

# AGENDA

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# *SYMPOSIUM*

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## **POLICY MODELLING BY GOVERNMENT AGENCIES IN AUSTRALIA**

*Modelling is an integral part of contemporary policy analysis. Properly done, it serves to structure the analysis of cause–effect relationships; highlight the likely impact of policy interventions; and provide a basis for assessing the sensitivity of outcomes to assumptions. By defining a quantitative framework within which those questions can be explored, it can and should impose a discipline on policy analysis that helps make the evidentiary basis for claims about policy more transparent and amenable to testing.*

*It is with those potential benefits in mind that the articles of this symposium examine recent experience with economic modelling in Australian public policy. Unfortunately, the symposium highlights serious issues as to modelling's role, quality and integrity. Their findings suggest an urgent need for action by policymakers to set new rules of the game for the use of modelling in and by the public sector.*

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# For a Charter of Modelling Honesty

Henry Ergas<sup>1</sup>

## The theory of modelling, and fitness for purpose

In a classic discussion of mathematical models in the social sciences, the philosopher Max Black describes models as metaphors, raising the fundamental, and long-debated, question of in what sense (if any) a metaphor can be ‘true’ or ‘false’ (Black 1962). Perhaps the most sensible answer to that question is by Clarke and Primo (2012), who view models in the social sciences as similar to maps — abstractions that describe relationships between entities in a defined space. As with maps, models are to be evaluated not by their inherent resemblance (or lack of it) to ‘the original field of thought’, but by their fitness for purpose: whether they help us get where we want to go (Clark and Primo 2012: 53).

That purpose differs from model to model but, generally, economic models fall into two broad categories; the theoretical and the empirical. To classify a model as theoretical is not to suggest it is entirely inward-looking, in the sense of being oriented solely to the working out of theory: after all, theoretical models can be predictive, as are many economic models that seek to identify the ultimate consequences for one variable (say, wages) of a change in another (say, the company tax rate). Gibbard and Varian (1978), for example, famously described standard models, such as that of rent controls, as caricatures that explain consequences by identifying and exaggerating, much as political cartoons do, the salient features of a person or situation.

Rather, the difference between theoretical and empirical models is that the latter describe the relationships within a data set, instead of simply that between a set of analytical constructs. In turn, those relationships within the data set may serve a range of purposes, going from exploratory (does class size in primary school affect students’ lifetime income?), explanatory (by what mechanisms does class size in primary school affect students’ lifetime income?), confirmatory (are the mechanisms by which class size in primary school affect students’ lifetime income consistent with conventional theoretical models of human capital?) and evaluative (by how much, if at all, would halving class sizes in primary schools increase students’ lifetime income and would that justify the costs involved?).

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The proper interpretation and assessment of answers to questions of this kind relies on searching scrutiny of the model from which they are derived. Scholarly journals promote this through the peer-review process, and by requiring authors to make models and data available to third parties for purposes of replication and testing.

## **The rhetoric of modelling, and the market for excuses**

There is, however, a tension between the professional standards essential to progress in economic modelling and the growth of a new and increasingly crucial purpose of models — the justificatory role. Used in that role, models serve primarily as a means of giving credibility to claims about policies, rather than as a framework for structuring the testing of those claims.

These models are primarily a form of rhetoric — a speech act, to use J. L. Austin's term — which (again, in Austin's terms) is inherently perlocutionary: that is, a form of action aimed at securing a particular persuasive effect (Austin 1962: 109). Thus, just as yelling 'fire' is intended to induce people to clear the building, so showing that imposing a carbon tax will not undermine economic growth is intended to justify such a tax. And what counts with such speech acts — not least in the minds of those engaged in them — is not what they say, but what they are likely to do.

The production of these speech acts has become part of a market for excuses which deserves more economic analysis than it has received. In it, economic modellers produce 'results' which are typically commissioned and distributed by policy proponents (or their opponents) to decision-makers and publics. The policy being advocated (or resisted) is not determined by the 'results'; rather, the causality all too often runs the other way. To make matters worse, there can be a form of Gresham's law at work in which bad modelling drives out good, with each poor-quality study conferring a negative reputational externality on the market as a whole. As perceptions of the quality of the average study decline, the gains to producing a high-quality study can decline too, since consumers are inclined to place less weight on models as such, creating an unravelling effect on the market as a whole. Having a model, any model, becomes simply a 'tick the box' feature of policy advocacy, quite regardless of the model's substantive merit.

The greater the difficulty consumers have in distinguishing the quality of modelling, the greater is the risk of 'junk modelling' dominating. Increasing the risk is the fact that poor-quality studies can masquerade as good-quality



models by replicating their ‘look and feel’: for instance, through sheer size and complexity (as in the reports on the NBN discussed in this forum by Kevin Morgan), technical sophistication (as in the climate-change modelling discussed by Ergas and Robson), opacity and impenetrability (as in the modelling of royalties discussed by Pincus, of company tax forecasts discussed by Davidson, and of the stimulus discussed by Humphreys) or even simply by generating seemingly very large and highly newsworthy numbers (as in the modelling of the costs of congestion discussed by Harrison) — and, most often, by a combination of all of these. The fact that key interpretative economic concepts are often misunderstood and misapplied (as in the modelling of ATM regulation discussed by Green) then allows questionable results to be parlayed into effective advocacy.

## A ‘Charter of Modelling Honesty’

Ideally, low-quality modelling would be screened out through the process in which (in Milton’s glorious phrase) ‘[truth] and falsehood grapple’, for ‘who ever knew truth put to the worse in a free and open encounter?’ (Milton 1644: 45). But that requires at the very least a contest that is indeed ‘free and open’ and hence maximises the chances of overcoming proponents’ efforts to insulate their models from untoward encounters with the evidence. Yet as several of the articles attest — including Morgan on the NBN, Ergas and Robson on the carbon tax, and Pincus on royalties — it has become common practice for the Commonwealth government to refuse to disclose to third parties the information needed for models to be adequately tested.

Standard freedom-of-information processes are ineffective in overcoming those refusals. They are costly, requiring the party seeking the information to make a substantial investment of time and financial resources; they are slow, as departments can take many months to respond, by which time the issue is no longer salient; and they are readily avoided, as they cannot deal with situations where some aspects of a model have not been fully documented. Moreover, these processes are subject to substantial incentive problems, as the benefits of disclosure are available to all (since the models being disclosed are public goods), while the costs fall entirely on the party seeking it. As a result, they lead to significant underinvestment in securing disclosure, relative to the levels that would be socially desirable.

But even were freedom-of-information processes more effective than they are, they should be unnecessary. Rather, the default position ought to be that the quality of public policy can only gain from full disclosure of the models that inform it. By allowing those models to be properly tested (and be seen to be

tested), full disclosure would not only improve the ultimate quality of those models, but also strengthen public confidence in economic modelling. And last but not least, those models are public goods (in the sense of being non-rivalrous in consumption, so that everyone can consume more of a particular model without anyone consuming less), so it is inefficient to force third parties to devote resources to reproducing them.

Some parts of government, most notably the Productivity Commission, already achieve high standards of transparency in their modelling work. But that is far from being the case for the Commonwealth government as a whole. It would therefore be desirable for a reform-oriented government to adopt a 'Charter of Modelling Honesty'.

That charter would set a 'best practice' standard for disclosure, including how models and associated data were documented and communicated. It would set out timelines and processes for access, including procedures for dealing with confidential or proprietary information. Under the terms of the charter, government would be required to report annually on its implementation, as part of wider freedom-of-information reporting. And the charter would apply not only to models generated internally but also to those on which third parties rely in pressing their case upon Ministers and departments.

The articles in this forum are a chilling warning. They point to a degeneration that threatens the legitimacy and credibility of economic techniques in the Australian public sector. It is time for all economists, and indeed for all those concerned with the quality of public policy in this country, to act to protect public confidence in tools and methods that deserve a better fate than that which this forum paints.

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# Modelling as Agit-prop: The Treasury's Role in Australia's Carbon Tax Debate

Henry Ergas and Alex Robson<sup>1</sup>

## Abstract

*This paper examines the modelling undertaken by the Commonwealth Treasury of the costs of an Australian emissions trading scheme, published in 'Strong Growth, Low Pollution'. Despite its considerable technical sophistication, we argue that this modelling is primarily an exercise in propaganda: 'the systematic dissemination of selected information to promote a particular doctrine' (Oxford English Dictionary). That propaganda role determined the limited range of questions asked in the modelling, the myriad unrealistic assumptions made in answering those questions, and the limitations imposed on third-party access to the model and data.*

## Introduction

Modelling has played a central role in the debate over the Rudd government's proposed emissions trading scheme (ETS), as well as the carbon/tax emissions trading scheme actually introduced by the Gillard government. In both cases, large-scale modelling was undertaken by Treasury, with a report on the Rudd government's proposed scheme ('Australia's Low Pollution Future' or ALPF) being released in 2008<sup>2</sup> and a subsequent analysis, 'Strong Growth, Low Pollution' (henceforth: SGLP), focused on the Gillard government's scheme, being released in 2011.

It should be noted at the outset that the models Treasury has developed have not been released to the public, on grounds that are largely specious.<sup>3</sup> Nor have the underlying data sets that inform those models been released. The — presumably intended — result is to make it impossible for those models to be thoroughly tested, or used to examine scenarios other than those Treasury that

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<sup>2</sup> For an economic analysis of the ALPF, see Robson (2009a) and Robson (2009b). Robson (2007) examines the earlier Shergold Report, and also contains a brief summary of the basic science of global warming.

<sup>3</sup> They are scrutinised in more detail below.

has chosen to model. Nonetheless, drawing on the published reports, this paper focuses on the modelling presented in SGLP and assesses the assumptions on which it is based and the consequent relevance of its results.

Our conclusion is that despite its obvious and very considerable technical complexity, the SGLP modelling was primarily an exercise in propaganda — which the *Oxford English Dictionary* defines as ‘the systematic dissemination of selected information to promote a particular doctrine’. It was that propaganda role that defined the questions asked in the modelling, the assumptions made in answering those questions, the interpretation placed on the results, the limitations imposed on third-party access to the model itself and the underlying data sets and the uses to which the results were ultimately put. In subsequent sections we examine each of these aspects in turn.

## What questions did ‘Strong Growth, Low Pollution’ ask?

The focus of SGLP was on the costs to the Australian economy of imposing a carbon tax, where those costs were assessed over the period to 2050. SGLP does not examine the benefits of imposing such a tax; indeed, the analysis specifically notes that it does not include the economic impacts of rising global emissions on Australia (with or without Australia’s mitigation actions). As a result, the most that can be said for its results is that they would potentially allow one to gauge the cost side of the ledger, leaving the question of whether there are commensurate benefits to the political process.

With regard to how costs are assessed, while the scheme proposed by the Gillard government is ultimately an emissions trading scheme, the modelling is undertaken as if a carbon tax was in effect, with the extent of that tax depending on the emissions reduction goal being pursued. Those emissions reduction goals are defined in terms of targets for greenhouse-gas concentration levels, with two such targets — at either 550 or 450 parts per million — being modelled. Given those targets, the modelling broadly determines the lowest global carbon price needed to achieve the required emissions reductions and then calculates the change in Gross National Income (GNI) relative to a base case. That base case is defined in terms of a ‘business as usual’ scenario in which the rest of the world undertakes mitigation according to pledges made at the United Nations Climate Conference in Cancún. This scenario differs significantly from the Rudd government’s ALPF modelling, which assumed a ‘reference scenario’ in which

countries introduced no new policies to reduce greenhouse-gas emissions, with atmospheric concentration of greenhouse gases therefore rising to over 1500 ppm CO<sub>2</sub>-e by 2100.<sup>4</sup>

The formal modelling of the GNI impacts relative to that base case was undertaken in SGLP using several models, of which two are particularly important. These are the GTEM model, developed by the Australian Bureau of Agricultural and Resource Economics (ABARE), which was used to examine the impact of abatement scenarios on the world economy; and the MMRF model, developed by the Centre of Policy Studies at Monash University, which is used to examine the impacts on Australia.

Using those models, SGLP examines two quantitative scenarios for each abatement target: a first is one in which the rest of the world pursues one or the other of the emissions reductions goals, while Australia remains in a 'business as usual' policy — that is, does not implement a carbon price of its own; and a second in which both Australia and the rest of the world implement a carbon price, that price being determined internationally. In other words, SGLP does not quantify the cost to Australia of the scenario in which Australia implements a carbon tax or emissions trading scheme, but large parts of the world do not. It does, however, present a brief, informal discussion of that scenario, which we comment on below.

The modelling neglects a number of costs that are likely to be associated with the Government's actual policy. For example, in seeking to compensate households for the increase in prices due to the carbon tax, the Government has reduced some average personal income-tax rates, but in doing so has increased marginal tax rates for many taxpayers.<sup>5</sup> The modelling ignores the welfare costs associated with these higher marginal tax rates, as it treats compensation to households as lump-sum transfers.

In addition, the modelling ignores the economic losses likely to be associated with the Clean Energy Future Fund and other outlays funded by the carbon tax and so reflects only the costs due to the tax, rather than those arising from any wasteful expenditures the tax revenues permit.

In short, SGLP is not a cost–benefit appraisal of the government's scheme; it is only an assessment of its costs. It does not compare those costs to alternatives, most importantly that of adapting to climate change rather than avoiding it. And, in undertaking its assessment, it only quantifies scenarios in which the

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<sup>4</sup> On this point, see the Centre for International Economics (2011).

<sup>5</sup> On this point, see Williams (2011).

rest of the world is credibly committed to global emissions reduction, and then looks at the impacts on Australia of participating or not participating in a global carbon market.

## The assumptions

The absence of a scenario in which Australia has a carbon pricing scheme but many other countries do not reflects the core assumptions in SGLP about the global environment. Those assumptions are: that all countries will implement the abatement commitments made at the 2010 United Nations Climate Change Conference held in Cancún, Mexico, although those commitments are not legally binding; that in doing so, at least the industrialised countries will implement some form of carbon trading mechanism, and those mechanisms will be sufficiently linked that a global carbon price will emerge as of 2015–16; that the resulting unified price will reflect (and equalise) participating countries' marginal cost of abatement; and that over time other countries, notably China, will join this market.

A number of other crucial assumptions are related to these core assumptions. In particular, it is assumed that there is some very low transactions-cost mechanism that provides credible 'offsets'; that is, permits that involve payment for emissions avoided, typically in developing countries. At the same time, market participants can not only 'bank' permits (that is, purchase permits now but use them at a later date) but also 'borrow' them. Moreover, both banking and borrowing can, on net, occur between periods, with the important consequence that some scheduled abatement can be deferred to future periods.

Before proceeding, it is useful to consider the import of these assumptions about the international environment. Put simply, there is very little prospect of their corresponding to reality. In particular, there is no reason to believe a global framework for emissions abatement, with credible, binding targets, will emerge between now and the end of this decade. Even were such an agreement to eventually be reached, there is no prospect of a global, unified, carbon price emerging between now and 2015–16, as (given implementation lags) that would require an agreement to be in place now. As for major developing-country emitters, notably China and India, making binding commitments to significant emissions reductions (relative to business-as-usual, which still involves large increases in emissions relative to 2001), this seems unlikely, all the more so if measures are taken (as is currently proposed) to curtail the use of difficult-to-police instruments such as the Clean Development Mechanism (in

which developing countries receive payments not to emit). Finally, there is no precedent for 'borrowing', which was specifically prohibited under the Kyoto protocol.

Treasury's justification for those assumptions is that it is simply taking countries at their word. This is not accurate, however, as Treasury's assumptions go far beyond any specific commitments countries have given. For instance, while China has at times suggested that it will consider a credible and binding commitment to multilateral abatement at some stage in the future, it has never gone beyond noting the possibility. India, for its part, has committed even less.

But even if some countries had made non-binding commitments to stabilise emissions levels at some lower level, it is unclear why it should be assumed that those commitments would be realised in full. Rather, just as in examining options for our defence planning and our trade policy, a risk-adjusted approach should be used that explicitly accounts for the fact that outcomes are uncertain, including the extent to which countries abide by their Cancún commitments. Yet Treasury's modelling assumptions not only rule these risks out, but rule in scenarios — such as the emergence of a global carbon price in 2015–16; an eventuality that was entirely implausible even when the modelling was carried out.

Beyond those core assumptions, myriad technical assumptions are, of course, built into the modelling. Particularly contentious are those related to the rate at which new, low-emissions, technologies become available. In some instances, that rate appears to be determined exogenously — that is, technologies simply appear and become available for use. Particularly significant in this respect are the assumptions relating to the timing of the commercial viability and deployment of carbon-capture-and-storage (CCS) technology. The modelling assumes that CCS is deployed by as early as 2024 in some scenarios. This has a substantial impact on Australia's income, given the size of our coal endowments. However, there is little evidence to suggest that this assumption of commercial deployment in less than 12 years is realistic.

As well as such exogenous technical change, the modelling also provides for induced innovation; that is, for the development of low-emissions technologies as a response to the carbon price. That linkage is effected through 'marginal abatement cost' (MAC) functions, which relate the marginal cost of abatement in each industry to the level of the carbon price. These functions are relatively 'aggressive', implying a strong response of technological innovation to the carbon price. However, this raises a host of issues about the credibility of the carbon price as a signal to innovation (discussed in Ergas 2012).



Another important modelling issue is what cost this induced innovation involves — in other words, how the cost of updating the capital stock is modelled, assuming innovation is largely embodied in new capital goods. As best one can tell, those costs are determined differently in the GTEM and MMRF models. That points to a further set of assumptions which are required to link the international and domestic scenarios and to close the respective models (that is, fix the constraint that then determines their solution). While there is no simple way of doing this, and the choice of closure and linkage can significantly affect the results, SGLP provides no information as to precisely how that linkage is made.

Finally, it is worth noting that both models lack any form of forward-looking behaviour. For example, once the carbon price is determined, it is assumed to rise over time in a manner consistent with the Hotelling valuation principle; that is, in line with an assumed rate of interest. However, the fact of those increases does not ‘bring forward’ any form of adaptation: agents do not, in other words, anticipate those increases and adjust to them in a forward-looking way. Rather, they are entirely myopic, which seems entirely inconsistent with the assumption that the Hotelling valuation principle holds and is also at odds with modern modelling practice.

## The results

If one accepts the modelling assumptions, the results are not implausible. However, the most striking feature of the results is that they highlight the implausibility of the assumptions themselves. In other words, while there appears to be internal validity (as best one can tell, the model ‘works’), the model lacks external validity — that is, a meaningful correspondence to the world as it is and is likely to be.

The model suggests, for example, that China will bear a very large share of the costs of achieving global abatement: by 2050, China’s per-capita GNI is modelled to be 5–10 per cent lower than it would otherwise be, while US per-capita GNI is essentially unchanged. The situation is even worse for the former Soviet Union, whose per-capita GNI is modelled to decline by 9–12 per cent. If these results are to be believed, it is unclear why defection would not be a strongly dominant strategy for these countries — that is, why they would not be significantly better off reneging on any commitments to abate. The assumption of stable, binding agreement therefore seems implausible.

Moreover, even those results depend on countries deferring planned abatement to periods beyond the modelling scenario. In other words, countries emit but offset those emissions against promised cuts in un-modelled future years, thus



reducing the cost of achieving abatement targets in the modelling period. Nor is that on a small scale: rather, by 2050, there is a global debt to the future of about 8 per cent of the total modelled abatement task. But that begs the question of whether such 'borrowing' would be consistent with the global policy framework (as noted above, borrowing from the future was specifically prohibited under the Kyoto convention); and even more so, of why the promises to abate in future would be credible. Yet if they are not credible, it is unclear why innovators would develop very-low-emissions technologies whose viability depends on the extremely high carbon prices that would be needed to clear that backlog of deferred abatement.

Equally, the results for Australia highlight the outputs' sensitivity to the assumptions. Though no direct comparison is provided in the documentation, the marginal cost of abatement seems significantly higher in SGLP than it was in the 2008 modelling (see Centre for International Economics 2011). This likely partly reflects the Gillard government's decision to exclude agriculture (which was included in the Rudd proposal) from its scheme, as well as the somewhat higher share of mining in the Australian economy in 2010 than in 2008. Be that as it may, the result is that a much higher share of Australian abatement in SGLP occurs by buying permits from overseas than was the case in the 2008 modelling. However, this obviously makes it crucial whether low-cost permits are indeed available in global markets and, if so, whether they are credible (that is, whether the abatement they promise in some other country actually occurs). The modelling suggests the bulk of these permits will be purchased from the undefined 'rest of the world', which is largely composed of relatively poor developing countries. At the moment, however, the market for such permits is extremely problematic, and there is no reason to believe the many obstacles that lie in the path of its development will be removed in the near future.

## Testing the models

SGLP gives very little indication of sensitivities, but it is clear that even were one to accept the characterisation SGLP gives of the future global policy environment, the results are highly sensitive to the modelling assumptions. For example, as shown in Centre for International Economics (2011), the global price depends crucially on the marginal abatement costs of the lowest-abatement-cost country, so that small changes in the range of countries that participate in the scheme and in their cost structures could change the results very materially. Equally, the estimated global costs of abatement are very sensitive to the level and structure of the MAC functions — that is, to the implied elasticities of induced innovation with respect to the carbon price — which do not seem to be based on any form of empirical testing. Finally, the precise way the linkage of the global and Australian models is carried out is likely to have a significant impact on the results.

On top of this, any sensible analysis would test how the costs to Australia change as the assumptions made on the global policy environment are changed. In particular, given that it is unrealistic to treat global agreement as an inevitability, a proper policy analysis would examine the costs to Australia of adopting a carbon tax/ETS when the rest of the world (or at least, major parts of it) do not.

This is discussed in SGLP, but entirely qualitatively and almost parenthetically. In a short, informal discussion, the report claims that ‘going it alone’ would impose lower, not higher, costs than would be borne under coordinated global action.<sup>6</sup> The reason given for this is mainly that world demand for our resources would be stronger than it would be under the coordinated-action scenario. On that basis, the report implies Australia would be well-advised to abate in any event, as it would not bear especially high costs from doing so.

But this approach seems wrong-headed. Thus, each cell in Table 1 below lists the basic structure of payoffs to Australia in four scenarios, and illustrates the comparisons that are relevant for policy considerations. The benefits to Australia when the rest of the world mitigates are B. As Australia accounts for 2 per cent of global emissions, it is reasonable to assume B does not depend on whether or not Australia engaged in mitigation. Treasury’s modelling concludes that C, which is the cost to Australia when Australia doesn’t mitigate and the rest of the world does, is less than K, the cost to Australia when both we and the rest of the world mitigate. In other words, conditional on the rest of the world mitigating, mitigating imposes a cost on Australia. Treasury does not estimate Z, which is the cost of ‘going it alone’ (that is, in the absence of global mitigation, if Australia mitigates, we will incur costs of Z), but in defending unilateral mitigation, claims  $Z < K$ .

**Table 1: Structure of payoffs to Australia in various scenarios**

		Rest of World	
		Mitigate	Don’t
Australia	Mitigate	B-K	-Z
	Don’t	B-C	0

Source: SGLP 2011.

Note: B is the assumed benefit to Australia of global mitigation which is assumed to be the same regardless of whether Australia does or does not mitigate. K is the cost to Australia when we mitigate along with the rest of the world, while C is the cost when we don’t mitigate but the rest of the world does. Z is the cost of unilateral mitigation by Australia.

6 Page 84 of SGLP states that ‘Some commentators suggest Australia is ‘going it alone’ and, as a result, Australia’s mitigation costs will be far greater than reported because impacts on domestic competitiveness will be far greater. This argument is misconceived. If the extent of global action is less than assumed, then Australian mitigation costs will be lower, not higher, than reported for two main reasons. First, less stringent world action would strengthen export demand and output for our energy exports. Second, if global action is less than assumed, world carbon prices will be lower, making it less expensive to source abatement overseas.’

However, from the perspective of rational decision-making, this is simply the wrong comparison. Rather, the relevant comparison for deciding whether Australia should mitigate when the rest of the world does not is between the costs in that scenario (in other words, the payoffs in the right-hand column of Table 1) — not that between the costs of Australia mitigating with and without coordinated global action (the top row of Table 1). For not mitigating to be ruled out as the dominant strategy for Australia, we would need  $Z < 0$ , which is farfetched.<sup>7</sup>

Even putting that aside, the report's suggestion that unilateral action is less costly to Australia than coordinated action also seems implausible — especially if the key difference is that in the coordinated-action scenario our resource competitors abate while in the unilateral scenario they don't. It seems likely that the report's claim — which is not backed by any modelling results — reflects unrealistically low estimates of substitution elasticities between Australian and foreign natural resources.

Unfortunately, it is not possible to test any of these issues as Treasury has not released the models and data sets on which it relied. Initially, Treasury claimed this was because of objections from ABARE; however, ABARE had previously signalled its intention to release the model. Subsequently, in replying to questions from Senator Mathias Cormann in the Senate's Estimates Committee (on 17 October 2011), the Executive Director of ABARE made it clear that the failure to disclose the models and data sets was a government decision, not one made by ABARE. Since then, Treasury has refused Freedom of Information requests to disclose the models and data on the basis that doing so would involve an undue compliance burden, as those models and data are not kept in a form that would allow their disclosure.

This is a deeply troubling justification. Assuming it is true, it implies Treasury does not adhere to good modelling practice, which requires managing information resources in a way that allows those resources to be audited, permits results to be replicated and avoids unnecessary costs when models and data sets need to be updated.

