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Henry Ergas
University of Wollongong, hergas@uow.edu.au

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Abstract
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Keywords
change, institutional, climate, issues, design, politics, create, policy, policies

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New policies create a new politics: issues of institutional design in climate change policy

Henry Ergas†

Institutional design focuses on the task of providing accountability and effective monitoring of decision-making by bodies vested with the coercive powers of the state in a context where information is inherently limited, costly to acquire and asymmetrically distributed. This paper focuses on issues of institutional design in the context of climate change policy. It examines proposals advanced in the June 2008 Draft and Final Reports of the Garnaut Climate Change Review ('Garnaut Reports'), and in the Government's July 2008 Green Paper and December 2008 White Paper on the Carbon Pollution Reduction Scheme ('Green and White Papers') with respect to how revenues raised by the sale of emissions permits would be used; and second, the proposed governance arrangements for the emissions trading scheme.

Key words: agency problems, climate change, corrective taxation, delegation, emissions trading, public economics.

1. Introduction

Arguably, the most important issue that the modern literature on institutional design focuses on is the task of providing accountability and effective monitoring of decision-making by bodies vested with the coercive powers of the state in a context where information is inherently limited, costly to acquire and asymmetrically distributed.[1] These information imperfections create scope for rent-seeking, which results in both an allocative inefficiency – in the sense that the policies pursued do not reflect underlying preferences – and in productive inefficiency, in that policy objectives are pursued at higher than efficient cost. While the conventional prescription for reducing vulnerability to rent-seeking is to insulate the policy process from interest group pressures, this conflicts both with effective accountability and with the need for policy to adjust to changes in preferences, information and choice sets. Further aggravating the difficulties is the inherent conflict between this need for policy adaptability on the one hand, and the contribution policy credibility and stability can make to the efficiency of policy on the other. These three

† Henry Ergas (email: ergas.henry@gmail.com) is Senior Economic Adviser at Deloitte Touche Tohmatsu.

[1] The underlying assumption is that effective monitoring will yield decisions that accord with the preferences of voters. Of course, voters may choose to structure institutions so as to achieve goals other than effective monitoring, but then that merely raises the question of how those institutions will be controlled. For a general discussion of institutional design, see Komesar (1997).

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elements of the institutional design dilemma – limited information, rent-seeking, and costly commitment – define a world where there are no solutions but only trade-offs.

Although these trade-offs are not very different across policy areas, the focus of this paper is on environmental policy. Within environmental policy, few areas are as high on the current agenda as climate change. I will therefore focus on climate change policy, and specifically on the proposals advanced in the June 2008 Draft Report of the Garnaut Climate Change Review ('Garnaut Report'), and in the Government's July 2008 Green Paper on the Carbon Pollution Reduction Scheme ('Green Paper') which is essentially reiterated in the September 2008 Final Report of the Garnaut Climate Change Review and the Government's December 2008 White Paper on the Carbon Pollution Reduction Scheme ('White Paper'). I note that in doing so, my paper is not intended to be a comprehensive critique of the Garnaut Report and the proposals emanating from that report and that the fact that I deal with only a few of the issues those reports raise should not be viewed as endorsing the stance they take on those issues that I do not cover.

Specifically, I will examine first, the proposals for how revenues raised by the sale of emissions permits would be used; and second, the proposed governance arrangements for the emissions trading scheme. Each of these raises interesting and important issues of institutional design, and of broader policy analysis. I will examine for each of these the broader principles of institutional design that are involved, and then apply those principles to the specific proposals.

2. Use of ETS revenues

According to the Green Paper:

> The Government has committed that every cent raised for the Australian Government from the Carbon Pollution Reduction Scheme will be used to help Australians – households and business – adjust to the scheme and to invest in clean energy options. (Green Paper, p. 277).

Revenues raised from the scheme have, in other words, been earmarked for outlays on adjustment, compensation and the promotion of 'clean energy', including through investment in low emissions R&D. These commitments have been retained in the White Paper (see Chapters 17 and 18).

Generally, the revenues raised through Pigouvian taxes are large relative to the direct efficiency changes those taxes induce.[2] This means that the efficiency with which those revenues are spent can dramatically affect the overall

[2] Simply put, this is because the revenues raised are a rectangle, while the efficiency change is a triangle.

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efficiency of the Pigouvian scheme.[3] It is therefore important to examine the extent to which the proposed earmarking is likely to encourage the efficient use of the revenues generated by the ETS.[4]

2.1 Earmarking generally

Earmarking, also commonly referred to as revenue hypothecation, can enhance the quality of public expenditure in three broad ways.[5]

First and most important, it has been argued that earmarking can signal the tax price of achieving particular outcomes and thereby improve accountability for, and public decisions about, public expenditure. For these improvements to occur, there must be a rational relation between the tax and the outcomes (so that the tax is a payment for the benefits, rather than serving some other purpose[6]), expenditures on the outcome must be determined at the margin by the tax (i.e. the hypothecation must have bite), and tax-payers must be able to monitor the linkage and the use of the revenues.

Second, it is said that earmarking could alter incentives for program administrators, including by constraining spending decisions and changing the marginal costs and benefits associated with alternative options. For example, where two activities are complements (i.e. an increase in the supply of one reduces the marginal cost or increases the marginal benefit of an increase in the supply of the other) but diligence in one is observable while diligence in the other is not, bundling the two and ascribing to them a dedicated revenue stream may be efficient.

Third, it has also been argued that earmarking may be a way of increasing the credibility of promises, reducing the inherent incompleteness of the implied contracts between government and the public. As well as any direct benefits arising from greater credibility of commitments, this may allow proponents of programs to signal the quality of the programs, of the proponents or both. For example, in the model of Brett and Keen (2000), a commitment to dedicate revenues to a particular use, which is of value to the public but would not be of value to a 'poor quality' politician, can

[3] This is one reason why the conventional prescription in the case of Pigouvian taxes is for the revenues to be used to provide lump sum transfers to tax-payers.

