rate under the OECD average, making it internationally competitive.

Chart 3.2 below includes the same policy scenarios as Chart 3.1, but instead shows the welfare impacts in per capita terms.

Chart 3.2: Tax revenue switch scenario under traditional assumptions, (change in consumer welfare, $per capita, 2009/10)



Source: KPMG Econtech MM900 simulations.

The charts above show that the policy option (under traditional assumptions) would be expected to result in increased economic welfare. For the "tax mix switch" scenario which abolishes revenue from existing mining-specific taxes and cuts the company tax rate by 5 percentage points with revenue from a perfect RRT, a welfare gain of $3.2 billion per annum is expected. This is equivalent to a gain of $147 per capita. This result will be the benchmark against which scenarios modelling the same policy option under different assumptions are compared. More detailed results from these scenarios, such as changes in GDP and consumption, are available in Appendix A.

4 Detailed Impacts of the "Tax Mix Switch" Proposal under Traditional Assumptions

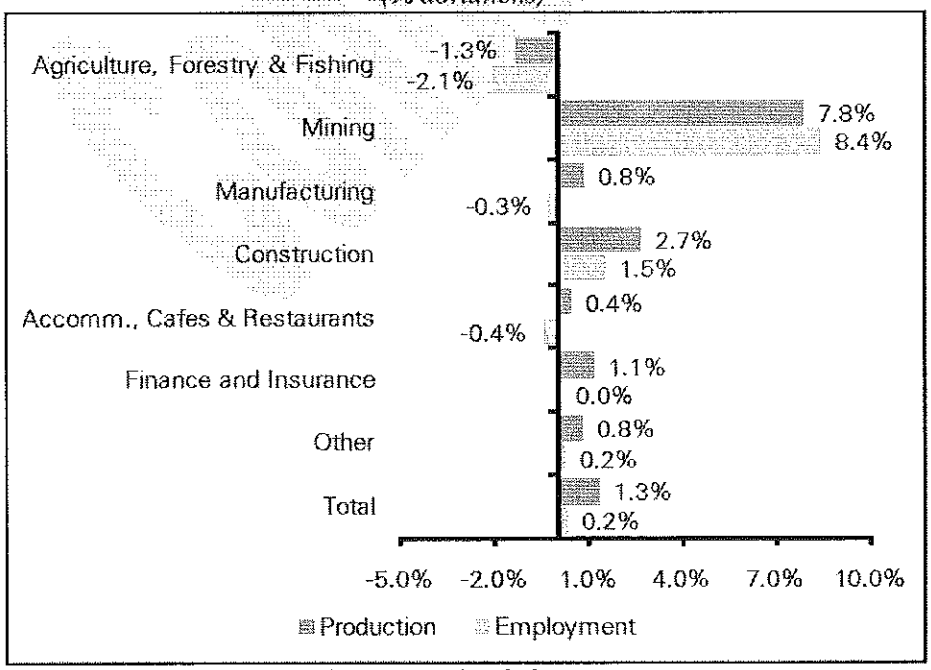
This section details further the impacts on the economy of the "tax mix switch" proposal, under traditional assumptions. The increase in activity in the mining sector caused by this policy has flow on impacts on the rest of the economy. In particular, under traditional assumptions there are some negative impacts on non-resource trade exposed sectors as well as non-mining states, which may be unintended. This section first explains the industry results before detailing the state results. Similar detailed results which relax some of the traditional assumptions are presented in Section 7, where they are compared to the results presented here.

4.1 Industry Impacts

The "tax mix switch" policy proposes to abolish the existing mining-specific taxes, such as royalties, and to reduce the company income tax rate by 5 percentage points. It proposes to make up the revenue shortfall that this creates through introducing a broad based RRT.

Chart 4.1 below shows the estimated impacts of this policy on GDP and employment in each industry. It shows that (with the exception of manufacturing and accommodation, cafes and restaurants) changes in employment in each industry broadly follow the direction of changes in production. However, the "tax mix switch" policy involves reducing the company income tax rate, which encourages greater use of capital in each industry. This results in industries becoming more capital intensive and, in general, production increases more than employment.

Chart 4.1: Tax Mix Switch under traditional assumptions, selected industry effects (% deviations)



Source: KPMG Econtech MM900 simulations.

As can be seen in Chart 4.1 the main impact of the "tax mix switch" policy under traditional assumptions is to increase activity and employment in the mining industry. This is for three reasons, as summarised below.

- Abolishing existing mining-specific taxes, such as royalties, is expected to have a positive impact on the resources sector. This is because it will reduce the cost of capital in the mining sector, and encourage investment.
- Reducing company income tax is also expected to have a positive affect on the resources sector. Again, this is because it will reduce the cost of capital in the mining sector, and encourage investment.
- Introducing a broad RRT is expected to have a zero effect on the resources sector, under the traditional assumption that a perfectly designed RRT is achievable.

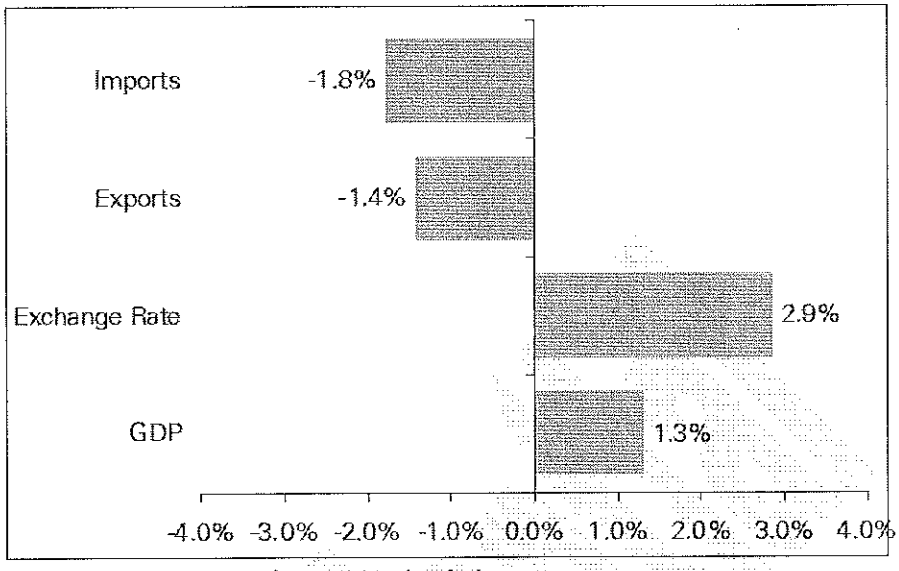
Importantly, reducing a tax on capital (such as royalties and company income tax) in the resources industry entails a higher economic benefit per unit of revenue cost than reducing a tax on capital more generally across the economy. As discussed in Section 3.2, this is for two reasons:

- The resources industry is capital intensive compared to the rest of the economy. Thus, for a given increase in capital stock, the resulting increase in output is greater for the resources industry than for other industries.
- The resources industry is highly trade exposed, and export prices do not need to be reduced in order to sell a greater volume of output. Thus, when the cost of production falls through tax cuts, the industry can respond by increasing their volume of production, without having to reduce the amount earned per unit. It should be noted that this production response may take some time to flow through, since resource development projects take a number of years to be completed.

Therefore, the "tax mix switch" policy has the largest impact on the mining industry, as compared to any other industry. However, the benefits estimated under the traditional assumptions are smaller if some of the traditional assumptions used are relaxed. This issue is analysed further in sections 5 and 6.

It is interesting to note the negative impacts of the "tax mix switch" policy on employment in the agriculture, manufacturing and accommodation cafes and restaurants (which is representative of tourism) industries. This may be a counter-intuitive result, because the "tax mix switch" policy involves reducing the company income tax across the whole economy, including for the industries mentioned. In general, a cut in the company income tax rate would tend to increase production and employment in any industry. However, there are macroeconomic effects offsetting this positive outcome in trade-exposed industries. These are shown in Chart 4.2 below.

Chart 4.2: Tax Mix Switch under traditional assumptions, national macroeconomic effects (% deviations)



Source: KPMG Econtech MM900 simulations.

One of the direct impacts of the "tax mix switch" policy is to increase exports from the resources sector because of the higher activity in the mining sector than would otherwise be the case. The higher resource exports mean that the exchange rate appreciates. This raises the price of all Australian exports in foreign currency terms, which dampens international demand for them. With reduced export revenues, imports also need to fall so as to maintain external balance in the long term.

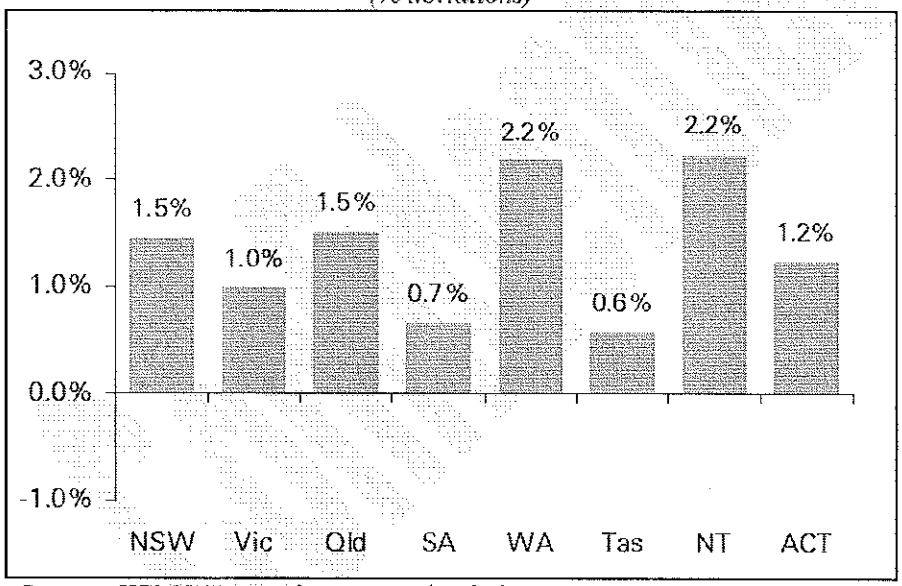
The reduction in international demand for Australian exports has a particularly large impact on export-oriented industries, such as agriculture, manufacturing and tourism (with some of the tourism impacts reflected in the accommodation, cafes and restaurants industry). The negative impact is large enough to reverse the positive effect of the reduction in the company income tax in the agriculture industry, where production is 1.3 per cent lower, and employment is 2.1 per cent lower. Manufacturing production is raised by 0.8 per cent, but this is not enough to raise employment in the industry, which falls by 0.3 per cent. The different directions for changes in production and employment in manufacturing are explained by the increased capital intensity of the industry. As is the case for most other industries, the reduced company income tax rate means that more capital is used to produce each unit of output, which reduces the labour requirements of the industry. In this way manufacturing is able to increase its production while still reducing its employment. The higher production and lower employment in the accommodation cafes and restaurants industry represents similar effects in the tourism industry.

4.2 State Impacts

The impacts on each state of the "tax mix switch" proposal will depend on their respective industry make up. For example, the states with a high proportion of mining in their GSP, such as Western Australia and Queensland, benefit from the "tax mix switch" policy. In contrast, states which rely more heavily on agriculture and manufacturing have less favourable outcomes.