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7 Rodriguez-Neto (2008) argues that the theory of repeated games may 'save the day' in relation to climate change policy and that folk theorems, which (broadly speaking) state that under certain circumstances cooperation may emerge as an equilibrium in an infinitely repeated game, may be important. But why should the theory of infinitely repeated games be more applicable than dynamic game theory, in which the players' strategies and payoffs change over time? In such games, it is possible that cooperation may actually be hindered if players place a sufficiently high value on the future (Skaperdas and Syropoulos 1996). Moreover, folk theorems do not state that cooperation *must* be an equilibrium of an infinitely repeated game. Indeed, defection in every round of an infinitely repeated game can still be an equilibrium. Therefore, whilst folk theorems are interesting, by themselves they provide little concrete guidance in the climate-change policy debate.

To make matters worse, the SGLP documentation does not fully provide the information needed even to indirectly test the results. Relatively few model parameters are actually disclosed and even when they are, they are frequently incomplete. For instance, while the parameters of the MAC functions are listed, the operation of these functions is smoothed in the early years — but quite how that is done is not explained. And, at times, the documentation simply refuses to disclose even estimated parameters: the constant partial equilibrium expenditure and own-price elasticities of electricity demand, to take a striking case, ‘are deliberately not presented so as to avoid any misinterpretation’ (SGLP: 160). One rather wonders how likely it is that anyone who knows what a constant partial equilibrium is needs to be protected from misinterpreting it.

## How the results were used

Its obvious technical sophistication notwithstanding, SGLP is first and foremost an exercise in propaganda, which the *Oxford English Dictionary* defines as ‘the systematic dissemination of selected information to promote a particular doctrine’ — the doctrine being that of the utility of the Gillard government’s carbon tax. The selective aspect of the information being disseminated is evident in the failure to release scenarios that could undermine the case for that policy: most obviously, the scenario specifying the costs to Australia of a unilateral carbon tax. It is also highlighted by the refusal to give access to the models and data to possible critics of the policy.

At the same time, the fact that the modelling was undertaken by Treasury (which was clearly constrained in its ability to comment publicly on Ministers’ claims about its modelling) meant there was little constraint on misrepresentation by government of its results. For example, the foreword to SGLP by Treasurer Wayne Swan and Climate Change Minister Greg Combet asserts that ‘The modelling finds jobs continue to grow under a carbon price’; however, the model assumes the labour market clears (and given population growth, it would be extraordinary if the labour force fell), so the fact that employment increases is hardly a result of the modelling — rather, it is a result of the assumption that the labour market clears in a scenario where the labour force continues to rise.

Similarly dubious claims have been made in relation to the effective carbon price paid as a result of the issuing of free permits to selected, trade-exposed, industries. Averaging the zero price of gifted permits with the price of the permits producers have to buy, Minister Combet and Trade Minister Craig Emerson have argued that the effective carbon tax will be ‘as low as \$1.30 a tonne’, so that the harm to production will be minimal. But these claims are fallacious. Production decisions obviously do not depend on the average price,

but on how much firms can save by reducing production. If avoiding one tonne of emissions saves \$23 in carbon tax payments, then it is that \$23 — the price at the margin — that matters.

More recently, the Government has relied on the modelling to justify its assumption in the 2012–13 Budget that the carbon price in 2015–16 will be \$29. However, the carbon price path in SGLP is simply the result of applying the Hotelling valuation principle to the price needed to achieve the ultimate abatement target;<sup>8</sup> there is no empirical basis for assuming prices will in fact follow the price path the Hotelling principle determines, all the more as it is well known not to hold in markets for exhaustible resources. But Treasury has not demurred from the statements made by Minister Combet and Treasurer Swan that claim justification in Treasury's modelling. The lack of robustness of this estimate is emphasised by the fact that the Government continues to state that this 2015–16 permit price will remain at \$29 even though the Government announced that the Australian scheme will now be linked to the European ETS.<sup>9</sup>

## Conclusion

While technically sophisticated, the modelling done for the Rudd and Gillard carbon price schemes was undermined by its partisan ends. Even its technical quality has been flawed by reliance on assumptions that serve those ends; moreover, the inability of third parties to replicate the results, or test the modelling sensitivities, limits the weight that can be placed on it.

Particularly egregious is the decision to assume speedy global agreement on cutting carbon emissions. By the time of the SGLP modelling it was apparent that this was highly unlikely; given that fact, the least one could expect is rigorous testing of whether Australia should nonetheless implement a carbon price, and a discussion of what such a unilateral approach would cost. That is all the more important as unilateral abatement would clearly yield, at most, trivial environmental benefits.

Some inkling of the magnitude of these costs can be derived by looking at the estimated reduction in Australian national income that occurs even with coordinated global action — for each dollar in revenue the carbon tax raises,

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<sup>8</sup> For the abatement target to be reached, price must rise to a threshold level. Given that level, the Hotelling valuation principle pins down the rate of increase in price.

<sup>9</sup> Paradoxically, the assumed equality of the autarky and free-trade price also suggests that there are no economic gains to Australia linking to Europe, which begs the question as to why such links are being pursued in the first place.

national income declines by around two dollars.<sup>10</sup> In other words, the carbon tax has an average excess burden four times greater than that of the most distorting tax identified by the Henry report.<sup>11</sup> These results imply that absent any environmental benefits, the carbon tax is extremely distorting in terms of its average excess burden — and that average excess burden would presumably be even higher if unilateral action causes an even greater decline in Australian national income.

That the AEB is high is unsurprising, as the carbon tax is a tax on an intermediate input and falls especially heavily on industries in which Australia has a comparative advantage. Given the emphasis Treasury has placed on average excess burdens in criticising mining royalties, one might have expected the risk of the economy bearing so great an AEB for little or no benefit to figure in Treasury's discussion; instead, it is completely lacking.

In short, this is modelling for a specific political purpose. Its technical quality is unknowable, as the models and data have not been released. Even were it high, however, that would not make it more useful to the public interest.

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10 Using, for example, a 1 per cent discount rate applied to data from Treasury's modelling output to 2050, the present value of carbon tax revenue is \$570 billion, whilst the present value of GDP losses is about \$1 trillion.

11 Modelling undertaken for the Government by KPMG for the AFTS Review estimates the average excess burden of a gambling tax at 0.54.

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# The Treasury–KPMG Econtech Modelling of the Excess Burden of Mining Taxation: Some Doubts

Jonathan Pincus<sup>1</sup>

## Introduction

The Commonwealth Treasury commissioned KPMG Econtech to model the efficiency of the existing Australian tax system. The report was an input to the 2010 ‘Henry Review’ of the Australian tax system (henceforth AFTS), and proved very influential to both it and (especially) the Rudd government’s response to AFTS. That response comprised proposals for a new Commonwealth tax on mining, called the Resource Super Profits Tax (RSPT); a proposal to abolish royalties; and a proposal to reduce the rate of corporate income taxation. Subsequently, Treasury commissioned a second KPMG Econtech report to model the welfare effects of that response.<sup>2</sup>

Both of the KPMG Econtech reports used a large Computable General Equilibrium model called MM900. As a proprietary model, its full publication would depreciate its value to the owners. However, because it was an important input to major government policy decisions, Treasury should have ensured that sufficient information was made available to enable disinterested but informed outsiders to judge its quality. It is not sufficient for Treasury, through its own internal processes, to be convinced of the quality of the modelling.<sup>3</sup> And there is no evidence that Treasury adopted a process similar to that of the Productivity Commission — which is widely regarded as ‘best practice’: when relying upon one model only the Commission forms an expert advisory group to question the modellers in some detail; and the Commission then publishes a summary of the comments and responses.

Central to mining-tax policy development were two notions. The first is that a tax on resource rents would produce public revenue without any disincentive

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1 University of Adelaide, [jjpincus@gmail.com](mailto:jjpincus@gmail.com) The author is grateful for the comments of George Fane and Henry Ergas.

2 The first KPMG Econtech report, 2010a, was entitled ‘CGE Analysis of the Current Australian Tax System’, and will be referred to as ‘CGE Current’. The second, 2010b, will be referred to as ‘CGE Response’.

3 Until forced by a Freedom of Information request, Treasury refused to release its own estimates of the revenues expected from mining tax proposals (Treasury 2010a).

effect or excess burden. When it came to the Petroleum Resource Rent Tax and the RSPT, KPMG Econtech assumed that this was the case; subsequently, however, Treasurer Swan disavowed the proposition. The second claim was that royalties, the main sources of mineral revenue for the states, were very inefficient. In fact, using MM900, KPMG Econtech concluded that royalties were the most inefficient of all 19 major taxes modelled (excepting gambling taxes, the inefficiency of which was likely overestimated. See 'CGE Current': 6): the average excess burden of royalties and crude-oil excise was 50 cents for each dollar of public revenue; and the marginal excess burden was 70 cents.

This paper concentrates on the KPMG Econtech modelling of royalties and the special taxes on mining profits. The published reports, 'CGE Current' and 'CGE Response', contain explanatory and expository material, brief discussions of some of the modelling and the relevant literature, and the parameter values. But crucial data and modelling have not been released in sufficient detail for independent examination, let alone sensitivity analyses — and the reports contain no sensitivity analyses. Therefore, this paper will rely on partial equilibrium, back-of-the-envelope calculations of excess burden, using information in the reports and other public sources.<sup>4</sup> When these calculations take account of effects on supply, and on the price of mineral exports, they suggest a very much lower excess burden than was estimated in 'CGE Current'. Moreover, the incidence tables that were provided by KPMG Econtech in 'CGE Current' themselves suggest a low excess burden.

## Background: 'Australia's Future Tax System'

On 13 May 2008 the Rudd government announced an inquiry into the Australian tax system, to be chaired by Dr Ken Henry, Secretary of the Australian Treasury.<sup>5</sup> The inquiry received over 1500 submissions, met with interested parties and conferred with tax specialists, and issued five consultation papers (but no interim report). A report on the retirement-income system was released on 12 May 2009. The final report, 'Australia's Future Tax System' (AFTS 2010), was provided to the government in December 2009, and released on 2 May 2010, simultaneously with the government's response.

Of the 138 recommendations, the Rudd government seized on one:

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4 For more detailed discussion, see Ergas and Pincus (2012).

5 The other members were Greg Smith (Australian Catholic University); Dr Jeff Harmer (Secretary of FaHCSIA), Heather Ridout (Australian Industry Group), and Professor John Piggott (University of New South Wales). Support for the inquiry was mainly provided by Treasury and FaHCSIA.

45: The current resource charging arrangements imposed on non-renewable resources by the Australian and State governments should be replaced by a uniform resource rent tax imposed and administered by the Australian government:

- a. is levied at a rate of 40 per cent, with that rate adjusted to offset any future change in the company income tax rate from 25 per cent, to achieve a combined statutory tax rate of 55 per cent;
- b. applies to non-renewable resource (oil, gas and minerals) projects, except for lower value minerals for which it can be expected to generate no net benefits. Excepted minerals could continue to be subject to existing arrangements if appropriate;
- c. measures rents as net income less an allowance for corporate capital, with the allowance rate set at the long-term Australian government bond rate;
- d. requires a rent calculation for projects;
- e. allows losses to be carried forward with interest or transferred to other commonly owned projects, with the tax value of residual losses refunded when a project is closed; and
- f. is allowed as a deductible expense in the calculation of income tax, with loss refunds treated as assessable income.

Literally backed by Dr Henry, Prime Minister Rudd publicly announced the Resource Super Profits Tax (RSPT). In support of this proposal the Treasury released a paper claiming that the mining industry contributed a low and decreasing share of its profits to government. Ignoring company tax payments, this claim was based an estimate of mining profits of \$91.2 billion that, somehow, included resource rents not counted in ABS or ATO data on income liable to company tax.<sup>6</sup>

What followed was a vigorous lobbying effort by mining companies, and then semi-secret negotiations between the Rudd government and the largest three mining companies: Xstrata, BHP and Rio Tinto. On 23 June 2010, Kevin Rudd was replaced as prime minister by Julia Gillard, who announced that the RSPT

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<sup>6</sup> According to the Minerals Council (2011: 15), 'While some commentators accepted this estimate (and the resultant claims) unquestioningly, a number of others drew attention to what appeared to be anomalies. The Economics Editor of *The Australian*, Michael Stutchbury, observed in June 2010 that while the \$91.2 billion was 'painfully extracted' from Treasury, 'it provided scant information on how this could exceed other measures of total mining company profits: \$63.6bn, according to the Australian Bureau of Statistics' estimate of mining pre-tax operating profit, or \$74.1bn in EBITDA (earnings before interest tax, depreciation and amortisation)'.

would not be adopted in its original form. On 2 November 2011 the Gillard government announced the proposed RSPT replacement, the Minerals Resource Rent Tax (MRRT).

MRRT applies to iron-ore and coal projects from 1 July 2012, with a tax of 30 per cent on taxable profits less an 'extraction allowance' (equal to one-quarter of the tax otherwise payable) to 'recognise the miner's employment of specialist skills': this reduces the effective rate to 22.5 per cent.<sup>7</sup> For existing projects, the taxable profit is to be struck after deductions relating to the value of the 'starting base'. Mining companies can choose whether to set the starting bases of their<sup>8</sup> projects at historic cost or market value. Companies will also receive a credit of all current and future royalty payments. MRRT was projected to raise \$3 billion in 2012–13 and \$9 billion in 2013–14.

Perforce, this paper will deal only with the KPMG Econtech modelling: the modelling of the MRRT was undertaken by Treasury, and has not been released (Wilson 2012) and the Treasury's website redirects a search for 'Minerals Resource Rent Tax' to the Australian Taxation Office, where no modelling is to be found.

## Taxes on rent, in theory and practice

AFTS proposed changing the tax mix to rely more heavily on levies imposed on rents of various kinds, especially land rents and resource rents. The reasoning relied upon has long been familiar in elementary economics: by definition, rents are receipts in excess of the minimum necessary to elicit supply — if it were possible to target rents and nothing else, then revenue could be collected with no excess burden. However, a mechanism needs to be devised to enable the tax authorities to distinguish rents from other returns, and to do so with perfect accuracy; or, equivalently, to identify perfectly inelastic supplies. No such mechanism can exist, because of asymmetric information.<sup>9</sup>

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7 The government has never clarified why it did not simply announce a tax rate of 22.5 per cent. A possible explanation is that setting a rate of 30 per cent and giving the mining companies an extraction allowance equal to one-quarter of the tax payable makes it slightly easier to raise the effective rate to 30 per cent while claiming that this was always the MRRT rate and that all that has been done is to reduce the extraction allowance.

8 A small Policy Transition Group (2010), chaired by the Minister of Resources had advised the government on the development of this tax.

9 There are the huge administrative difficulties of trying to measure costs and revenues, and to allocate the costs of inputs that are shared by many projects to each individual project. This is illustrated by the fact that, after 24 years of operation, there remain substantial areas of dispute in tax law as to liability under the Petroleum Resource Rent Tax, including: the delineation between exploration and development activity; the treatment of indirect expenses; the precise definition of the taxing point; the requirements for substantiation of expenditure; and the precise scope for transfer of expenditure between projects. Several of these issues are the subject of current litigation, and are likely to make their way to the High Court.

For natural resources, *ex-ante* auctions for the right to mine and sell minerals would seem to provide a clean extraction of resource rents — but even here questions arise. For example, if the auction price is to be paid in advance, then the supply of finance comes into play, and finance is not in perfectly elastic supply to the borrowers. AFTS and some of its members also worried about thin auction markets and a version of ‘seller’s regret’ (which could lead a government to impose additional taxes or charges if the miner ends up making huge profits).<sup>10</sup> Instead of auctions and royalties, Dr Henry advocated a version of the ‘Brown tax’, which became the RSPT. DEEWR (2010) claimed that ‘The RSPT is world class. It sets a new benchmark for resource taxation.’ Not for long: or, not in the way that DEEWR had in mind!

The Brown tax makes government a *pro-rata* owner of all cash flows from the project, incomings and outgoings, including the cost of finance. If implemented *ex ante*, the coercion that makes it a tax is that it mandates public equity in nascent projects; but the projectors would have the choice of not going ahead with the project. However, when implemented retrospectively, that choice is moot and then the Brown tax becomes the equivalent of partial expropriation of the existing projects. For a government short of revenue, a new tax on existing projects — which would fall on quasi-rents as well as on pure rents — offered the prospect of a quicker and larger access to revenue, especially following unexpected and unprecedented rises in minerals prices. Graphs like that presented by the AFTS (2010: Chart 6.1) and the government, showing royalties falling as a percentage of rising profits during a period of rapid commodity price rises, did nothing to reassure the disinterested onlooker that the government was then making a sharp distinction between pure rents and quasi-rents.

Moreover, the RSPT differed in one important respect from the Brown tax proper (and from a ‘pure’ system with an Allowance for Corporate Capital expenses): instead of instant refunds of 40 per cent of outlays, the companies would receive a promissory note bearing a rate of interest decided by government, not the market. As was noted at the time, when tendered as asset or collateral, such promises would be valued at a discount to face value.<sup>11</sup>

In keeping with elementary economic theory, the Rudd government, its Treasury and other departments, and Dr Henry himself, insisted that the RSPT would have no excess burden. The argument was sometimes put as follows (see, for example, DEEWR 2010): if a company maximises its profits by some set of actions, then by the same set of actions it would maximise any fraction of the

10 To try to justify the imposition of a rent tax on both new and existing projects on the ground that an auction alone might result in the assumed undesirable imposition of a rent tax on existing projects is not so much as case of the pot calling the kettle black, as the pot calling itself black.

11 It was revealed under FOI that Treasury (2010b) admitted that the RSPT would make some existing miners ‘cash-flow negative’, thereby threatening the triggering of sanctions under debt covenants.

profits, including the fraction that would be retained under the Brown tax. Therefore, a Brown tax would have no disincentive effects. Dr Henry seemed to hint that he realised that, taken to its logical extreme, this argument was nonsensical, when he noted that, on the same reasoning, a Brown tax of 90 per cent would leave incentives unimpaired. The obvious question then is ‘Why not then impose a Brown tax at the rate of 99.999... per cent?’<sup>12</sup>

To model the RSPT on the assumption that it would have zero excess burden<sup>13</sup> would be to contradict the (later) statement made by Treasurer Swan in his Parliamentary ‘Explanatory Memorandum’ for MRRT (Swan 2011):

1.32 As the sources of mining rents are difficult to identify separately in practice, the MRRT aims to strike an appropriate balance between recovering a sufficient return to the community from the profits attributable to the underlying resource rents at the valuation point, and recognising that some mining expertise and capital may also be taxed in a process which has regard to realised profits and their equivalents.<sup>14</sup>

Yet, the modelling undertaken by KPMG Econtech for Treasury assumed zero excess burden for the Petroleum Resource Rent Tax and, subsequently, for the RPST.<sup>15</sup>

## Modelling royalties

The Rudd and Gillard governments wanted to abolish state royalties. However, the Policy Transition Group (referred to earlier) recommended that royalties be credited against MRRT liabilities; and, reluctantly, the Gillard government accepted this element. Belatedly, the Gillard government asked the review into the distribution of the GST to suggest ways to discourage rises in royalty rates. (Western Australia and Queensland have since increased royalty rates.) For any company with a sufficiently large MRRT liability, an increase in royalty

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12 Treasury Secretary Henry’s claim was reported in *The Australian* (2010). Similarly, a mining tax expert claimed that ‘If 100 per cent of the project was a worthwhile investment for the company, 60 per cent of it will be similarly worthwhile, so the [Brown] tax will neither discourage nor encourage investment’ (Smith 2010a: 8).

13 In fact DEEWR (2010: 13–4), the government department responsible for the Resource Tax Consultation Panel, claimed that the RSPT would stimulate mining investment because it reduced the risk that the companies would bear (from 100 per cent to 60 per cent). The best one could make of this claim is that it implies that government ‘financing’ would be cheaper or otherwise more attractive than what was on offer from the finance sector itself — a case of ‘market failure’, presumably. However, DEEWR (2010: 11) made the sensible point that, because royalties would be credited against any RSPT liabilities, the deterrent effect of royalties would be diminished, if not completely removed.

14 The claim that it is impossible to tax pure rents *ex post* was made forcefully in Ergas, Harrison and Pincus (2010).

15 ‘CGE Response’ raised no new issues of note that were not present in ‘CGE Current’.

rates would not alter its after-tax profits, but merely shift revenue from the Commonwealth to the states. The desire for revenue is undoubtedly the main motivation for the Commonwealth to try to limit, if not abolish, royalties.

The argument used in AFTS against royalties, and adopted by the Rudd and Gillard governments and their departments, related to the inefficiency of royalties and their high excess burden. Again, the argument is based on elementary economics: royalties are levied on output, not the input, and so shift the cost curve upwards. Thus, royalties reduce output at the relevant margins. But the relevant policy question was ‘How inefficient were royalties?’

AFTS and the Rudd and Gillard governments determined that royalties were very inefficient: they imposed much higher excess burden than almost any other tax or levy (when an appropriate equi-revenue comparison was made). For every extra dollar in revenue, the private sector in Australia lost \$1.70: the marginal excess burden of royalties was 70 cents.

In arriving at this startling conclusion, AFTS drew on estimates by KPMG Econtech, of the average and marginal excess burden of the 19 main types of tax or impost, using a large general-equilibrium model called MM900. The work was commissioned and overseen by Treasury. The final report from KPMG Econtech was dated 26 March 2010.<sup>16</sup>

KPMG Econtech reported the average and the marginal excess burdens; AEB and MEB. However, AEB is not a concept discussed commonly in the tax literature in situations with more than one tax.<sup>17</sup> Instead, I will follow the literature and concentrate on MEB: the ratio of the increase in excess burden to the increase in revenue.

The estimate of an MEB of 70 cents for royalties was startling for two reasons. First, royalties were the main means that states used to garner resource rents from their ownership of sub-soil deposits. So we might expect that royalties would fall heavily on pure rents and so have relatively low excess burdens. Secondly, Australia looms large in the world supply of coal and iron ore and so we might expect that some of the tax burden would be shifted to foreigners. For both intuitions, however, it needs to be kept in mind that, although royalty rates were relatively low (few then above 5 per cent), and by themselves would reduce output little and raise export prices a little, in fact they came on top of other taxes, chiefly company tax and payroll tax.

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<sup>16</sup> It is not clear from the Treasury website when KPMG Econtech (2010a) was released publicly.

<sup>17</sup> The derivation of the partial-equilibrium formula (supply-side only) for AEB is available from the author.



## A 'reality test'

As a 'reality' test of the KPMG Econtech estimate of 70 cents in the dollar for MEB, I will present a partial-equilibrium model that assumes that all taxes imposed on mining can be simply converted into excise-tax equivalents and cumulated,<sup>18</sup> and that the export price is endogenous. The first purpose of the model is to estimate the cumulative tax rate that is required to achieve an MEB of 70 cents — this turns out to be unbelievably high. The model is then used to generate a BOTE estimate of the excess burden.

Figure 1 illustrates the Australian market for a mineral, under the following assumptions:

1. All Australian output is exported.
2. Linear supply and demand curves, with slopes  $\zeta$  and  $-\delta$ .
3. The price without the tax is normalised to one.
4. A set of excise taxes is imposed which cumulates to rate  $t$ .
5. A marginal rise in the tax rate increases tax revenue.

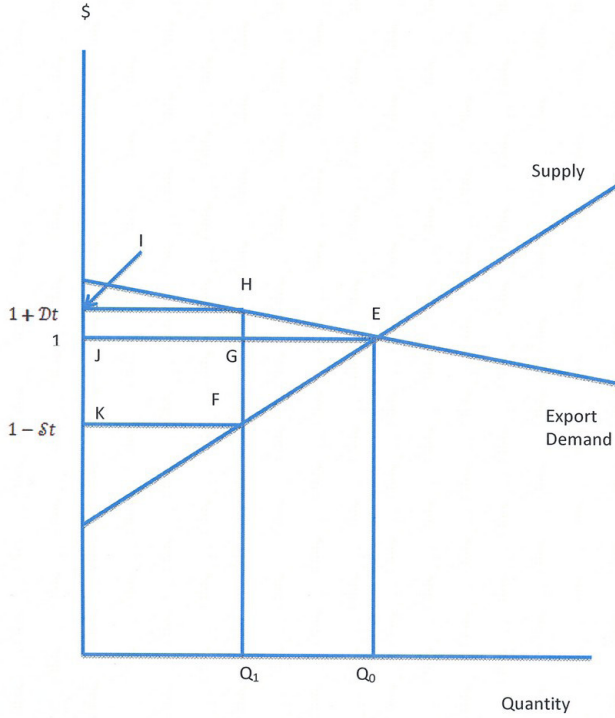
Although assumption 1 is a matter of analytical convenience, it does reflect the fact that the vast bulk of the major Australian mineral outputs are exported. It leads to an underestimate of excess burden, by the (neglected) loss of Australian consumer surplus; however, assumption 4 produces an overestimate, because taxes on company income and payrolls have smaller effects on output than do excises.

With these assumptions, the excess burden of royalties and other imposts on mining in Australia comprises two elements: (1) the excess burden from the supply-side response of the cumulative tax rate, shown as the triangle FEG in Figure 1; and (2) the national gain from shifting some of the revenue burden onto foreigners.

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<sup>18</sup> For example, the excise-equivalent rate for company tax would be 15 per cent of output for a company tax rate of 30 per cent, if taxable income equalled 50 per cent of sales.





**Figure 1: Excess burden of an excise when all output is exported**

Notes:

1. The slopes of the supply curve and the demand curves are  $\zeta > 0$  and  $-\delta$ .
2. Prior to any tax, price is 1 and quantity is  $Q_0$ .
3. An excise tax is imposed at a rate  $t = Dt + St$ , where  $D = \delta / [\delta + \zeta]$  and  $S = \zeta / [\delta + \zeta]$ .
4. Under the tax the supply price is  $1 - St$ , and the demand price is  $1 + Dt$ , and the quantity is  $Q_1$ .
5. Excess burden is  $FEG = HIJG$ .

