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Carbon Pricing and Equity

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Introduction

The problem of stabilizing the global climate is one of the most urgent, complex and intractable issues facing the world today. Everyone in the world contributes, to some degree, to the emissions of greenhouse gases that cause climate change, but some contribute far more than others. Conversely, everyone will be affected by measures to reduce emissions. Further while the world as a whole will be substantially better off if the global climate is stabilized, there will be net economic costs compared to the (hypothetical) case where the problem of human-caused climate change had never arisen, or where a cost-free technological solution was available.[1]

In this context, problems of equity loom large. Who should bear the direct costs of reducing carbon emissions, and who, if anyone should be compensated for those costs. These questions arise in allocating the burden between countries, between generations and between households within a country.

The aim of this paper is to provide a basis for understanding these issues. The primary focus is on questions of equity between Australian households, as they relate to the proposed introduction of a carbon price, and the associated package of compensation and adjustment measures.

The problem of climate change

Climate change has been described as 'the greatest market failure the world has seen' (Stern 2007). Global temperatures are rising rapidly, by comparison with the natural fluctuations observed in available temperature records. The primary cause is emissions of greenhouse gases, the most important of which is carbon dioxide, as a result of human activity. The consequences of a 'business as usual'

[1] It is for this reason that claims that the problem of climate change is fictitious, or that technology will fix the problem without any need for a policy response are so appealing to some groups in the community.

(BAU) approach to climate change will be adverse and may be serious or even catastrophic.

The world is a long way from reaching a binding global agreement on reducing carbon dioxide emissions. Nevertheless at the most recent conference of parties to the UN Convention on Climate Change, held in Cancun in 2010, most governments agreed that it was important to limit climate change to 2 degrees of warming relative to the pre-industrial level. On the best available estimates, this is consistent with stabilization of atmospheric concentrations of carbon dioxide at 450 parts per million (ppm).

Stabilization at 450 ppm implies that global emissions of CO2 need to be reduced by about 50 per cent by 2050. As will be discussed in this paper, an equitable sharing of the international burden will require wealthy countries, which currently have much higher emissions per person to reduce those emissions to levels more comparable with those of poor countries. As a result, a 50 per cent reduction in average emissions will require substantially larger reductions of 80 to 90 per cent for wealthy countries such as Australia.

The Australian government currently proposes to …

Ideas about equity

There are at least two different conceptions of equity that are relevant in setting carbon prices and in deciding how to allocate the revenue raised from a carbon price.

The first conception starts with the observation that the capacity of the atmosphere to absorb emissions of carbon dioxide [2] is limited, and the

[2] Most of these points apply to other greenhouse gases such as methane. However, carbon dioxide is the most important greenhouse gas, and that the current Australian policy is focused primarily on setting a price for emissions of CO2. So, in this paper, attention will be confined to carbon dioxide.

consequences of excessive emissions are borne by everybody on the planet, now and in the future. So, in the absence of carbon prices or other rules, those who burn fossil fuels are appropriating, without any compensation, part of that absorptive capacity, leaving less for everyone else.

It is inequitable that those with access to the resources and technology required to burn fossil fuels should be free to do so, imposing negative consequences on everyone else. On the other hand, energy is essential to every aspect of modern civilisation, and there is no easy and immediate way of ending the use of fossil fuels.

The inequity associated with unrestricted use of fossil fuels applies between countries, over time and between businesses and individuals within countries. Imposing a price on carbon dioxide emissions is one way of responding to this inequity.

The second concept of equity relates to the distribution of income and wealth within society. Debate over the distribution of income and the relationship s between economic equality, equity and growth has been going on since time immemorial. Most, though not all, Australians accept some version of the social democratic view that, while some inequality in market incomes is inevitable, greater equality of both incomes and opportunities is desirable, and should be pursued through redistributive taxation and welfare policies, as well as through the provision of public goods such as health and education.

The first of these conceptions of equity is more relevant to the big questions of climate policy at the national and international level. The second is of more interest in considering the detailed implementation of policy initiatives such as the proposed carbon price.

Equity between countries

There is a large literature on the question of how to achieve an equitable allocation of the burden of reducing carbon dioxide emissions. Interested readers are directed to …

As regards equity between countries, a variety of historical claims are made in both directions. On the one hand, wealthy countries with high current and past emissions argue that the cost of reducing emissions depends on the size of the proportional reductions and hence that existing emissions levels should be taken as a starting point for determining future emissions. On the other hand, poor countries argue that, having made little contribution to the current stock of atmospheric CO2, they are owed a 'carbon debt' which entitles them to larger emissions in the future.