Following the industry outcomes, the "tax mix switch" scenario is expected to lead to higher output for each state under traditional assumptions. This is partly due to the increased capital intensity of most industries. However, as detailed in section 4.1, there will be offsetting effects from reduced agriculture production in each state, due to the appreciation of the Australian dollar.

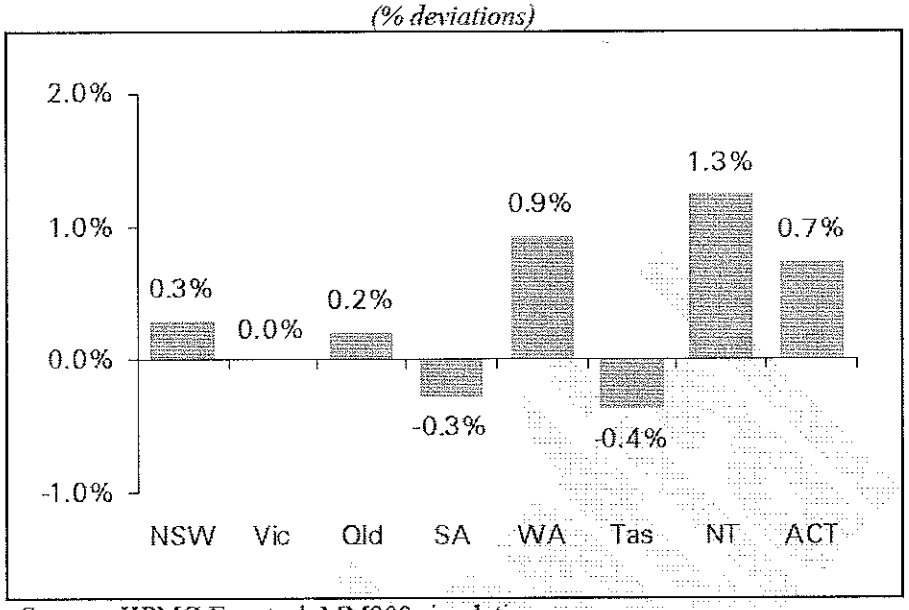
Chart 4.3: Tax Mix Switch under traditional assumptions, state production effects (% deviations)



Source: KPMG Econtech MM900 simulations.

However, in Victoria, South Australia and the Tasmania, the higher level of GSP is not expected to be large enough to increase employment in these states. Chart 4.4 below shows the overall changes in employment in each of the states as a result of the "tax mix switch" policy, as estimated using the traditional analysis.

Chart 4.4: Tax Mix Switch under traditional assumptions, state employment effects (% deviations)



Source: KPMG Econtech MM900 simulations.

As expected given the industry results presented in section 4.1, Victoria, South Australia and Tasmania all have flat or reduced employment as a result of the "tax mix switch" policy. This is because these states have a relatively high proportion of agriculture and manufacturing industries in their GSP, which suffer under the "tax mix switch" policy.

Changes in production and employment the Northern Territory and the Australian Capital Territory are relatively large in percentage terms, but because these territories are relatively small, these results are not large changes in absolute terms.

The results in this section (and section 3) have been from scenarios using the traditional assumptions that capital is perfectly mobile internationally, and that it is possible to design a RRT that has no economic costs. However, there are two main issues surrounding the use of the traditional assumptions in these scenarios.

- If it is assumed that capital is not perfectly mobile – then there would be lower economic costs associated with company income tax and existing mining-specific taxes such as royalties. That is, there would be a smaller benefit from reducing these taxes.
- Likewise, if the design of the RRT means that it does not only tax rents, but also the required return on capital – then it will not have a zero economic cost, but rather a negative economic impact.

Relaxing these assumptions reduces the welfare gains from a policy which abolishes existing mining-specific taxes and cuts the company tax rate, and then makes up the revenue shortfall with a broad RRT. These issues are discussed further in the following section.

4.3 Transitional Issues

The model used for this analysis, MM900 is a long-term model. It gives the impacts on the economy of the "tax mix switch" after the economy has fully adjusted to the changes in taxes. These are the most important impacts to consider for policy analysis. However, the short run impacts of the "tax mix switch" proposal will be different to the long run effects. In particular, the expected benefits of the "tax mix switch" policy may take a number of years to come to fruition.

This slow adjustment time comes about for two main reasons. First, competitive pressures and capital movements may be slow to adjust to changes in taxes. Second, the "tax mix switch" policy may alter a company's decisions about the timing of resource extraction, because of organisational factors. These issues are discussed below in turn.

Capital Adjustment

A reduction in royalty payments and company income tax directly reduces the cost of production. Moreover, in the long run a reduction in royalties and company income tax will encourage investment. This investment increases productivity in industries, which also reduces the cost of production. In competitive industries, these reduced costs will flow through to reduce consumer prices, which increases the purchasing power of households.

However, these reduced consumer prices may not be observed in the short term, for two reasons.

- In the short term, companies may be able to take advantage of lower company income tax payments and rather than passing on any immediate cost savings to the consumer, they may instead retain higher profits or pass them directly to owners/shareholders through higher dividends. However, over the longer term, competitive pressures are expected to lead to firms passing on the cost saving in the form of lower prices.

- Any increases in investment brought about by the "tax mix switch" will take time to occur. Since the capital stock is relatively slow to adjust, it can be expected that the full productivity benefits of the "tax mix switch" scenario will take a number of years to come to fruition. Typically, this adjustment process may take 5 to 10 years.

Thus, the expected benefits from lower consumer prices and higher purchasing power of households may take a number of years to be fully realised.

Organisational Issues

The "tax mix switch" policy could lead to changes in the profitability of different investments within the resources sector. This can have implications for firms' decisions about the timing of their production because of organisational factors such as credit constraints and alternative project options.

For example, each resources company will have credit constraints in the short term, and it may not be able to develop all of the sites to which they have access at the same time. Therefore, the company must choose which sites to develop first and which to develop at a later date. Given the international nature of many resources companies, this decision is often made on a global basis.

Therefore, a change in the resource tax regime in Australia, especially one that would increase the overall tax take from a resource project, could affect the timing of decisions to develop resources. For example, consider the case of a tax change in Australia that reduces the return on a resource (to which a company already has access) below the return on another resource (to which that same company has access) in another country. Given the company's credit constraints, in the short term, it may need to choose between developing one resource or the other. After the introduction of the "tax mix switch", if the resource in Australia now offers a smaller rate of return (although it may still generate a normal rate of return), then developing the resource in the other country may be given priority at the expense of the resource in Australia.

In this way, although, in the presence of the "tax mix switch" policy, any resource with an after tax rate of return at least as large as the required rate can be expected to be developed in the long run, taxes can affect the timing of the development of different resources. Resource taxes in Australia which compare unfavourably to resource taxes in other countries may delay the development of some deposits in Australia.

Therefore, the potential benefits from the "tax mix switch" policy would take time to be fully realised. The transitional issues noted here mean that the short term outcome may be less favourable than the long term outcome, and that the effects of the policy may take 5 to 10 years to be fully realised.

5 Are Project Funds really that Mobile – and How does this Affect Traditional Tax Comparisons?

This section examines the impact of one of the assumptions made in Section 3. That is, it assesses the appropriateness of assuming that investment funds are perfectly mobile internationally. It then discusses the implications for the benefits of abolishing existing mining-specific taxes and reducing company income tax if funds are assumed to be less mobile. The simulations in this section show that these tax reductions are less beneficial if capital is less than perfectly mobile.

5.1 Are Project Funds Really that Mobile?

As discussed in Section 3, the economic costs of company income tax and existing mining-specific taxes such as resource royalties rest on the mobility of international investment funds. Traditionally, the supply of foreign investment funds to Australia is assumed to be perfectly elastic. This reflects traditional neo-classical theory, which indicates that capital stocks adjust so that the after tax returns on investments are equalised across countries. Under this analysis, an increase in the Australian company income tax or royalty rate would reduce investment into Australia, which would increase the before tax rate of return to capital. This exit of capital would continue until the after tax rate of return was restored to equality with the rest of the world.

Under these assumptions, industries in Australia can attract as much capital as required as long as they can offer an after tax return on capital equivalent to the required international rate of return. However, there are a number of considerations which indicate that the after tax rate of return that industries must offer may increase as their capital requirements increase (indicating that the international mobility of funds is less than perfectly mobile). First, capital markets may be segmented and exhibit "home biases". Second, non-tax factors may make investment in Australia attractive relative to other countries. These factors are now discussed in more detail.

Segmented Capital Markets and "Home Biases"

Cooper et al. (2000) note that "evidence suggests that international capital markets are neither fully integrated nor completely segmented." That is, there is evidence that capital markets are partially segmented (Cooper et al., 2000).

This segmentation may be by industry – where there may be a pool of investment funds directed to each type of industry, with each pool being somewhat separate from the rest of the capital market. These segmentations may be because there are costs associated with investors in one industry moving their investment to another industry. For example, there may be costs involved in gathering information about another industry.

Such industry segmentation may mean that to move investment into another industry would involve a higher cost. This means that there is a less than perfectly mobile supply of foreign funds. That is, each industry may have an upward sloping capital supply curve indicating a higher rate of return for capital is required to encouraged further investment.

Also, "home investor bias" may reduce the international mobility of capital to less than perfect. The home investor bias discourages international capital flows because investors may be reluctant to invest overseas because of a lack of information about other countries or because of risk aversion. This would mean that domestic investment would be, to some extent, determined by domestic savings, rather than international investment flows.

Overall, Zodrow concludes that while there is "general agreement that capital is mobile and has become increasingly mobile over time…There is, however, far less agreement as to whether capital is sufficiently mobile that it is reasonable to assume perfect international capital mobility" (Zodrow, 2008, p.43).

Non-Tax Factors

Non-tax factors may also impact on the sensitivity of investment to the tax rate. These factors would lead to some degree of fixidity in a firm's choice of location, and a lower responsiveness to changes in the tax on returns to capital.

According to the OECD "central predictions of the neo-classical theory of investing as regards tax effects on investment have been challenged in recent years by the new economic geography framework". (OECD 2007, p10) This theory emphasises the importance of location-dependent profits. For example, there may be cost reductions available from locating in specific areas due to a concentration of that particular business activity. By locating in a particular area, a business may be able to reduce transportation costs and export to small markets.

Moreover, other factors may also make location in Australia attractive relative to other countries. Following (Kelly and Grazini 2005, pp. 37-39), these may include:

- proximity to final markets;
- sunk costs, so that existing investments may be 'locked in';
- other taxes such as tariffs;
- labour market conditions; and
- profit shifting – which is a practice mainly of multinational corporations.

According to the OECD (2007) other factors 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 may also mean that capital supply is less responsive to changes in taxes.

In support of this argument, Görg et al (2007) found that countries with higher taxes and higher social welfare spending are actually more successful in attracting overseas investment. The study analysed data from 18 OECD countries over a 14-year period and found that perceptions about the host country's economic and social environment are key to the choice of location for many multinationals. Investment decisions depend on the combination of taxation and the provision of public goods and services that host countries can offer because of taxation. An 'unfavourable' tax differential may lead to more (and not less) investment flowing into a country.

All of the factors listed above influence the profitability of a project. As long as these other factors that influence investment decisions exist, a change in the taxation of capital may not alter the decision to invest in Australia as much as would otherwise be the case.