Source: Author's own illustration.

These two elements depend on how the tax falls on each side of the market. Define the shares of the tax borne by demanders and suppliers as  $D$  and  $S$  respectively, where  $D = \delta / [\delta + \zeta]$  and  $S = \zeta / [\delta + \zeta]$  and  $D + S = 1$ . These determine the post-tax price received by the producers, equal to  $1 - St$  in Figure 1; and the price paid by the foreign demanders,  $1 + Dt$ . In turn, these determine the overall excess burden, given the tax rate and the relevant elasticities. At  $Q_1$  in Figure 1, the elasticity of demand is  $\epsilon(Q_1) = -(1 + Dt) / \delta Q_1 < 0$ ; and the supply elasticity is  $\eta(Q_1) = (1 - St) / \zeta Q_1 > 0$ .

It is shown in Ergas and Pincus (2012) that, using  $\tau_s = s_t / (1 - s_t)$ ,

$$MEB = s_t \eta / (1 - \tau_s \eta) - D \quad (1)$$

The first term in (1) is the MEB on the supply side — a national loss;<sup>19</sup> the second is the MEB from the endogenous rise in export price — a national gain.

Table C.3 in 'CGE Current' shows the export demand elasticity as  $-6$ . Although neither KPMG Econtech report records the supply elasticity, it can be recovered (with some guesswork) as  $1.75$ .<sup>20</sup> Thus, foreign demanders would pay 23 per cent of the revenue collected from all taxes falling on mining.<sup>21</sup> In partial equilibrium, with all output exported, this means that 23 cents must be deducted from an MEB calculated on the supply side only. Therefore, to achieve MEB of 70 cents, as reported in 'CGE Current', an unbelievably high cumulative tax rate is required, as will now be shown.

It is not possible to estimate the cumulative tax rate from 'GCE Current' or 'CGE Response', so an indirect approach is needed. The Minerals Council (2011), when asserting that miners were paying their 'fair share' to the community, claimed that the larger miners were paying around 40 per cent of profits to governments. Presumably, this industry lobbying body would have no incentive towards an understatement, so adopting 40 per cent as the estimate of government levies as a ratio to profits does not seem unduly prejudicial to the 'reality' test of an MEB of 70 cents.<sup>22</sup> Using expression (1) and the two elasticities ( $1.75$  and  $-6$ ) shows that an MEB of 70 cents requires a cumulated tax rate of 29 per cent on sales. Arithmetically, on the Minerals Council's claim, that implies profits equal to 73 per cent of sales in 2004–05, which is unbelievably high.

So, to recapitulate: using the partial-equilibrium model illustrated in Figure 1, and parameters from 'CGE Current', an MEB for royalties of 70 cents requires a cumulated tax rate of 29 per cent on sales; and that in turn implies a ratio of mining profits to sales of 73 per cent in 2004–05.

A realistic estimate of the cumulated tax rate on mining sales is around 13 per cent (see Ergas and Pincus 2012). Expression (1) then yields an MEB of 19 per cent on the supply side and minus 23 per cent on the demand side, for an overall MEB of  $-4$  per cent.

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19 If export demand were perfectly elastic, then MEB would be given by the conventional supply-side formula  $\tau\eta/(1-\tau\eta)$ , where  $\tau = t/(1-t)$ . When export demand has elasticity, the supply-side element of the MEB is reduced for two reasons: the fall in supply price is smaller than the rate of tax,  $t$ ; and the marginal revenue gained includes some paid by foreigners.

20 A supply elasticity of around  $1.75$  means a doubling of prices would increase minerals output to a level three-and-a-half times what it was in 2004–05; and if the prices remain at the new higher level, Australian mining would maintain output at 350 per cent indefinitely.

21  $1.75/(6 + 1.75) = 0.23$ , and so the export price rises by 23 per cent of the tax rate.

22 However, the ratio of tax to profits may have been higher in 2004–05, the year of the MM900 minerals database — which was before a huge rise in prices. In both reports, KPMG Econtech adjusted the database of 2009–10 to incorporate the lower export prices experienced in 2004–05. This would have had the effect of increasing the supply elasticity and, therefore, the estimate of MEB.

KPMG Econtech ('CGE Current': 27) explained that, due to its assumptions about the supply of capital, the ultimate incidence in MM900 is primarily on labour; and none on capital. For royalties, its own incidence tables show an extremely small burden on labour: less than one-tenth of that needed to exhaust the estimate of the (dollar value of the) excess burden of royalties (using pp.5 and 59). Read in this way, the incidence table in 'CGE Current' justifies an average excess burden of 4 cents, not the 50 cents reported; and, presumably, an MEB much lower than the 70 cents reported — for example, 5.6 cents, which is 70 times  $4/50$ .

The small negative partial-equilibrium estimate of MEB depends on the terms of trade effect, via export prices. 'CGE Current' reported that the optimum uniform import tariff was 11 per cent; and that, although Australian tariffs were far from uniform and averaged far less than 11 per cent, nonetheless the KPMG Econtech modelling showed that tariffs improved economic welfare. Tariffs reduce imports and so reduce exports, and thus export prices rise: this is the main mechanism through which tariffs improved national welfare in MM900. If so, then it is unexpected that economic welfare did not rise as a result of imposts on mining, which also reduce exports in which Australia has some market power. The simplest formula makes the optimum export tax equal to the inverse of the elasticity of export demand, that is,  $1/6$  or 17 per cent, which is similar to the 19 per cent estimate of the cumulated rate used earlier. On the face of it, existing imposts on mining seem closer to the optimal export tax than existing tariffs are to the optimal import tax.<sup>23</sup>

Maybe an explanation of the puzzles discussed above lies in unpublished details of the modelling. MM900 was a computable general-equilibrium model, with almost 900 products by 109 industries with access to six primary factors of production within a nested CES production function. At the top level, firms chose between three aggregates: labour, capital and fixed factor. These aggregates respectively reflected choices between low-skilled and high-skilled labour; between structures and other capital; and between land and other fixed factors. Included in the last named were natural resources, assumed in fixed endowment, and specific to each mining industry. Labour was in slightly elastic supply (on the leisure-employment margin); foreign financial capital was in perfectly elastic supply, while domestic savings were proportional to income. MM900 was run in comparative static mode: equilibria were computed independently of any other equilibrium — there were no adjustment paths between equilibria. To estimate average excess burden, the model was run with the tax and without

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23 According to Lerner's symmetry theorem, either optimal tax would improve economic welfare. KPMG Econtech estimated the effects of royalties with tariffs in place, and *vice versa*. So it is even more surprising that, with allegedly very damaging mining taxes in place, tariffs were estimated to improve economic welfare; but not the obverse.

the tax (or impost); for marginal excess burden, the simulations were with and without a small (5 per cent) reduction in the statutory rate.<sup>24</sup> In both cases, the results were reported as the change in national welfare (compensating variation) divided by the change in total receipts of government. Public budgets were balanced through lump-sum transfers to and from households. The MM900 database, which was for 2009–10, was not made public; nor was the detail of the modelling.

This was an exercise in comparative statics. Therefore, the database had to represent an equilibrium, against which all other simulations were compared. Presumably with that requirement in mind, unspecified adjustments were made for the sharp rise in mineral prices between 2004–05 and 2009–10 (and for the effects of the GFC).<sup>25</sup> KPMG Econtech asserted that miners were making excess profits in 2009–10, arising from resource rents; in this, it supported Treasury. Was the mining sector in equilibrium in 2004–05, but not 2009–10? Did the estimate of rents include only pure rents, or did they include quasi-rents? How would such an apportionment be made?

There is another complication involved in embedding a natural resource within a computable general-equilibrium model: natural resources are exhaustible (at least in the long run, in which we will all be dead). Yet the usual assumption in CGE models is that the resource stock is fixed, which suggests that it is modelled as providing a service, rather than a material input; or that there is some activity through which the stock is replenished (on analogy with how depreciation of the reproducible capital stock is offset by gross investment).<sup>26</sup>

## Conclusions

To support the inquiry into the tax system (AFTS), Treasury commissioned and accepted a report from KPMG Econtech (2010a and its supplement 2010b) on the excess burdens of major Australian taxes and government imposts. The modelling used MM900, a large computable general-equilibrium model, run in

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24 Average Excess Burden or AEB is not a concept well explored in tax theory; in partial equilibrium, the formula for AEB gives double weight to the 'retained' taxes and so the value is 'path dependent'. (The derivation is available from the author.) The interpretations of AEB and MEB present difficulties if revenue falls as a result of the imposition of a tax or its increase.

25 As prices rise and profits increase, the supply elasticity falls, because of the choice of CES form of production function. Thus, with higher minerals prices, that part of the excess burden which is attributable to the supply side falls for two reasons: the royalty rates fall as a proportion of price; and the supply elasticity falls.

26 In addition, a nested production function with *constant* elasticities of substitution ill fits mining: even if labour and capital were very cheap, it would not be possible to produce a tonne of output using less than a tonne of ore.

comparative static mode. The two estimates that had the most immediate effect on policy related to a new tax that the Commonwealth wished to levy on mining companies — the RSPT — and to an old state-government impost, royalties.<sup>27</sup>

Regarding the new taxes, KPMG Econtech reported zero excess burdens for the Petroleum Resource Rent Tax and subsequently for the RSPT. Actually, this conclusion was arrived at by direct assumption, not a simulation: KPMG Econtech merely asserted that taxes aimed at so-called excess profits have no incentive effects, no excess burden. Eventually Treasurer Swan, in his Parliamentary explanation of the MRRT legislation, contradicted the assertion of zero excess burden, when he explicitly recognised that the rewards to the specialist skills of mining companies (and their financiers) would be taxed in the process of an attempt to tax pure resource rents.

The second, and startling conclusion of KPMG Econtech, was that the existing state royalties imposed massive excess burdens: an average excess burden of 50 cents for each dollar of revenue, and a marginal excess burden of 70 cents. Whereas the conclusion about the purity of ‘super profits’ taxes was simply assumed, the conclusion about royalties came out of simulations that, naturally enough, relied on assumptions about elasticities and tax rates. Unfortunately, some of the information necessary for external evaluation of the modelling was not included in the KPMG Econtech reports: specifically, the supply elasticities of mining; the share of output that was exported; the adjustments made to the 2009–10 database to account for increases in minerals prices since 2004–05; cost shares; and the tax and royalty rates applied. As to the modelling itself, only a sketch was published.

The conclusion about the inefficiency of royalties has gone largely unchallenged, despite its startling nature, and its apparent inconsistency with aspects of the MM900 model and the modellers’ report on the final incidence of royalties. On the contrary, it was endorsed by Commonwealth departments, by Commonwealth officials, and by 20 or so economists who lent unconditional support to the proposal to introduce the Resource Super Profits Tax. Possibly the 20 relied on *a priori* reasoning: excess profit taxes have no excess burden, whereas an excise-like royalty does. However, numbers matter for policy: that is what quantitative modelling is for, to sort out the numbers and, preferably, provide confidence intervals around them. It is not conducive to good policy when the modelling is in a black box and when outsiders are not provided with a key to get inside.

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27 In the national accounts, royalties are a cost of production, not a tax. Ergas and Pincus (2012) suggested that by treating royalties as a tax, the modellers have mistaken a transfer of rents for excess burden.

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# The Treasury's Non-modelling of the Stimulus

John Humphreys<sup>1</sup>

In late 2008 the global financial crisis (GFC) sparked a boom in Keynesian economic commentary and activist fiscal policies. The Australian government responded with an immediate \$10.4 billion 'cash-splash' to households (Commonwealth Treasury 2008), followed by a \$42 billion 'Nation Building and Jobs Plan', which was to include \$12.7 billion more hand-outs as well as a \$28.8 billion increase in government capital investment.<sup>2</sup> In total, the government 'stimulus' was estimated to be about \$52 billion. If we included all discretionary government spending that happened after the GFC then the number would be far higher.

And as it happened, Australia came through the GFC without much trouble. While the GDP/capita did shrink by 0.8 per cent in 2008/09, this was hardly noticed since the government and most media failed to discuss the per-capita statistics and instead reported that total GDP grew by 1.4 per cent. However you report it though, Australia did better than many other countries.

The proponents of the Keynesian policies and the politicians and bureaucrats who implemented them were quick to claim success. The American micro-economist Joseph Stiglitz said of Australia: 'What your government did was exactly right'.<sup>3</sup> Our Treasurer, Wayne Swan, proudly claimed 'rapid fiscal stimulus measures shielded our economy and jobs from the worst consequences of the global financial crisis' (Swan 2010).

In part, these glowing reports are based on modelling done by the Commonwealth Treasury, which is often treated by the media as the gold-standard of economic advice in Australia. The government says that Treasury modelling shows thousands of jobs saved and billions in extra tax revenue (Peatling 2009), and Keynesian commentators have used Treasury as their evidence to justify the stimulus.

It is therefore alarming that Treasury never released any proper modelling of the stimulus package. The best it offered was a short note outlining the methodology for their budget forecasts (Treasury 2009), which will be discussed below.

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1 Human Capital Project, john.humphreys99@gmail.com

2 Announced in February 2009: Commonwealth Treasury (2009).

3 As quoted in Hagan and Gruen (2010).

## Treasury 'modelling'

In modelling fiscal policy it is necessary to factor in a number of different impacts. These issues will be explained and discussed shortly, and include:

- The impact on private savings
- The impact on net exports (that is, international crowding out)
- The impact on domestic investment (that is, domestic crowding out)
- The response of monetary policy
- Costs of government debt.

Of these different impacts, the Treasury methodology only considered two, and one of those it got totally wrong. Its methodology was so simplistic that a critic can walk you through it in about a minute.

- To calculate the private savings response, Treasury estimated that 30 per cent of cash transfers would be saved, while the direct government investment would not lead to a private savings response. Given the roughly equal split between transfers and investment, this equates to a total savings offset of only 15 per cent of the total stimulus. The calculation is somewhat simplistic and low compared to many studies, but it is possible.
- Second, Treasury considered the impact on net exports. To quote from its report: 'We apply an import share of 0.15 which is the economy-wide average share of endogenous imports in Gross National Expenditure.' This methodology is dead wrong, and creates a drastic underestimate of the impact on net exports.
- Based on the above two assumptions, Treasury then calculated its fiscal multipliers. For transfer payments, it concluded that 70 per cent would be spent and 85 per cent of the spending would go on domestic production, giving a multiplier of 0.6 ( $=0.7 \times 0.85$ ). For direct government spending, it concluded that the multiplier would be 0.85, with the other 0.15 being spent on imports.
- The total stimulus package is adjusted for the fiscal multipliers above to calculate the apparent benefit from the stimulus (see right-hand column in Table 1 below). Then to calculate the 'no stimulus scenario', Treasury simply take the budget forecasts and subtract the estimated impact of the stimulus. Note that the benefits are additive, so that by the end of 2009/10, Treasury estimates that GDP is 2.6 per cent higher than the counter-factual.

**Table 1: Benefit of the stimulus according to Treasury (annual GDP growth)**

	Budget forecast	No stimulus scenario	Benefit/cost
2008/09	0.1 %	-0.9%	1.0%
2009/10	-0.4%	-2.0%	1.6%
2010/11	2.1 %	3.4%	-1.2%

Source: Australian Government 2009, Treasury Briefing Paper for the Senate Inquiry into the Economic Stimulus Package.

- To estimate an employment response, Treasury then assumes that a 1 per cent increase in GDP leads to a 0.75 per cent increase in employment. That means a 2.6 per cent boost in GDP equates to a 2 per cent increase in employment, which was just over 200 000 jobs.

## Open-economy macroeconomics and the impact on net exports

There are several problems with the Treasury non-modelling, but the biggest problem is the way it treats the change on net exports. To understand how the modelling should have been done it is necessary to recall some basic open-economy macroeconomic theory.

Money flows in and out of our economy through two channels; the current account (trade in goods and services) and the capital account (savings and investment). These two flows offset each other, so that a capital account surplus (KAS) is always matched by an opposite current-account deficit (CAD) (Makin 2002). For countries with a floating exchange rate, the mechanism for matching the financial flows is the changing value of the currency. For example, if there is an increase in foreign investment then there will be an increase in the demand for Australian dollars, putting upward pressure on the exchange rate. The higher dollar will then put downward pressure on net exports until the inward and outward cash flows equalise. The result will be a higher capital-account surplus (more foreign investment) but also a higher current-account deficit (lower net exports).

Put simply, if we need to borrow more money from overseas, then our net exports will decrease by the same amount. This isn't necessarily a bad thing, but it is something that we need to remember.

When the government runs a budget deficit, it finances some of that deficit by borrowing from overseas. To the degree that government borrowing increases

net foreign borrowing,<sup>4</sup> then that change will be offset by a decrease in net exports — which can be called ‘international crowding out’. To measure the size of this effect, we need to consider what percentage of government debt is financed internationally.

Under the standard Mundell-Fleming model (Fleming 1962 and Mundell 1963) with highly mobile international capital and a floating exchange rate, it is assumed that a small open economy will finance all of its government debt from international markets. This would mean that international crowding out would be 100 per cent and fiscal stimulus would be completely ineffective. However, the government will get less than 100 per cent of its financing from international markets when there is a rising supply price of foreign capital (Makin 2009), so we are once again left asking how much of government debt will be internationally financed.

According to a report written by Treasury officials, about 60 per cent of recent government debt has been financed by foreign borrowing, though the exact percentage fluctuates from year to year (Di Marco, Pirie and Au-Yeung 2007). Warwick McKibbin also finds international crowding out of about 60 per cent for Australia from his modelling work.<sup>5</sup> This is obviously far in excess of the 15 per cent that Treasury used in following its flawed methodology. The mistake made by Treasury is assuming that government stimulus can only impact net exports when people directly buy foreign products, but in reality the stimulus will have an impact on all trade-exposed sectors.

Interestingly, in a different context the Treasury Secretary recently admitted that Treasury got its economic modelling wrong, in part because it was overestimating net exports (Parkinson 2012). Treasury had not predicted the rising dollar associated with international crowding out. It is interesting then to note that at the beginning of the GFC the Australian dollar dropped to US\$0.61 in October 2008, but after the introduction of the stimulus the dollar rose strongly to over US\$0.90 by October 2009, and then reached parity by November 2010 (Reserve Bank of Australia 2012). Without the stimulus, the dollar would have been lower and net exports would have been higher.

The only attempt from Treasury (or any pro-Keynesians) to respond to this point has come from David Gruen, who points out that international crowding out is a bigger issue for countries more exposed to international trade and financial flows, and Australia is in the middle on this score (Gruen 2009). This is certainly true, and it can be picked up in a model by adjusting the estimate for foreign-financed government debt (whether 15 per cent or 60 per cent or some

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4 It is possible for public foreign borrowing to displace private foreign borrowing, which will not change total foreign borrowing. However, this will then mean higher domestic interest rates and lower domestic investment, as discussed in the next section.

5 McKibbin, Stoeckel and Lu (forthcoming), and personal correspondence.

other number). In making his case, Gruen cites a paper by Mendoza, Vegh and Ilzetzki (2009) that shows fiscal policy is more effective for economies with lower international trade flows. What Gruen failed to mention was that the paper in question also showed that for countries with a floating exchange rate, the fiscal multiplier was actually negative.

For the Treasury estimate to make sense, we must believe that only 15 per cent of new government debt will be financed by international lenders. That estimate is unbelievably low, meaning that the Treasury approach is going to significantly overstate the benefits of any stimulus because it has misunderstood the impact of stimulus on net exports.

## Domestic crowding out

While the Treasury approach to international crowding out was totally wrong, it did not even attempt to provide an estimate for domestic crowding out, where extra government spending comes at the expense of domestic investment.

While 60 per cent of stimulus spending may be financed internationally, that leaves 40 per cent to be financed by domestic lenders. The increased demand for loanable funds will then drive up the price of loanable funds (interest rates), which will decrease private borrowing and therefore private investment. Makin (2009) argues that this form of domestic crowding out is actually more costly than the international crowding out discussed above.

However, while increased foreign borrowing is perfectly matched by falling net exports, domestic borrowing is not perfectly matched with falling private investment. If the government is able to borrow money from domestic savers who were previously unwilling to lend out their money, then the government borrowing will not crowd out private investment and will create the intended stimulus effect.

The relevant question then is the degree of domestic crowding out. In a Treasury paper from 10 years ago, it was suggested that domestic crowding out might be a real concern for Australia, with the authors concluding that 'significant discretionary fiscal policy movements may have large associated costs' (Comley, Anthony and Ferguson 2002). In normal economic conditions, there is a good argument that domestic crowding out would be nearly complete.

Proponents of stimulus policies often claim that domestic crowding out is relatively small in times of crisis, and that may well have been the case for this stimulus. However, it is very difficult to believe that it was zero, as implicitly assumed by Treasury.

## Monetary policy response

Treasury also entirely neglected to factor in any monetary policy response to its fiscal expansion.

As suggested above, the only way for fiscal stimulus to be effective is for the money to have been sourced from Australia, and for that money to come from savers who were previously unwilling to lend money. Since fiscal stimulus relies on new money coming into the system, it is important to note that it is actually a form of 'monetary expansion' similar to when the Reserve Bank of Australia (RBA) increases money supply by reducing interest rates.

In Australia, the RBA is independent and it is required to target price stability. It does this by controlling the total amount of base money supply in the economy, trying to ensure that money-supply growth is roughly similar to GDP growth.<sup>6</sup> If the RBA observes that money supply has reduced significantly in one part of the economy and this may lead to deflation (as happened with the GFC when banks reduced their lending), then it responds by lowering interest rates and increasing its own money supply.

Conversely, if the RBA observes that something has caused an increase in the money supply (such as the government stimulus), then it should respond by having marginally higher interest rates, so as to decrease its money supply by the same amount, and ensure there is no risk of inflation.

If the RBA perfectly offset the money expansion caused by the fiscal stimulus, then that would mean that the fiscal stimulus cannot increase economic activity. However, monetary policy is not always fully effective.<sup>7</sup> It could be argued that monetary policy was not working fully in Australia, and so fiscal stimulus was necessary. Indeed, McDonald and Morling (2011) make the argument that the nature of the GFC weakened the effectiveness of monetary policy, since banks and borrowers were becoming more cautious.

That being said, it is unreasonable to argue that monetary policy was absolutely ineffective, as is the implicit position of Treasury. Indeed, Treasury Secretary Parkinson later admitted: 'While the GFC significantly impeded global financial markets, it did not materially impede domestic monetary policy once

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6 The RBA controls the money supply by targeting the overnight cash rate using open market operations. It does not directly target a money-supply level, but the ultimate consequence of its behaviour is to control the base money supply. Inflation occurs when money-supply growth exceeds output growth, while deflation occurs when output growth exceeds money-supply growth. The RBA doesn't actually aim for perfect price stability, but an inflation rate of between 1–3 per cent.

7 In situations where banks want to lend money but people are unwilling to borrow, traditional monetary policy through low interest rates can be ineffective. Also, while fiscal policy can be for any amount, monetary policy tends to only move in jumps of 25 basis points.

bank borrowings were guaranteed by the Commonwealth government.<sup>8</sup> To the degree that monetary policy was still partially effective, then the fiscal stimulus would have been partially offset due to marginally higher interest rates (albeit with a lag).

## Repaying the debt

Another cost of the fiscal stimulus that needs to be included is the increased tax required to pay for the ensuing debt. In their recent analysis of fiscal stimulus, Guest and Makin (2011) use a macroeconomic model to consider the long-term consequences of stimulus, assuming that the debt will be repaid through higher taxes in the following years.

Their model does not include international crowding out, but it does factor in both the standard domestic crowding-out mechanism and also an extra economic cost caused by the tax needed to pay off the debt. After adding this extra element, Guest and Makin are able to estimate a long-term multiplier of -1.43, which means that for every \$100 spent on stimulus, the economy will contract by \$143.<sup>9</sup>

The above result is dependent on the timing of the debt repayments. Guest and Makin assume that the government will start to repay the debt the year following the end of the stimulus. An alternative assumption is that the government will only pay the interest on its debt and will not repay the principle. As the second approach pushes the costs further into the future, it will reduce the present value of the costs, and provide a more sympathetic result when evaluating the stimulus package.<sup>10</sup> However, the Treasury modelling does not even include this more sympathetic approach, and instead seems to assume the debt away.

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8 Parkinson (2012).

9 Guest and Makin (2011) note that the negative multiplier is robust to a variety of sensitivity analysis, and is consistent with other long-term analysis. Interestingly, in a later paper Guest and Makin show that the size of the multiplier depends crucially on how the stimulus is spent — with unproductive stimulus having a long-run multiplier of -3.3 and productive stimulus having a long-run multiplier of -0.5.

10 If the interest rate on the debt is the same as the discount rate, then the timing of the debt repayment becomes irrelevant. If the interest rate is lower than the discount rate (as is likely with government debt), then a delay in the payment will reduce the present value of the payment.



## Private savings response

The Treasury modelling did factor in a savings response to the stimulus, with 15 per cent of the total stimulus assumed to have been saved. Unfortunately, Treasury looked at just one element of private savings by only considering the marginal propensity to consume (MPC) the transfer payments.

However, there are several other mechanisms through which government stimulus can impact on savings, and these weren't considered by Treasury. Makin and Narayan (2011) explain that when people take a lifecycle (Modigliani 1976) or permanent-income (Friedman 1957) approach to consumption, then they are likely to save a large portion of any temporary income, significantly lowering the MPC for stimulus payments — a result confirmed by Taylor (2009). Further, the theory of Ricardian Equivalence suggests that private savings may increase as a response to government deficits in anticipation of higher future taxes. Whatever the reason, private savings often increase significantly when government savings decrease.