Whatever the merits of these claims, it does not seem likely that either can form a basis for a sustainable long-term international agreement. Rather, the only sustainable and equitable basis for a long-term agreement is one in which all people on earth, wherever they live have the same entitlement to CO2 emissions. Those who wish to emit more than their share must compensate those willing to emit less (for example, through intergovernmental transfers or through the purchase of tradeable emissions permits)

Equity between generations

A critical issue in evaluating climate policy is that of evaluating equity between generations. The costs of climate mitigation policy will begin immediately and rise gradually over the period to 2050, after which they will probably decline, since most carbon-based energy use will have been replaced by renewables or displaced by more energy-efficient processes. By contrast, the benefits will initially be very small, since the gap between business as usual trajectories and mitigation trajectories will grow only slowly. The point at which the current benefits of mitigation will exceed the costs is almost certainly 20 to 30 years, and perhaps further, in the future.

It follows that, for older members of the community, the costs of climate mitigation will exceed the benefits to them personally. By contrast, for those who are young now, and for future generations yet to be born, the benefits will exceed the costs.

It is important to observe that this issue cannot usefully be discussed in terms of 'current' and 'future' generations. While future generations will benefit from climate mitigation, so will the current younger generation (as well as middle-aged people who live long enough!)

This point is critical in understanding a debate which has divided economists regarding the formulation of climate policy.

The standard approach in ethical theories, on which assessments such as the Stern and Garnaut reviews are based, is one that treats all people as equally valuable, regardless of when they are born. This does not mean all monetary gains are equally valuable, since additional income is worth more to someone when their income is low than when income is already high. But it does mean that welfare gains should not be discounted simply because they occur in the future.

However some economists advocate a limited response on the basis of models which place a lower weight on welfare gains accruing in the future than on welfare gains accruing in the present (even where initial incomes are the same). This is commonly justified by suggesting that the current generation can choose how much weight to place on its own welfare relative to that of future generations. Further it is suggested that observed choices over individual lifetimes, where people prefer benefits sooner rather than later, can be translated to social choices. Finally, it is suggested that observed market rates of return to capital are too high to be consistent with the weights derived from standard models of welfare.

This argument fails on a number of levels. First, as discussed above, it cannot be defended on the basis that the 'current' generation must make decisions

including those related to the weight to be placed on 'future' generations. Welfare discounting means that more weight is placed on members of the existing population the earlier they were born. And the difference is not trivial. With 3 per cent discounting of welfare, a person born in 2010 is given less than a quarter the social weight of one born in 1960.

Finally, the empirical claim is wrong, reflecting a focus on returns to equity capital, which are largely driven by risk rather than the value of present and future income. The relevant rate of return to capital is the real rate of interest on government bonds, which is typically around 1 or 2 per cent, consistent with the rates derived from the standard model and used in the Stern and Garnaut reviews.

In practical terms, these equity issues (along with the weight placed on the preservation of biodiversity and the avoidance of species extinction) account for most of the differences between recommended policy responses to climate change. Economists who value all welfare gains equally conclude that strong and early action to stabilise the climate is justified. Those who place less weight on the interests of the young than on those of the old, and still less weight on those yet to be born, generally favor a slow start and an unambitious target.

Equity between households

In the context of the Australian public policy debate, the main issues relate to equity between households. The introduction of a carbon price will raise the cost of living for all households. However, as will be shown below, given typical patterns of consumption expenditure, the cost increase, expressed as a proportion of income will be several times larger for low-income than for high-income households.

Several different approaches have been suggested when structural reforms such as a carbon price impose costs on households.

A proposal with immediate appeal is to provide compensation sufficient to ensure that all households are better off. In principle, this should be feasible, since the total benefits of a structural reform should exceed the costs. In practice, however, it turns out that if all households are to be fully compensated, most must be overcompensated, with the result that the package as a whole will have a substantial net cost to the budget.

In the case of a carbon price, for example, households with broadly similar characteristics (number of people in the household, income and so on) vary widely in their patterns of (direct and indirect) energy use. A compensation package sufficient to offset the increase in the cost of living for the most energy intensive households would entail a substantial net payment to the average household. Moreover, while the general idea that compensation undermines the incentive effect of a carbon price is false (see below), targeting compensation to the households that use the most energy will indeed negate the effects of a carbon price.