5.2 Policy Implications – Under Less Mobile Funds

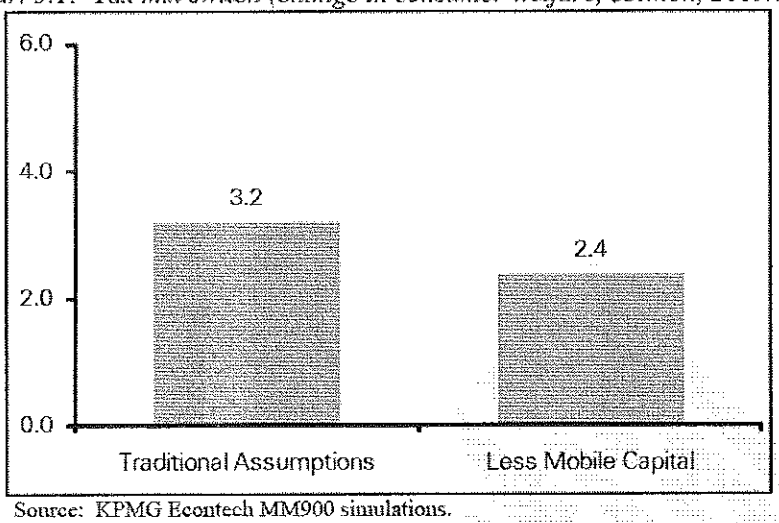
The above discussion indicates that capital may be less internationally mobile than traditionally assumed. If this were the case, then capital would be less responsive to changes in tax rates than concluded under traditional economic analysis. It follows that, in this case, when taxes on the return to capital (including company income tax and mining specific taxes such as royalties) are reduced, the inflow of investment funds to Australia would be smaller than under the traditional assumption of perfectly mobile capital. Thus, the capital stock in Australia would still increase in response to reductions in these taxes, but by less. This would mean that the traditional analysis could overstate the benefits of the "tax mix switch" policy option compared to an analysis which takes into account potential imperfections in capital mobility.

To illustrate this, an additional scenario is presented below. This scenario varies the scenario presented in Section 3 above, by relaxing the assumption of a perfectly mobile supply of funds.

The assumption used in the scenario presented below is that the rate of return to capital needs to increase to attract additional foreign investment. Specifically, the current level of Australian net foreign liabilities means that the required rate of return is 50 basis points higher than if Australian had zero net foreign liabilities. This still reflects that capital supply is very responsive to the rate of return, but that it is less than perfectly mobile (in which case no change in the rate of return would be required to stimulate additional foreign investment).

Chart 5.1 below shows the estimated welfare impact from abolishing mining specific taxes and reducing the statutory rate of company income tax by 5 percentage points, and replacing the revenue through a perfect RRT. The results under both the assumption of perfect capital mobility (traditional assumptions) and the assumption of less mobile capital are shown.

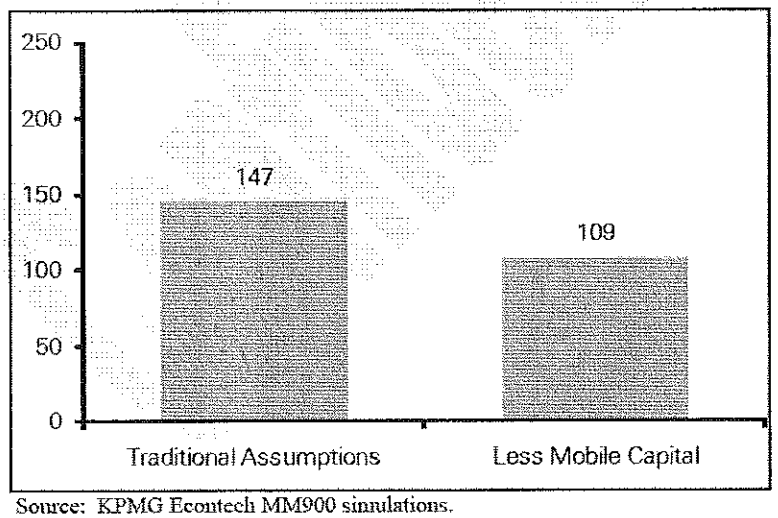
Chart 5.1: Tax mix switch (change in consumer welfare, $billion, 2009/10)



Source: KPMG Econtech MM900 simulations.

Chart 5.2 includes the same scenarios as Chart 5.1 above, but instead shows the increases in consumer welfare in per capita terms.

Chart 5.2: Tax mix switch (change in consumer welfare, $per capita, 2009/10)



Source: KPMG Econtech MM900 simulations.

The charts above show that this "tax mix switch" is still expected to increase economic welfare, but the estimated increase is smaller when the lower mobility of capital is taken into account.

As presented in section 3.5, an additional welfare gain of $3.2 billion per annum is estimated under the traditional assumptions. This is equivalent to a gain of $147 per capita. However, the size of this welfare gain is partly driven by the assumption of perfect capital mobility. In comparison, if capital is less than perfectly mobile, then the welfare gain is reduced to $2.4 billion per annum. This is equivalent to a gain of $109 per capita. More detailed results

from these scenarios, such as changes in GDP and consumption, as well as industry impacts, are available in Appendix A.

The results above illustrate how assuming perfectly mobile capital could overstate the welfare gain from using a RRT to replace revenue from mining-specific taxes and funding a cut in the company tax rate, compared to a scenario with less mobile capital. In addition, the benefits estimated under a traditional analysis will also be influenced by the assumption that it is possible to implement a RRT with no economic costs. The following section analyses this assumption.

6 Pitfalls in the Design of a Resource Rent Tax (RRT)

As explained in Section 3.1, a perfectly designed RRT would ensure that a RRT would have zero economic cost. However, as also noted, in practice it is difficult to design a RRT that only taxes the economic rents. Therefore, this section analyses the practical challenges of implementing a perfect RRT.

- Section 6.1 discusses the difficulties in implementing a perfect RRT, which result in the potential for an imperfect RRT to tax capital in the mining sector. This section discusses why taxing capital is problematic, before discussing specific challenges in designing a perfect RRT. Next a paper which questions whether a perfect RRT is achievable is cited. Lastly, other issues concerning the terms of trade and sovereign risk are discussed.
- Section 6.2 presents the results of scenarios illustrating the implications of an imperfectly designed RRT for the "tax mix switch" policy option.

6.1 Difficulties in Implementing a Perfect RRT

A survey of the literature surrounding the implementation of a RRT reveals that there are a number of practical challenges in achieving the zero economic cost outcome anticipated by the traditional analysis. For example, Hogan (2007) notes that "there are significant issues in designing a resource rent tax, particularly in the inclusion of a risk premium allowance". Some authors, such as Smith (1999) even go so far as to conclude that a RRT with zero economic cost is theoretically impossible.

Taxing Capital in the Resources Sector is Costly

As discussed in Section 3.1, a firm will undertake a resource project as long as it can earn at least the required rate of return on its investment (which includes the risk free rate of return and a risk premium). If the design of the RRT causes the expected rate of return to fall below this required rate, then the firm will no longer have an incentive to invest. In this case, the RRT changes from being only a tax on rents, to being a de-facto tax on capital in the resources industry. That is, although a natural resource generates location-specific rents as it is immobile, the capital necessary for developing the resources is highly mobile. Therefore, if the design of the RRT leads to a de-facto tax on capital, investment in the industry is expected to fall, reducing the productive capacity of the resources sector.

Importantly, a tax on capital in the resources industry entails a higher economic cost per unit of revenue than a tax on capital more generally. As already discussed in Section 3.2, this is for two reasons:

- The resources industry is capital intensive compared to the rest of the economy. Thus, for a given reduction in capital stock, the resulting fall in output is greater for the resources industry than for other industries.
- The resources industry is highly trade exposed. This means that firms have little scope to increase the price of their output in response to the tax, and instead reduce output.

However, export prices may not respond immediately to tax changes particularly in the case where price is contracted for a certain fixed period.

Given the high costs of taxing the required return to capital in the resources industry, if the RRT taxes more than just the economic rents of a firm, then it has the potential to be distortionary. There are a number of difficulties in designing a RRT so that it only taxes economic rents. The first is that there are practical difficulties in allowing the full offset of costs against revenues. The second is challenges in finding the correct uplift rate to apply to the costs. Both of these difficulties are connected to the treatment of risk in the resources sector, and are discussed below. Uncertainties about the terms of trade and sovereign risk also pose challenges in designing a RRT with zero economic costs. These factors are now discussed in turn.

Difficulties in Fully Offsetting Expenditures

As discussed in Section 3.1, for a RRT not to distort investment decisions, it must not change the riskiness of any investment. A RRT reduces the profitability of an investment should it be successful. Thus, to leave the riskiness of the investment unchanged, it should also reduce the loss if the investment be unsuccessful. If this is the case, then the decision of the firm to make the investment would be unaffected by the RRT, and the tax would have zero economic cost. This could be achieved through three different design mechanisms.

- The first option is to implement a 'Brown Tax', in which the government receives a portion of the profit in each year. This includes making a payment to the firm in any year in which a loss is made.
- The second option is to allow the losses of one company to be sold to another company which can then claim these as offsets against their own tax liability. This would allow companies making losses to realise the value of their tax loss with certainty.
- The third option would be to allow all firms to carry their expenses forward, and offset these against the profits of future years when calculating their tax liability. There would also need to be the provision that firms making losses over the entire life of the project could claim a tax rebate for expenses that had not been carried forward at the end of the project life. In this case, expenses could be carried forward at the risk free rate of interest (the long-term government bond rate), because they would represent a tax offset that is certain. [17]

The three mechanisms above make allowances for offsetting all expenses against revenues when calculating tax liability under the RRT. Importantly, tax liabilities are allowed to be negative whenever losses are made. This achieves certainty that any profits of the project will be reduced by the same proportion as any losses, and that the tax will not alter the riskiness of any project. That is, while governments receive tax revenues from successful projects, governments are also liable to make payments to firms with loss-making projects.

[17] Hogan (2007) argues that if a RRT that allows for full offset of costs could be achieved, and all costs were carried forward at the government bond rate, then this tax would have the same outcome as the Brown Tax and involve no economic costs.

In practice, governments (including the Australian Government) have instead implemented a different form of the RRT. In the current version of the tax, no payments are made to firms in loss-making years, but instead, expenses in these years are carried forward and offset against revenues.[18] As noted by Hogan (2003, p49), "in the current system there is still some scope that not all relevant expenditures in exploration, development and extraction are offset against revenue for resource rent tax purposes". For example, there are two cases where costs incurred cannot be offset against profits.

- New investors cannot claim their tax rebate if their exploration is unsuccessful because they do not have a project against which to offset their costs.
- Old investors who have a project that is less profitable than expected cannot offset their development expenditures because they are not transferable to other projects.

If the three mechanisms listed above cannot be used, then the riskiness of each resource project would be increased. This is because of the inability to offset all costs, with certainty, against revenues when calculating tax liability. This uncertainty about tax rebates would increase the risk premium required on investments in the resources sector[19]. In this case, uplift factors higher than the risk free rate of interest would need to be used, as discussed in the following section.