[4] Useful discussions of earmarking can be found in Bird and Jun (2005); Eklund (1972); Glazer and Proost (2007); Spackman (1997); Teja (1988) and Wilkinson (1994), among many others.

[5] See references cited in footnote 6 for an overview of benefits and costs discussed in the literature.

[6] Some hypothecation – such as the widespread linking of revenues from government lotteries to 'merit goods' such as education or culture – is obviously unlikely to improve the quality of public decision-making in that there is no meaningful sense in which the 'price' of culture at the margin is the loss of welfare associated with the holding of lotteries. As a result, the hypothecation does not signal the cost of expanding the supply of culture, will not induce revelation of marginal valuations of culture, and will not 'unbundle' tax-payer decisions about the supply of culture from other decisions.

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support a separating equilibrium in which politicians signal their quality to the electorate.

That said, there are also at least four important ways in which earmarking can reduce efficiency in public expenditures.

First, earmarking implies inflexibility in the allocation of revenues among competing uses. If the earmarking is substantive, in the sense of being effectively constraining, social rates of return are unlikely to be equalised at the margin across uses. Tax rates, expenditure levels or more likely both, will be distorted as a consequence.

Second, reserving revenues to a program gives it a monopoly over those revenues, encouraging and potentially perpetuating technical inefficiency in its supply.

Third, earmarking can facilitate rent-seeking by allowing the interest groups that benefit from the hypothecated revenue stream to more effectively focus their activities. Rather than competing against other interest groups for a larger share of general revenues, the relevant groups can limit their efforts to seeking an increase in (or protecting from erosion) the hypothecated tax. At the same time, the political commitment they secure is potentially made more credible by the earmarking, increasing both the 'price' the interest groups are willing to pay in exchange and the resources they are willing to dissipate in obtaining it. Rent-seeking coalitions therefore become easier to create and sustain, and the aggregate costs to the community from rent-seeking rise, as Kimenyi, Lee and Tollinson (1990) found in their study of the US Highway Trust Fund.

Fourth, these adverse consequences are made all the greater by the risk earmarking creates of fiscal illusion, i.e. of the hypothecated revenues not being as visible as other forms of public revenue and expenditure. The Garnaut Report provides a striking example of fiscal illusion when it claims that using revenues from ETS auctions for the earmarked purposes allows those purposes to be achieved 'without placing pressure on public finances' (p. 372) – ignoring the fact that devoting the revenues to those purposes has an opportunity cost.[7]

By and large, empirical studies of earmarking find that these harmful effects outweigh the positive effects hypothecation can have. For example, a series of recent, careful, assessments of earmarked transport programs in

[7] Arguably a comparison can be made here with hopes placed in the so-called 'purchaser provider' split model of government service provision which downplayed the fact that it tended to leave the purpose of government spending channelled through such models unscrutinised or at best does not resolve the need to periodically assess the purposes behind various forms of government service provision. For instance, commenting on the UK and New Zealand experience with such models in health, Street (1994) notes that: 'Experience from the UK and NZ suggests that it is unlikely that the problems of priority setting will be resolved by independent non-elected bodies. Although it may be valuable to have purchasing authorities promoting discussion of the issues, the questions of resource allocation cannot be avoided under a purchaser/provider separation any more than under other forms of health system organisation'.

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Europe – where congestion or road toll charges have been earmarked for public transport programs – generally find that the hypothecation has been wasteful.[8] First, putting income distribution consequences aside, congestion and higher road use charges should lead to lower subsidies and higher prices for public transport,[9] but hypothecation has caused the effect to go in the opposite direction, causing an efficiency loss. Second, many of the programs funded, or proposed to be funded, by hypothecated funds have had very low social rates of return, both in absolute and relative terms, to alternative uses of the funds. Third, any income distribution consequences of the changes in road pricing would be more efficiently dealt with through direct transfers,[10] rather than through public transport subsidies, which, given use patterns of public transport, are a poor way of achieving distributional goals.

2.2 Earmarking in the Garnaut Reports and the Green and White Papers

As the transport case illustrates, any assessment of earmarking needs to look to the specifics of the proposal, and the earmarking proposed in the Garnaut Reports (Draft and Final versions) and the Green and White Papers are no exception to this rule.

At the most general level, it seems obvious that the earmarking these documents propose bears no relationship to the Lindahl-Buchanan approach of benefits taxation. In particular, there is no sense in which the proposed charges are the 'tax price' of the outcomes being sought through the outlays. Moreover, there is no commitment to limit expenditures on those outcomes to the quantum of the revenues raised. Finally, the bundling of outlays on

[8] See de Palma *et al*. (2007).

[9] Subsidies to public transport are justified to a greater or lesser degree by the under-pricing of road use. When road use charges are set at (or closer to) Pigouvian levels, the efficient subsidy to other transport modes declines.

[10] The funds raised by the charges could then have been used to reduce other, more distorting, taxes. Elaborating on this point, the direct burden of taxation is larger than necessary to raise a given amount of revenue. This is because taxes alter individual incentives and economic decisions at the margin, and therefore affect economic outcomes at the margin and in the aggregate. In driving a wedge between bid and ask prices for economic resources, taxes eradicate the opportunity for individuals to exploit all gains from trade. Because the revenue raised is typically not sufficient to offset the value of the foregone gains from trade, the direct burden exceeds the revenue collected, and so most taxes are said to create an excess burden or deadweight loss. The size of this deadweight loss is proportional to the extent to which individuals divert resources towards lower valued uses in response to the tax. The marginal excess burden (MEB) of a tax describes how the excess burden changes as a tax is changed by a very small amount. Some taxes have higher MEB than others, but they may also raise more revenue at the margin. Thus, a natural measure of the welfare cost of a tax that can be used to compare the efficiency consequences of different kinds of taxes is the normalised marginal excess burden (NMEB) of a tax, which measures the MEB per dollar of revenue raised. By definition, a pure Pigouvian tax involves no deadweight loss, i.e. causes no excess burden. As a result, using the revenues from a pure Pigouvian tax to reduce other taxes increases welfare by the extent of the excess burden foregone.