At the opposite extreme, it is sometimes argued that structural reforms should be introduced in a 'clean' form, with no attempt to compensate losers. Instead, issues of income distribution should be addressed entirely through taxation and welfare policies, along with structural adjustment assistance for firms and workers that are adversely affected.

This approach has some merit in the case of reforms that do not directly involve government revenue and expenditure. Even here, however, if governments are unable or unwilling to compensate those worst affected by a reform, they may find it difficult to sustain a claim that the community as a whole will be better off. More importantly, the carbon price, like the GST, will create a substantial new source of government revenue. The proceeds must be returned to the public in one way or another, either through lower taxes or higher expenditure[3] ()

[3] Another theoretical possibility would be to pay off public debt, but in general, the target level of public debt should not be altered in response to policy measures like the carbon price. In any

An intermediate approach is to compensate directly those most adversely affected by the negative consequences of a given structural reform, then relying on general taxation and welfare policies to deal with remaining consequences over time. Applied correctly in conjunction with a consistent program of reforms that benefit the community as a whole, this approach should ensure that the majority of the community is better off as a result of the package associated with any particular reform and that the entire community is better off in the long term.

In criticising this approach, it is sometimes argued that changes to general tax and welfare policies will erode the effects of compensation over time. In the case of the carbon price, for example, the primary compensation for taxpayers consists of a substantial increase in the tax-free threshold. Over time, further changes to the tax scales will be made, and, at some point, it will be impossible to distinguish the effects on the tax scale of the measures introduced associated with the carbon price to those of later changes.

Nevertheless, provided consistent principles of equity are applied, the effects of the initial compensation should be sustained. A more accurate way of stating the criticism would be that, over the long term, the outcomes of the different approaches to compensation discussed above will converge. The benefits of direct compensation associated with a reform package arise primarily in relation to short-term adjustment.

Why economists favour market responses to climate change

An informal poll held at the Australian Conference of Economists found that only 11 per cent of attendees supported 'direct action' (this group includes some

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case, a reduction in public debt produces a saving in interest payments, which raises once again the issue of how the saving will be returned to the public

non-economist business delegates), while 80 per cent favored price based mechanisms.

But why are economists so overwhelming in their support of market-based responses to climate change? Of course, economists support markets in general, but the great majority of the profession also supports direct government intervention in appropriate cases. The overwhelming support for a market based response to climate change reflects economists' understanding of the nature of the problem.

Energy is essential to all aspects of modern life. On the other hand, our current methods of producing energy generate quantities of carbon dioxide too great for the atmosphere to absorb without producing a substantial disruption of the global climate.

So, we need to find a way to maintain the essentially uses of energy while reduce carbon dioxide emissions. This can be done by using alternative energy technologies, by using energy more efficiently or by changing our consumption patterns to focus less on energy-intensive items (such as lighting, heating, airconditioning and travel) and more on items that do not require so much energy (such as health services and telecommunications).

This problem raises a vast number of possible options, and the problem is to choose which will achieve the necessary reductions in emissions with the least possible disruption and economic cost. This is a difficult problem. For example, in reducing emissions from transport, the alternatives include the development of more fuel efficient private cars, expansion of public transport or the use of telecommunications (phone calls, email, Skype and so on) as a replacement for face-to-face meetings. It is not immediately obvious what mixture of these options is best, and there may well be other possibilities

One solution is for the government to appoint experts to identify the best methods of reducing emissions and then introduce regulations or other forms of 'direct action' to ensure that these methods are adopted. Sometimes, this is a

sensible solution. Most of us are not very good at comparing the purchase price of household goods, from lightbulbs to fridges, with the lifetime energy costs they will generate. So, it makes sense for government to impose energy efficiency requirements, such as the phasing out of incandescent light bulbs.

But in most cases, no body of government experts has the information needed to make the necessary trade offs. The alternative solution is to make those responsible for carbon emissions pay a price, just as they do for goods and services of all kinds.

To see how this works, consider the government's proposal for a price of $23/tonne. This will affect the decisions of businesses and households at a number of levels. First, consider electricity generators. They currently receive an average of about $40 for a megawatt-hour (MWh) of electricity (about 4c a kwh). Generating that MWh from brown coal emits about 1.3 tonnes of CO2, so a brown coal generator would have to pay around $30 MWh as the price of the carbon they emit. The corresponding figures are around $23/tonne for black coal, $10-15 tonne for gas and zero for most alternatives.