Difficulties in Setting an Appropriate Uplift Rate

As discussed above, if the RRT does not allow all costs to be offset, then the tax increases the riskiness of any project. To avoid this, the RRT could be designed to ensure that it only starts taxing firms after they are earning positive economic rents. This would mean that it would not change the behaviour of investors in the resources sector. The challenge in doing this related to difficulties in correctly identifying economic rents.

In order to tax only economic rents, a RRT could attempt to allow the firm to earn a required rate of return on their investments before the firm must pay any RRT. This is commonly done through the application of uplift rates to expenditures when they are carried forward. To avoid discouraging investment, a perfectly designed RRT would set an uplift rate high enough to cover the risk free rate of return plus the risk premium required for that project. This would ensure that the economic rents of a project were correctly identified and that there would be no economic costs associated with the tax.

However, if the uplift rates are set too low, then the tax may not leave sufficient after tax returns for some projects to go ahead. For example, if the uplift rates are set below the required rate of return of a project, then even if it does not earn any economic rents, investors would end up paying some RRT. This tax payment would erode profits to below the required rate of return, and as a result, the project would not go ahead. In this case, the RRT would act like a de-facto

[18] As discussed in section 3.1 (and below) these past expenditures are accumulated with interest.

[19] Importantly, the inherent risk of the resources project is not the relevant source of risk for the RRT design. Rather, the risk that the tax will not allow refunds on loss making projects (and thus alter the riskiness of the project) is the most important consideration.

tax on the return to capital in the mining industry. This type of tax involves a high economic cost, as described above.

Conversely, setting an uplift rate too high also entails some economic costs. For example, if the uplift rate is significantly above the required rate of return, firms could benefit from the offset against their tax liability. This gives incentive to delay the date at which the offset is claimed, which could be done by delaying the date of resource extraction. It also gives incentives to invest in capital so that they can reduce their tax liabilities by using the high uplift rate. However, it may be argued that this incentive to investment may be an improvement, rather than an economic cost, when viewed in the context of the whole tax system. For example, it may partially offset the discouraging effect on investment that company income tax has on the resources sector.

The above discussion implies that, for the RRT (without full offset of expenditures) to have zero economic costs, it is important that the uplift rate is set equal to the required rate of return (including the risk premium). However, a major challenge in designing such a RRT is that, in practice, required rates of return are not uniform across investment projects. Instead they vary depending on the riskiness of each investment. This makes setting an appropriate uplift rate problematic.

On the one hand, using a RRT with constant uplift rates across the whole resources industry would not be ideal. Such a design would be likely to either:

- discourage investment in more risky projects if the uplift rate is too low; or
- encourage overinvestment in less risky projects if the uplift rate is too high.

On the other hand, given the information asymmetries that exist between the government and the investor, setting an uplift rate appropriate for each resources project would be administratively difficult.

Given the difficulties of designing a perfect RRT, there is the potential that a RRT will be imperfect and involve some economic costs. This is quite different to the traditional analysis of the RRT, which assumes that is has zero economic cost. These considerations indicate that the traditional economic analysis could overstate the benefits expected from the introduction of the "tax mix switch" proposal modelled in this report.

Doubts about the Perfect RRT

Smith (1999) goes further than much of the economic literature on the design of the RRT, and concludes that it is impossible to design a RRT with no economic costs. Smith extends the traditional model used to analyse the decisions of resources firms, by taking into account that firms decide:

- whether to obtain additional information about the deposit;
- when to extract the resource; and
- at what rate to extract the resource.

With his model, Smith concludes that a RRT will "encourage excessive investment in information about the deposit, premature investment in mining, and a slowing of the rate of extraction." He also finds that the higher the uplift rate and the higher the rate of tax, the greater these distortions are.

The Implications of the Terms of Trade

Another factor contributing to the difficulties in implementing a broad RRT is that the economic rents available in the resources sector are uncertain. This is partly because of uncertainties around commodity prices and the terms of trade.

In times of high commodity prices, any particular project is more likely to earn economic rents. Thus, even an imperfectly designed RRT is less likely to remove the rents from that project and start eroding the required rate of return. However, in times of lower commodity prices, any particular project will earn smaller economic rents. This means that more projects will be marginally profitable than with higher commodity prices. In this case, an imperfectly designed RRT becomes more likely to erode the required rate of return for this higher number of marginally profitable projects. Thus, the risk that the RRT entails an economic cost is greater the lower the terms of trade.

Sovereign Risk

Sovereign risk is an additional issue related to the discussion of the role of certainty in investment decisions. In particular, there may be a perceived risk that the government may alter the design of the RRT in the future and apply those changes to existing projects. For example, if the government increases the rate of the RRT at some future date and does not quarantine the change to new projects, the profitability of each existing project would be adversely affected.

If investors perceive this as a potential risk, it will be factored in to their decisions. Boadway and Keen (2009) also acknowledge this issue, as outlined below.

> *"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."* (Boadway and Keen, 2009, p28)

More generally, sovereign risk may increase the risk premium required by investors in the resources sector. This could mean that the "tax mix switch" policy would lead to a smaller increase in investment in the resources sector, relative to the traditional analysis. This sovereign risk issue is particularly important for the mining sector, compared to other industries, because investments tend to be long term in nature, with high start-up costs and long lead times. This increases the risk that, even if all expenditures can be offset against revenues or if the appropriate uplift factors can be identified, a RRT would have an economic cost, and reduce the benefits of the "tax mix switch" policy.

Any tax on the resources sector, including royalties and resource rent taxes, potentially involves sovereign risk problems. In particular, the introduction of a new broad based RRT may add to the perception that sovereign risk is an issue if existing projects are captured by the

arrangements. However, if a new RRT is introduced, potential negative sovereign risk impacts could be reduced by credibly establishing that any further future changes in taxation in the resources sector would not apply to existing projects.

6.2 Policy Implications – Under an Imperfect RRT

Given the discussion above, there are a number of potential challenges involved with the practical implementation of a RRT. A RRT can act as a deterrent to investment, through:

- a failure to allow the full offset of all costs;
- an uplift rate set lower than the required rate of return for some projects; or
- perceived sovereign risk.

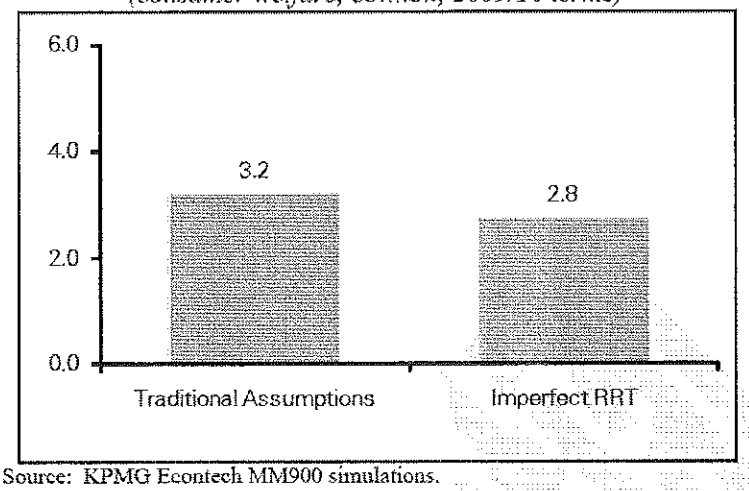
These potential problems mean that a RRT could be imperfect, and have some economic costs. This would reduce the economic benefits of the "tax mix switch" policy option, compared to an analysis which assumes that the RRT is perfectly designed.

To illustrate the implications an imperfectly designed RRT on the expected benefits from the "tax mix switch" proposal, this section varies the modelling under traditional assumptions presented in Section 3 to demonstrate the implications of using a RRT that does entail an economic cost. The imperfect RRT modelled in the scenario below acknowledges that it not only taxes economic rents, but also taxes a component of the required returns to capital. Specifically, the modelling considers the case where 35 per cent of the revenue raised by the imperfect RRT is through a tax applied to the return to capital in the mining industry. The baseline scenario reflects current forecasts that the terms of trade is at the 2005/06 level, however this forecast is uncertain. However, as explained above, if the actual terms of trade is lower than currently forecast, then there is a higher chance that an imperfect RRT would erode the required returns to capital, and would lower the expected benefits of the "tax mix switch" policy. To explore the possible implications of uncertainty surrounding commodity prices, the modelling reflects the case where the terms of trade are at approximately 2004/05 levels[20], combined with the assumption of an imperfect RRT.

Chart 6.1 below presents the results of abolishing the existing mining specific taxes, cutting the company tax rate by 5 percentage points and replacing the revenue through an imperfect RRT. It compares the results to the traditional analysis of this policy option.

[20] Specifically, the assumption that 35 percent of the revenue raised by the imperfect RRT is through a tax applied to the return to capital in the mining industry reflects this consideration.

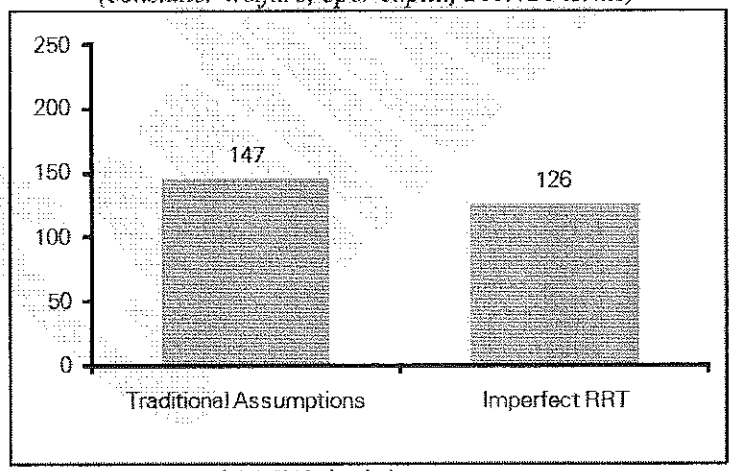
Chart 6.1: Tax mix switch
(consumer welfare, $billion, 2009/10 terms)



Source: KPMG Econtech MM900 simulations.

Chart 6.2 includes the same scenarios as Chart 6.1 above, but instead shows the increases in consumer welfare in per capita terms.