Makin and Narayan go on to survey the empirical evidence on the relationship between private and public savings, noting that 'most of these studies have concluded that at least half of the change in fiscal balances in advanced economies was offset by an opposite change in private savings'. A paper written by Treasury officials also noted that the international evidence is for a 50 per cent savings response, though its own work suggests that the number is closer to 40 per cent in Australia (Comley, Anthony and Ferguson 2002). In their study of Australia, Makin and Narayan find an even higher private savings response — of between 75 per cent and 100 per cent — which suggests that nearly all the value of a stimulus would be saved. This result is consistent with the study by De Silva and Davidson (2009), which found a very low level of increased spending as a result of the stimulus.

Put in this context, the Treasury assumption that only 15 per cent of the stimulus will be offset by private savings seems very low, and inconsistent with its own previous research.

## Conclusion

The biggest problem with the Treasury model is that because it misunderstands the issue of international crowding out, it drastically underestimates the impact on net exports. In addition, it entirely ignores the issues of domestic crowding



out, monetary policy responses, and the costs of repaying the debt. While its estimate for the private savings response to the stimulus is at the low end of the range, this is the least of the problems.

The ignorance of open-economy macroeconomics suggests that Treasury has neglected much of the advances made in macroeconomics over recent decades, and its strange assumptions on domestic crowding out and private savings response show that it has forgotten much of its own research. As Harvard economics professor Robert Barro said in 2009 when the US was debating its own stimulus policies, 'The financial crisis and possible depression do not invalidate everything we have learned about macroeconomics since 1936' (Barro 2009).

## An alternative model

It is easy to criticise, but unless there is a better alternative then the Treasury approach will continue to be repeated and believed. In response, I have put together a 'fiscal policy model' that incorporates all of the key variables discussed above. The model uses stimulus spending estimates from the government budget documents, and the latest economic data from the National Accounts.

In addition, following the lead of Hagan and Gruen (2010), this model includes the positive budget-feedback mechanism, where the immediate benefit of the stimulus leads to higher taxes, which improves the budget position compared to the counter-factual. As Hagan and Gruen explain, the marginal budgetary cost of the stimulus will be less than the headline figure. The budget feedback mechanism is assumed to occur with a one-quarter delay.

The assumptions used in the 'central scenario' of the model are:

- (1) private savings response = 15 per cent
- (2) degree of international crowding out = 60 per cent
- (3) degree of domestic crowding out = 20 per cent
- (4) monetary policy response = 50 per cent
- (5) the repaying of debt interest at 2 per cent, augmented by a 30 per cent efficiency cost of the tax.

Additional assumptions were necessary regarding the quarterly breakdown of stimulus payments and the lag effect of the crowding out and monetary policy response. International crowding out is assumed to happen quickly, while domestic crowding out and the monetary response happens more slowly.<sup>11</sup>

Using these assumptions, the model suggests that the stimulus provided a 0.5 per cent increase in GDP in 2008/09. This benefit was entirely unwound by the end of 2009/10, and then in 2010/11 the stimulus was actually a drag on the economy, leaving GDP about \$6 billion lower than the ‘no stimulus’ counterfactual. These outcomes can be compared with the estimates made by Treasury:

**Table 2: Comparative estimates of stimulus benefits (annual GDP growth)**

	Treasury estimate	Updated estimate
2008/09	1.0%	0.5%
2009/10	1.6%	-0.5%
2010/11	-1.2%	-0.4%

Source: Author’s own analysis.

Using the Treasury approach to estimating the employment impact, then the stimulus has resulted in the loss of over 30 000 jobs.

A ‘multiplier’ can be calculated by finding the discounted present value of future benefits against the discounted present value of the budgetary cost of the stimulus. Using the ‘central scenario’ above, the early benefit from the stimulus provides a positive multiplier of 0.5, but it then falls away sharply so that the multiplier by the end of 2011/12 is -0.1. Projecting forward, we can estimate a long-term multiplier of -1.5, which is close to the estimate provided by Guest and Makin (2011).

This is also consistent with McKibbin and Stoeckel (2009), who find that the stimulus provides an immediate boost, but then becomes a net drag on the economy with a negative multiplier. In addition, these results are consistent with Barro’s estimate of a near-zero multiplier (Barro 2009), the US Congressional Budget Office estimates of a negative long-run multiplier (Elmendorf 2009), and Ergas and Robson’s finding that the Australian stimulus fails a cost–benefit analysis (Ergas and Robson 2009). It is also consistent with the anecdotal evidence from around the world that has shown no relationship between the size of the fiscal stimulus and economic growth (Ricardian Ambivalence 2012).

These results are robust to a wide range of sensitivity analysis, with nearly all scenarios producing a long-run multiplier of between -1.4 and -1.6. Interestingly,

<sup>11</sup> The relative speeds of international and domestic crowding out are suggested by the modelling work of McKibbin, Stoeckel and Lu (forthcoming).

one of the most sensitive assumptions relates to the assumed lags in crowding out and monetary policy. Longer lags increase the immediate benefit, and even though the benefits are unwound within two years, the higher initial benefit is reflected in higher multipliers: 0.7 in the short run and -1.3 in the long run.

This new fiscal policy model is still a very imperfect representation of a complex economy. However, by fixing some of the most egregious errors of the Treasury attempt, it can at least give a more accurate story about the stimulus. That story seems to be that there was some short-term benefit that was quickly unwound, leaving the Australian economy poorer for the experience.

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# Treasury Forecasts of Company Tax Revenue: Back of the Envelope or Back to the Drawing Board?

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*The last decade has seen Treasury make large forecast errors when forecasting company tax receipts. This paper demonstrates the source of those errors: Treasury does not model the actual company tax base but rather estimates growth rates for aggregate measures and then makes ad hoc adjustments to Gross Operating Surplus to estimate taxable income. The consequence of this forecasting strategy is that Treasury does not have a detailed understanding of the company income tax.*

## Introduction

In May 2012 Treasury announced that it would be undertaking a formal review of its forecasting performance (Uren 2012). In particular there was concern that Treasury had been ‘overestimating company tax revenue’ (Uren and Creighton 2012). Company tax revenue has fallen short of Treasury forecasts in the years since the global financial crisis (GFC). Prior to the GFC, Treasury tended to underestimate company tax-revenue receipts. These forecast errors can have a substantial impact on the budget bottom line as Australia has a high ratio of company tax revenue to GDP by OECD standards (Clark, Pridmore and Stoney 2007).

Some level of error is unavoidable; the important question is why these errors occur and whether they are systematic. I present the argument below that the forecast errors occur because Treasury does not actually model the Australian company tax base. Rather, it bases forecasts on private Gross Operating Surplus (GOS) and then makes several ad hoc adjustments to approximate the company tax base. In retrospect, this method is highly inaccurate. It is an open question, however, whether structural modelling of the company tax base would provide better forecasts of company tax receipts.

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In the next section I set out how Treasury describes its methodology. Section three shows the extent of forecast errors. Section four discusses whether Treasury models the company tax base or not. I then discuss why these results matter and section six concludes.

## How Treasury describes what it does

The Treasury forecasting method is described in an appendix to the ‘Budget Papers Statement Five: Revenue’. The latest Budget Papers (2012/13: 5–42) state:

Most of the large and complex heads of revenue, such as personal and company income taxes are forecast by mapping appropriate economic parameter growth rates to the various income, expense and deduction items on the relevant tax returns. An estimate of total tax payable is then calculated by applying the statutory rates to the estimated income base.

Treasury identifies three potential sources of forecast error. First, its initial growth forecasts may be incorrect. That statement covers a multitude of possible biases. Second, translating economic forecasts into taxation-receipts forecasts can give rise to errors. This relates to the actual method Treasury employs to approximate the company tax base given its growth forecasts. If the method closely approximates the tax base, these errors should be small. Finally, Treasury argues that unexpected events and unexpected policy changes give rise to forecast errors. This, of course, must always be true and this source of forecast error is unavoidable. Over and above these three sources of forecast error, timing issues may also play a role in forecast errors — but over a budget cycle timing errors are less likely to be of concern as they would likely ‘wash out’ over the forward-estimates period.

## Company income tax receipt forecasts

Table 1 shows estimates, forecasts and actual company income-tax receipts for each year from 2001/02 to 2012/13. The Budget Papers do include additional information (‘Projections’) but I have not captured that data. In each year, the forecast receipts for that year (shown in bold in the table), the trailing estimate for the previous year, the forecast for the next year, and the actual receipts (underlined) are captured. The rows contain data reported in each year, while the columns show the estimate, forecast or actual receipts for each year.

For example, looking at the row ‘2012/13 Budget Papers’, the Budget Papers forecast 2012/13 company income-tax receipts to be \$73 480 million while the



actual receipts for 2010/11 were \$56 262 million. The row '2010/11 Budget Papers' indicates that the Budget Papers had forecast company income-tax receipts to be \$66 520 million in that year. The row marked 'Forecast Error' represents the difference between the actual receipt and the forecast receipt. It is possible to estimate the forecast revision by comparing the forecast for each year with the forecast of the previous year. For example in 2011/12, the Budget Papers showed a one-year-out forecast of \$78 140 million for 2012/13, while in 2012/13 the forecast was \$73 480 million. The difference is shown in the row labelled 'One-year Revisions'.

The forecast errors can be divided into pre-2008 and post-2008 — a distinction that is likely to be associated with the onset of the GFC.

While the 2001/02 forecast error is negative \$76 million, the subsequent pre-GFC forecast errors are positive. Quite clearly, Treasury was consistently underestimating company income-tax receipts. By contrast, the post-GFC forecast errors are negative. The forecast error in 2008/09 is \$12.8 billion, while the one-year revision from 2008/09 to 2009/10 is \$25.8 billion. That pattern of error is consistent with the notion that Treasury was surprised by the onset of the GFC but rapidly updated its estimates of revenue given the GFC had occurred.

There is, however, something unusual in the 2010/11 budget: having seen company income-tax receipts rapidly decline, the Treasury increased the forecast from \$55.7 billion in 2009/10 to \$66.5 billion in 2010/11, only to actually collect \$56.3 billion. It appears that company taxable income did not recover as quickly as the Treasury had expected. Similarly in 2010/11, Treasury had expected company income-tax receipts of \$78 billion in 2011/12, while the latest estimate of receipts for that year is \$67.5 billion. In other words, it appears that company income-tax receipts are taking longer to recover than Treasury expected.

The important question is whether these forecast errors are large or small. One way to evaluate the relative size of the errors is to examine their cumulative size. Prior to the GFC the cumulative underestimate of revenue is some \$15.4 billion (over seven years, an average error of \$2.2 billion per annum), while the cumulative overestimate following the GFC is \$24.8 billion (over three years, an average error of \$8.3 billion per annum). Looking at the one-year revision data, the cumulative pre-GFC changes are \$25.5 billion, while those of the post-GFC period are \$18.2 billion. These sums of money are not trivial.

**Table 1: Company Income Tax Receipts; Budget Paper Forecasts and Outcomes (\$millions)**

Actual/Forecast	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
2001/02 Budget Papers	27 209	*										
2002/03 Budget Papers	27 480	28 400	30 270									
2003/04 Budget Papers	<u>27 133</u>	31 260	32 370	33 750								
2004/05 Budget Papers		<u>33 365</u>	37 310	39 400	42,230							
2005/06 Budget Papers			<u>36 337</u>	40 610	48,040	50,140						
2006/07 Budget Papers				<u>43 106</u>	50,480	<b>56,860</b>	59,400					
2007/08 Budget Papers				<u>48 987</u>	58 270	<b>64 580</b>	68 580					
2008/09 Budget Papers					<u>58 538</u>	66 480	<b>73 490</b>	80,770				
2009/10 Budget Papers						<u>64 790</u>	57 950	<b>54 980</b>	55 740			
2010/11 Budget Papers							<u>60 705</u>	53 650	<b>66 520</b>	78,020		
2011/12 Budget Papers								<u>53 193</u>	57 880	<b>74 600</b>	78 140	
2012/13 Budget Papers									<u>56 262</u>	67 460	<b>73 480</b>	
One-year Revisions (\$)			2100	5650	5810	6720	5180	4910	-25 790	10 780	-3420	-4660
Error of Current Forecast(\$)	-76	4965	3967	3706	947	1678	210	-12 785	-1787	-10 258		

Source: Budget Papers (various issues). Forecast Error is defined as the Actual Receipt less the Forecast, and an 'over forecast' is consequently recorded as a negative magnitude. Current year forecasts are shown in bold; actual outcomes are underlined.

\*The 2001/02 Budget Papers do not contain a separate estimate for 2002/03 company income-tax receipts.

## Does Treasury model the company tax base?

Since 2007 Treasury has published at least three papers measuring company tax rates across industry within Australia (Clark, Pridmore and Stoney 2007; Greagg, Parham and Stojanovski 2010; and Clark, Greagg and Leaver 2011). These papers provide an insight into Treasury's tax methodology.

Clark, Pridmore and Stoney (2007: 5) indicate that 'it is common practice to estimate the effective [company] tax rate by expressing company tax collections as a percentage of GOS, in large part because GOS is readily and publicly available'. Greagg, Parham and Stojanovski (2010: 95) argue that GOS is not an appropriate measure of taxable income as it excludes some sources of taxable income while also excluding some deductible company expenses. Clark, Pridmore and Stoney (2007: 11–12) discuss how GOS can be adjusted to derive a measure of 'nominal [company] profit' or 'nominal economic profit' and that measure does appear to generate an effective tax rate close to the statutory rate after 2000/01. It is this 'validation' that provides Treasury with the confidence that its adjustments to GOS provide a reasonable approximation to taxable company income.

It is very likely that Treasury does not model the company tax base but, instead, forecasts corporate GOS and then makes various ad hoc adjustments to proxy for taxable company income. It is quite clear that the Treasury's starting point, if not its end point, is a measure of GOS. To the extent that adjustments are made, it is not clear what they are or how they are undertaken, and the results of these adjustments do seem to vary from Treasury paper to Treasury paper.

Despite the limitations of GOS as a measure of taxable company income, the two variables do appear to be highly correlated with each other over long periods of time. Figure 1 shows a time series of private GOS and taxable company income, collected from the Australian Taxation Office (ATO) for the period 1989/90 to 2009/10. Unfortunately, ATO data are not (yet) available for the period after 2009/10.



**Figure 1: Private Gross Operating Surplus and Taxable Income**

Source: ATO Taxation Statistics and ABS 5206.0 table 7.

There are, however, deviations between the two series. The first deviation occurs in 1998/99 and taxable income is somewhat flat until 2003/04 while GOS continues to grow. After 2003/04, company income grows faster than does GOS and it is unsurprising that Treasury consistently underestimates company income-tax receipts in that period.

It is in the post-GFC era that we observe the second and large deviation between the two series. That deviation begins in 2006/07. In the next year, the forecast error (shown in Table 1) is still positive, albeit small. By 2008/09 the two series have deviated quite substantially and the forecast error is a massive negative \$12.8 billion. It is here that the mechanism whereby Treasury translates economic forecasts into forecasts of taxable income has broken down. To be fair, it is unlikely that anybody would have realised this had happened at that time. Consistent with that view, the forecast error in 2009/10 is much smaller while the one-year revision is large.

Unfortunately, that argument does not explain the massive forecast error in 2010/11. The contrast between the forecast error and the one-year revision does suggest a change in forecast method or a political intervention to improve the reported budget figures.

## Why does this matter?

The fact that Treasury does not model the actual company tax base has important consequences. In the first instance the Treasury method can lead to significant forecast errors. In addition to undermining the budget process and making it difficult for government to pursue responsible and prudent fiscal policy, significant forecast errors also undermine Treasury's credibility. After a series of large forecast errors and subsequently unexpectedly large surpluses, John Stone (2007: 19) asked the question: 'Can it be, people are asking, that the Treasurer, knowing that even bigger forecast surpluses would produce irresistible pressure for the personal income tax rate scale reforms that he seems determined not to give us, is instructing his department to produce these latter-day "rubbery figures"?''

I believe that Stone's concerns were unfounded. It is far more likely that the Treasurer intervened in the 2010/11 year to produce a 'rubbery' forecast than the scenario Stone invites us to consider.

A far greater problem revolves around policy. By forecasting growth rates and not modelling the actual tax system, Treasury does not have a good understanding of the operation of the tax system. This deficiency was well illustrated during the mining tax debate in 2010. Following the Henry Review the Rudd government had proposed a new tax on mineral rents. Part of the argument for a new tax related to the view that mining companies did not pay enough company tax.

The Henry Review first cited — and misinterpreted — a US study by Markle and Shackelford (2009) that suggested that Australian mining firms paid an effective tax rate of 17 per cent (see Mann and Coorey 2010). Treasurer Wayne Swan (2010) subsequently relied on this study to argue:

It's also the case that mining companies operating in Australia get a big discount on the company tax they pay because of very generous tax concessions they get at the expense of Australian taxpayers.

... wholly-domestic mining companies paid an effective tax rate of only 17 per cent and multinational mining companies paid an effective tax rate of only 13 per cent — both dramatically below the headline company tax rate of 30 per cent.

At the same time, the then Deputy Prime Minister, Julia Gillard, told the Nine Network that mining companies paid 17 per cent tax, 'These are the cold, hard facts — the truth' (AAP 2010).

That both Julia Gillard and Wayne Swan did not actually understand the paper they were citing is not a reflection on them: the paper consisted of a complex econometric analysis. What is problematic is that Treasury had misinterpreted the results.

Treasury research also concludes that mining firms pay low effective tax rates (Greagg, Parham and Stojanovski 2010; and Clark, Greagg and Leaver 2011). But the results in these papers are inconsistent with ATO data showing that the mining industry paid an effective tax rate of 28.5 per cent in 2009/10. Confirmation bias led Treasury to misinterpret Markle and Shackelford (2009), and uncritically accept a result that should have been questioned. An understanding of the actual company tax base would have avoided that error. Certainly it would not have led to the Treasurer claiming that mining companies have generous tax concessions. But how else could Treasury explain its own results?

## Conclusion

Treasury has made large and persistent forecast errors when forecasting company tax receipts. The approach of forecasting growth and then making ad hoc adjustments to get to a receipts forecast may well be the most effective technique Treasury can employ. The alternative would be to employ a bottom-up technique that would likely be complex and expensive. There are severe limitations, however, to the Treasury methodology. Discrepancies in growth rates between GOS and taxable income will lead to massive errors — as we have seen since 2001. At least we now understand why the errors were made: it is less likely a case of political interference than of genuine error.

By forecasting aggregates and not modelling the tax base, Treasury has little understanding of the tax base itself. This reduces Treasury effectiveness in proposing policy and, more importantly, avoiding policy error.

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# The Treasury–Reserve Bank ATM Taskforce Report: Would it Pass a Cost–Benefit Analysis?

Hugh Green<sup>1</sup>

## Introduction

In December 2010 the Commonwealth Government announced that the Reserve Bank of Australia and the Treasury would establish a joint ‘ATM Taskforce’ to analyse reforms to Australia’s ATM market in 2009 which aimed to improve the competition and efficiency of the market by removing interchange fees on ATM transactions, replacing them with direct charges, while at the same time improving the information given to consumers about the costs of transactions at ‘foreign’ ATMs.

In May 2012 the Taskforce released its conclusions that these reforms have been ‘overwhelmingly positive for the ATM market and for consumers’, stating as support the magnitude of fee savings to ATM customers. Remarkably, in reaching this conclusion the Taskforce did not consider the reforms in the context of a formal cost–benefit analysis framework. To conclude that the reforms have been ‘positive’ implies that their benefits have outweighed their costs, which in turn involves summing the impacts of the reforms on all parties, both ATM owners and customers. Indeed, as stated in the Government’s own *Handbook of Cost Benefit Analysis*, ‘the aim [of cost–benefit analysis] is to measure the sum of changes in consumer and producer surplus’.<sup>2</sup> However, in analysing the effects of the reforms the Taskforce ignores their impact on the welfare (both direct and indirect) of ATM owners, focusing only on the impacts on consumers.

The result of this focus on consumer surplus is that any fee savings are seen as a positive, regardless of the effects they have on the welfare of the market as a whole. Further, the sole focus on fees masks the underlying resource costs at play. In particular, the travel costs faced by consumers and the differentials in processing costs between foreign and domestic transactions are crucial in determining optimal usage patterns.

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2 Department of Finance and Administration 2006: 22. Available at: <http://www.finance.gov.au/publications/finance-circulars/2006/01.html>

As I argued in the last issue of this journal (Green 2012), the reforms have in fact been welfare-destroying as they have led to an inefficient use of the ATM network. Consumer surplus has increased, but not by the full extent of the fee reductions due to the additional travel costs implied, while producer surplus has fallen by an amount close to the reduction in fees. Driving this result is the fact that fees are virtually unchanged, while the transparency effects of the reforms have alerted consumers to the inefficient price signals caused by foreign fees being excessively high relative to the price of 'domestic' transactions.

Despite this, the Taskforce concludes that competition in the market could be improved by further regulations to improve transparency. In this article I argue that the lack of a formal framework for analysis has led to this conclusion being misdirected. Further, the analysis could be better informed by recognising key results in the academic literature on ATM pricing. Just as the initial attempt at increasing fee transparency did not improve competition or efficiency, it is unlikely that furthering that regulation will achieve the desired results. Nonetheless, regulation of the ATM market is complex and, as the Taskforce argues, more direct regulation of fees poses its own challenges.

## The 2009 Reforms

In March 2009 the Reserve Bank of Australia (RBA) implemented reforms to the Australian ATM market, aimed at improving competition and reducing perceived inefficiencies in the market at that time. There were two important aspects of these reforms. First, interchange fees between the ATM owner and the cardholder's financial institution were removed and replaced by the ATM owner directly charging the customer for the use of the machine. Second, the fee for this transaction was required to be displayed to the customer prior to the transaction being completed.

Prior to the reforms, most transactions at foreign ATMs attracted a fee of \$2, while transactions at domestic ATMs were free, with financial institutions instead preferring to recover costs through other account fees. This fee differential was significantly greater than the difference in processing costs between a foreign and domestic ATM which may amount to only a few cents. The result was an inefficiently low use of foreign ATMs relative to domestic ATMs. By moving to a system of direct charging it was hoped that competition for customers between ATM owners, who could now directly control the fee charged to the customer, would lead to a reduction in fees towards marginal cost. This would be aided by displaying fees at the point of transactions to inform consumers of the actual cost of a transaction, which was previously communicated to them through periodic bank statements.

The outcomes of the reforms were somewhat different from their intention (Green 2012). Fees are, for all intents and purposes, unchanged now from what they were prior to the reforms, while there has actually been a shift *away* from foreign ATMs towards domestic machines (an increase from around 53–61 per cent of all transactions being conducted at domestic ATMs). The magnitude of this shift in dollar terms is significant, with the Taskforce reporting a reduction in foreign fees paid of \$120 million and \$150 million in the two years following the reforms.

## Analysis of the Taskforce’s Conclusion

Having reviewed the effects of the reforms, the Taskforce concludes:

In the view of the taskforce, the impact of the 2009 ATM reforms has been overwhelmingly positive for the ATM market and for consumers. On the demand side, consumers became well aware that it costs them something to conduct a foreign ATM transaction. They have responded accordingly by significantly reducing such transactions in preference to using their own ATMs and by finding alternatives, such as eftpos cash-out. In this regard, the reforms have been very successful, reducing expenditure by at least \$120 million in the year following the reforms and a further \$150 million in the following year.

It seems strange to conclude that a market outcome has been improved when an overpriced product is used even less. So how has the Taskforce come to this conclusion? First, in assessing the impacts of the reform the Taskforce has not adopted a formal cost–benefit framework which would identify all impacted groups and compare the gains and losses to each. For example, the conclusion that the reforms have been ‘very successful’ because they have reduced fee expenditure by \$150 million is no more correct from an economic efficiency perspective than the statement that they have been very unsuccessful because they have reduced fee revenue to financial institution shareholders by \$150 million. Both perspectives consider the surplus of only one group in the market to the exclusion of the other.

The focus on fees, which are simply a transfer in a cost–benefit analysis and not a net welfare effect, abstracts from the real resource costs and benefits. In particular, as argued in Green (2012), consumers will have incurred significant travel costs in switching to using domestic ATMs instead of more convenient foreign machines. The Taskforce’s report makes passing reference to these costs but does not include them in the formal analysis of the reforms. For example, in outlining why some consumers continue to use foreign ATMs the report concludes that ‘this group appears to have made a judgement that the cost, in

terms of time and effort, of locating and travelling to the nearest own-ATM exceeded the direct charge'. But it does not use the same logic to conclude that those who do make the switch still bear such a cost.

These costs need not be small. If the average consumer, who has as a result of the reforms switched to using domestic ATMs, incurs a travel cost of \$1 to save the \$2 fee then the fee saving of \$150 million corresponds to additional travel costs of \$75 million. The other resource cost to consider is the cost saving of processing more transactions through domestic rather than foreign ATMs. As noted above, this is non-zero but relatively small. Hence, as an order-of-magnitude estimate, the reforms have likely led to net costs to the community in the tens of millions of dollars. Understandably, the Taskforce may place greater weight on the welfare of consumers than of shareholders. However, this preference would indeed need to be very heavily weighted towards consumers for the conclusion that the reforms have been successful to ring true.

An interesting question is why the fees have remained unchanged since the reforms and not fallen towards marginal cost, as envisaged. The Taskforce considered the level of competition in the market to be reasonable, indicating that the inflexibility could not be attributed to market power alone. On the transparency front, however, it suggests that consumers are still less than completely informed about ATM fees and this may be reducing the degree of price competition. For example, it states that 'while consumers are aware that foreign transactions incur direct charges, currently it is not made clear to them just what these charges are when approaching or passing by ATMs'.