At these prices, new investment in brown coal power stations is no longer profitable, and existing brown coal stations are likely to close earlier than they would otherwise (the government is planning to help this along with some adjustment assistance). Where supplies are available, gas-fired electricity is usually the cheapest option followed by black coal and wind. As prices rise and the costs of relatively new renewable technologies fall, they will become competitive, even without regulatory measures such as the renewable energy target.

Given that the costs of coal-fired and gas-fired power will rise, the price of electricity will also rise, probably by around $23 MW/h or 2.3 c a kWh. That's not huge, but it's enough to provide businesses in particular with a stronger incentive to invest in more energy-efficient technologies. However, rather than governments specifying what investments companies should make, the

imposition of a price lets them pick the option that is most cost-effective for their own business.

Finally, we can expect some changes in household consumption patterns. At the current carbon price these will be modest, but a rising carbon price will reinforce some trends that are already taking place, such as a reduction in the use of private cars, particularly among the young.

The government's climate change plan

The Australian government's climate change plan, entitled 'Securing a Clean Energy Future' was released on 10 July 2011. The central element of the plan is the introduction of a requirement for large-scale emitters of carbon dioxide (the '500 largest polluters' to hold permits for the CO2 they release into the atmosphere.

The price of permits is to be fixed at $23 a tonne on 1 July 2012, rising at 2.5 per cent a year in real terms. From 1 July 2015, the government will fix the quantity of emissions permits it makes available (either through auction or allocated directly to firms), and the carbon price will be set by the market.

The introduction of the carbon price is combined with a range of measures that have two main purposes. First, there are measures designed to compensate households, workers, communities and business that would otherwise be worse off as a result of the introduction of the carbon price. Second, there are measures designed to assist in the adjustment to an economy with lower CO2 emissions. The main focus of this paper is on the first class of measures and their implications for equity.

The main measures in the first category are

* For households, reductions in taxes, higher family payments and increases in pensions

* For workers and businesses a 'jobs and competitiveness program which

> will provide $9.2 billion over the period to 2014-15 to assist the most emissions-intensive activities in the economy that are exposed to international competition. This will support local jobs, encourage industry to invest in cleaner technologies and avoid 'carbon leakage' offshore.

* For communities identified as being at risk, a range of measures including community development programs and economic diversification programs.

* For businesses, a proportion of the emissions permits allocated each year will be provided free to firms with historically high emissions levels. In addition, the government will call for tenders from brown coal power generators willing to close down early in return for a cash payment

The main measures designed to assist transition include

* Funding of $10 billion for the Clean Energy Finance Corporation

* Establishment of an Australian Renewable Energy Agency

* A Clean Technologies program

To a large extent, and particularly in relation to renewable energy, these measures represent a rearrangement of existing programs.

In total the cost of the compensation measures and measures designed to promote the transition to a lower-carbon economy is expected to exceed the revenue raised from the sale of permits. The difference is projected at … billion over the period … or around $1 billion a year. Under current macroeconomic conditions, it seems likely that this difference will not be met through offsetting tax increases or expenditure cuts elsewhere in the budget. Rather, in view of the deterioration in economic projections over the last year or so, the government will accept a slightly higher budget deficit, thereby providing a modest fiscal stimulus.

The impact of a carbon price

A carbon price increases the cost of energy generated using carbon-based fuels. Typically, some but not all of this cost increase will be passed on to consumers, directly or indirectly.

In the case of electricity, the structure of the market is such that the price is commonly determined by the cost of electricity generated using either gas (in periods of high demand) or black coal (in periods of low demand). Typically, a megawatt-hour of electricity generated using gas is associated with emissions of around 0.6 tonnes of CO2, so the additional cost associated with a carbon price of $23/tonne is about $14/MWh or 1.4c/KWh. In the case of black coal, a megawatt-hour of electricity generated using gas is associated with emissions of around 0.6 tonnes of CO2, so the additional cost associated with a carbon price of $23/tonne is about $23/MWh or 2.3c/KWh. So, the increase in household electricity prices is likely to be in the range 1.4-2.3c / kWh, compared to current prices that are typically 15-20c kWh for most use. This is consistent with reported Treasury modelling suggesting a 10 per cent price increase.

The most useful source of data to assess the effect on households of price increases associated with the carbon price is the Household Expenditure Survey, conducted every six years by the Australian Bureau of Statistics. Unfortunately, the results of the most recent survey, conducted in 2009-10 have yet to be released, so the most recent publicly available data is for 2003-4.