Chart 6.2: Tax mix switch
(consumer welfare, $per capita, 2009/10 terms)



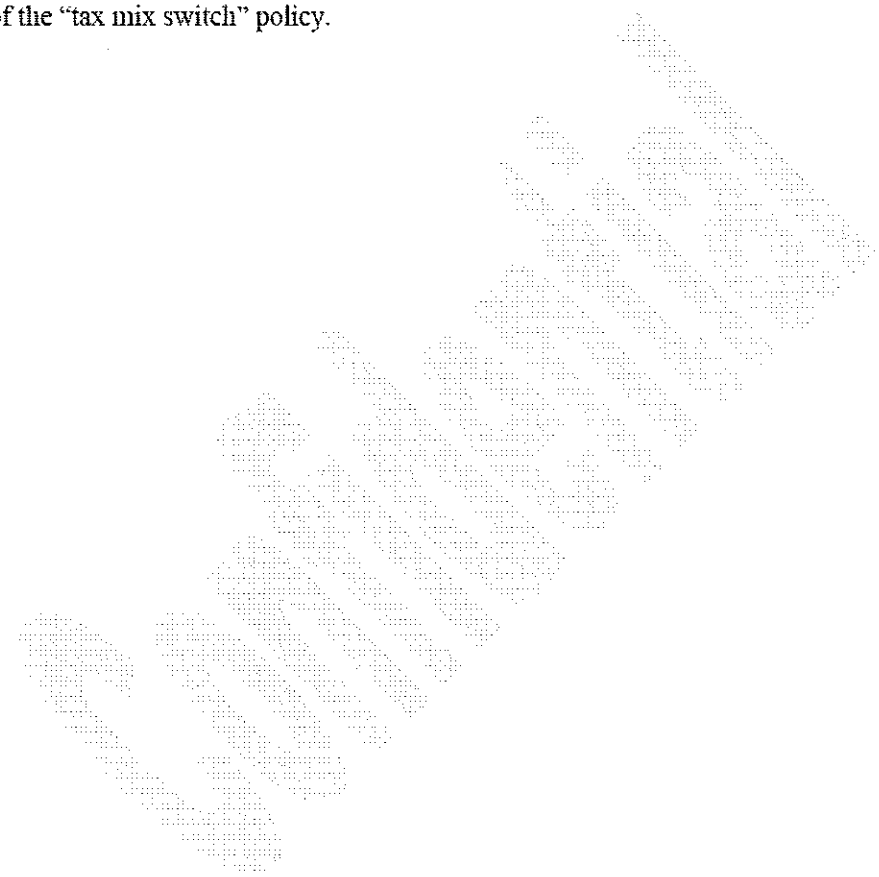
Source: KPMG Econtech MM900 simulations.

Under traditional assumptions, replacing revenue from mining-specific taxes and cutting the company tax rate by 5 percentage points with revenue from a perfectly designed RRT means that annual consumer welfare is $3.2 billion (or $147 per capita) higher than would otherwise be the case.

However, the size of this welfare gain is partly driven by the traditional assumption that an increase in RRT to replace the revenue comes at no cost. When it is taken into account that the RRT may be imperfect in design, the welfare gain falls to $2.8 billion (or $126 per capita) per annum. Thus, the traditional analysis could overstate the benefits of the "tax mix switch" policy

option. More detailed results from these scenarios, such as changes in GDP and consumption, as well as industry impacts are available in Appendix A.

Importantly, the more revenue that the Government requires from the RRT, the more difficult it is to design the RRT with low economic costs. For example, setting a lower uplift rate to increase the base of the tax will increase the potential tax revenue per successful project. At the same time, a lower uplift rate will also increase the likelihood that it is below the required rate of return for any particular project, discouraging investment in it. Therefore, it might be expected that the higher the revenue requirements of the RRT, the more that this will reduce the benefits of the "tax mix switch" policy.



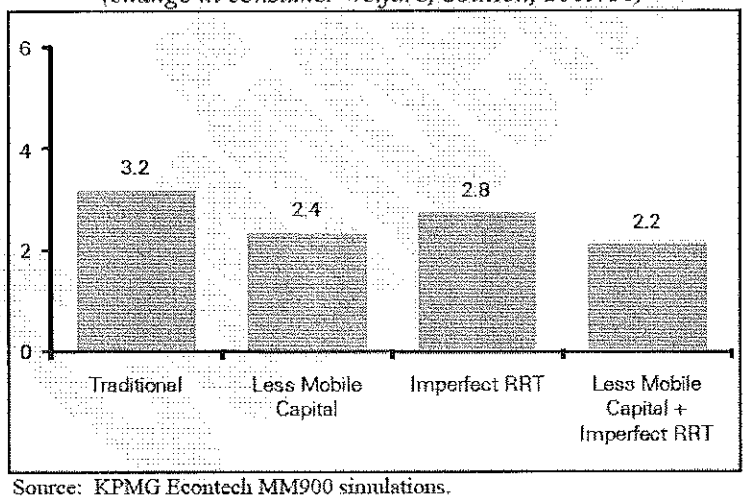
7 Policy Implications

The model simulations presented in this report demonstrate that there are likely to be some economic gains from a "tax mix switch policy" which abolishes existing mining-specific taxes and cuts the company tax rate, and then replaces the revenue with a broad based RRT. However, the estimated gains of such a policy are likely to be smaller than under traditional assumptions when it is taken into account that:

- *capital may be less than perfectly mobile internationally; and*
- *designing a perfect RRT is problematic.*

Therefore, the traditional analysis could overstate the benefits of a "tax mix switch" policy option compared to an analysis which relaxes the traditional assumptions. The left most bar in Chart 7.1 shows the expected outcome under the traditional analysis. The second bar represents the gain in consumer welfare when the modelling assumption of perfect capital mobility is relaxed. The following bar then shows the results of implementing an imperfect RRT under the assumption of perfect capital mobility, including the risk that the terms of trade lower than is currently forecast (at the 2004/05 level). The last scenario combines these two assumptions.

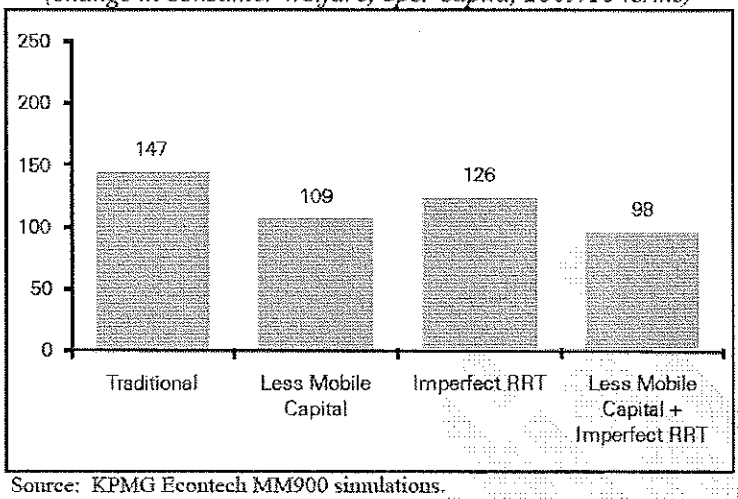
Chart 7.1: Tax mix switch
(change in consumer welfare, $billion, 2009/10)



Source: KPMG Econtech MM900 simulations.

Chart 7.2 includes the same scenarios as Chart 7.1 above, but instead shows the increases in consumer welfare in per capita terms.

Chart 7.2: Tax mix switch
(change in consumer welfare, $per capita, 2009/10 terms)

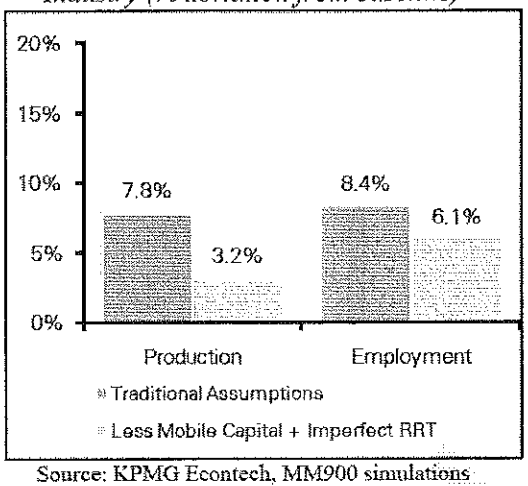


Source: KPMG Econtech MM900 simulations.

As can be seen in the charts above, the "tax mix switch" policy option modelled involves a positive welfare gain. Specifically, KPMG Econtech simulations estimate that the welfare gain from the "tax mix switch" policy under traditional assumptions could be $3.2 billion (or $147 per capita). However, if it is taken into account that capital may be less mobile and that the RRT may be imperfect then the expected gains are lower, at an estimated $2.2 billion (or $98 per capita). This implies that the traditional economic analysis could overstate the benefits compared to an analysis which takes into account potential imperfections in capital mobility and in the design of the RRT, by 50 per cent.

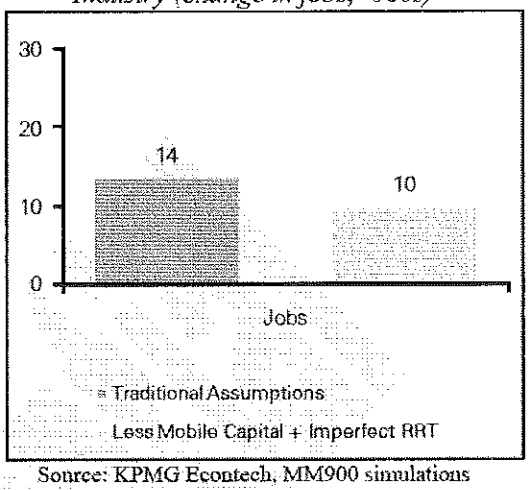
This possible overstatement is also observed in other results. For example, while the "tax mix switch" policy is expected to have a positive impact on the mining industry, using the traditional assumptions could overstate these benefits. Under the traditional assumptions, mining industry production is estimated to be 7.8 per cent higher and employment is estimated to be 8.4 per cent higher if the "tax mix switch" policy is implemented. This can be largely attributed to the reduction in mining specific taxes such as royalties. However, these results could overstate the benefits from the policy by around 140 per cent and 40 per cent respectively, compared to a case which relaxes the traditional assumptions. The charts below present the simulated increases in production and employment for the mining industry under the two sets of assumptions

Chart 7.3: Tax mix switch - Mining Industry (% deviation from baseline)



Source: KPMG Econtech, MM900 simulations

Chart 7.4: Tax mix switch – Mining Industry (change in jobs, '000s)

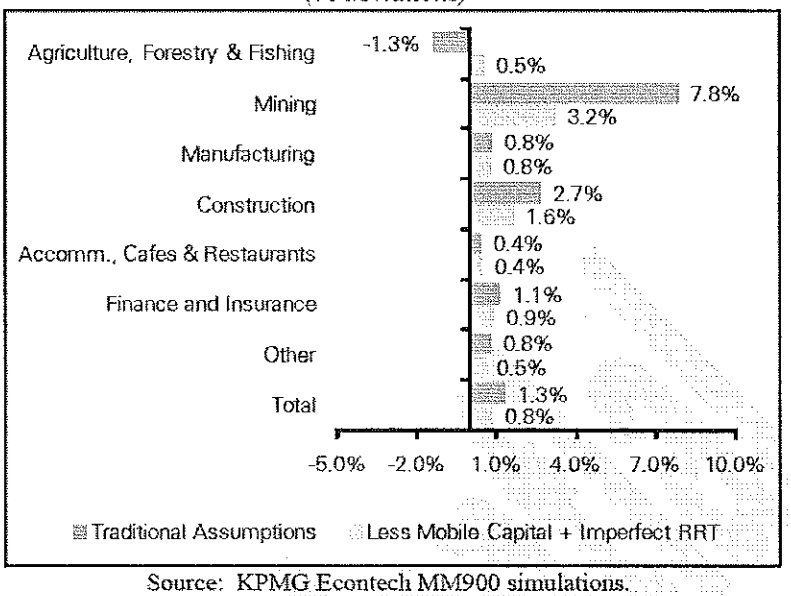


Source: KPMG Econtech, MM900 simulations

Although the "tax mix switch" policy has a positive impact on sectors such as the mining industry, it is expected to have a negative impact on some other trade-exposed sectors of the economy. This is because the value of the Australian dollar is expected to appreciate under the policy because of the potential improvement in the balance of trade from higher mining exports. For example agricultural production and employment is lower by 1.3 and 2.1 per cent respectively under the traditional analysis. Employment in the manufacturing industry is flat or 0.3 percent lower, as shown in Charts 7.5 and 7.6 below.