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compensation, income support, spending for energy efficiency and for investment in 'clean energy options' undermines the transparency that is integral to the effectiveness of earmarked schemes of benefits taxation.

The resulting concerns are made all the greater by the specific proposed uses of the funds. While there has been extensive public discussion of the proposed compensation to more emissions-intensive industries, the other elements in the package can also be shown to be of concern.

First, some of the alleged market failures on which spending is to be targeted seem poorly thought through. The discussion of buildings in both documents is a case in point, with the Garnaut Report claiming, for example, that the fact that rented houses contain older, less 'energy-efficient' appliances than those found in houses owner-occupied evidences a market failure that should be addressed through subsidies and regulations (see for example section 17.3.1 of the Final Report).

However, rented accommodation may be older and/or generally lower quality than owner-occupied housing: usually, the most efficient way of providing lower quality accommodation is to build high quality accommodation and allow it to deteriorate over time.[11] As a result, rental housing will embody older vintages, and – as in the rest of the economy – it is incorrect to think that efficiency is increased by forced scrapping of vintages whose operating costs, though relatively high, are still less than the effective average total costs[12] of more recent equipment. Additionally, to the extent to which tenants value more 'energy-efficient' appliances at more than their effective average total cost, it is not obvious why this outcome would not be achieved through appropriate contracts with landlords. And if there is an impediment to that outcome being achieved, it seems more likely to lie in tenancy laws, which reduce landlords' incentive to invest in higher quality,[13] than in any market failure as such.[14]

All of this merely highlights the more general point, which is that especially when price signals are set correctly (as is the aim of the ETS), 'energy effi-

[11] See the discussion of equilibrium in the housing market in O'Flaherty (2005) at pages 410 and follows. The intuition behind this result is simple. Assume the objective is to provide low quality, rental, accommodation in ten years' time. One way of doing this is to set aside today an amount sufficient to build such accommodation at that time. The alternative is to build high quality accommodation now and allow it to deteriorate gradually over time. So long as the rental rate on high quality accommodation is more than the interest rate, the latter alternative will dominate. In equilibrium, the rental rate will decline to the point which just makes these options equivalent.

[12] These costs are higher than average total costs for owner occupiers, both because of transaction costs and because of higher rates of depreciation associated with moral hazard (i.e. the tendency of tenants to take less care of equipment they do not own).

[13] See again, O'Flaherty (2005) at pages 372 and follows.

[14] Capital market rationing is sometimes said to lead to inefficiently slow scrapping of outdated vintages of consumer durables. While this is obviously possible, the same capital market failures would affect a wide range of household investment decisions, and it is not clear why welfare would be improved by addressing them in respect of one type of appliance (namely, those that are especially energy intensive). Moreover, capital market rationing is not likely to affect investment decisions by landlords.

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ciency' is not a sensible goal in itself, any more than is 'making Pavlovas using less passionfruit', as it may indeed be efficient in an overall sense to use more energy per unit of output rather than less in particular situations.[15]

Second, while there likely is a case for promoting innovations that reduce the carbon intensity of output, the approach proposed in the Garnaut Reports and the Green and White Papers seems flawed. The essence of this approach is to link the funding of this R&D to ETS receipts, and through that linkage, increase outlays on that R&D substantially.

However, this straightforwardly positive linkage between the funding of these innovations and receipts from the sale of emissions permits does not fit economic logic. A straightforward application of the Sandmo rule for Pigouvian pricing in the presence of substitutes (Sandmo 1976) dictates that the greater the likelihood of investment in low emissions R&D succeeding, the lower should be the current ETS price and hence the receipts from the ETS, which goes in the opposite direction of the crude linkage between receipts and outlays facilitated by the earmarking proposal. As a result, the linkage is likely to distort the carbon price, the volume of resources devoted to low emissions R&D, or both. More importantly, rather than providing a dedicated revenue stream for low emissions R&D, it seems preferable to include realistic estimates of any positive externalities in the assessment of the benefits from R&D proposals generally, and then subject those proposals to the same decision criteria, regardless of the technology or industry to which they relate.[16] To the extent to which the general process for allocating R&D funding is flawed, this is best addressed through a review of current policies promoting innovation. This is consistent with the Tinbergen-Mundell insight that if a policy instrument can directly address a market imperfection then it should be relied on, rather than an alternative instrument that can only indirectly address the issue.[17] This is because any indirect intervention distorts economic choices, and is likely to have a weaker impact on the intended indirect target than direct regulation, and the impacts of the indirect approach are likely to be harder to predict than those of the direct approach.

In contrast, the approach proposed by the Garnaut Reports and the Green and White Papers would distort the allocation of resources as between competing uses of scarce R&D resources.

[15] For instance, the rental housing may actually be provided at minimum social cost, even if it involves using older appliances that have higher energy use than do the most recent vintages. It is an obvious fallacy to think costs are minimised by constantly scrapping older vintages so as to always use equipment of the most recent vintage.

[16] There is no reason to believe this is more difficult for low emissions R&D than it is for other types of R&D, but even if it were, this could be dealt with by applying a mark-up to the measurable benefits.

[17] Tinbergen (1956). The principle was later elucidated by Mundell in the area of macroeconomic management. The resulting Tinbergen-Mundell approach states that there must be as many independent policy instruments as there are policy targets and secondly that a policy instrument should be assigned to the policy target on which it has the maximal effect. See Mundell (1962).

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These distortions are likely to be all the greater given that the supply of research scientists and engineers is likely to be relatively inelastic, even in the medium term. Additional earmarked funding for one type of R&D is then likely to merely increase payments to scientists and engineers as the favoured form of research bids resources away from other, less favoured, types of R&D.[18] The fact that assessments of earmarked R&D projects find that the earmarked funding increases the output of scientific research, as measured by number of publications, but that the publications have relatively low citation rates, suggests that these displacement effects can be socially highly costly.[19] Accentuating these concerns is the more general finding that especially 'but not solely' for basic research, progress primarily reflects scientific and technological opportunity, and attempts to speed up the rate of progress lead to rapidly decreasing quality, rapidly rising costs, or both.[20] The frequently observed inefficiencies in the selection and governance of large publicly-funded R&D projects only make these risks more acute.[21] The inefficiency arising from distorting the pattern of R&D would then be compounded by ineffectiveness in actually promoting scientific and technological advance.