Given this conclusion, the Taskforce argues that the price signals consumers receive are still insufficient to promote price competition between ATMs. It recommends improving the information customers receive about pricing by requiring ATM owners to display the foreign fee upfront rather than part way through the transaction, as currently occurs. However, the increased transparency achieved so far has had a clear effect on consumer decisions, with a large increase in the share of transactions conducted at domestic rather than foreign ATMs. Further, the fact that the vast majority of machines charge the same \$2 foreign fee makes it unlikely that consumers are not sufficiently informed of the cost of using foreign machines. Hence, a continuing lack of transparency does not seem to provide a satisfactory explanation for the rigidity of fees witnessed since the reforms.

The academic literature on ATM pricing does provide such an explanation. This literature points to the strategic use of ATMs by deposit-taking institutions to increase their market share for deposits. This article does not intend to provide a thorough review of the literature,<sup>3</sup> but a couple of points are worth noting.

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3 Noone (2012) provides a comprehensive and up-to-date review of the key literature.

First, the literature demonstrates that banks with a large number of ATMs may price foreign transactions significantly above domestic transactions as a way of increasing the cost of holding an account with a competing bank. Direct charging may facilitate this practice by providing banks with closer control over these fee differentials.<sup>4</sup> Hence, an important conclusion from the literature is that ATMs cannot be considered as a separate market and that the strategic nature of their pricing means that the usual forces of competition cannot be expected to operate on them. Finally, the literature assumes that consumers are perfectly informed about ATM prices, implying that moves to improve transparency would not remove these strategic motives and may only move to strengthen them.

How seriously should these findings be taken? Given that there is no other clear explanation for the lack of movement in fees to date, the answer appears to be that the literature’s conclusions should indeed be considered when designing future regulation. Further measures to increase transparency are unlikely to get at the core issues driving inefficiencies in the market and may only serve to continue or increase the large costs to society outlined above.

## Policy implications

The lack of a formal analysis framework is not simply an academic point, as the conclusion that the reforms have been positive has led the Taskforce to conclude that the outcome could be further improved upon through additional measures to increase transparency. There is the impression that we are heading in the right direction but more of the same is required. In fact, if we consider the impacts of the reforms from a cost–benefit analysis perspective we are left to conclude that they have come at a net cost to the community.

So what should be done? The Taskforce considers the more heavy-handed approach of regulating ATM fees directly. It rightly argues against such regulation on the grounds that it may lead to unintended market consequences and could potentially lead to a less-efficient distribution of machines if machines from high-cost locations are removed or incentives to deploy additional machines are reduced.

An alternative form of price regulation not explored so far would be to regulate the differential directly, either by requiring banks to charge the same direct fee on domestic and foreign transactions, or tying this fee differential to a cost-based standard.<sup>5</sup> This differential, which is based on strategic motivations, drives the

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<sup>4</sup> Donze and Dubec (2009).

<sup>5</sup> Fees for independent ATM deployers would remain unregulated.

decisions of consumers and is responsible for the inefficient use of the network currently observed. Further, as shown by Donze and Dubec (2009), it would be expected that ATM fees would fall as a result of this strategic motivation being removed. Finally, with more-efficient price signals in place, moves to improve transparency could then be justified.

Whichever approach is chosen, it should be informed by a formal framework in which the costs and benefits can be assessed. Weight should be placed on the surplus of both consumers and producers and consideration needs to be given to all resource costs. Finally, greater heed should be paid to the academic literature, which has provided strong insight into the reasons behind the rigidities present in the market.

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# Australia's NBN: Come Hell or High Water

Kevin Morgan<sup>1</sup>

Are there projects of such self-evident value that they ought to be exempt from even the most rudimentary cost–benefit analysis? Seemingly so, according to the former Finance Minister Lindsay Tanner, as long as it's the National Broadband Network (NBN). In May 2009, a month after Kevin Rudd had announced the \$43 billion project, when asked about the absence of a cost–benefit analysis (CBA), Tanner said: 'We had to make the clear decision that said this is the outcome we are going to achieve come hell or high water because it is of fundamental importance to the future of the Australian economy' (quoted in Martin 2010).

A year later, Tanner remained unmoved by Opposition calls for a CBA and he dismissed such analysis as subjective because 'cost–benefit analyses of the orthodox kind are basically captives to the assumptions you feed in' (Martin 2010).

Stephen Conroy, the Broadband Minister, was similarly dismissive. When pressed in May 2009 about the lack of a CBA, he told opposition spokesman Senator Nick Minchin, 'As I have repeatedly stated, this is an election commitment and we intend to deliver it.' (Senate Hansard 2009). The election commitment had actually been a \$4.7 billion upgrade of the copper network which also had not been subject to a CBA. Clearly, for Conroy, election promises don't have to be evaluated, even when they have morphed from a \$4.7 billion upgrade using 'fibre to the node technology' (FTTN) into a \$43 billion 'fibre to the home' (FTTH) network.

Conroy's lack of interest was perhaps understandable. Had the \$43 billion project been subject to a CBA, his failed \$4.7 billion policy may have come under renewed scrutiny. Under that initial policy, the government had tendered out the right to upgrade the Telstra copper network. Given that Telstra had not agreed that anyone else could upgrade its network and the government had not offered compensation to secure that right, the tender collapsed when Telstra was dismissed from the bidding in late 2008. No doubt FTTN, the most commonly deployed technology to deliver high-speed broadband, which uses fibre to a street corner cabinet, would have been revisited in a CBA.

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Tanner's readiness to dismiss the need for a CBA was, though, less understandable. The Department of Finance is the custodian of CBA practice and has a lead role in reviewing projects. Finance maintains the Handbook of Cost-Benefit Analysis that governs the evaluation of new projects and its Office of Best Regulatory Practice sets out the processes by which new legislation should be evaluated, including cost-benefit analysis.

Also the project had obvious implications for the budget. Under the Public Private Partnership model that was initially proposed, the Commonwealth's 50 per cent commitment would have been \$11 billion in equity and a guarantee on \$10.5 billion in debt.

Nor can Tanner's lack of interest be reconciled with his complaints about the lack of serious policy debate. Mr Tanner believes that politics has been dumbed down and that few are interested in detailed policy debates. On releasing his book *Sideshow: Dumbing Down Democracy* in April 2011, Tanner said: 'I would always try to put the focus on the merits of the issue ... but at times I felt overwhelmed. I sometimes felt like I was talking a foreign language' (Australian Broadcasting Corporation 2011).

In relation to the NBN, whatever language he was speaking it wasn't the language of CBAs. Indeed, there was an unspoken subtext which Tanner acknowledged in 2011. In his reflections on his time as a 'reformist minister', Tanner said the NBN was really about 'getting the market structure right', an objective he and Broadband Minister Stephen Conroy had 'pursued relentlessly over seven years' (Tanner 2011). That meant the structural separation of Telstra. The PM, Julia Gillard, claimed this was the 'Holy Grail' of telecommunications reform which would lead to significant benefits from heightened competition and finally deliver on Professor Fred Hilmer's 1993 competition policy reforms.<sup>2</sup> Although the direct costs of separation are known — Telstra is to be paid \$11 billion in compensation — the benefits have not been quantified, as the policy was not subjected to a CBA.

Professor Hilmer took issue with the Prime Minister's claim saying 'his committee had taken a cynical attitude towards claims that utilities involved natural monopoly infrastructure elements that needed to be separated from more competitive retail activities' (see *The Australian*, 7 December 2010). That view reflects the international consensus that the costs of structural separation potentially outweigh the benefits. Consequently, no regulator has enforced structural separation, meaning that like the NBN there is no international precedent for separation. That uniqueness alone was good reason to test the benefits of separation through a CBA.

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2 Transcript of joint press conference 'Prime Minister Broadband Minister', Sydney, 29 March 2012.



The resolve to secure separation and create a wholesale-only NBN was such that the government wasn't merely ignoring opposition calls for a CBA: it was ignoring its own policy on infrastructure. Infrastructure Australia had been created in April 2008 to, amongst other functions, 'evaluate proposals for investment in, or enhancements to, nationally significant infrastructure'.<sup>3</sup> In its first report in December 2008 it said it had developed 'a new approach to decision making [that] uses a robust framework' (Infrastructure Australia 2008). The framework includes seven stages for the evaluation of projects, and at the sixth stage projects are to be subject to a CBA.

Although neither the initial \$4.7 billion FTTN network nor the \$43 billion NBN had been identified and prioritised for funding by Infrastructure Australia, there was a clear intent that all major projects, including communications projects, should be considered by that body. The NBN had been identified by Infrastructure Australia as one of its seven infrastructure 'themes.' But a key brief for Infrastructure Australia was also to ensure the better use of existing infrastructure 'to solve problems without the need for investment in additional capacity' (Infrastructure Australia 2009), and that raised the spectre that upgrading the existing network with FTTN might be revisited had they been consulted.

In failing to allow Infrastructure Australia to evaluate the NBN, the government wasn't just denying its own policy intent. It went counter to the provisions of the Nation Building Funds Act 2008, given that the \$2.5 billion seed funding for the NBN was held in the Building Australia Fund.

Under Section 52 of the Nation Building Funds Act, the Minister for Finance may not authorise a payment from the Building Australia Fund unless the Communications Minister 'has recommended the authorisation of the payment'. But under Section 52(5) the Communications Minister must not make a recommendation 'unless Infrastructure Australia has advised under section 117 that the payment satisfies the relevant BAF evaluation criteria'. The evaluation criteria require that 'Proposals should demonstrate, through a cost-benefit analysis, that the proposal represents good value for money.'

In summary, as the Senate Select Committee on the NBN noted in its third report in November 2009, the government was refusing to comply with its own legislative requirements (Senate Select Committee 2009). The report provides a concise account of the government's failure to observe proper process in relation to the evaluation of the NBN.

The Committee also provided the only major public forum in which the need for and lack of a CBA was debated. It drew significant contributions from the

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3 Infrastructure Australia Act 2008, Section 5, 'Functions'.

Productivity Commission, the Business Council of Australia and from Henry Ergas and Mark Harrison, who had undertaken a CBA of the NBN as part of a 2009 Productivity Commission roundtable on evidence-based policy.

In its submission to the committee, the Productivity Commission noted the uncertainties that surrounded the NBN such as 'the evolution of technologies and consumer demand' (Senate Select Committee 2009: Chapter 6) that would make it difficult to undertake a CBA. They suggested that some of the uncertainty could be lessened, by running trials. This would have given some hard data on rollout costs, on demand and on consumers' 'willingness to pay'.

Given that NBN Co. was committed to building five 'first release [trial] sites' in early 2010 and that a limited rollout was already under way in Tasmania, the suggestion had considerable merit. The mainland first-release sites and Tasmanian rollout would have provided a wealth of data. They embraced a wide range of geotypes and a broad social and economic spectrum. It was also obvious from NBN Co.'s first corporate plan that the volume rollout would not begin until 2011, when the 14 000 homes to be served in the first-release sites were completed (NBN Co. 2010). The Productivity Commission's suggestion and NBN Co.'s timetable were clearly not in conflict.

Nevertheless, the Productivity Commission's proposal was ignored, as was its call that the \$25 million McKinsey-led NBN implementation study, which had commenced in mid-2009, should include a cost-benefit analysis. Similarly the Business Council's calls for a CBA were ignored, with the government members on the committee claiming that it would lead to prolonged delays in the rollout.

But whilst the government's response to the Productivity Commission and Business Council was marked by a lack of interest, the response to the Ergas-Harrison study was less restrained. Their findings suggested the costs of the all-fibre NBN would outweigh the benefits by \$14-20 billion and lead to \$200-plus a month retail pricing for high-speed services (Senate Select Committee 2009: Chapter 6). Their findings had been based on a counterfactual that may have touched a raw nerve with the Broadband Minister Stephen Conroy as it was predicated on FTTN, which in urban areas could comfortably deliver speeds of 40Mbps. The study was not merely dismissed but was the subject of a highly personal attack by Conroy on Ergas in an estimates hearing in May 2010.

Ergas and Harrison had questioned the NBN in the context of low demand internationally for FTTH services and had made the quite reasonable assumption that as a government business enterprise the NBN would be required to earn a commercial rate of return. But as they demonstrated, a commercial rate of return would demand NBN pricing that would translate into retail prices that consumers might not be willing to pay.

Consequently, to ensure the NBN's prices 'met the market'<sup>4</sup> and were comparable to existing prices, the Implementation Study found that the NBN could be commercially viable, with an internal rate of return of 7 per cent, marginally above the long-term bond rate. In a subsequent appearance before the Select Committee, Ergas pointed out that the government had never explained why a return just above the long-term bond rate was acceptable. Indeed, treating the NBN in this way wound back GBE reform which had seen the Hawke/Keating government raise the interest rate on Telecom Australia's debt from the bond rate to a commercial 13 per cent. There was, though, considerable benefit from deeming the NBN to be 'commercial'. It kept equity injections off-budget and exempted the NBN from scrutiny by the Public Works Committee. The downside was that a low rate of return meant the PPP funding model was abandoned, exposing taxpayers to a liability of \$27.5 billion in equity and guarantees on some \$13 billion in debt.

The government holds out the McKinsey implementation study and NBN Co.'s subsequent corporate plans as vindication of the NBN. But neither the McKinsey study nor the two iterations of the NBN corporate plan offer the insights that a CBA could offer. The McKinsey study stressed that it had 'not undertaken a cost benefit analysis of the macro economic and social benefits that would result from the implementation' (McKinsey/KPMG 2010). The study did, however, examine the costs of building the network and found that it could be built for \$42.8 billion, only \$200 million under the initial estimate. Yet despite being more than 500 pages long, the study doesn't contain any spread sheets or detailed breakdown of costs that would allow an independent observer to establish whether the capital cost is reasonable. The study is remarkably vague, even on the size of the NBN network. It merely notes that around 250 000 kilometres of fibre will have to be deployed.

Nor can the NBN Co.'s corporate plan, which does not assess benefits, be accepted even as an objective and reliable assessment of costs or revenues. Only 9 per cent of the rollout targets set for mid-2012 under the first plan released in December 2010 were achieved. This failure was addressed by issuing a revised plan in August 2012. The new plan revealed capital costs had been underestimated by \$2.8 billion, or 14 per cent, because the network would actually need to be 25 000 kilometres longer.

That error suggests that estimating the NBN's costs is a work in progress and that the initial cost estimate of \$43 billion may not have stood up to scrutiny. As Treasury and Finance stated in estimates hearings in May 2009, the initial

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4 In a brief to consultants assisting NBN Co. on its Special Access Undertaking, NBN Co. noted that prices had been 'set to meet the market' (Synergies Economic Consulting 'Advice on NBN Co. Ltd's Special Access Undertaking': 8).

estimate was not the product of a CBA, although Finance did undertake some analysis of costs, noting that 'Our costing exercise was entirely related to the cost of building or acquiring a network. It was not a business study or a cost-benefit study or a business case analysis' (Senate Select Committee 2009: Chapter 6).

It appears that the costs considered by Finance were first generated by the expert group that considered the FTTN bids in late 2008. One member of the panel confided privately that once the demise of the FTTN tender became obvious, they turned their attention to FTTH and extrapolated costs on fibre deployment from a 2008 British report to the Australian market.<sup>5</sup> Given the significant differences between UK and Australian geography, use of the UK estimates may have significantly underestimated FTTH costs for Australia.

The fragility and uncertain origins of that initial cost estimate may in large part explain why the NBN has not been subject to a cost-benefit analysis. Technology experts who advised the government on the original FTTN policy believe FTTH capital costs lie between \$60–\$80 billion.<sup>6</sup> Also, despite claiming that the NBN will boost business productivity and transform the health and education sectors, these sectors are already well served with fibre and high-speed broadband. More significantly, although there are many studies that demonstrate the benefits of broadband, as Howell and Grimes have noted there are none that demonstrate that very-high-speed broadband, so-called third-generation broadband, yields significantly greater benefits than current second-generation broadband (Howell and Grimes 2010). A CBA might have called into question many of the government's claims about the NBN's benefits, which appear to lie in as-yet-unknown applications.<sup>7</sup>

Although the government maintains that calls for a CBA are politically motivated, in refusing to undertake one they have ignored expert and non-partisan advice from, amongst others, the Productivity Commission, the Business Council and two leading academic experts on cost-benefits analysis. Given that Lindsay Tanner recently described the NBN as 'an improvised response to an unexpected situation' (see *The Age*, 26 September 2012) the unwillingness to subject the NBN to a CBA has been a political imperative for the government, which refuses to expose a hastily-thought-out policy to proper scrutiny. And in the absence of any international precedent for either a national FTTH network or structural separation, a CBA would have been the only way to establish the evidence base which Kevin Rudd had said was integral to framing policy.

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5 Broadband Stakeholders Group, 'The costs of deploying fibre-based next generation broadband infrastructure', 8 September 2008.

6 'Gibson Quai AAS founder predicts NBN cost as high as A\$80 billion', *Commsday*, 16 May 2011.

7 The Treasurer Wayne Swan commented on launching an NBN trial site in mid-2011 that the NBN was being built 'So that we can tap the unknown possibilities of the future, the known possibilities and the unknown possibilities', *The Australian*, 29 July 2011.

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# The Problem of Road Congestion: The Futility of ‘Avoidable Cost’ Estimates

Mark Harrison<sup>1</sup>

## Abstract

*The Bureau of Infrastructure, Transport and Regional Economics estimates of the costs of road congestion in Australian capital cities (\$9.4 billion in 2005 and projected to more than double by 2020) are widely cited. But these projections appear to overstate the problem and provide little, if any, guidance for sound policy development. They are not measures of the net gain from introducing congestion charging. Moreover, such numbers provide no help for evaluating the net benefits of other policies to deal with congestion, such as increasing road capacity. Without efficiency-based cost–benefit analysis of all policies to deal with road congestion, governments run the risk of lowering social welfare.*

## Introduction

Attend any conference on congestion pricing (they are a common occurrence) and a speaker will inevitably cite the estimates by the Bureau of Transport and Regional Economics (and its predecessor<sup>2</sup>) of the ‘avoidable social cost of congestion’, usually accompanied by a homespun story of how long it takes them to drive to work in the morning. The speaker then goes on to say: ‘Something must be done!’ Road builders will usually recommend building more roads, environmentalists recommend more subsidies for public transport, and economists will usually recommend congestion charging. If the speaker is an economist, the call may be accompanied by a lament that economists have been recommending road pricing for 50 years (see Walters 1961) to no avail; road builders will lament the lack of funding for infrastructure; and environmentalists that people prefer to drive.

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<sup>2</sup> The Bureau is the successor of the Bureau of Transport and Regional Economics. Both entities are referred to here as ‘the Bureau’.

Of what use is it to know that the 'avoidable social cost' from congestion is \$10, or \$20 billion? Although it serves to highlight the fact that congestion is costly, the number provides little, if any, guidance for sound policy development.

The Bureau figures measure the deadweight loss from excessive congestion, and indicate the potential social gain from a costless, perfect road-pricing scheme that results in the optimal level of road use given road capacity. But in practice, road pricing schemes are expensive and imperfect, and will not reap the theoretical benefits the Bureau numbers estimate.

They don't tell you how, and how much, to spend on reducing congestion. Certainly a cost of \$10 billion a year does not mean we should spend \$10 billion a year solving congestion — the net gain would then be zero, at best.

The relevant policy issue is the costs and benefits of feasible policy responses and which has the greatest net benefit. The aggregate figures do not answer that. Should we introduce road charging, increase road capacity or encourage public transport? Projects to reduce congestion need to be evaluated on their merits, on a case-by-case basis, using standard cost-benefit analysis. The key issue is not the estimated cost of congestion, but the returns to the options for reducing congestion. That requires detailed network analysis and calculations regarding the impact of the policy proposals.

## **The methodology of the Bureau's cost estimates**

In 2006 the Council of Australian Governments commissioned the Bureau to examine the current and emerging causes, trends and impacts of urban traffic growth and congestion. The result was 'Estimating urban traffic and congestion cost trends for Australian cities' (BTRE 2007; references to page numbers in the following text refer to this report).

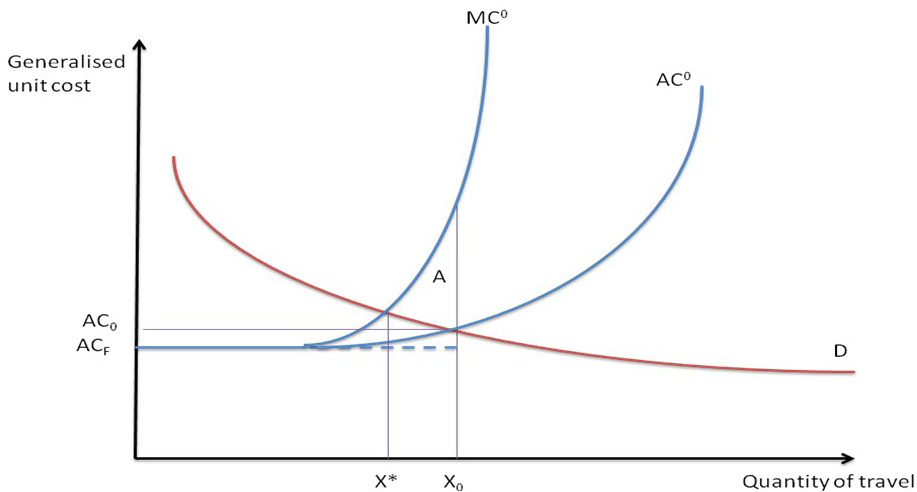
The Bureau estimated the costs of congestion in 2005, for the eight Australian capital cities, in the base case, or 'business as usual' (p.3), to be \$9.4 billion, and projected they would more than double to \$20.4 billion in 2020 (all figures in 2005 dollars). The costs come from extra travel time and travel time variability, increased vehicle operating costs (more fuel consumption) and extra pollution. Over 75 per cent, \$7.1 billion, of these costs are time costs (p.13), and they will be the focus here.

The above figures represent the 'avoidable social costs of congestion' (p.1) — the difference between the optimal level of congestion (at current capacity) and the actual level — or the deadweight loss from excessive congestion. It is, of course,



not efficient to have no congestion or pollution. Like any cost, congestion costs may be worth bearing if the benefits are greater. The relevant issue is whether the costs of extra pollution or congestion from undertaking a car journey are greater than the costs of not undertaking the journey.

The Bureau's 'avoidable social cost' is illustrated in Figure 1 (BTRE 2007: Figure 2.37). The AC curve shows how the average cost paid by each (identical) driver for a typical trip varies with the number of trips taken at current road capacity. At low levels of traffic, they are at  $AC_F$ , costs per trip under free-flow conditions. Eventually, adding an additional car on the road slows down existing traffic, increasing the cost of travel for other drivers, an externality. The AC curve starts to slope up. The social marginal cost (MC) of an extra trip is the private cost (AC) plus this extra congestion cost imposed on other drivers; the MC curve lies above the AC curve when the AC curve slopes upwards.



**Figure 1: The costs of congestion**

Source: BTRE 2007: Figure 2.37.

The optimal number of trips is  $X^*$ , where the benefit from an extra trip just equals its marginal social cost. When each driver decides whether to use the road, they compare the private costs and benefits of doing so and do not take account of the increase in cost that the journey imposes on others. The equilibrium number of quantity of travel is  $X_0$ , where the total cost of travel is the rectangle  $X_0^*AC_0$  or, equivalently, the area under the MC curve up to  $X_0$ . Total congestion costs are that part of these areas above  $AC_F$  (that is, above the dotted line). The Bureau estimates the resulting deadweight loss from the excessive trips,  $X^*X_0$ , which

impose social costs (including congestion costs imposed on others) greater than social benefits: triangular area A, which is about half the total congestion costs at X0 (p.78).

The authors estimate vehicle kilometres travelled in each of the eight capital cities and then estimate average speeds and the cost of delay. The costs are projected through to 2020 — by estimating the vehicle kilometres travelled in each city through to 2020 and applying the same methodology. Vehicle kilometres travelled in the eight metropolitan areas are projected to increase by 33.9 per cent over that period (Table 2.1, p.67) and costs by 116.8 per cent. Part of the growth in vehicle kilometres driven comes from the projected 16 per cent increase in the population of the capital cities (Table A.2, p.128). Per-head congestion costs increase by less (87 per cent =  $2.168/1.16 - 1$ ).

The authors qualify the results, pointing out that they use ‘aggregate indicators of a city’s overall average traffic conditions’ (p.iii) rather than network models that attempt detailed simulations of traffic flows on a city’s road system. The report provides ‘order of magnitude evaluations’ (p.2).

The authors conduct sensitivity testing. Reasonable variations in parameter assumptions result in a range of estimated costs from \$5–15 billion in 2005, rising to \$10–30 billion in 2020. The wide spread in the estimates reflects the difficulty in calculating congestion costs and underlines the fact that the figures should be used with care. Yet the level of uncertainty surrounding the estimates is rarely communicated.

The authors recognise the figures are uncertain, but emphasise (p.125) their finding that costs will double over the 15 years to 2020, under the assumptions of the model that they have applied:

the principal finding of this study remains: that, in the absence of improved congestion management, rising traffic volumes in the Australian capitals are likely to lead to escalating congestion impacts, such that the net social costs of congestion over the next 15 years (under a business-as-usual scenario) are likely to at least double.