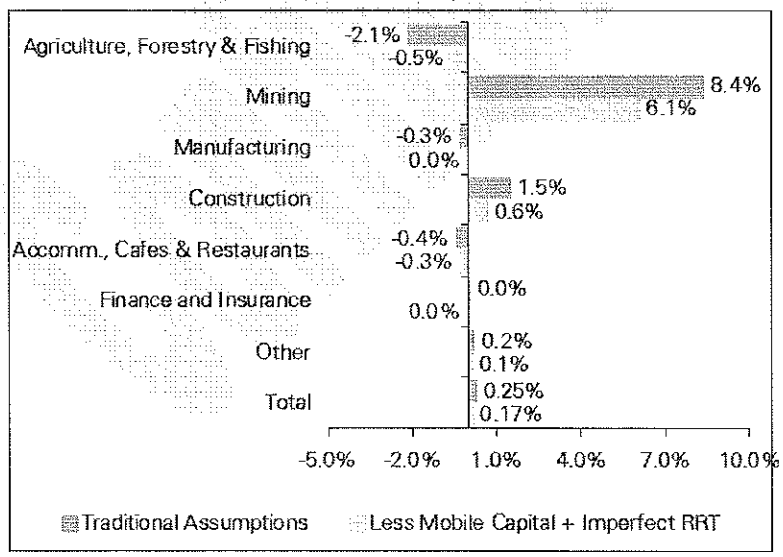
The traditional analysis could overstate the industry production and employment results for each industry. The sectoral results under both the traditional assumptions and the assumptions of less mobile capital and an imperfectly designed RRT are presented in the charts below.

Chart 7.5: Tax Mix Switch - selected industry production effects (% deviations)



Source: KPMG Econtech MM900 simulations.

Chart 7.6: Tax Mix Switch - selected industry employment effects (% deviations)



Source: KPMG Econtech MM900 simulation

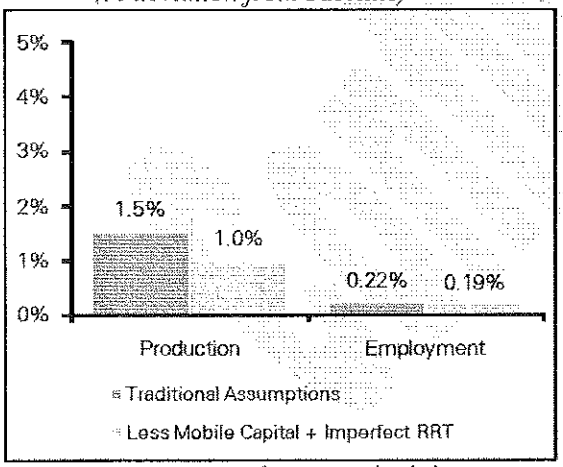
These results show that the "tax mix switch" policy modelled in this report could not be used to encourage activity in some sectors (such as agriculture and manufacturing). This is because this policy is expected to put upward pressure on the value of the Australian dollar as a result of the potential improvement in the balance of trade from higher mining exports. This, in turn, contributes pressure on trade-exposed industries.

Following on from these sectoral results, states with relatively large mining industries (such as Queensland and Western Australia) are expected to benefit from the "tax mix switch" policy. However, the traditional assumptions may also overstate these benefits to Queensland and Western Australian production and employment from the "tax mix switch" policy.

If a RRT is used to fund the abolition of existing mining specific taxes and a 5 percentage point cut in the company tax rate, then under the traditional assumptions production and employment in Queensland are estimated to be 1.5 per cent and 0.22 per cent higher respectively. This compares with lower gains of 1.0 per cent and 0.19 per cent respectively if both of the traditional assumptions are relaxed. Thus the traditional analysis could overstate the production gain in Queensland by around 50 per cent and the employment gain by around 15 per cent.

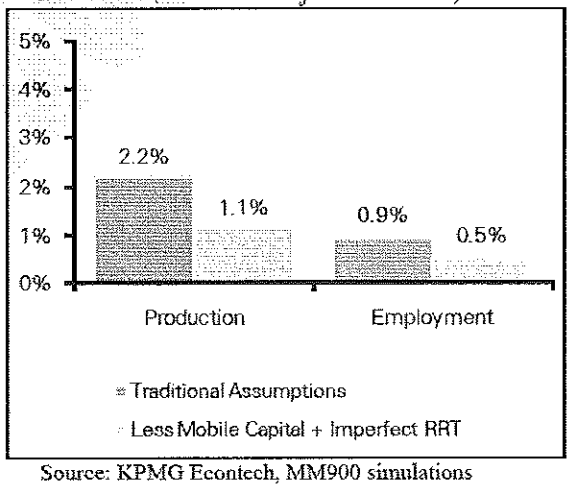
The traditional assumptions could also overstate the benefits to Western Australian production and employment from the "tax mix switch" policy option. If a RRT is used to fund the abolition of existing mining specific taxes and a 5 percentage point cut in the company tax rate, under traditional assumptions, production and employment in Western Australia could be higher by 2.2 per cent and 0.9 per cent respectively. This compares with lower gains of 1.1 per cent and 0.5 per cent respectively if both of the traditional assumptions are relaxed. Thus the traditional analysis could overstate the production gain in Western Australia by around 95 per cent and the employment gain by around 75 per cent.

Chart 7.7: Tax mix switch – Queensland (% deviation from baseline)



Source: KPMG Econtech, MM900 simulations

Chart 7.8: Tax mix switch – Western Australia (% deviation from baseline)

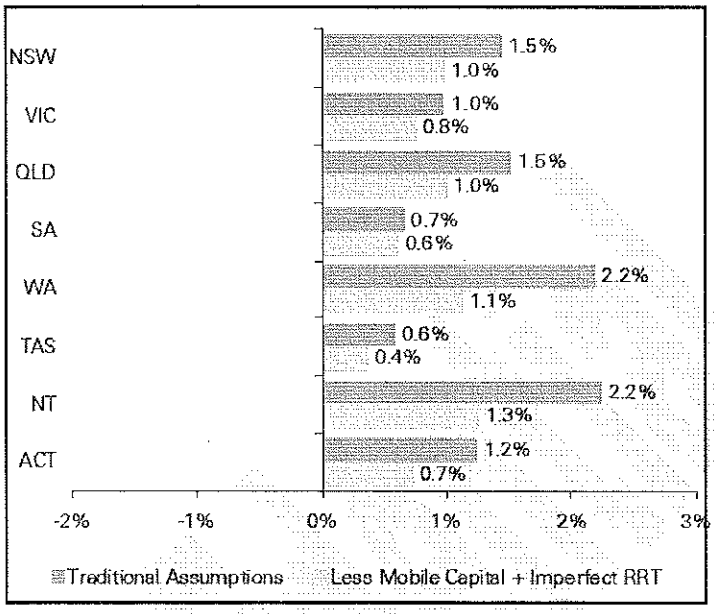


Source: KPMG Econtech, MM900 simulations

Production in all states is higher due to the "tax mix switch" policy, as shown in Chart 7.9. This is because production in most industries benefits from reduced taxation on capital. However, although employment in states with relatively large mining industries is higher from the "tax mix switch" policy, in some states employment is lower. For example, under the traditional analysis, Victorian employment remains unchanged and employment levels in South Australia and Tasmania are expected to be lower than otherwise by 0.3 and 0.4 percent respectively, as

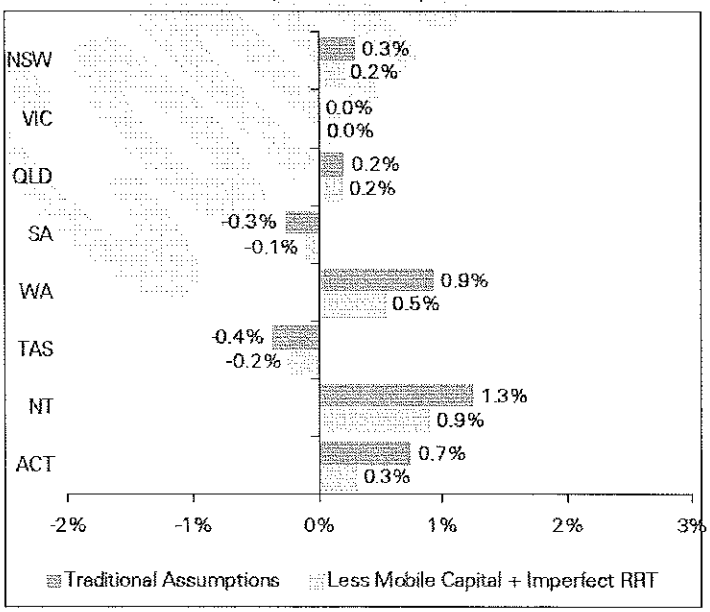
shown in Chart 7.10. The results under the assumptions that capital is less than perfectly mobile and that the RRT is imperfect are also shown.

Chart 7.9: Tax Mix Switch - state production effects
(% deviations)



Source: KPMG Econtech MM900 simulations.

Chart 7.10: Tax Mix Switch - state employment effects
(% deviations)



Source: KPMG Econtech MM900 simulations.

The changes in the Northern Territory and the Australian Capital Territory shown in the charts above are relatively large in percentage terms, but because of the small size of these territories, this result is not a large change in absolute terms.

Importantly, the more revenue that is required from a RRT, the more difficult it becomes to design a RRT that only taxes economic rents. The lower the uplift rate, the larger is the tax base, and the more revenue that can be raised per project. However, a lower uplift rate also means that there is a higher chance that projects would not go ahead as a result of the tax. Likewise, the higher the RRT rate, the more revenue that can be raised per project. However, a higher rate also means that there is a higher chance that projects would not go ahead as the tax is more likely to reduce profits below the required rate of return.

The abolition of existing mining specific taxes and a 5 percent cut in the statutory company tax rate would require a large increase in RRT collections to cover the revenue gap. Revenue collections of this magnitude may mean that uplift rates need to be set at a low level, or that tax rates need to be high. This would increase the likelihood that the RRT would become a tax on both the rents and the required returns to capital in the resources industry. This would reduce the welfare gain from this policy.

The benefits estimated in the modelling refer to the long term impacts of the "tax mix switch" policy. Normal economic adjustment process means that these benefits may take 5 to 10 years to be fully realised. Following a tax mix switch, the development of a resource may also be delayed for a time, as a funding-constrained project developer may choose to divert capital originally earmarked for a particular project to a lower taxed project alternative in another country.

There may be negative sovereign risk impacts if existing and potential investors perceive that the government may alter the design of the RRT in the future and apply those changes to existing projects. For example, if the government increases the rate of the RRT at some future date and does not quarantine the change to new projects, the profitability of each existing project would be adversely affected. If investors perceive this as a potential risk, it will be factored in to their decisions, and they may require a higher risk premium. This could mean that the "tax mix switch" would lead to a smaller increase in investment in the resources sector. This sovereign risk issue is particularly important for the resources sector because investments tend to be long term in nature, with high start-up costs and long lead times.