Finally, to the extent to which the results of low emissions research are indeed a public good, or at least confer substantial benefits on the world as a whole, that needs to be taken into account in determining the appropriate level of funding, exactly as we would in other areas.[22] This is even more plainly the case where the results of that research (for instance, in renewables) could reduce world demand for (and the prices we receive for) Australian exports, for instance of coal.[23] In that case, increasing funding for those technologies could involve a two-fold loss to the Australian economy, as Austra-

[18] The impact of the elasticity of supply of scientists and engineers was discussed in Ergas (1984) and is examined in Goolsbee (1998). The fact that (according to ABS 81090DO003_200607) environmentally-related R&D already accounts for 20 per cent of all Government-funded R&D in Australia, exceeding health and defence, and only slightly less than is spent on primary industries, itself suggests that further expansion may be difficult and highly costly.

[19] See for example Martin (1992) and Payne (2002). Typically, these studies refer to congressional earmarks in the US, rather than to hypothecated funding as such. However, the causal mechanisms that lead to poor quality outcomes are likely to be similar – the restriction of competition for the funding and the fact that with given funding, the scarcity of high quality projects means that some low quality projects will be funded.

[20] The hypothesis that the underlying rate of scientific progress is not all that responsive to rates of effort was famously set out by Derek de Solla Price, see for example de Solla Price (1986) at pages 92 and follows. See also for basic research Stephan and Levin (1992). George Stigler's well-known 'law' (in Stigler 1984) that at any one time, there are no more than 14 really first class scholars in any field of research, is fully consistent with de Solla Price's results.

[21] See for example Jewkes *et al*. (1969); Henderson (1977); Ergas (1984, 1987); Finon (1989); Keck (1988); and Cohen and Noll (1991).

[22] See for instance Alston and Mullen (1992) and Alston *et al*. (2004).

[23] Obviously, the same issues arise if the R&D results in supply shifts that transfer surplus to foreign consumers, as would occur for example, if exports are a significant share of output and the supply shift is pivotal rather than parallel.

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lians would pay both through the increased price of carbon emissions and through the loss of income consequent on the use of the technology.

Third, the proposed compensation to low and middle income earners may be both unnecessary and inefficient.

The case for that compensation is explained in the Green Paper in terms of the higher share of emissions-intensive goods in the consumption baskets of low income households and is reiterated in the White Paper (Chapter 17). However, what would seem to matter more from an equity perspective is the share of those goods in the consumption of low consumption households, as some households (notably the elderly) with low incomes may be living off accumulated capital and in that sense, not be particularly disadvantaged. Indeed, US evidence suggests that while the emissions intensity of consumption is relatively high for low income households, it is not equally high for low consumption households, and the income-related gap in emissions intensity is even lower when income is measured on a life-time basis (thus eliminating the effect of transitory income shocks).[24] As a result, it remains to be demonstrated that the price changes consequent on an ETS will cause disproportionately large real income losses for disadvantaged households.

That said, truly disadvantaged households in Australia are likely to be recipients of government pensions and other benefits, and those payments are indexed in a way that appears to cope relatively well with relative price shocks.[25] As a result, the Government's commitment to provide compensation above and beyond the effect picked up through benefit indexation suggests a real increase in benefit levels. The justification for such an increase is unclear. It is even less clear why specific compensation would also be provided to middle income households. As for the notion, suggested in the Green Paper (see for example page 80), that the budgets of those households, i.e. of the vast majority of Australians, could be fully compensated for the impact of an ETS, it seems difficult to reconcile with the fact that introducing a binding carbon tax must impose a cost on the economy and hence reduce at least some real incomes.

Be that as it may, the effect of thus providing compensation, in a way slanted to low and middle income earners, would be to increase the effective progressivity of the tax/benefit structure, i.e. the effective marginal tax rate on labour incomes. However, it seems likely (Bovenberg and de Mooj 1994 and Parry and Oates 2000) that a carbon tax will itself increase the tax on labour relative to leisure, thus accentuating the disincentives to work arising from the tax structure.[26] Further increasing the distortion,

[24] Hassett *et al*. (2007).

[25] See the estimates of growth in the real value of pensions provided in Harmer (2008), for example at pages 77–78.

[26] While Australia has a relatively low average tax rate on labour income by OECD standards, the progressivity of the personal income tax structure is relatively high. See OECD (2007).

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thereby increasing the economic cost of the carbon tax, seems very difficult to justify.

In short, the proposed earmarking does not seem likely to increase the quality of public expenditures. Rather, the earmarked expenditure programs appear to be of low quality, at least from the standpoint of aggregate welfare. It would likely be greatly superior to use the revenues from the scheme to reduce distorting tax rates, for instance, by flattening the structure of the personal income tax.

Indeed, as explained by Fullerton and Metcalf (2001), this policy prescription – that the revenues collected through the sale of pollution permits should be used to fund reductions in other, distorting, taxes – is fairly robust. In effect, the revenue raised from the sale of the permits reflects a scarcity rent associated with restricting access to the pollutant. The effect of that scarcity rent is to increase production costs by more than the minimum necessary, as firms must both incur the 'real' outlays associated with reducing emissions and pay the tax. This will reduce real net wages, with adverse consequences for labour supply. It is difficult to do better, from an aggregate welfare perspective, than to use the revenues to offset this effect through a reduction in other taxes on production.

In contrast, the earmarking proposed in the Garnaut Report and the Green and White Papers seems likely to inflict a double loss on the Australian economy: the loss associated with the increase in production costs; and the loss associated with wasting the funds raised through the sale of permits.