## **‘Prediction is very difficult, especially about the future’<sup>3</sup>**

We are now almost halfway through the projection period. How have the numbers held up? In August 2011 the Bureau published revised estimates

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3 Niels Bohr, Danish physicist (1885–1962).

of vehicle kilometres in Australia, derived from fuel sales data (BITRE 2011). These recent estimates of annual vehicle kilometres are significantly below the projections that underlie the Bureau's congestion cost estimates — 15 per cent lower in 2009–10 for cars and light commercials (Loader 2011). The projections assumed the shares of different transport modes in metropolitan trips would stay constant, city travel growth would equal population growth rates and that world oil prices would fall to nearly US\$50 a barrel by 2011 (2005 dollars) (Figure A.4 p.34). None of these has happened, and the global financial crisis reduced travel demand. Car passenger kilometres per capita peaked in 2004 for all cities and have been mostly in decline since then, and there was a mode shift towards mass transit, with passenger kilometres per capita rising significantly from 2004–05 to 2008–09, especially in Melbourne (Loader 2012, using data from the Bureau's Australian Infrastructure Yearbook). One analyst concludes: 'There is strong evidence that "business-as-usual" growth in vehicle kms is just not happening in Australian cities, and thus the 2007 forecast doubling of congestion costs by 2020 is very unlikely to play out' (Loader 2011).

## The magic wand is not a policy instrument

At best, the Bureau's aggregate congestion-cost figures indicate the potential gains (if the model's assumptions hold true) from a costless, perfect pricing scheme, which sets price equal to marginal cost at all times and results in the optimal level of road use. It is an example of magic wand economics. It is the benefit from waving a magic wand and getting the optimal level of congestion. Unfortunately, magic wands are in short supply.

In practice, actual congestion pricing schemes are expensive, imperfect, and not able to capture the theoretical benefits identified. For example, charging on part of the road network increases congestion on uncharged substitute roads, offsetting the benefits from charging. The greater the marginal congestion costs on other roads and the greater the portion of drivers diverted off the priced road that move to other roads, the lower the optimal charge and the smaller the benefits.

Further, road pricing schemes are costly to set up and operate. The London Congestion Charge required start-up costs of £200 million in 2003 pounds (Santos and Shaffer 2004: 177). The total start-up cost of the Stockholm trial was 1.9 billion Swedish Kronor in 2006 (Eliasson 2008: 401), around A\$300 million at current exchange rates. In the Netherlands, the cost of implementing a national system of congestion charging was estimated in 2006 as €2.2–4.1 billion (2006 euros), with operational costs estimated to be €500–1100 million per annum (BITRE 2008: 43). Experience in Singapore, London and Stockholm suggests operating

costs eat up 15–30 per cent of revenue collected (International Transport Forum 2010: 9). It is an open issue whether road pricing schemes generate enough benefits to justify their enormous costs and overseas experience has shown they rarely produce a net community benefit. If it costs more to avoid the costs than to bear them, then they are not really avoidable social costs.

Justification requires rigorous case-by-case analysis and tailor-made strategies that are location and project specific. The optimal charging system would vary from city to city, determined by the topography of the city, the shape of the road network and the nature of the traffic flows.

For example, an earlier Bureau of Transport and Communication Economics report pointed out that Sydney does not appear to be a likely candidate for a cordon scheme since much of its congestion involves traffic not travelling through the CBD. Melbourne's different spatial form and travel behaviour mean that the pattern of congestion is markedly different, and tends to be concentrated on a small central area near the CBD, thus favouring cordon pricing (BTCE 1996: 74–5).

Although it is often claimed that the Bureau's measure of the deadweight loss from congestion is 'the cost that is relevant from the point of view of policy formulation' (Meyrick 2011: 109), it does not capture the benefits from congestion policies other than charging. For example, the net benefits from increases in road capacity and subsidies to public transport depend on the change in total congestion costs (which are real costs borne by drivers) — not just the change in the deadweight loss triangle (excessive costs).

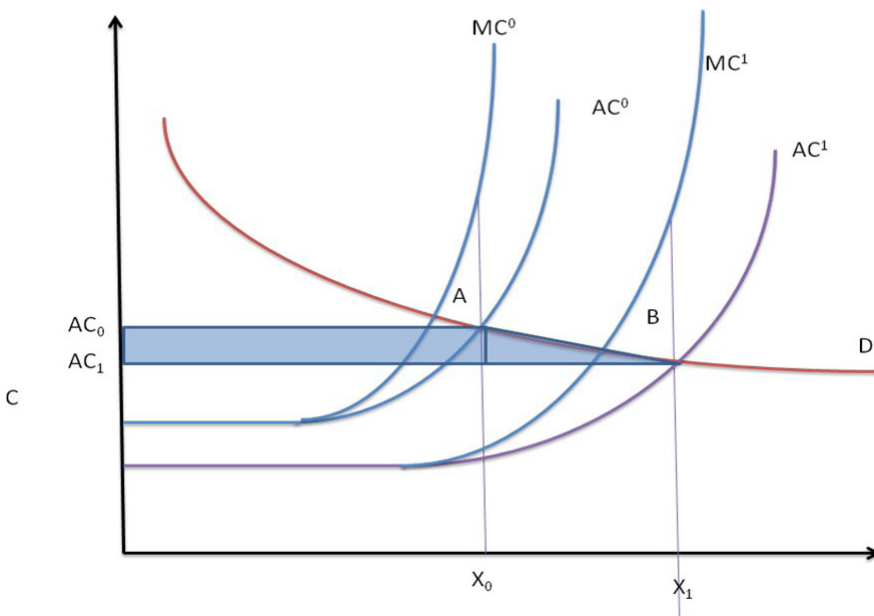
## **'Avoidable social cost' estimates: Better is worse**

Worse, a beneficial increase in road capacity may increase the Bureau's measure of congestion costs. This is illustrated in Figure 2 below. An increase in capacity shifts the average and marginal cost curves from AC0 and MC0 to AC1 and MC1, making them flatter (by reducing the effect of extra cars on travel times). The extra capacity shifts them down if it increases free-flow speeds. The deadweight loss with the new capacity is area B, which could easily be bigger than area A, depending on the shape of the cost and demand curves.

The cost paid by drivers falls from AC0 to AC1, giving a benefit to drivers (increased consumer surplus) equal to the shaded area (the gain from a reduction in travel time on existing trips plus the consumer surplus on the additional trips taken, the so-called induced traffic X0X1), and it is possible that will exceed the costs of the extra capacity. So a desirable capacity expansion could increase the BTRE's measure of the costs of congestion.

The Bureau assumes a constant elasticity of demand for travel of  $-1.2$  (p.103). This elastic demand means that in the Bureau's model, a 1 per cent fall in AC increases traffic by more than 1 per cent, travel costs (AC x quantity of road use) increase, and so may the costs of excessive travel. If so, that means the Bureau's assumption of steadily increasing capacity may act to increase its congestion cost estimates rather than reduce them, as commonly assumed. An increase in demand will increase measured deadweight loss; an expansion in capacity may stimulate road use and increase deadweight loss further.

Some environmentalists claim that building more roads is not a sensible response to traffic congestion: having more roads simply encourages more cars and you are back where you started from. Richard Moe, head of the US National Trust for Historic Preservation, states: 'Building more roads to ease traffic is kind of like trying to cure obesity by loosening the belt' (cited in Ball 2004: 195). The above analysis shows that so long as the demand is not perfectly elastic, there is a benefit to drivers to be weighed against the costs of capacity expansion — despite inducing more traffic. The Henry Tax Review (2010: 53) states that 'the avoidable costs of urban congestion may grow to around \$20 billion in 2020. This cannot be reduced simply by building more city infrastructure, as most new road space induces new traffic.'



**Figure 2: The effect of a capacity expansion**

Source: Author's modelling.

Although more roads may indeed increase the deadweight loss from not pricing, increased capacity may produce a net benefit that needs to be compared with the net benefits of other policies.

The point is that because the BTCE measure of 'avoidable social cost' does not measure the benefits from road expansion it is useless for judging that way of dealing with congestion. It is a measure of the potential benefits from road pricing — which could rise or fall with increased capacity. An increase in the deadweight-loss triangle from A to B tells us there would be a greater welfare gain from introducing efficient pricing at the higher capacity.

## **The necessity for cost–benefit analysis**

The public interest is more likely to be served if all options for reducing congestion are rigorously evaluated and judged, and provision and pricing decisions made, on the basis of efficiency-based cost–benefit analysis.

Congestion charging results in an efficiency gain if the revenue to road owners (which comes at the expense of motorists) exceeds the net loss to motorists. Revenue from congestion pricing needs to be spent wisely and not treated as some windfall. The efficiency gain is likely to be small relative to the gain in revenues. It does not take much by way of costs involved in developing and implementing a congestion charging system to eliminate any efficiency gains. Further, if some of those revenues are wasted, such as being spent on projects with costs greater than benefits, even a small proportion of waste could outweigh any efficiency gains from congestion charging.

In particular, it shouldn't be automatically assumed that the proceeds should be spent on public transport, as is done in most overseas schemes. Public transport can potentially play a significant role in the successful implementation of road pricing, especially as road pricing increases demand for alternative transport options. However, this role does not allow planners to abdicate responsibility for applying standard project evaluations to public transport developments. With roads properly priced, the efficiency case for subsidising public transport diminishes. Increased subsidies to public transport can therefore yield benefits less than their costs. Nor should the proceeds automatically be spent on building roads.

In the Bureau's model, congestion pricing must make drivers worse off since it works by raising the cost to drivers to get them off the road. Congestion charging is likely to be inequitable, because the net benefits of road pricing to a driver decline (become more negative) with his value of time, and value of time and income are positively correlated. The poor lose the most from road pricing.

Without rigorous project appraisal, the political process could produce a congestion charging scheme which is both inequitable and inefficient, lowering social welfare and reflecting badly on both the government that implemented it and on the idea of congestion charging. In fact, evaluations of actual road pricing schemes often find the costs to be greater than the benefits.

Economists should focus on designing efficient schemes which provide gains that can be used to compensate losers. Policymakers need to focus on providing more useful data: aggregate congestion-cost figures distract from the serious policy work required.

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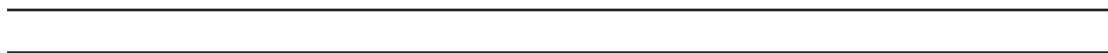
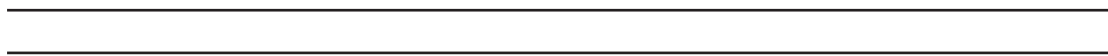
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# *ANALYSIS*





# Investments in Fire Management: Does Saving Lives Cost Lives?

Brian Ashe, Felipe Dimer de Oliveira and John McAneney<sup>1</sup>

## Abstract

*The total cost of structural fires and bushfires in Australia was estimated at around A\$18 billion in 2010, or about 1.5 per cent of GDP. This cost includes some A\$16 billion devoted to managing the risk. At the same time, Australia's fire fatality rate of 0.6 per 100 000 of population, already low by international standards, has proved resistant to increasing expenditure on fire management and protection. Following a concern that this expenditure might encompass an overinvestment compared with the real risk, this paper examines the regulatory cost of this investment. Since on average poorer people have worse health outcomes, and governments or companies have no alternative but to pass on increased costs or taxes, it is possible to estimate the lives forgone, on account of an increased mortality rate, of any overinvestment. Adapting a model of Keeney (1997) for Australian conditions, we determine the Australian willingness to spend (WTS) for preventing a loss of a life in the fire space to be between A\$20 and A\$50 million, depending upon how these costs or taxes are imposed upon the population. If we accept, by way of example, the results of an expert elicitation (Ashe and McAneney 2011) to imply an overinvestment in fire prevention and management of the order of A\$4.5 billion per annum (2010 dollars), this excess would imply between 90 and 225 extra fatalities annually. These numbers are of the same order as the annual average number of fire fatalities actually experienced. The analysis shows the importance of carefully evaluating the unintended costs of any new safety regulations and particularly in insuring that the costs are at least grosso modo in line with the purported benefits.*

## Background

This paper attempts to evaluate the opportunity cost of investments in managing fire in Australia. While much debate takes place about fire, particularly in respect of bushfire (wildfire), very little of this is informed by a true understanding of its cost. Previous work by Ashe, McAneney and Pitman (2009) has helped

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quantify the aggregate cost of investments in fire mitigation, response capability and the consequences of fire, a cost which they put at about A\$12 000 million or 1.3 per cent of GDP in 2005.

Ashe, McAneney and Pitman (2009) also showed that of the total cost of fire, nearly 86 per cent was accounted for by investments in fire safety and mitigation (termed *costs in anticipation*) and maintaining fire services (*costs in response*) and only about 14 per cent could be attributed to the costs of dealing with the *consequences of fire*. *A priori* we might expect that if investments in anticipation and response were reduced, then the consequences of fire should increase; but, if so, by how much? An updated breakdown of the cost categories of Ashe, McAneney and Pitman (2009) is given in Table 1 and shows that by 2010, the total cost of fire had increased to A\$18 000 million, or 1.5 per cent of GDP, whereas the proportion of the cost of dealing with the *consequences of fire* had dropped to 9 per cent. While this reduction in consequences in terms of fire damage is gratifying, does the increase in investment in dealing with fire represent good value for money? These are important questions which this study attempts to explore for the first time.

International experience reviewed by Ashe, McAneney and Pitman (2011) suggests that the economic efficiency in fire-management investments cannot be simply assumed. This study employed structured expert judgement to explore whether Australian fire professionals perceived the current allocation of investment in mitigation and response to be optimal. Of the 26 respondents, none believed an increase in investment in anticipation or response would be cost effective. Even more relevant to the current study was the fact that most respondents were of the view that net economic benefits would accrue from decreases in investment, even though this might come at the expense of an increase in property damage and loss of life.

Actual decisions about investments in fire prevention and management are intrinsically political, with the ultimate driver of political outcomes being public opinion. If the system of investments for dealing with the fire risk were sub-optimal, then it is likely, at least in part, that this arises from the community's perception (or misperception) of the risk. With this in mind, Ashe and McAneney (2011) surveyed public opinion and found that, on average, Australians significantly overestimated the impact of fire in respect of fire-related deaths. Their follow-up survey undertaken in April 2009, following the 7 February 2009 Victorian bushfires and a death toll of 173 and heavy media coverage, showed this concern to be further exaggerated (*ibid.*). This result is in accord with other studies showing the strong influence of the media on public perceptions of risk (for example, Flynn, Slovic and Kunreuther 2001) and is yet another manifestation of the fact that when human lives are at risk, decision-making is rarely rational (Viscusi 1993; Tengs *et al.* 1995).

**Table 1: Total Cost of Fire in Australia (2010): Summary of cost components**

Cost component	Total cost (\$ million)	% of total
Fire safety in buildings	2 835	
Fire-safety measures in structures / infrastructure	4 023	
Fire-safety education and training	46	
Insurance administration	375	
Fire safety in consumer items	1 849	
Fire research	23	
Maintenance of fire-safety equipment and measures	2 743	
Sub-total: Cost in anticipation	11 895	66
Cost of injury due to fire	427	
Property losses	937	
Loss of business	58	
Environmental costs	225	
Heritage and cultural costs	58	
Wider economic distortions	-	
Sub-total: Cost as a consequence	1 705	9
Fire-service response costs	2 015	
Volunteer fire service	2 311	
Private fire brigade responses	116	
Criminal justice costs		
Sub-total: Cost in response	4 441	25
<b>Total cost of fire in Australia 2010</b>	<b>18 041</b>	<b>100</b>

Source: Updated from Ashe, McAneney and Pitman 2009.

## ‘Death’ by regulation

Over the past 25 years, the number of government regulations aimed at improving safety in both Europe and America has soared (*Economist* 2004). John Graham, appointed as America’s top regulator at the Office of Management and Budget in 2001, was previously an academic who promoted the use of cost–benefit methodologies to analyse risks. He called the inefficiencies of regulation ‘statistical murder’, arguing that bad regulation absorbs money that could be better spent to save lives another way (*ibid*).

Wildavsky (1980; 1988) was the first to draw attention to the negative impacts on public health on the opportunity costs of government public-health programs. He argued that economic growth, not government regulation, has been the

primary means by which life expectancy and health status have improved, and that government policies formulated without taking into account the scarcity of resources may often do more harm than good.

An estimation of the net number of lives saved by regulation is often referred to as a risk-risk analysis (Viscusi 1994a; 1994b). Risk-risk analysis can be a useful tool for eliminating clearly undesirable policy options in cases where the use of the cost-benefit analysis is controversial or problematic (Viscusi 1994b).

Amongst others, Kitagawa and Hauser (1973), Wildavsky (1980; 1988), Frerichs *et al.* (1992), Lutter and Morrall (1994), Viscusi (1993; 1994a; 1994b) and Gerdtham and Johannesson (2002) all provide support for the conclusion that the mortality rate for individuals with higher incomes is lower than that for individuals with lower incomes. Reasons for this relate, *inter alia*, to better nutrition, better sanitation, better healthcare, better education and better socioeconomic status — all of which are easier to come by with money.

The ‘richer is safer’ argument is, in its simplest form, that the costs of regulation are necessarily borne by individuals. Intermediaries such as the government or companies have no option other than to pass costs to individuals. Thus, at least temporarily, increased taxation or costs leave individuals and families poorer in the sense that they have less disposable income for other purposes, including better healthcare. And, as will be discussed below, there is good evidence that poorer people on average have worse health outcomes. Thus, at least in a statistical sense, increased regulatory costs induce fatalities.

Lutter and Morrall (1994) used the notion of a *utility maximising individual* to derive a general relationship between the critical income loss necessary to induce one fatality. They refer to this as society’s *willingness to spend* (WTS) to reduce health-and-safety risks and determined its value for a number of countries. In the case of Australia, they estimated the WTS as US\$4.2 million in 1980 dollars. Adjusting this figure for changes in Gross Domestic Product (GDP), the current Australian WTS would be around about A\$15 million in 2010 dollars.

Keeney (1990) attempted to quantify this opportunity cost further in terms of *statistical or regulatory fatalities*. He did this by drawing upon the evidence given above that poorer people have poorer health outcomes, and combining this with the notion that government intervention reduces people’s purchasing power and a statistical relationship between mortality and income. In this way, Keeney found that the cost of direct intervention — regulation — in the economy may induce more fatalities than had been previously recognised. Specifically, Keeney found that in 1980 dollars, one fatality might be induced for each

US\$3–7.5 million cost of regulation. *A priori*, the introduction of new regulations or policies should not induce more statistical fatalities than the numbers of actual lives claimed to be saved by the intervention.

In the most recent work in this field, Gerdtham and Johannesson (2002) also concluded that life-saving regulations/interventions may be counterproductive if they have an indirect mortality effect through the reduction in disposable income. The income loss that will induce one ‘statistical’ or ‘regulatory’ fatality in Sweden was estimated to be US\$6.8 million when costs were borne equally among all adults.

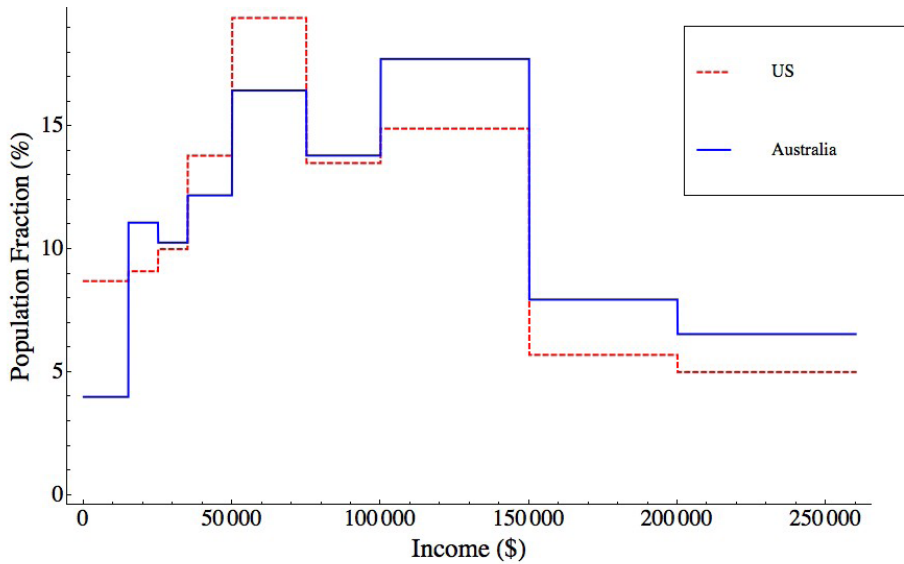
This paper seeks to estimate society’s WTS for fire risk in Australia. To our knowledge, no similar work has been undertaken in this country. The paper begins by adapting Keeney’s model to Australian conditions and the investments in fire management, prevention and response. This is followed by brief consideration of a thought experiment: what would be the likely consequences for fire fatalities in Australia if an extreme *laissez-faire* strategy was adopted? The paper concludes with some discussion on the implications for the level of government investment in fire management and prevention and its possible utility to other areas of government intervention.

## Theory and methods

The broad conceptual underpinnings of Keeney’s (1990; 1994) model have been introduced above. In more recent work, Keeney (1997) refined his model to consider how the cost of regulation might vary depending upon how the financial burden was distributed amongst the population of different incomes. In other words, outcomes also depend upon how both income and the regulatory burden are distributed.

Figure 1 shows the distribution of annual family income for Australia in 2009–10 obtained from the Australian Bureau of Statistics (ABS). The total number of samples is five million, which is used to derive the proportions shown in Figure 1. We employ the Gross Family Income data from the 2006 census data, which provides the numbers of families with income in given income brackets and from which the fraction of the population with access to given income can be derived. We assume that the distribution of family sizes is independent of income, a conservative approach if larger families were to be wealthier than individuals who are single. For comparison, we show US data on income.<sup>2</sup>

<sup>2</sup> From the 2012 US statistical abstract 696, ‘Money Income of Families — Percent Distribution by Income Level, in Constant (2009) Dollars’, at: <http://www.census.gov/compendia/statab/2012/tables/12s0696.xls>



**Figure 1: Fraction of the Australian and US population vs. mean annual income for 2009–2010. (The exchange rate during this time was close to parity (US\$1 ≈ A\$1))**

Source: Australian Bureau of Statistics.

Figure 1 shows broad similarities between these two countries in terms of income distribution, with the majority of both populations being middle class with modest differences in the lowest and upper income brackets. We will use this similarity, as well as those in culture and wealth, to justify using US income-mortality models in Australia.

Based on the work of Kitagawa and Hauser (1973) and Frerichs *et al.* (1984), Keeney (1997) employed an exponential decay model to describe the mortality rate:

$$r(x) = a \exp(-bx) + d \quad (1)$$

where  $r(x)$  is the mortality rate for individuals with income  $x$ .  $a$ ,  $b$  and  $d$  are the model parameters, with  $b$  determining the rate of decay of mortality with rising income, and  $a$  and  $d$  constrained by the average mortality rate:

$$\text{mean } r = (a + d)/2 \quad (2)$$

The model is causal in the sense that income (or lack thereof) directly influences the mortality rate and it does not consider that healthier behaviour may be the cause of higher (or lower) income. In other words, mortality is expressed as a function of income.



No quantitative studies of mortality rates as a function of income are available for Australia and thus our approach has been to rescale US data presented by Keeney (1997) using Purchasing Power Parity (PPP) to convert to Australian currency in 1991 and then to adjust for inflation to bring values up to 2010. The data for this exercise came from the International Monetary Fund ([www.imf.org](http://www.imf.org)). The PPP factor for Australian dollars in 1991 is given as A\$1.35 per international dollar and the 1991–2010 Australian inflation factor is given as 1.67, resulting in a scaling factor of 2.25. (The analogous figure is 2.5 if US inflation is adjusted for first and then the result converted to 2010 Australian dollars using PPP.) In other words, a reduction in income of A\$2.25 today will induce (in a statistical sense) the same increase in mortality rate as did US\$1 in 1991. This being the case, the income above which 1991 mortality rates become independent of income, around US\$70 000, maps to A\$160 000 in today's values ( $2.25 \times 70,000$ ). This provides us with a re-scaled  $b$ -value parameter for Keeney (1997) model (equation 1) and the corresponding shape or decay rate for  $r(x)$  under Australian conditions.

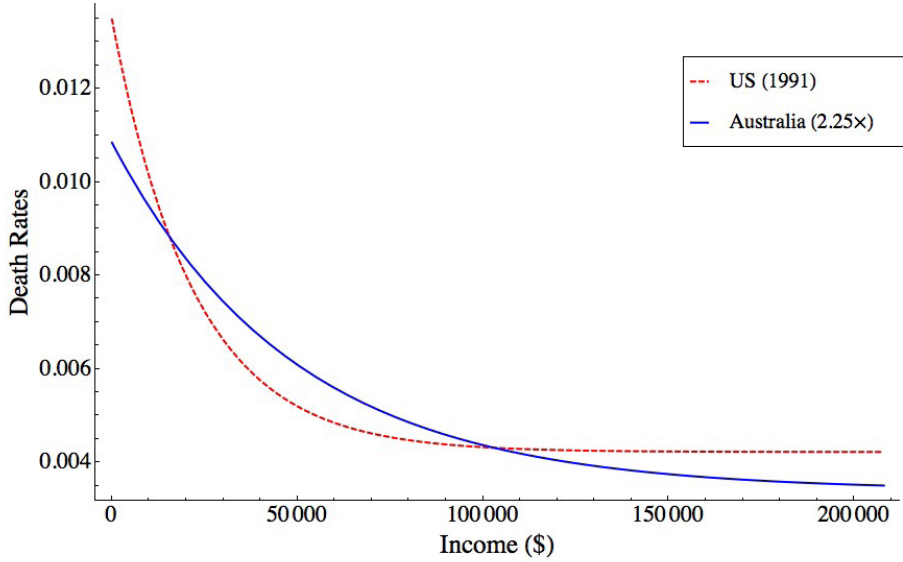
The remaining parameters  $a$  and  $d$  are determined from the national mortality rates (that is, independent of income) according to equation (2). Data from the Statistical Abstract of the United States (1990) gives a mortality rate of nine per 1000, and the Australian 2006 census ([www.abs.gov.au](http://www.abs.gov.au)) gives an equivalent figure of seven per 1000. We rescale the US  $a$  and  $d$  parameters of Keeney (1997) by a factor of 7/9 to obtain the parameters for the mortality rate model, as summarised in Table 2.