Any tax on the resources sector, including royalties and resource rent taxes, potentially involves sovereign risk problems. In particular, the introduction of a new broad based RRT may add to the perception that sovereign risk is an issue. Therefore, if a new RRT is introduced, potential negative sovereign risk impacts could be reduced by credibly establishing that any further future changes in taxation in the resources sector would not apply to existing projects.

Overall, our analysis shows that a full assessment of a "tax mix switch" policy option such as that presented in this report should not only take into account the results of the traditional analysis, but should also take into account that:

- capital may be less than perfectly mobile;
- the design of the RRT may not be perfect; and

- sovereign risk may be an issue.

Each of these factors may reduce the benefit, derived in the long term, from the introduction of a broad based RRT to fund the abolition of existing royalties and a reduction in the company tax rate.

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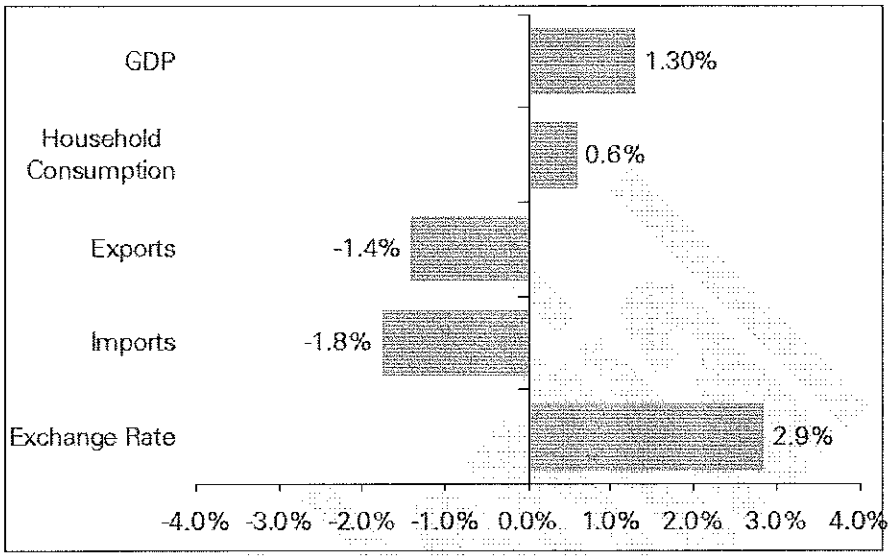
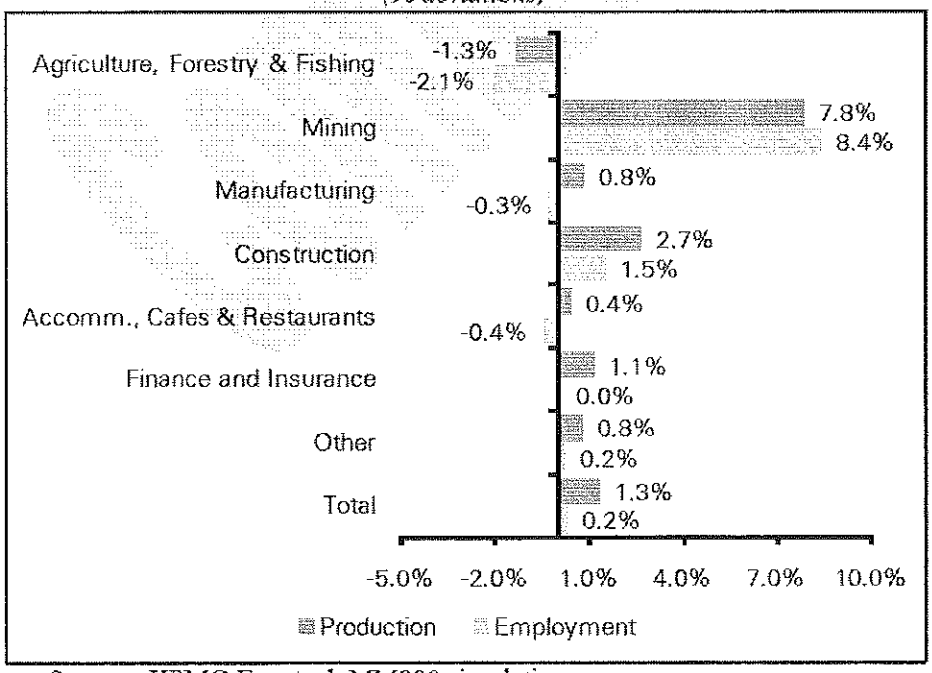
Appendix A: Detailed Results

Chart A1: Tax Mix Switch under traditional assumptions, national macroeconomic effects (% deviations)



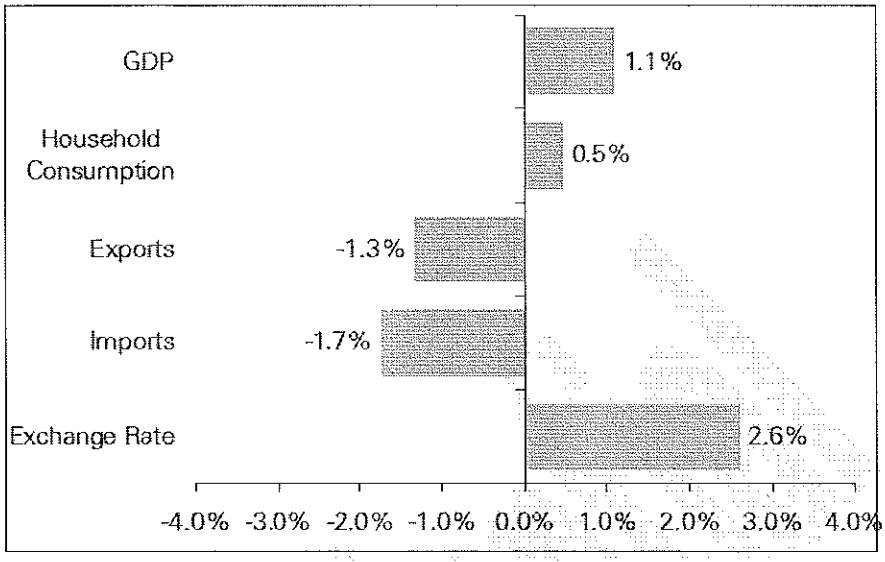
Source: KPMG Econtech MM900 simulations.

Chart A2: Tax Mix Switch under traditional assumptions, selected industry effects (% deviations)



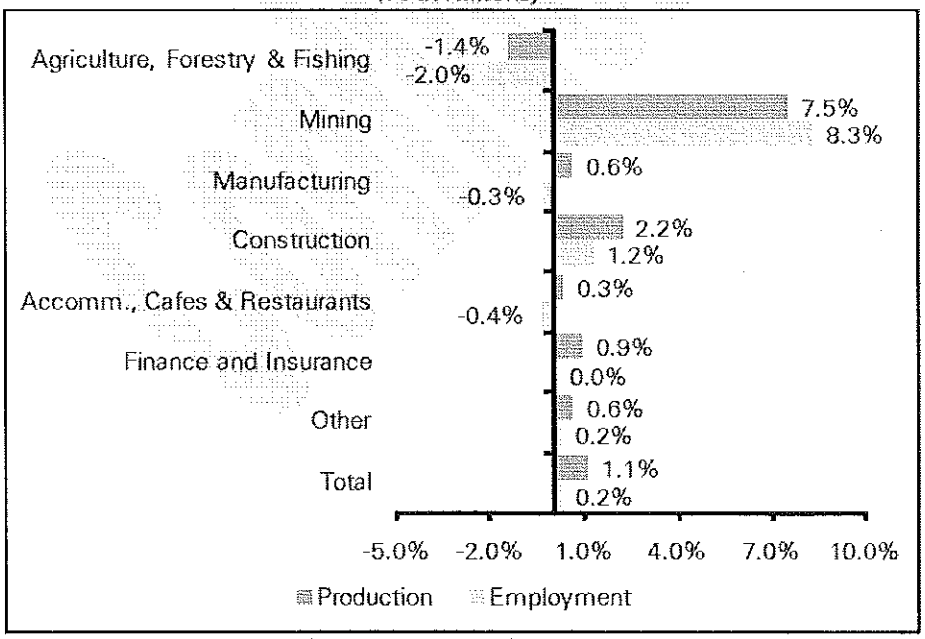
Source: KPMG Econtech MM900 simulations.

Chart A3: Tax Mix Switch with less mobile capital, national macroeconomic effects (% deviations)



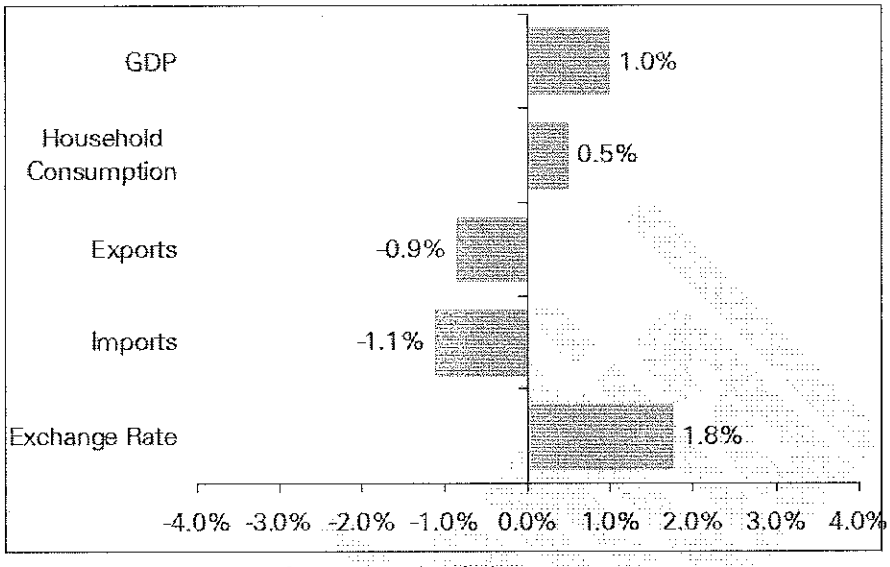
Source: KPMG Econtech MM900 simulations.

Chart A4: Tax Mix Switch with less mobile capital, selected industry effects (% deviations)



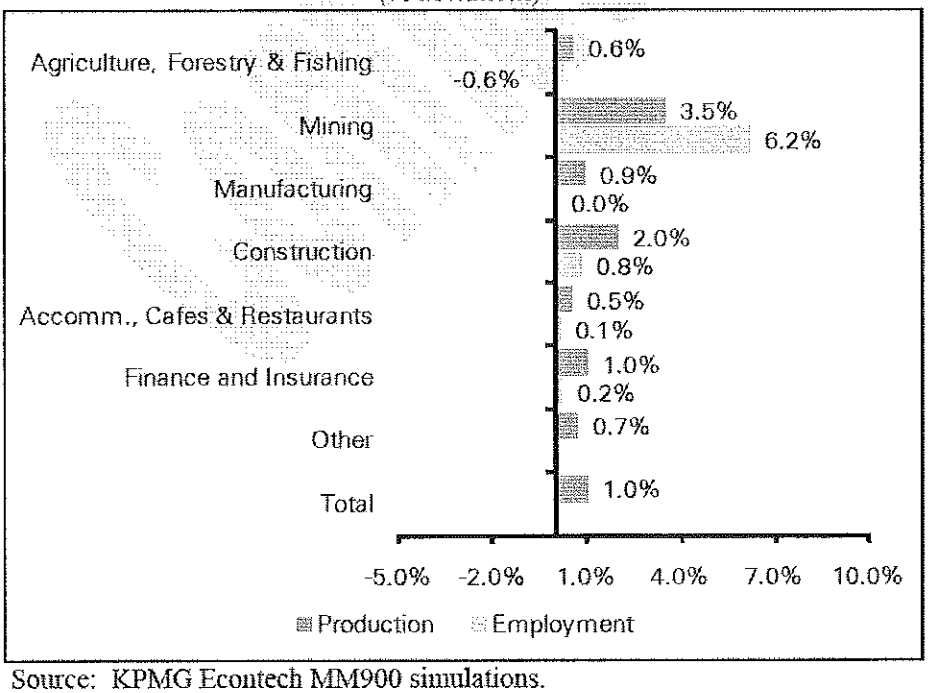
Source: KPMG Econtech MM900 simulations.