3. Scheme governance

I turn now to the issues associated with scheme governance. Attention here focuses on the question of where responsibility should lie for determining the path of emissions, administering targets and allocating compensation, and what role, if any, should be played in these by a carbon 'central bank'. The more general question is that of the appropriate division of labour between differing kinds of institutions, notably executive government (Ministers and their departments, answering to parliament) on the one hand, and what are often referred to as 'non-majoritarian institutions' (such as independent agencies and courts) on the other.[27]

These non-majoritarian institutions reflect the delegation, by the electorate as the principal, of authority to an agent, with the extent of that authority being defined by the scope of the delegated powers (in substance, the policy discretion) granted that agent relative to the control instruments (i.e. powers to shape, constrain, reverse or annul outcomes) on which the princi-

[27] Such an institution can be defined as one that (a) possesses and exercises a grant of specialised public authority separate from that of other institutions, and (b) is neither directly elected by the people nor directly managed by elected officials. See Thatcher and Sweet (2003) at page 2 and also Vibert (2007).

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pal can rely. While non-majoritarian institutions play a wide variety of roles in democratic systems of government,[28] and have an especially long history in Australia,[29] two efficiency objectives that can be served by thus delegating powers are of particular interest. These are first, resolving commitment problems, i.e. enhancing the credibility of actual or implied promises, and second, reducing vulnerability to rent-seeking.[30]

These objectives can be enhanced by delegation if delegation confers what can be very loosely described as 'greater distance' from immediate pressures and provides incentives for those to whom power is delegated to act in ways that reflect that 'greater distance' while nonetheless conforming to the public interest, at least in some net sense.[31] As with earmarking, there is a 'tying the hands' effect, in which, in principle, governments improve outcomes by reducing the scope of their discretionary powers. Inevitably, that reduced scope has some cost, and the issue is whether that cost is worth bearing. In considering that issue, I will deal first with the question of the credibility of long term commitments and then with that of rent-seeking.

The credibility of commitments becomes especially important when it is desirable for economic agents to make investments that have an element of irreversibility in reliance on actual or implied policy promises, and which hence are vulnerable to loss should those promises not be kept. Time inconsistency is the canonical form of this commitment problem in economics, with the term referring to situations in which conduct by a policy-maker that is rational *ex ante* is not (and is known not to be) rational *ex post*, so that rational actors will discount the probability of a commitment to that conduct being maintained.

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[28] See for instance Holmes (1995).

[29] Thus, Parker, writing in the 1960s, noted the 'long established habit, carried further, perhaps in Australia than in any other advanced society, of institutionalising the resolution of conflicts over the allocation of values. Its central feature is the attempt to remove important allocative decisions from a process of *ad hoc* bargaining or trials of strength, based on the relative power of competing interest groups, to a system of adjudication by committees, boards, tribunals, departmental agencies, autonomous corporations and similar institutional devices': Parker (1965), pp. 88–89; see also Hughes (1980) for a more extensive review of the history and role of delegated powers in Australia.

[30] A third efficiency objective often ascribed to these institutions is that of overcoming information asymmetries in technical areas of governance through the development and deployment of specialised expertise. However, it is not apparent, as a general matter, why similar expertise could not be secured within executive government, and there is little evidence that non-majoritarian institutions enjoy a clear advantage in this respect relative to executive government, for example in the Australian system of government. That said, where the primary reason for delegation is to secure access to expertise, one would expect the relevant agency to have limited substantive decisional independence, for instance, in terms of making and implementing policy. This is consistent with the observations in Thatcher and Stevens, who find that 'expertise based' agencies are more likely to have what amount to advisory roles (or at least, are more readily over-ruled) than do agencies that seem aimed at addressing credible commitment and rent-seeking issues.

[31] In other words, the gains from the delegation exceed the costs in terms of reduced responsiveness to community preferences.

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The problem of time consistency is readily illustrated. Consider a central bank facing a trade-off between inflation and unemployment, in which current inflation depends also on expectations of inflation in the future (Schaumburg and Tambalotti 2007). The credible announcement of a future policy tightening, in excess of that needed to curb current inflationary pressures, lowers inflationary expectations, thereby easing today's trade-off. Given that, it is optimal for policy to seek to exhaust the marginal benefits of this announcement effect. However, once the recession this tightening implies arrives, the optimal policy is to reverse course, renege on the announcement and avoid the recession. But for the original intention to have the desired effect, it must be believed to be credible – in other words, for the sacrifice ratio (the cumulative increase in unemployment that is due to the disinflation effort divided by the total decrease in inflation) to be improved, investors, wage-setters and other price-making actors must believe that the central bank will not deviate from the policy it has announced, regardless of the consequences. The lower the probability attached to the central bank staying the course, the less effect the announcement will have on the costs of disinflation.

At least analytically, a similar issue of time consistency arises in respect of pollution taxes, in so far as the objective of those taxes is to induce investment, including through innovation, that once made is sunk.

Laffont and Tirole (1996), for example, model a pollution tax that is intended to promote low-pollution innovation, where the innovation, once made, has low constant marginal costs. The government issuing the permits can then act opportunistically, expanding (or threatening to expand) the supply of permits post-innovation, reducing the innovator's bargaining power with respect to potential users. *Ex post*, this allows the government to pursue its objective of reducing pollution at lower social cost; however, the likelihood of this time inconsistent behaviour reduces the *ex ante* incentives to innovate, thereby increasing costs overall. The greater the likelihood of *ex post* opportunism, the higher the aggregate social costs will be of achieving the pollution reduction target.[32]

When the *ex post* profitability of innovation depends on artificial scarcity – as is the case in an ETS – there is a risk that does not arise in other contexts: that to expropriate the innovator, government may not need to modify intellectual property rights (which would likely be highly politically costly) but can simply rely on its ability to alter the supply of pollution rights. As with time consistency risks generally, the scope this offers for opportunistic conduct will deter otherwise efficient investment.