**Table 2: Adjusting parameter values for equation (1) for Australian conditions**

Parameter	Original US Value	Adjustment Factor	Re-Scaled Value for Australia	Explanation
$a$	0.00926	0.8	0.00744	National Mortality Rates
$b$	0.0450 (per \$1000)	1/2.25	0.02	Purchasing Parity Power and Australian Inflation
$d$	0.00422	0.8	0.0034	Mortality Rate

Source: Author, from various sources.

Figure 2 illustrates Keeney's (1990) mortality rate function and the resulting Australian equivalent that follows from our assumptions as described above.



**Figure 2: Mortality versus income functions for the United States (1991) and Australia (2010). Units of income are curve dependent: 1991 US\$ for the dashed line and 2010 A\$ for the solid line**

Source: Author, from various sources.

Lastly, we must consider how the burden of the cost falls across families according to income. This distribution is calculated for two scenarios: first, if costs per family ( $C(x)$ ) were imposed uniformly across all incomes ( $x$ ) and therefore were independent of income, that is:

$$C(x) \propto k$$

and secondly, if costs were distributed proportionally amongst families, the corresponding function has the form

$$C(x) = kx$$

and where  $k$  is a constant. According to the Keeney (1991) model, we are now in a position to estimate the number of individuals killed by regulatory costs that have an overall cost of  $C_T$ . Before doing so, we need to determine the value of the constant  $k$ . This can be derived since we know  $C_T$  is the sum of all individual contributions across the Australian population or, more succinctly (for the proportional distribution of costs),

$$C_T = \sum_i (Np_i) kx_i$$

where  $p_i$  is the proportion of individuals with median income  $x_i$  and  $N$  is the total Australian population (assumed 21 million). Solving for  $k$  we have

$$k = \frac{C_T}{N \sum_i p_i x_i}$$

Having calculated the distribution in costs, we can move forward and calculate the variation of mortality rate,  $\Delta r$ , due to the loss in income  $(x - c(x))$  arising from the introduction of the regulation, which is given by

$$\Delta r(x) = r(x - C(x)) - r(x)$$

The total number of statistical deaths induced by the regulation is then calculated by applying this equation to each one of the income brackets given earlier:

$$\Delta F = \sum_i \Delta r(x_i) N p_i \quad (3)$$

## Results and discussion

### Willingness to spend — cost of a regulatory fatality

The manner in which regulatory costs are allocated among individuals depends on the complex workings of the economy and the intermediaries and thus may be borne very differentially (Lutter and Morrall 1994). Here, two possibilities are separately considered: first, where all costs are shared equally among individuals regardless of income; and secondly, where costs are imposed proportional to the individual's income. Since no studies have been undertaken to determine which premise is most appropriate for Australia, the following discussion considers both. When regulatory costs are shared proportional to income, we find that the WTS is A\$50 million, and when costs are shared equally among the whole of the Australian population, the WTS reduces to A\$20 million.

By way of comparison, Lutter and Morrall (1994) estimated a corresponding figure of US\$4.2 million in 1980 dollars, which equates to approximately A\$15 million in 2010 terms. While broad agreement with the lower value from the Keeney (1997) model is comforting, given the uncertainties in its calculation, in what follows we shall employ the WTS range of A\$20–50 million.

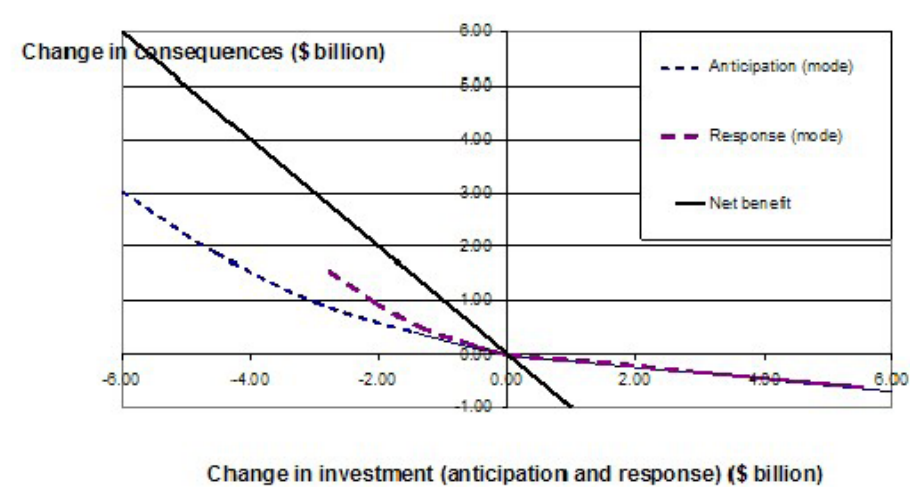
### Cost of over-regulation in the fire sector

Limited research has been undertaken into the investment in fire safety in Australia, or for that matter for any other country at a national level.

Most studies have focused solely on the benefits of increasing fire safety (Marryatt 1988; Ramachandran 1988) without evaluating the opportunity cost of such actions. In order to advance our analysis, we need to put a figure on the extent of *overinvestment* in fire protection, management and response in Australia. In the absence of other information, we employ the results of the structured expert-judgement exercise of Australian fire professionals undertaken by Ashe and McAneney (2011). For the benefit of the reader, we briefly review the central findings of that exercise.

### Structured expert judgement

None of the 26 respondents surveyed expected an increase in investment to result in a net economic ‘gain’, and all but four suggested that if the investment in *anticipation* were to decrease by A\$4000 million, costs as a *consequence* would likely increase by A\$2000 million. The latter scenario implies a positive net benefit in a strict economic sense of A\$2000 million. Figure 3 illustrates the modal responses from the structured expert-judgment exercise.



**Figure 3: Modal opinions provided by participating experts from Ashe and McAneney (2011)**

Source: Ashe and McAneney, 2011.

Figure 3 implies that a net loss to the system will result from an increase in investment and a net benefit if investment were decreased. Assuming the respondents, all Australian fire professionals, have correctly understood the questionnaire (and we have no reason for thinking this was not the case), then the implications are significant. Consider the following example: given a

total cost of the current system in 2005 of A\$12 000 million, if investment in anticipation were to increase by A\$4000 million, consequences are anticipated to decrease by only A\$500 million. This implies a negative net benefit of A\$3500 million. On the other hand, if the investment in anticipation were to decrease by A\$5000 million, consequences are anticipated to increase by A\$2000 million, decreasing the total cost to approximately A\$9000 million to give a positive net benefit of A\$3000 million. Of course, the latter comes with increased (negative) consequences, including increased loss of life and property damage, but from a strictly economic perspective, the perceived net dollar result is positive.

In what follows, we shall assume by way of example that the overinvestment is in the order of 25 per cent of the total cost of fire or A\$4500 million in 2010 dollars. Dividing A\$4500 million by our estimated cost of a *regulatory or statistical fatality*, implies a cost of between 90 to 225 fatalities per annum, depending on whether or not the regulatory impost is imposed uniformly across the income spectrum or is based on family income. In either case, the numbers of *regulatory deaths* is of the same order as the annual average fatality rate of 114 — 100 lives lost in structural fires (Productivity Commission 2011) plus 14 in bushfires (Crompton *et al.* 2010) — under the current system of funding.

## Implications

The above analysis suggests, and within the uncertainty of the estimates, the costs of regulation are of the same order as the actual fatalities. However, this is not necessarily a problem if many more lives are saved by virtue of regulatory involvement. To put some rough bounds on this number, we now explore a thought experiment that asks: ‘What would happen if there was minimal investment in fire protection and management?’ We approach this question only in terms of lives lost, as we know of no way to estimate the financial cost of minimal intervention in the fire system. Environmental and ecological considerations are ignored.

The fire fatality rate of 0.6 per 100 000 population (~114 per annum) in Australia is very low by international standards, and has proved very resistant to increasing expenditure on fire management and protection (Ashe, McAneney and Pitman 2009). The World Health Organisation (WHO 2002) estimated the number of deaths and mortality rates due to fire-related burns by WHO region and income group: the lowest was 0.8 for high-income groups and the highest was 11.6. The latter figure is some 20 times higher than the current Australian rate, and may provide an upper bound to possible fatality rate with only limited intervention. In Australia, this rate would correspond to approximately 2200 fire fatalities per annum. This figure must be reduced by the absence of statistical fatalities induced by regulation. We do this now.

Based upon our estimate of the WTS per prevented fatality of A\$20–50 million of investment, we would calculate that the current total investment costs of fire in terms of anticipation and response (~A\$16 billion for 2010 (Ashe, McAneney and Pitman 2009)) as equivalent to 320–800 regulatory fatalities. Therefore, net fatalities *in the absence of any government intervention* might potentially increase from about 114 to between 1400 and 1880 ((2200 – 320) and (2200 – 800) respectively). We contend that this outcome would be unacceptable for most Australians, even though both figures are of the same order as the current annual road toll of 1600 fatalities (BITRE 2011). Although it is not possible to propose an optimal figure for investment we *posit* that it lies somewhere between the current system of investment and this hypothetical minimum.

Not considered in the above analysis in respect of bushfire is that a minimal-interventionist approach would put more responsibility back on homeowners and local councils. Currently, poor land-use planning allows construction within or very close to fire-prone bushland, a practice responsible for episodic large loss of life and property destruction in extreme bushfires (Chen and McAneney 2010; Crompton *et al.* 2010; and Crompton 2011). However when normalised for changes in population, the *average* annual death toll from bushfires is only about 14 (Crompton *et al.* 2010; Crompton 2011), a figure small in relation to the 100 or so lives lost annually in structure fires (Ashe, McAneney and Pitman 2009).

In the case of structural fires, a study of fatalities in residential homes by Brennan (1999) concluded that fire victims are some of the most vulnerable people in our community and yet they are likely to be housed in accommodation that provides them with little support in a fire emergency. The findings also highlighted the necessity for adapting preventative education for each at-risk group. Safety programs directed at the general public, whether they are about increasing awareness of and reducing hazards, improving understanding or modifying behaviour, are unlikely to have an impact on people who have other urgent and more immediate problems related to everyday survival. Engineering and design solutions offer a partial solution but much wider issues of social equity are raised by the fire fatalities.

## Conclusions

This paper has investigated the opportunity cost of regulation in terms of mortality induced by the wealth decline arising from government interventions in fire management. The wealth decline necessary to induce a *regulatory fatality*, the so-called *willingness to pay*, in Australia is between A\$20 million and A\$50 million and, if the overinvestment in fire prevention, management and response

were around A\$4500 million, this would be equivalent to an annual death toll of between 90 and 225 lives. These figures are of the same order as the average annual loss of life due to fires (~114). Whether the overinvestment is of this order or not is immaterial; the important issue is that efforts to reduce risk by regulatory intervention must not cost more in terms of *regulatory* or *statistical fatalities* than the lives that might be saved by such intervention.

Our study also explored the consequences of a minimal-interventionist approach to addressing the fire risk in Australia, something that might result in significant economic savings but likely substantially increase the annual death toll from fire-related incidents to somewhere near the current loss of life in traffic accidents. We suspect this increase would be politically unacceptable. It is concluded that the optimum system to address fire safety lies somewhere between the current sub-optimal system and the *in extremis* minimal-intervention strategy.

No attempt was made to deal with life choices such as those made to live in close proximity to bushlands in fire-prone Victoria, for example (Crompton *et al.* 2010; Crompton 2011). Rather, our focus has been firmly on the loss of life induced by regulatory interventions that leave people poorer on average. We *posit* that this cost should be at least roughly in balance with the proposed benefits of improved fire-safety regulations, such as the mandatory use of fire alarms in all residential homes, say, to save lives. The importance of other intangible benefits associated with proposed regulatory intervention can be considered once a clear risk-risk benefit is expected based on the WTS methodology explored in this study.

And, lastly, while some might baulk at the idea of putting a cost on human life, most would find it difficult to justify an annual spend of \$1 billion, say, in order to save one more life on average. In reality, trade-offs governing public expenditures are always present — for example, the decision to spend an extra billion on education will come at the expense of a new operating theatre for a hospital or several armoured vehicles for the army. The approach adopted here to estimate the opportunity costs of government investment follows closely that of Keeney (1990; 1997) in the US and is not restricted to investments in fire prevention and management. It should prove more generally useful in tempering government investments in a range of other areas in the economy and ensure that the burden of regulation is kept *grosso modo* in line with the desired outcomes.



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# ***ARGUMENT***

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# Taming Volatile Capital Flows in Emerging Economies

Stephen Grenville<sup>1</sup>

*Just about all economists agree that international trade in goods and services is beneficial and should be unrestricted. There is much less unanimity, however, on the benefits of international capital flows. The volatility and ‘sudden stops’ experienced over recent decades, especially in emerging economies, have provoked some rethinking. It is argued here that this re-think has much further to go before the analytical discussion fits the reality of capital-flow behaviour and policy comes to grips with the challenge of living with capricious capital flows. Flows to East Asian emerging economies illustrate the argument.*

## Prologue

The attitude to international capital flows has changed markedly since Bretton Woods established the framework and norms for international transactions after World War II. At the time of Bretton Woods (and for more than two decades afterwards) it was widely accepted that capital flows might be disruptive and should be treated differently from trade flows. Controls were not only acceptable, but were the norm.

With generalised floating of exchange rates in 1971, capital flows came to be seen as part of the equilibrating process, the more so because market-based outcomes had become the intellectual norm. The central policy message was that flows should be unimpeded by regulation or restrictions. Advocacy of unregulated capital flows reached its peak in 1997, with efforts to incorporate free capital flows into the IMF Articles, on a par with the commitment to free trade in goods and services (see IMF Independent Evaluation Office 2005).<sup>2</sup>

Now, a rethinking is under way, best illustrated by the IMF’s shifting position. For decades a proselytiser for free capital flows, the active debate by the IMF staff over the past two years recognises the potential downside of excessive capital flows (Ostry *et al.* 2010; 2011). Even the more staid IMF Executive Board is prepared to countenance measures to manage flows (IMF 2012(a) and 2012(b)).

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<sup>2</sup> That said, even in this period there were voices disagreeing with these efforts — Bhagwati (1998), for example.

Other international institutions are also exploring new ways of thinking about capital flows (at the Bank for International Settlements; see Borio and Disyatat 2011). These changes in mindset occur slowly, with some largely oblivious to the shift (see, for example, Yellen 2011).

## The analytical framework

Neither the Mundell/Fleming framework (the workhorse of much policy thinking) nor the academically more-favoured intertemporal<sup>3</sup> framework specifically addresses what is happening in financial markets. It is here, in sometime-aberrant market behaviour, that much of the volatile action and puzzles are to be found. It's often useful to think of these flows in the same way that financial markets view them, in terms of portfolio balance. Capital flows to where the (risk-adjusted) expected returns are highest.

This portfolio-based approach needs to be reconciled with the national accounts. Capital flows are, of course, identically equal to the savings/investment balance and also the current-account balance.<sup>4</sup> Some general equilibrium process is needed to reconcile the different factors driving portfolio balance and the national accounting components. That said, capital flows have often been seen as the passive equilibrating mechanism which would, to a large extent, allow the national accounts components (consumption, savings and investment) to be the main determinants of the general equilibrium outcome. All that seemed to be required to make this work satisfactorily were well-functioning financial markets and capital flows which are unrestrained by regulation or controls. This was, indeed, the thrust of policy advice, particularly from the IMF. Where this narrative has departed from reality is that financial markets have not always been well-functioning.

## What are the characteristics of capital flows in practice?

*The flows are very volatile:* The Mexican crisis (1994–5) and the Asian crisis (1997–8) demonstrated that capital flows were not a smooth equilibrium process with well-defined parameters, largely determined by interest differentials and stable exchange rate expectations. The inflows to emerging countries increased quite suddenly in the early 1990s. While not extraordinarily large in respect of the portfolios of *investing countries*, the inflows were huge relative to the

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<sup>3</sup> See Obstfeld and Rogoff (1994).

<sup>4</sup> Including official flows such as foreign-exchange reserve holdings.

financial sectors of the recipient countries, and large relative to their total GDP. A well-functioning market would have recognised that this magnitude of inflow could not be effectively absorbed without major disruption. These flows were not driven by well-founded judgements about market fundamentals, but were the lemming-like rushes of optimism followed by pessimism that characterise foreign capital flows to emerging countries. Higher interest rates were not effective in preventing the outflow, nor did large falls in exchange rates convince investors that future movements in the exchange rate would be reversionary appreciations. Balance-of-payments equilibrium was achieved not through changes in interest rates or exchange rates, but by painful falls in income large enough to produce substantial current-account surpluses, matching the capital outflows.

This is illustrated by the specific experience of Emerging Asia, shown below in Table 1.<sup>5</sup> Note especially the volatility of the flows to the ASEAN-5 countries, where inflows exceeded 9 per cent of GDP in 1996, to be replaced by outflows almost as large a couple of years later. In 1996, Thailand, a relative neophyte as a capital importer, received inflow equal to 13 per cent of GDP. This capital departed over the next two years. Similar (although less extreme) variability was exhibited during the 2008 global financial crisis.

**Table 1: Emerging Asia net private capital inflows, % of GDP**

	1995	1996	1997	1998	1999	2000	2001	2002	
Total (ex. China)	3.4	3.8	2.4	-4.4	-1.3	0.8	-1.2	-0.3	
ASEAN-5	6.6	9.1	4.4	-6.6	-5.7	-3.1	-3.6	-1.3	
	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total (ex. China)	-0.4	1.5	0.9	-0.2	0.4	1.2	-1.1	3.5	2.1
ASEAN-5	-1.2	1.0	2.3	0.8	1.2	1.3	-3.5	2.2	4.0

Source: Pradhan *et al.* (2011).

*Even for advanced countries, interest differentials don't seem to be important:* The flows between developed countries behave differently from the flows to emerging countries, but are no closer to the interest-based analytical framework. The gross flows in both directions have been huge, many times larger than the net flows.<sup>6</sup> How is this consistent with the idea that interest differentials are the main, or even an important, driver of the flows? If that were true, countries would tend to have flows which were largely one-sided (either mainly inflows or mainly outflows), with the net flows not much smaller than the gross flows.

<sup>5</sup> Defined, following IMF usage, as all of Asia excluding Japan, Australia, New Zealand, and low-income countries. 'ASEAN 5' comprises Indonesia, Thailand, Philippines, Malaysia and Vietnam, omitting the special case of financial-centre Singapore.

<sup>6</sup> See IMF (2011): Figure 4.2.

*UIP doesn't hold:* Uncovered interest parity is central to much of the financial market's analysis (for example, for the setting of forward exchange rates) and is an important element in making the case that financial markets are efficient. It is now abundantly clear that UIP offers feeble guidance for the exchange rate/interest rate nexus (see Engel 1996). UIP often gets the *direction* wrong (countries with higher interest rates appreciate rather than depreciate), let alone the magnitude (Cavalo 2006). This inability to predict the direction is familiar in East Asia in the period 2000–10 (Grenville 2011), where interest rates have often been higher than global norms while at the same time exchange rates have appreciated.<sup>7</sup>

*Capital flows 'uphill':* For almost all of the last decade, emerging countries have been building up their foreign-exchange reserves (that is, investing in foreign assets) faster than foreign investment has been flowing into these countries.<sup>8</sup> Capital is flowing uphill from the emerging countries to the mature industrial countries.

*Exchange rates are volatile:* Despite foreign-exchange markets being information-rich, long-established, deep and free of restriction, exchange rates are inexplicably volatile, not only in their daily movements, but also in their persistent swings. When exchange rates are driven by changes in capital flows, exchange-rate changes don't play much of a role in achieving equilibrium because rate expectations are often extrapolative (the higher price doesn't reduce demand; it increases it). Exchange rates (especially in emerging countries) are not well anchored (which would be the basis of reversion-to-mean stabilisation) because there is not widely accepted analytical knowledge of the underlying fundamentals to anchor the price. This is a chicken-and-egg problem: because exchange rates demonstrate inexplicable volatility, there is no accepted model which would anchor the rate in the face of temporary shocks. Markets spend more time guessing what other participants think than about the fundamentals.

*Portfolio returns haven't equalised:* Over a sustained decades-long period, higher returns have been available from investment in emerging countries. The return on investing in 2000 in one-year bonds in India, Korea, Singapore or Malaysia was greater than the US return by more than 30 per cent, and in Indonesia the return was 150 per cent higher. For equities, the higher relative return for the same countries ranged between 50–300 per cent.<sup>9</sup>

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7 For Indonesia, Malaysia, South Korea, the Philippines and Thailand, the average interest differential vis-à-vis the US dollar in 2000–10 was positive, while the exchange rate appreciated over the decade. See Grenville (2012): Figure 2.

8 See Grenville (2012): Figure 5.

9 See Grenville (2012): Figure 6.



## How well do the characteristics of the real world fit the analytical model?

It's hard to argue that the portfolio balance perspective fits the real world at all closely. This framework explains flows in terms of interest differentials plus a conglomeration of other factors which are usually just called 'risk'. This catch-all term has three characteristics. It is often very large compared with the interest-differential explanation. Second, it is largely unexplained. Third, it is 'time variant'; that is, it varies very considerably in response to nebulous factors such as expectations. Analytically, this 'risk' term is a *deus ex machina* that is invoked to 'explain' the huge degree of unexplained variation of flows. In financial-market discussion, 'risk' is often treated as if it could be captured by some certainty-equivalent based on a well-formed view on probabilities (that is, as if the issue was Knightian risk), without any consideration of uncertainty (with unknown probability distribution), which is usually the more relevant concept.

We shouldn't be surprised that in the real world financial assets are very far from the close substitutes (that is, differing only by interest return and exchange rate expectations) usually envisaged in the models<sup>10</sup> and UIP. The legal framework that supports financial assets differs fundamentally between countries. Underlying assets (fundamentally the collateral behind financial assets) vary hugely in their intrinsic characteristics, most importantly in their property rights.

Moreover, not only are the intrinsic characteristics different, but what matters for financial markets is the *subjective* assessments of financial assets. Some are easier to assess and to price and will remain fairly stable in price (for example, US-dollar bonds). But most foreign assets are poorly known by many of the big players in the markets (fund managers), and the cost of gathering reliable information is high. Most investors have a strong 'home-currency bias', and for good reason. They prefer to hold assets in their own country because they know the legal and institutional system, the tax rules and what legal recourse they have if anything goes wrong with their investment. As well, they generally know much more about the specific characteristics of home assets than foreign ones. Liquidity varies hugely between markets and varies over time with the whim of moods of optimism and pessimism. Transaction logistics can often be difficult. The institutional facilities to buy assets (say, equities) in the emerging countries of East Asia are much less easy for investors. Big fund managers develop the specialised expertise necessary for diverse investment, but even for large investors such investments will be a small part of the portfolio. Being a

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10 For example, the Mundell/Fleming model.

small part of the portfolio means that it is not worthwhile to expend too many resources gathering information: better to just cut and run when uncertainty increases.

Equilibria in flows and stocks, if they occur, are fleeting: we don't observe the flows stopping or even stabilising, as an indication that some portfolio balance has been achieved. What about the dynamic behaviour of the flows? The Dornbusch (1976) overshooting model provides a possible explanation, with its simple reconciliation for two assets offering different risk-adjusted interest returns. First there is a once-off appreciation of the higher-interest-rate country, then a depreciation which lasts the length of time the interest rates take to reach equilibrium. While there is no recorded example of this sequence in the real world, at least it seems intuitively plausible in the context of a cyclical movement in interest rates which opens up a temporary differential with foreign rates. But for the countries of East Asia, the interest differential is not cyclical. It is structural, reflecting the higher productivity and profitability available in these countries as they move towards the production frontier. They have higher Wicksellian (natural) real interest rates than the mature industrial countries, already at the production frontier. This differential is likely to last for some decades.

## The challenges for empirical analysis

Most analytical work on capital flows focuses on net flows. This would be appropriate if the main action was in the national accounts (that is, if the savings/investment balance was the determinant of capital flows): the net capital flow would be the residual funding. If, however, the flows themselves are an important determinant of the overall outcome, this would require analysis in terms of *gross* rather than *net* flows (the decision-makers are usually focused on gross flows. The net figures confound multiple decision-makers).<sup>11</sup>

These are *financial flows*, recorded in the flow-of-funds accounts, and not directly reflected in the national accounts (see Borio and Disyatat 2011). If, for example, the foreigners buy an existing asset, then the chain of transactions which this sets off would have to be analysed to know what the effect is on the national accounts: it's not like just adding the dollar flow to the investment accounts.

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11 Just to complicate the story, however, some inflows have closely related outflows (for example, with derivatives and forward cover, and when the country is acting as a financial intermediary for another country, as in Hong Kong *vis-à-vis* China).

The decisions are *portfolio choices*, so we should be looking at stock positions rather than flows. And even here the outcome usually reflects the two sides of a transaction (for example, both borrower and lender), so questions of ‘push’ and ‘pull’ factors may both be relevant. The interconnection between the new portfolio equilibrium and economic activity (via wealth effects and relative interest-rate changes) is so complex that it will be hard to get a firm handle on it.