Chart A5: Tax Mix Switch with an imperfect RRT, national macroeconomic effects (% deviations)



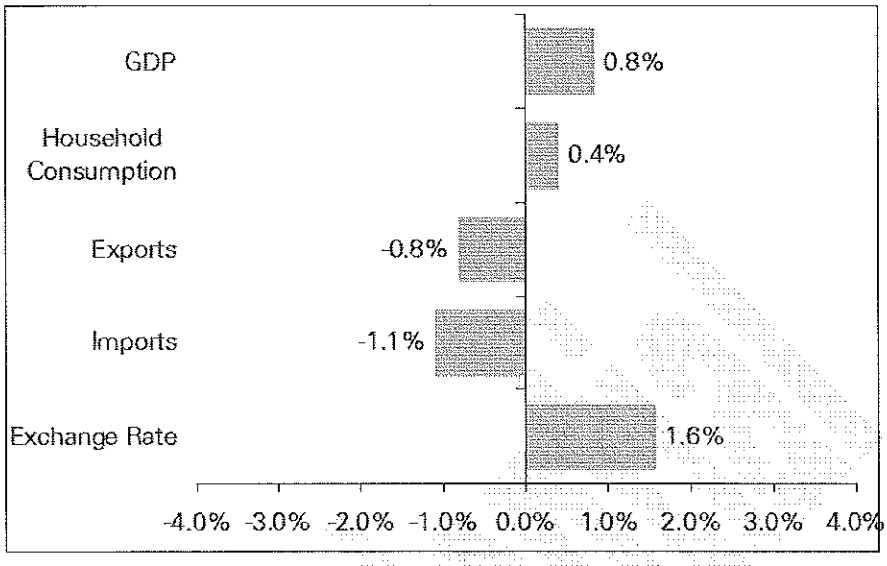
Source: KPMG Econtech MM900 simulations.

Chart A6: Tax Mix Switch with an imperfect RRT, selected industry effects (% deviations)



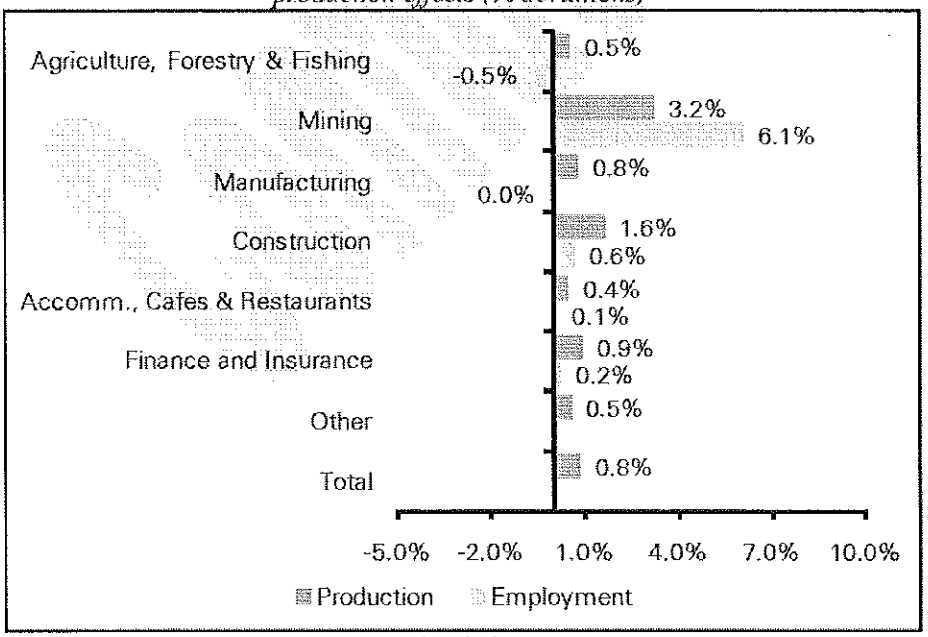
Source: KPMG Econtech MM900 simulations.

Chart A7: Tax Mix Switch with less mobile capital and an imperfect RRT, national macroeconomic effects (% deviations)



Source: KPMG Econtech MM900 simulations.

Chart A8: Tax Mix Switch with less mobile capital and an imperfect RRT, selected industry production effects (% deviations)



Source: KPMG Econtech MM900 simulations.

Appendix B: MM900 Model

This document provides more detail on KPMG Econtech's MM900 national industry and policy model.

Background

MM900 has evolved from an industry model, MM303, which Econtech developed in 1997/98. It was then upgraded to MM600+ under a contract to the Australian Competition and Consumer Commission. In 2009 the model was further developed, to its current form, to assist the Commonwealth Treasury in the Henry Tax Review. .

MM900 has around eight times more product detail than any other Australian computable general equilibrium (CGE) model. It has 889 products produced by 109 industries, on the basis of the recently available Australian 2004/05 Input-Output tables.

In terms of the time dimension, MM900 focuses on long-term effects of policy changes. This is an appropriate time frame for evaluating public policies, such as taxation.

MM900 provides answers to 'what if' questions. For example:

- What if assistance is provided to a particular industry?
- What if taxes are changed?
- What if a new government spending program is introduced?

Simulations of economic shocks involve varying the values of one or more model inputs relative to their baseline values. With open access to all model inputs, a wide variety of shocks can be conducted. These can involve virtually any shift in technology, tastes, foreign demand or taxation. Access to all of the model components means that results can be derived for any economic variable that is included in the model.

Key Results

Owing to its high level of detail, MM900 can produce a wide range of results.

- It estimates the effects of policy changes on key macroeconomic aggregates such as GDP, exports, imports, the exchange rate, consumption, employment and investment.
- It breaks down the effects of policy changes into 889 products. For each product, the model produces results including prices, production, consumption and trade flows.
- It breaks down the effects of policy changes into 109 industries. For each industry, it produces results for production, employment, capital stock, land and the value of natural resources.
- It estimates changes in tax receipts for each of the 19 taxes in the model.
- It breaks down results for output and employment by industry to the detailed regional level.

Assumptions

Profit maximisation

The representative business in each industry chooses inputs and outputs to maximise profit subject to prices. Their production function exhibits constant returns to scale, which implies perfect competition in each market.

Labour market equilibrium

In the long-run equilibrium, the labour market is assumed to attain equilibrium. In MM900 households choose their labour supply depending on the wage. However, the wage is determined by the model and depends on total labour supply from households and total labour demand from industries.

External balance

In the long run, net liabilities to the foreign sector must follow a sustainable path. This assumption is implemented by setting the balance on international trade equal to the cost of servicing payments on foreign-owned capital, such that net foreign liabilities are stable relative to GDP. The real exchange rate needed to achieve the external balance constraint is determined by the model.

Private savings

In the long run, the level of private sector saving and associated asset accumulation must also be sustainable. Further, one potential problem with long-run models is that saving (i.e. sacrificing present consumption for future consumption) can appear artificially attractive. This is because, if saving is increased, long-run model results will show the gain in future consumption, but not the sacrifice of present consumption. Domestic saving is held constant in MM900 to avoid this problem. Specifically, the quantity of capital that is owned locally is fixed as a proportion of labour income.

Therefore, given unchanged labour income, any additional investment required is made by foreign investors. The necessary foreign liabilities are supplied perfectly elastically.

Budget balance

In the long run, the government's budget balance must also be sustainable. Specifically, MM900 assumes that the budget is in balance, so that tax receipts always equal government expenditure. 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.

Price sensitive choices

MM900 takes into account a large number of price-sensitive choices made by households, businesses and the foreign sector. For example, it models the decisions of households, businesses, investors and foreign traders in a sophisticated manner. This more complete modelling of economic choices means that MM900 produces higher quality results than other models.

Households make a three-stage decision to maximise their utility, given their constraints. First, given the wage, they choose how much time they will spend working, and how much they will spend in leisure. This determines the total labour supply in the economy, and the labour income of households. Second, given their incomes, they then decide how much of it to spend, and how much to save. Third, given their consumption expenditure, households choose which goods and services they will purchase.

Australian producers combine both factors of production (capital, labour and fixed factors) and intermediate inputs to produce outputs. At a broad level, there are three primary factors of production. These are described below.

- Labour, of which there are two types, skilled and unskilled labour. This model treatment allows the modelling of the number of people employed, which is a head count of people, to be separate from the effective labour input, which depends on the average skill levels in each industry.
- Capital, of which there are two types, building structures (residential and non-residential) and other capital. This allows separate modelling of taxes on structures, which sometimes has different effects on investment to taxes on other capital.
- Fixed factors, of which there are two types, land and other fixed factors. The total amount of land available in the economy is fixed, but each of the industries compete to use the land. Other fixed factors are specific to certain industries, but not all industries have them. Other fixed factors are inputs into production from which industries can make above-required profits, such as natural resources, brand image or access to specific networks.

Each industry has different technologies, and therefore chooses a different mix of these factors of production. When the prices of these factors change, so does each industry's decision about their input mix. For example, if the wage increases, then each industry will switch to using less labour and more capital in their production.

Export and import markets respond to changes in the prices of Australian goods and services, relative to world prices. Import and export volumes are identified for each of the 889 products in the model. Prices of Australian produced goods and services reflect the cost of production in Australia, while world prices are exogenously given.

Features

MM900 is a sophisticated budget-modelling tool. Particular attention has been paid to the structure of taxes in MM900. MM900 has a highly detailed tax treatment, incorporating 19

different local, state and national government taxes. It also tracks the revenues from each of these taxes; making is easy to assess the budget implications for various policy options.

Not only capital and labour, but also land and natural resources, are recognised as primary factors of production in each industry. For example, each sector of the mining industry has access to its own natural resource. This gives more realistic modelling of the constraints that are placed on the economy through the fixed nature of some inputs into production.

MM900 pays particular attention to the correct measurement of changes in national standards of living, or economic welfare. It uses to measure the compensating variation and equivalent variation from welfare economics. These are alternative measures of the gain in real consumer spending. The model can also take into account the impact of externalities on economic welfare.

The model takes into account that average business sizes vary from one industry to the next. Average business sizes are influenced by factors such as payroll tax.

Certain assumptions underlying the model can be adjusted to undertake sensitivity tests. For example, it allows different assumptions about the responsiveness of foreign investment to changes in the domestic economy. Elasticities of demand and supply can also be adjusted. The effect of changing certain labour market parameters can also be tested.