In Stanley Kubrick's 1964 film 'Doctor Strangelove', the time consistency problem is solved through a commitment technology – the 'doomsday machine' – that once put in place, will, in the event of a surprise nuclear

[32] Additionally, it can be shown that the slower the rate at which the new technology is likely to become obsolete, the greater the incentive for the permit issuer to act opportunistically. See Levine *et al*. (2005).

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attack, automatically 'destroy all human and animal life on earth', despite the fact that it 'is not a thing a sane man would do'.[33] In the economic literature, the institutional equivalent of the 'doomsday machine' is the independent central bank, which, vested with the discretion to control inflation, does not succumb to the temptation to seek short term gains in real output at the expense of long term price stability.

This occurs because the central bank, unlike the executive government, does not internalise (or internalise to the same extent) the political benefits that short term output expansion would create. In other words, by delegating the control of inflation to the central bank, the government severs the costs and benefits of the inflation–real output trade-off, assigning the price stability objective to an agent whose benefits depend mainly or solely on the inflation rate. In its simplest form (often referred to as 'Rogoff delegation', after Rogoff (1985)), this is done by vesting control of the central bank in individuals who are especially 'conservative', in the special sense of having an unusually strong aversion to inflation, i.e. having a utility function in which immediate real output gaps have little weight relative to long run price stability. Given those preferences, commitments to price stability will be regarded as credible, reducing the costs of disinflation.[34]

Whether this account of central bank independence is plausible is a matter of intense debate, both as regards the solidity of its theoretical foundations[35] and its empirical relevance.[36] So too is the question of whether, as a factual matter, central bank independence, however defined, actually reduces the sacrifice ratio, with perhaps the best that can be said being that the case in favour of independence is not proven.[37]

That said, it may be that time consistency issues would have greater weight in the context of the introduction of an entirely new set of 'fiat rights', such as those involved in an ETS.[38] This view is expressed in the Final Garnaut

[33] The underlying principle of seeking to achieve deterrence through credible commitments to mutual assured destruction is classically set out in Schelling (1980). The origins of this principle are discussed in Ayson (2004).

[34] The same outcome can be achieved by other means, for instance, by assuming the central bank owns a 'reputational capital stock' that would be devalued in the event of time inconsistency, making deviation from an anti-inflation stance costlier for the central bank than for other decision-makers.

[35] See notably McCallum (1995, 1997). More generally, any credible account of central bank independence that justifies independence on the basis of time consistency must explain why the arrangement is not vulnerable to renegotiation, especially if politicians would, in fact, derive significant benefit (even if only short term) from acting in a time-inconsistent manner. This inevitably goes to issues of political structure, which are discussed in Keefer and Stasavage (2003); Lohmann (2003) and Moser (1999).

[36] For example, Bell (2004), in his review of the development of central bank independence in Australia, concludes that time consistency issues played no role.

[37] See for example Berger *et al.* (2001), who conclude that independence does not reduce, and may in some conditions actually increase, the sacrifice ratio, and more recently, Crowe and Meade (2007), who find that any significant relation between central bank independence that may have been found in earlier data sets no longer persists.

[38] Lohmann (2003) discusses 'fiat institutions' and their credibility.

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Report, which notes that 'markets can quickly collapse if their credibility is shaken. This is all the more pertinent for markets that owe their existence solely to government decree' (page 323). However, to the extent to which the key issue is that of underpinning confidence in irreversible investments in abatement (that is, abatement investments whose profitability depends on the path of future carbon prices), this leads to somewhat different conclusions than might be initially thought.

In particular, unlike the central bank case, where the bank must be assumed to have (or be induced to act as if it had) an unusually strong preference for price stability, in an ETS, the entity setting policy, were it seeking to overcome perceived risks of time inconsistency, would need to place a particularly high weight on industry profits, as compared to abatement.[39] This is simply because *ex post* (that is, once successful innovation has occurred), the greater the weight placed on abatement, the greater the attractiveness to the agency of acting opportunistically, forcing down the price of the new technology and thereby securing widespread use. What is therefore required *ex ante* is a credible commitment to forego what in *ex post* terms are socially profitable opportunities for abatement, thereby increasing the expected return on investment in innovation. Moreover, the greater the uncertainty about the fixed costs innovators will incur, the greater must be the willingness to allow prices *ex post* to be marked up above cost, thereby further reducing *ex post* abatement.[40] The arguments here for fixing the appropriate scope of governmental discretion in the determination of a carbon price therefore has some overlap with the arguments addressed in the academic literature on sovereign or regulatory risk, and on regulatory takings and eminent domain, which also deal with the tendency of governments in the absence of appropriate constraints on their discretion, to intervene in a manner which could adversely damage investment incentives.[41]

[39] This is similar to the utility regulation case, discussed in Gilbert and Newbery (1994) and Levine *et al.* (2005).

[40] There is, in other words, an information rent, which in expectational terms, must be greater, the greater is the information asymmetry about the cost of the innovative technology.

[41] For an overview of the implications of regulatory risk and its consequences for investment in infrastructure industries see Ergas *et al.* (2001). For a general overview of the economic effects of uncertainty, including through regulation, on investment incentives, see Dixit and Pindyck (1994). On regulatory takings and eminent domain, see for instance, Blume *et al.* (1984) and Miceli and Segerson (1994) who study the problem of how the regulator is 'captured' by anti-development interests and would weigh the benefits of regulation only against direct fiscal outlays (compensation payments). This gives rise to the conclusion in these papers that costs borne by property owners are given no weight in the regulator's decision and therefore the requirement for compensation can increase efficiency of regulatory decision-making by forcing the regulator to internalize otherwise unweighted costs. Expanding on this, Fischel and Shapiro (1988) find that positive (though not full) compensation is desirable when regulatory decisions are expected to be made on the basis of majoritarian voting or by median-voters. Schieffer (2007) reviews the past literature on these areas and sets out the conditions under which full compensation can be justified on efficiency grounds but also attaches a caveat to this result where the government faces budget constraints and limited powers of taxation.