As well, the *data (especially for the gross flows) are seriously incomplete*. We do not have a proper handle on the volume of carry-trade (McCauley 2010) and important parts of the interaction (for example, derivatives offered by the branches of foreign banks and transactions taking place in the non-deliverable forward markets) may not be caught in the balance-of-payments data, even though their impact is similar to the flows which *are* recorded in the balance of payments.

In short, we are at a very early stage in understanding capital flows.

## The benefits from foreign investment have been mis-stated

The case for free capital flows is usually given along the following lines (see IMF 2010: Box 1):

- Funding for investment can be obtained in larger volume and more cheaply.
- FDI brings technology and managerial skills.
- Consumption smoothing occurs in the face of adverse shocks.
- Risk is spread and portfolio diversification can occur.
- Flows provide discipline for macro policy.

In practice these advantages look much less compelling.

The obvious attraction of capital flows is the opportunity to *fund extra investment*. But emerging East Asia generally saves more than it invests. Current-account surpluses are the norm. On the surface, there is no obvious need to supplement domestic funding by drawing on foreign capital. There is little doubt that FDI has been very useful, but it is the technology and skills transfer that is useful, rather than the funding.

A closely related argument is that foreign funding is *cheaper*. But the cost of funding is the principal channel through which monetary policy operates to influence the level of domestic economic activity. To the extent that foreign funding is cheaper, this undermines the intent of monetary policy.

What about the advantage of *consumption smoothing*?<sup>12</sup> There is no evidence of this in the emerging countries (Kose *et al.* 2007). In fact, the opposite occurs: capital flows are pro-cyclical, adding to consumption in the upswing and restraining it in the downswing. In the upswing, foreign funding gives borrowers more opportunity to overextend themselves. We shouldn't find this too surprising. Shifts in confidence are one of the central causes of cycles (and crises). Foreigners share the optimism of the upswing. When economic activity falls because of domestic lack of confidence, foreign funding is not going to step in to fill the shortfall.

In practice, the more likely cyclical sequence is that foreign capital enables the cyclical upswing to run longer. With a floating exchange rate, stronger activity appreciates the exchange rate, encouraging imports, thus holding inflation in check. 'Spilling' stronger demand into imports may soften the cycle (avoiding 'sudden stops'). If this extended sequence is being funded by foreign capital inflow (rather than being suddenly cut off through lack of foreign exchange that sometimes occurred in fixed-exchange-rate regimes), in this sense the inflows might be seen as smoothing the cycle. But this just postpones the problem and is not the sort of consumption smoothing envisaged in the textbooks.

In any case this sort of cyclical stabilisation might more usefully be done using the country's own foreign-exchange reserves: running down reserves during the strong phase of the cycle tightens liquidity rather than adding to it. Spilling excess demand is in any case a poor substitute for higher interest rates, which may be undermined by capital inflows.

What of the argument that international flows allow *spread of risk* and provide portfolio diversification benefits? Are domestic portfolios and balance sheets safer if they contain foreign liabilities, probably denominated in foreign exchange? Are domestic banks stronger if they obtain a significant part of their funding from overseas?<sup>13</sup> Are foreigners who have invested part of their portfolios in foreign assets, probably in foreign currency, more likely to be stable holders?<sup>14</sup> Put in these terms, the diversification benefits seem more likely to be perverse than helpful. Risk is spread to the least-knowledgeable, most-flightly holders of debt. The extra risk element in the form of the exchange rate component in the foreigners' return on investment exacerbates this volatility.<sup>15</sup> McCauley (2010) argues that East Asia diversified by accepting foreign investment in equities and investing in safe assets as part of their foreign-exchange reserves,

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12 A characteristic of the intertemporal models such as Obstfeld and Rogoff (1994).

13 Recall the 2008 Korean experience, when branches of foreign banks suddenly reversed their earlier capital inflows.

14 Japan, with its high ratio of government debt to GDP, is seen as stable because most of this is held domestically.

15 There are, however, cases where the opportunity of foreign diversification is clearly in the interests of the capital-receiving emerging country. It has been a long-standing part of Singapore's investment strategy

preparing for upcoming problems. If emerging countries need to do this, are the short-term inflows such a good idea in the first place? The pro-cyclical action of foreign investors means that they don't 'accept their share of the poor harvest, in textbook fashion, but instead head for the exit' (McCauley 2010: 134).

There are clearly situations in which foreign capital flows can exert *discipline* over macroeconomic policies, with governments having a strong incentive to maintain good policies in order to avoid departure of flighty capital. This argument would be more powerful if markets had developed a reliable reputation for discerning and timely monitoring. Foreign investors, however, tend to follow imitative lemming-like correlated behaviour, and rating agencies have a well-established reputation for observing economies through the rear-vision mirror, rather than in a forward-looking way. If excessive foreign flows encourage recipient countries to keep interest rates too low, this doesn't promote discipline. To the extent that foreign inflows cause the exchange rate to be above its long-term equilibrium, it is hard to see this as exercising helpful macroeconomic discipline.<sup>16</sup>

So much for the usual arguments in favour of foreign capital. One rarely mentioned advantage is that foreign financial centres may provide a range of useful financial services not available in the home country. Singapore may provide this for Indonesia's corporate and banking sector; Hong Kong for China; and New York for a range of countries (including countries with mature financial markets such as Australia).<sup>17</sup>

To balance the evaluation of this rather modest list of advantages, we need to recall the financial fragility and prudential problems discussed above in relation to specific countries in East Asia.<sup>18</sup> We also need to note that the policy responses to capital reversals are usually ineffective. In particular, higher interest rates are impotent in halting outflows when there are doubts about the health of the financial system and the exchange rate is under pressure.

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to encourage both inflows of FDI and outflows of investment capital, to diversify what would otherwise be a narrow range of assets, excessively correlated with the performance of the domestic economy. It is worth noting that this diversification is initiated and managed by the recipient country.

16 The issue of discipline may also be relevant at the micro level. When there is a direct relationship between borrower and lender, the foreign lender may provide effective and appropriate discipline on the domestic borrower (just as a domestic direct lender would). But much of foreign inflow occurs in an indirect way (with the foreigner holding a market instrument such as a bond) without direct connection between foreign lender and domestic borrower.

17 Does this ability to get foreign funding easily inhibit the growth in the domestic financial market? It is often argued that this is the reason for the thin corporate bond market in Australia, and may explain the small size of the Indonesian financial sector. This view can be seen in the argument that China is not yet able to provide the full range of intermediation, so sends its surplus funds to be invested in safe US assets (foreign-exchange reserves), with the US sending part of this back in the form of risk-capital investments into China.

18 OECD (2011) shows that emerging countries that have experienced large capital inflows are more likely to experience a banking crisis.

## Are the suggested remedies appropriate?<sup>19</sup>

*The exchange rate should appreciate if the rate is undervalued:* This seems self-evident but irrelevant to the problem: these emerging countries find themselves with continuing upward pressure on their exchange rates and this is unwelcome because of loss of international competitiveness. They see their problem as overvaluation rather than undervaluation.

*Exchange rate intervention:* Earlier IMF views that intervention would have no effect on the exchange rate may have been softened, suggesting that intervention is acceptable provided it doesn't distort monetary policy.<sup>20</sup> Even this may exaggerate how far the IMF has moved: this intervention is sometimes put forward as a method of augmenting an inadequate level of foreign-exchange reserves, leaving unresolved the question whether intervention policy might also legitimately be used to constrain an appreciation.

*Fiscal tightening to make room for expenditure associated with the inflow:* There seems universal support for this strategy,<sup>21</sup> but it is rarely relevant to the core problem of capital inflow. If the domestic cycle is running too strongly, self-evidently there is always opportunity for fiscal restraint, regardless of capital flows. If the domestic economy is not running too strongly (but the capital flows are causing uncomfortable upward pressure on the exchange rate), tighter fiscal policy seems more likely to exacerbate the appreciation rather than help. Tighter fiscal policy (that increases national saving relative to investment) will tend to push the current account more towards surplus. Accommodating the capital flows within a current account that is in greater surplus will require appreciation of the exchange rate.<sup>22</sup> Thus the remedy gives a perverse outcome. In any case, what is the rationale for reducing budget expenditure or raising revenue in order to make room for the foreign capital? There is an unwarranted presumption here that the foreign capital gives rise to more useful activity than the budget. Why should foreign capital be encouraged at the expense of budget priorities?

*Macro-prudential measures:* These have been put forward as the new panacea for excessive capital flows.<sup>23</sup> To the extent that capital flows present a threat

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19 For a typical enumeration of the IMF-endorsed responses, see Ostry *et al.* (2011).

20 The IMF is still confused in making the distinction between sterilised and unsterilised intervention. In practice, intervention is always sterilised.

21 For example, see Yellen (2011).

22 The standard textbook IS/LM diagram, showing the relationship between the savings/investment balance and monetary liquidity, is misleading here. It implies that the tighter fiscal policy will reduce interest rates and thus discourage capital inflow. However, modern monetary policy sets interest rates directly (for many, the Taylor Rule replaces the LM). Thus there is no reason to expect tighter fiscal policy to affect interest rates and hence discourage inflows.

23 There is a comprehensive discussion of these possibilities in Ostry *et al.* (2011).

to financial stability, these are certainly an appropriate response. But issues related to the stability of the financial system should not depend on whether or not capital flows are excessive at the macro level. If substantial fundraising on foreign money markets presents a vulnerability to the banking system, then that is itself the rationale for restriction. Restraining the banks from providing foreign-currency denominated loans may make sense to protect the domestic banks from currency mismatch, regardless of what is happening to capital flows.

Overall vulnerability will often be reduced by effective macro-prudential policies. It seems quite possible, however, that macro-prudential measures might, themselves, push the problems elsewhere rather than resolving them. For example, restricting banks from providing foreign-currency loans or receiving foreign-currency funding might encourage non-bank borrowers to seek foreign funds directly from overseas intermediaries, which might be potentially more dangerous than if the inflow occurred via the domestic banking system.

## What this means for policy

While the IMF's recognition of these issues is belated and incomplete, it holds out the best opportunity to develop a more relevant policy agenda (see IMF 2012a and b). In embryonic form, it has already put in place the elements from which an effective policy could be developed:

- There is a recognition that the usual array of conventional policy instruments could be used to discourage excessive inflows. Macro-prudential measures which limit domestic banks' overseas borrowing and limitations on the issuance of those types of securities which are most favoured by foreign investor should be part of the policy toolbox.
- When all else fails, the IMF envisages that *capital-flows management* might be undertaken. This includes the various taxation measures (for example, Chile's *encaja* and Brazil's taxes). The Fund has been, to a large extent, responsible for the stigma surrounding management of capital flows. Thus it should assume primary responsibility for removing the stigma by endorsing these management measures more fully.
- Since 2009 the Fund has been carrying out the Multilateral Assessment Program (MAP), focused on external imbalances. More recently still, it has produced a Pilot External Sector Report (IMF 2012c) which calculates *external divergences*: 'the gap between actual current account balances and those estimated by staff to be consistent with fundamentals and desirable policies. They reflect distortions and should be eliminated.' It also calculated 'estimated differences between real effective exchange rates and those consistent with fundamentals and desirable policies'. While this discussion



often emphasises the current account, this Report explicitly covers the counterpart capital flows.

- Some broad notion of the fundamental equilibrium exchange rate (FEER) is needed for effective intervention. The IMF calculates three different versions of FEER (IMF 2006). While there are obviously wide margins of uncertainty around these calculations (as there are with all policy variables), these will be the basis for policy options on intervention. This is at least the start of a rational policy framework. Some official endorsement of a broad band for the exchange rate (such as Singapore gives) may anchor market expectations effectively. Williamson's (2008) Band/Basket/Crawl (BBC) offers more specifics. Capital flows which are not disruptive of the exchange rate require no policy response: variations of the exchange rate within the band would be accepted. Temporary departures outside the band would be handled with foreign-exchange market intervention. Persistent departures from the band require closer policy analysis: is this a new equilibrium, to which the economy should adapt, accepting the stronger exchange rate?

## Conclusion

The three-decade-long period when the main thrust of policy advice was to open up capital accounts and allow free flows of international capital has left a policy vacuum for the real world, in which capital flows can be excessive, volatile and cause disruption to exchange rates and interest rates.

This blinkered policy perspective has left many unresolved issues. What, for instance, should emerging countries with substantially higher growth and profit prospects (and thus permanently higher Wicksellian interest rates) do over time if this causes excessive capital inflow? There may be a case for *ad hoc* 'sand in the wheels' to keep the flow of foreign capital from opening up a substantial current-account deficit which leaves the economy vulnerable to volatile changes in sentiment. The IMF has come a long way in recent years in recognising the challenges which capital flows impose on emerging countries. But translating this into an effective policy framework is still a work in progress.

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# ***REVIEW ARTICLE***

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# The Academy in Decay

Ruth F. G. Williams<sup>1</sup>

## The academy and the agora

Over several decades diverse strategies have been applied to increase the number of university graduates in Australia. In the 1940s, for example, the Curtin Labor government funded an increased number of scholarships, and, for the first time, women could apply for these scholarships. In the 1960s, the Liberal government under Menzies opened several new universities in outer-metropolitan localities. Funding for postgraduate scholarships was also provided by this government in order to promote research. In 1967, access to tertiary studies increased when (non-university) Colleges of Advanced Education (CAEs) were opened to provide specialist education and preparation for teaching, nursing, accountancy, and so on. In the 1970s, the Whitlam Labor government took a different stance again, abolishing fees in 1974, in a policy that remained in place for 15 years. Donald Meyers (2012) traces the genesis of another such major policy shift in higher education, when just over two decades ago an enterprising politician, John Dawkins, and an academic economist, Bruce Chapman, placed a spotlight on higher education in Australia.

From time to time, an entrepreneurial politician will emerge on the political landscape and, being adept at spotting a policy problem in need of a solution, will forge a symbiotic relationship with an academic to produce some evidence relating to this problem. With the passage of political time, a major restructuring is then delivered on the basis of that academic work. An earlier notable example of this phenomenon was the promise of free-to-user universal health insurance that facilitated the end of two decades of conservative government by Whitlam Labor in 1972. This nexus between the academy and government turned on the work of two health economists, Dick Scotton and John Deeble, who had already produced evidence of the inadequacies of the existing voluntary private-insurance arrangements. When Bill Hayden was appointed Minister for Social Security in the new government, he formulated Australia's first system of universal health insurance, Medibank (subsequently, Medicare).<sup>2</sup>

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2 For details of the relationship, see Scotton and Macdonald (1993; 1995).

The focus that Dawkins chose was higher education. In September 1987, Chapman, then at The Australian National University, took a full-time consultancy to work for Dawkins, who had by then been appointed Federal Minister for Employment, Education and Training in the Hawke government. This collaboration resulted in the White Paper 'Higher Education: a Policy Statement' in July 1988.

## The managerial revolution comes to campus

*Australian Universities: A Portrait of Decline* is concerned with the aftermath of the Dawkins-Chapman restructuring of the university sector that was popularised by catch-cries such as 'equity of access', 'efficiency' and 'international competitiveness'. This was seemingly a boon for government as well in that it promised to recoup Commonwealth funding of student loans through Chapman's Higher Education Contribution Scheme (HECS). With the adoption of this scheme, funds for government could be collected from the student base of an ever-expanding tertiary sector, thereby relieving the pressure on the Federal budget.

In *A Portrait of Decline*, Meyers<sup>3</sup> portrays (p.ii) this development as 'the destructive "reform" of the tertiary sector spearheaded by John Dawkins and perpetuated by subsequent governments'.

It is interesting to note as an aside that the book has been published only as a free PDF document on the web, with the various non-university presses he approached deeming that there was 'insufficient' interest in the topic to make it worth their while. The university publishers, on the other hand, indicated that they did not publish 'this sort of work' or that 'they already had similar work in the pipeline' (p.iii). Meyers records (p.iii) that Melbourne University Press rejected the manuscript for its indignant tone and for 'questionable assertions, generalisations and too few direct examples with documentation and detailed explanation'.<sup>4</sup> Given that everyone who works in universities knows what is happening, this stance makes one wonder whether the publisher missed the point regarding the lack of data, or whether the delusion implicit in the comment is systemic.<sup>5</sup>

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3 Meyers holds a PhD from the University of Queensland, with expertise in neuroscience and biomedical research. The author of numerous international peer-reviewed papers, he has taught in universities both in Australia and the United States and is currently practising as an environment consultant.

4 However, it is important to note that a correction is required here: the words quoted above are actually those of Dr Nathan Hollier, Director of Monash University Publishing. See Hollier (2012).

5 Meyers was not the first to suffer such a fate. *Why Universities Matter...* (Coady, 2000), for example, was earlier rejected by Melbourne University Press. The process by which that rejection occurred was highly controversial. <http://www.allenandunwin.com/default.aspx?page=94&book=9781865080383>

Now, more than two decades on from the Dawkins reforms, Myers presents a portrait of a time-worn face etched with pain and showing signs of continued abuse. Through eight chapters, he wipes away the make-up from the cosmetically disguised public face of Australian universities and holds up a warts-and-all picture to public scrutiny.

In Chapter 2, Meyers documents the limits placed upon sensible decision-making in the modern corporatised university: 'It's not uncommon for rank and file committee members to receive tens or hundreds of pages of documentation less than 24 hours before they are supposed to reach important decisions' and 'typical university managers are purposefully detached from the realities of the organisation's real work'. In the same chapter, he examines the new financial arrangements under which universities operate, and the retreat by government from funding universities adequately.

In Chapter 3, 'A Policy, a Plan and KPIs for Everything and Everyone' he tells of the alien drumbeat of Key Performance Indicators (KPIs), Quality Assurance processes, 'The Planning Jungle' and the 'System Fever' to which academics are forced to march by the 'bureaucratic brains trust' that determines university policy.

Meyers places a particular spotlight on the role of 'Educationalists' — academics with expertise in the theories of learning and teaching — who have proved to be highly influential on account of the 'peculiar symbiosis' they have with managers in Australian universities. Between them they have introduced what the author considers to be flawed theories such as 'student-centred learning'. Such strategies have resulted in a situation where, he asserts, 'the proportion of students emerging from 15 years of education without the basic skills needed to underpin productive employment simply defies belief'.

Chapter 4, 'Student-Centred Pandering', elaborates on these flaws that continue to be advocated by the Educationalists despite the now-considerable body of literature that exists on the failings of the (so-named) Constructivist-based, unguided or minimally guided approaches to instruction (see, for example, Kirschner, Sweller and Clark (2006)). Chapter 5, 'Every Child Wins a Prize', discusses several other flaws in the approaches to learning, with a particular focus on the failures of the Constructivist approach to teaching mathematics.

Meyers' major concern about a student-centred learning system is that, within it, 'the only fault possible is that of a teacher who does not identify the student's preferred learning mode and who uses inappropriate in-class tasks or assessment items' (p.67). This will no doubt resonate with readers familiar with recent allegations of lecturers being required to 'explain' why it is not their fault that some students cause themselves to fail (Thomson 2012).

Chapter 7, 'Management v Academic ... No Contest', examines the clash in objectives between academic and managerial staff and gives a description of the burden that academics are bearing. There are also several intriguing accounts of 'how a redundancy is engineered' (by managers) and 'how to incur the wrath of management — without even trying'.

It is noteworthy that the potential for university managers to form alliances, such as Meyers observes with Educationalists, has long been foreshadowed by others. Readers interested in Meyers' account will gain a sense of the lineage of these ideas from earlier accounts of the problem, such as that of Culyer (1970). Culyer's analysis was cogent and farsighted. He foresaw how readily a hopeless imbalance can form over who controls the learning objectives of the modern university. He argues that the problem lies in the fact that the objective of academics is to maintain academic standards and keep those standards 'high'. But students have a different objective: to reduce their personal costs of learning (in time, effort, income forgone, and so on). Maintaining academic standards can also prove difficult for bureaucrats, who have their own objective to lower costs. Bureaucrats and students will tend to form an implicit alliance in that their shared objective of lessening the costs of learning is contrary to the costly academic objective. In this three-cornered contest, the academics, being outnumbered and outmanoeuvred, lose.

And yet both Meyers and Hil (2012) claim that all the problems started when Dawkins thought that improvements would be achieved by bringing economic realism to university education. Dawkins' solution, and a scheme to finance it, would lie in the private benefit being borne by students with the positive externality of higher education subsidised by government. The 'Dawkins revolution' has blurred the various types and abilities of students: and in doing so invites resource misallocation. But, at the broadest level, the Chapman financing solution to a positive externality 'ought' to work. However, devising economic policy for complex phenomena can be extremely difficult. While economics is often regarded as a precise science, the complexity of the problem is strictly incalculable. To formulate policy that counts in all the costs and benefits of such a major resource re-allocation as the Dawkins reform, and to weigh the distributional consequences beforehand, is hard. Often only the passage of time reveals what was not thought of, not expected, and what was missed.

No reader need regard Meyers' account as implausible, but to lay blame entirely at the feet of Dawkins and Chapman may miss something else that is important. The source of much of what Meyers finds to be happening in Australian universities is at the microeconomic level: the Dawkins reform was subsequently appropriated by managers and their rent-seeking behaviour. Along with



managerialist ways, academic work in universities seems to be under Soviet-like administration. The current environment is academically both adverse and perverse.

## Academics and ‘Whackademics’

Meyers’ *Portrait of Decline* is one of a plethora of other thought-provoking books on the issues facing the modern university. These include Coady (2000); Marginson and Considine (2000); Menand (2001); Biggs and Davis (2002); Tuchmann (2009); McMahon (2009); Nelson (2010); Delbanco (2012); and Gaita (2012). Not to be overlooked either is Allan Bloom’s earlier account, *The Closing of the American Mind: How Higher Education has Failed Democracy and Impoverished the Souls of Today’s Students* (1987).

Richard Hil’s *Whackademia: An Insider’s Account of the Troubled University* (2012) is an excellent account of what’s happening inside Australian universities today. *Whackademia* warrants discussion and comparison with Meyers’ *Portrait*, and I would urge any concerned reader-citizen to read both.

Also of great use in this regard are two very accessible essays by Richard Samuelson (Samuelson 2012a; 2012b), in which he argues, for example, that: ‘Successful economies result from many sources, not just an educated workforce, though that’s important. Other crucial influences include flexible markets, management competence, work ethic, government policies, and an entrepreneurial culture’ (2012b).

In that same essay, he also reports various useful data, such as the following:

Some robust economies have workforces with a much smaller share of college degree-holders than the United States: Germany’s rate is 26 per cent. Some other countries with higher rates (Japan: 56 per cent) are floundering. And some with higher rates (Russia: 55 per cent) lag well behind the United States economically.

As Samuelson (2012a) sees it:

The real concern is the quality of graduates at all levels. The fixation on college-going, justified in the early postwar decades, stigmatizes those who don’t go to college and minimizes their needs for more vocational skills. It cheapens the value of a college degree and spawns the delusion that only the degree — not the skills and knowledge behind it — matters. We need to rethink.

Another important and very relevant contribution from the United States is the book *Academically Adrift: Limited Learning on College Campuses* (Arum and Roksa 2010) in which sociologists Richard Arum and Josipa Roksa reported on their work to measure gains in critical thinking, analytical reasoning and other 'higher-level' skills taught at the tertiary level to students at four-year colleges and universities. Among several findings drawn from data on 2,322 students from 24 schools, the authors report that 45 per cent of college students had not significantly improved their critical thinking and writing skills after two years; after four years, the proportion was still 36 per cent and, in most cases, only 'modest' improvement could be reported. They also report the poor results to be associated with academic standards that are too lenient. For example, of the students surveyed, one-third said that they studied alone five or fewer hours a week; half of those surveyed reported that in no subject in the prior semester had they been required to do more 20 pages of writing. When, in summary, the authors asked themselves, 'How much are students actually learning in contemporary higher education?' they concluded (p.34) that for many undergraduates the answer is 'Not much'.

With the university's core activity being the production, discovery and dissemination of knowledge, the fad of having the modern university operate on a managerial business model ignores the minefield of externalities — positive and negative — inside universities. These externalities have long been known about. For a detailed recent description, see McMahon (2009).<sup>6</sup> The externalities of universities are poorly understood but mostly they are ignored and grossly mishandled.

Meyers' book will undoubtedly provoke varied reactions, partly because the homogeneity that once existed across the separate and different components of Australia's higher-education sector (university, CAE ...) has become blurred since the Dawkins reforms.

Some may dismiss Meyers' account because it contains anecdotes that do not reflect the whole picture or merely reflect the jaundiced view of someone who was once employed in a New Generation University (NGU).<sup>7</sup> Such reactions would be regrettable: it is worth keeping in mind that Meyers came from 'industry' and has since returned to industry. His perspective — raw as it is in parts — is nevertheless important and fresh, and ought to be listened to.

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6 In this book, McMahon also reports the results of his attempt to quantify the externalities: that exercise is brave and desperately needed but the task proved to be bigger than Ben Hur. Although confidence cannot be placed in the magnitudes that McMahon reports, he paves the way for future work. More importantly, though, McMahon's book is further evidence of the failures of the managers to manage.

7 The New Generation University was a government classification for relatively newer universities that has been abandoned since Meyers' term of employment. Many such universities now come under another classification such as the so-called Regional Universities Network.

Dawkins' reforms have resulted in a spectrum of institutions scattered along quite different dimensions; the people employed at one end of the spectrum are often not aware of other ends.

Australia's academic workforce is likely to regard some of the content of this book as all too familiar, possibly mildly rambling, and yet somewhat therapeutic as well, since various phenomena that he describes are real. Yet again, there are the self-deluded and the uninitiated who may find this book to be an exaggeration, a work of science fiction or fantasy. The growing evidence adduced in this review strongly suggests that Meyers' account may be raw but it is not singular; and the uninitiated may wish to keep in mind that truth is often stranger than fiction.

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