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What the relevant theory would recommend, in other words, is selecting as the agent setting future price paths an agent who places an especially low, rather than an especially high, weight on abatement, relative to industry profits.

Of course, such an assignment of policy responsibilities would have costs, as well as potential benefits. So as to limit monitoring and agency costs, delegation is frequently accompanied by rigid rules, which must impede the response to new information, including changes in the public's preferences. Moreover, so as to allow economic actors to distinguish opportunism on the one hand, from justified changes in policy conditional on new information on the other, the institution itself needs to rely on rule-conforming behaviour, even when that is costly.[42] This is especially likely to be true when institutions are relatively new. Finally, the stress on rule-conformity in decision-making is likely to be especially great when agency performance is difficult to measure in terms of outcomes, or when the relation between instruments, outputs and final (welfare-determining) outcomes is uncertain. All of these factors are likely to be relevant in the context of a carbon 'central bank'.

The greater the need for ongoing flexibility, the higher the cost of rule-oriented delegation will be. As well as those direct costs, delegation of a specific task (such as that of setting a path for future emissions reductions) may prevent the 'bundling' of responses to new information with other policy instruments, with the failure to secure economies of scope as between these instruments causing an efficiency loss.[43]

In practice, new information will emerge not only with respect to the climate change policies of other countries – as is stressed by both the Garnaut Reports and the Green and White Papers – but also about the severity, or otherwise, of climate change as a problem and the costs and benefits of addressing it. As a result, it seems important to retain the flexibility to amend policy, and to have direct political accountability for that policy, enhancing the likelihood of a timely response. This suggests that it is indeed desirable to locate responsibility for setting the emissions path, and the political accountability for that path, directly in a Minister, rather than delegating that responsibility to an independent body (whose

[42] Indeed, an agent that is seeking to develop and preserve a reputation for time consistency faces the problem that the parties with respect to whom it seeks that reputation can find it difficult to distinguish the response to new information from opportunistic conduct. The extent of the problem can be reduced through transparency of decision-making, and there is a significant trend among central banks towards ever greater disclosure – see for instance Mahadeva and Sterne (2000). However, given that disclosure is never complete, and explanations of actions may be viewed as self-serving, some part of the burden of establishing and retaining credibility is borne by adherence to simple, observable rules, such as the Taylor Rule in monetary policy. Adherence to these rules inevitably involves a loss relative to the first best response to new information. This is another form of the 'rules versus discretion' issue.

[43] The costs of delegation are analysed in Alesina and Tabellini (2007a,b).

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response would be hindered by its statutes and operating rules[44]). The fact that decisions as to the trajectory of emissions reductions can have such major effects on Australia's prosperity, and are not capable of being reduced to a clear and fixed formula or set of rules that a third party could be given responsibility for implementing, make the case for direct Ministerial responsibility all the stronger.[45]

To that extent, an independent agency should not have 'outcome independence', i.e. the scope to set its own targets. This is perhaps comparable to the position of the Reserve Bank (which under the Statement on the Conduct of Monetary Policy has an inflation target set by the Government[46]), though such an agency would also have less 'instrument independence' (i.e. control over the mix of instruments) than has the RBA. In effect, under an ETS without price caps, the objective and the instrument essentially coincide, in that setting the emissions reduction path automatically determines the volume of permits to be issued. As a result, the agency's role, as far as the ETS itself was concerned, would seem to be relatively narrow and essentially regulatory (i.e. ensuring compliance), though it might have some responsibilities for monitoring and better promoting efficiency and stability in the secondary market. Whether this is an appropriate or sensible role for an agency that might otherwise not require much substantive economic and financial expertise is an open question.

In short, while there may be issues associated with time consistency, it does not seem that they warrant the delegation of responsibility for setting emissions reduction trajectories to a 'carbon central bank'. Absent that responsibility, such an entity would, in an ETS without price floors and ceilings, have a rather limited decision-making role, certainly compared to the RBA, as the Government's decisions about the emissions trajectory would effectively determine the settings for the primary instrument (the volume of permits).

The Garnaut Reports and the Green and White Papers suggest the agency should also be given responsibility for addressing compensation claims, pre-

[44] The literature on central bank independence stresses that for the independence to be credible, it must be costly for government to alter the mandate and operations of the central bank. As a result, effective delegation involves constructing bulwarks against change. The need to then maintain controls against misbehaviour by the agency then induces the imposing of further constraining rules, to an extent that depends on the costs and likelihood of misbehaviour.

[45] The impossibility of devising such a formula, and the high error costs involved in an inappropriate decision, would make monitoring costs very high, undermining the efficiency gains from delegation. It can be shown that the smaller the extent to which the agent's behaviour can be made to be rule-bound, and the higher the costs of the inappropriate use by the agent of its discretion, the greater the other limitations that must be placed on its substantive capabilities – see generally Komesar (1997). As these limitations erode the quality of the agent's decisions, they reduce and may entirely eliminate the net gains from delegation.

[46] The scope of the RBA's statutory independence is controversial, but in practice, likely to be substantial by convention. That said, the RBA does not have the degree of statutory or practical independence of the European Central Bank, which both sets its own objectives and controls its choice of instruments.

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sumably so as to reduce the costs of rent-seeking. This assumes that independence provides assurances against rent-seeking, which runs counter to both theory and experience with regulatory agencies.[47] These suggest that the costs of rent-seeking (including by the agency itself) are not effectively constrained by the mere fact of distance or otherwise from the political process. Rather, they are best constrained by a combination of first, procedural safeguards, including constraints on the forms and nature of interaction between the parties seeking the relevant rents and the decision-maker;[48] and second, by narrowly confining discretion in the determination of claims, both through clear rules that can guide the disposition of those claims and by providing for substantive rights of review. Given such constraints on discretion, the allocation of the initial decision-making power – be it to a Minister, a Ministerial Department, or a statutory agency – is not likely to be of great significance.

4. Conclusions

The introduction of an ETS would be an event of obvious significance for Australia's economic prospects. Designing the institutional arrangements for such an ETS raises important questions about how to deal with the constraints arising from limited information, with the risks of rent-seeking and with problems of policy credibility.

The standard recipes for dealing with these issues involve a broad range of options, including earmarking of revenues, as a way of improving public choice, and the delegation of key decisions to independent agencies, so as to enhance policy credibility and reduce vulnerability to rent-seeking. This paper has examined those options, both so as to clarify the general principles involved and to assess their applicability to the specific proposals made in the Garnaut Reports and the Green and White Papers. As noted in the Introduction, this paper does not pretend to be comprehensive in its critique of these reports and in particular of the proposals emanating from the Garnaut Reports. Such a critique would ideally tackle a range of other issues, for instance relating to its discount rate assumptions and the choice of a trading scheme over a carbon tax.

Four broad conclusions can be drawn from the discussion.

First, while earmarking can have merit, the specific proposals advanced in the Garnaut Reports and the Green and White Papers do not. These

[47] See Dal Bó (2006) for a recent survey of the relevant literature.

[48] Thus Komesar (1997) stresses the role constraints such as the adversarial and public nature of litigation place on the extent to which courts are vulnerable to rent-seeking relative to administrative agencies. In a classic article, Vilhelm Aubert explained the 'formalism' associated with adjudication as a means of converting the parties involved into 'professional strangers', limiting the scope for improper influence to be brought to bear: Aubert (1967), p. 45. Fuller (1978) explains that this 'formalism' is only effective where disputes can be resolved into matters of right, and highlights the tendency of 'polycentric disputes' (which lack clear 'guiding principles') to degenerate into forms of adjudication that are merely 'a kind of continuation of bargaining behind closed doors': Fuller (1978), p. 397.

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proposals are more likely to reduce efficiency than to enhance it. The community would be better off if the revenues raised through the ETS were used to reduce other, more distorting, taxes.

Second, there may be an issue of time consistency in respect of an ETS, and to the extent to which there is such an issue, the effect would be to reduce otherwise desirable investment and innovation. Were such an issue to be dealt with by delegation of responsibility for setting the emissions trajectory to an independent 'carbon central bank', that bank, if it is to give investors confidence that their investments would not be expropriated, would need to develop a reputation for placing greater weight on industry profits than on abatement. This is the opposite of what is commonly supposed.

Third, delegation of responsibility for setting the emissions trajectory to an independent 'carbon central bank' would not, however, be costless. Rather, so as to reduce agency costs, any delegation is likely to require the entity to operate according to fairly tightly defined rules, which limit the extent to which it could respond to new information. Moreover, delegation to a specialised agency would reduce the ability to achieve economies of scope across policy areas, imposing further costs. Given the many uncertainties that surround the science, economics and international politics of climate change, it would seem preferable to retain Ministerial responsibility for setting the emissions trajectory. As a result, any 'carbon central bank' would have little or no 'outcome independence' and (in an ETS without price caps and floors) very limited 'instrument independence'.

Fourth, delegation to such an independent entity of the responsibility for determining compensation claims is no panacea against rent-seeking. In effect, theory and experience suggest that the mere fact of independence has little impact on the extent of rent-seeking and may indeed create rent-seeking opportunities for the independent agency itself. Rather, rent-seeking costs are best reduced by setting out clear rules for the allocation of any compensation, formalising the processes involved in seeking and obtaining compensation, and providing substantive rights of review of decisions. With those in place, the location of decision-making powers at first instance is of limited significance. Given that, it is a matter of opinion whether there is a clear case for establishing an independent agency, especially since its role should be so limited.

All of this suggests a far simpler institutional design than proposed in the Garnaut Review and the Green and White Papers, with no earmarking of revenues and little role for new institutions. However, these conclusions seem out of step with the spirit of the times, and it is worth concluding on why that might be the case.

In his famous 1935 study of the US tariff, Elmer Schattschneider observed that 'within limits, every regime can choose and formulate the pressures to which it will be subjected.' Thus, through 'the protective system', governments 'stimulate the growth of industries dependent on this legislation for their existence'. It is these industries, he noted, that 'form the fighting legions

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behind the policy.' Equally, 'the losers adapt themselves to the new conditions imposed upon them, find themselves without the means to continue the struggle, or become discouraged and go out of business.' By these means 'new policies create a new politics'.[49]

Indeed, shaping such a 'new politics' is fundamental to successful policy entrepreneurship, which requires developing actors and coalitions that can support and sustain the policy into the future. It does not seem far-fetched to suggest that the institutional designs set out in the Garnaut Review and the Green and White Papers pursue this objective, rather than being informed by the grander goals of economic efficiency. In other words, the complexity and non-transparency of the Scheme as proposed to date may well be a 'feature' rather than a 'bug' to some of its most avid supporters among the interest groups that may stand to benefit from it.

Thus, even putting aside the payments to emissions-intensive firms, the earmarking provides a very substantial stream of net revenues to scientists and engineers, as inelastic supply encounters a significant increase in spending, driving up prices. Moreover, the greatest rewards would go to those scientists and engineers involved in emissions-related research, cementing a community that has been, and could remain, a strong supporter of an ETS. At the same time, the earmarking promises what could be substantial side payments to low and middle income earners, reducing the opposition to rising implied carbon prices. Further support would come from industries receiving compensation, especially if that compensation locked in rents that increased with the ETS price. However inconsistent these uses of the ETS revenues are with standard welfare maximisation, and however fallacious the notion that everyone (or nearly everyone) can be compensated for the costs of a scheme that must reduce real income, they may well be highly politically efficacious.

At the same time, any independent agency created to operate the ETS would likely be an additional advocate for the scheme, much as has happened with such agencies in many other policy domains. Moreover, such an agency might well have the ability, through the allocation of compensation revenues, to create coalitions that unconditionally support its efforts, reducing rather than enhancing the scheme's long run efficiency.

In short, institutional design is likely to be shaped first and foremost by the primacy of politics. The pity of it is that the economic costs could be so high.

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[49] Schattschneider (1935/1974), p. 288.

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