The most important relevant findings from the 2003-4 survey were

* Average household expenditure on domestic fuel and power was $23.59 per week. GDP per person at current prices has risen by a little over 40 per cent since 2003-4, so a comparable figure for 2011-12 would be around $33/week.

* Domestic fuel and power accounted for about 2.6 per cent of total expenditure on goods and services

* Domestic fuel and power is a larger component of total expenditure on goods and services for low income households than for high income households. Households in the bottom quintile (20 per cent) of the income distribution (adjusted for household composition) allocate 3.8 per cent of total expenditure to domestic fuel and power compared to 2.1 per cent for households in the top quintile

* The ratio of expenditure on goods and services to income is higher for low income than for high income households. Households in the bottom quintile have average gross income of $337 and average expenditure of $489, while households in the bottom quintile have average gross income of $2280 and average expenditure of $1320. That is, expenditure is equal to 145 per cent of income for those in the lowest quintile, implying that these households are either running down savings or taking on additional debt. By contrast, for households in the top income quintile, expenditure on goods and services is equal to less than 60 per cent of total income. The remainder of gross income for these households consists of income tax, insurance, mortgage payments and other forms of saving.

Turning to the impact of the carbon price on households, the results of the Household Expenditure survey cited above suggest that a 10 per cent increase in the cost of domestic fuel and power would (in the absence of any change in consumption patterns) increase household expenditure by $3.30 per week, which is exactly consistent with the modelling results reported by Treasury.

For an estimate of the total impact of the carbon price on households, we may proceed as follows. The sale of permits (initially at a fixed price) is expected to raise around $8 billion per year. If 50 per cent of this cost is passed on to households, the total increase in household expenditure will be around $4 billion per year. Since there are currently around 8 million households in Australia, the average increase will be around $500 per household per year, or around $10 per household per week, which is consistent with the results of Treasury modelling.

The effect of the carbon price on consumer prices in general may be estimated as the ratio of the increase in household expenditure associated with the carbon price to total household expenditure, which is around $700 billion. This yields an increase of 0.6 per cent, close to the value of 0.7 per cent reported in Treasury modelling. On the assumption that the Treasury modelling is more price, the value of 0.7 per cent will be used in subsequent calculations

There is no simple way of estimating the distribution of the total impact between high and low income households. The effect of the carbon price will be to increase energy input costs for all goods and services. In the absence of detailed modelling, it seems reasonable to suppose that all expenditure items, with the exception of fuel and power, will be affected equally.

On that basis, the 0.7 per cent price increase for the average household may be divided into two components: an increase of approximately 0.25 per cent associated with a 10 per cent increase prices for fuel and energy (which account for 2.5 per cent of total expenditure), and an increase of 0.45 per cent representing the indirect impact of the carbon price on the price of goods and services in general.

For low income households, the indirect impact may be assumed to be similar to that for households in general, implying an increase of 0.45 per cent in the cost of their consumption bundles. However, because low income households allocate around 4 per cent of total expenditure to fuel and energy, the increase from this source will be 0.4 per cent, implying a total price increase of 0.85 per cent. Using the same approach, the relatively low share of expenditure allocated to fuel and energy by high income households means that this group will face a price increase of around 0.65 per cent.

A more significant difference in the effects of a carbon price arises from the differences between income groups in the ratio of household expenditure to household income. Since expenditure is 145 per cent of income for the lowest income quintile, a price increase of 0.85 per cent is equivalent to a real income

production of 1.2 per cent. On the other hand, since expenditure is 60 per cent of income for the lowest quintile, a price increase of 0.65 per cent is equivalent to a real income production of 0.4 per cent.

In the absence of compensation, then, a carbon price would be regressive, with the cost, expressed as a proportion of income being three times as large for households in the bottom quintile of the income distribution as for those in the top quintile.

Compensating households: How and how much?

In deciding whether and how to compensate households for the impact of a carbon price, two issues arise. The first, which has been the source of great confusion in public discussion, is whether compensating households and firms will negate the purpose of imposing a carbon price, namely to change behavior. The second, and the primary concern of this paper, is to determine an equitable basis for compensation.

On the first point, economic analysis is straightforward. Suppose the price of one good rises while that of other goods fall, in such a way that consumer's income is still sufficient to buy the same goods as before the price change. Standard economic theory says that in these circumstances, consumers will buy less of the good that has become more expensive and more of those that have become cheaper. On exactly the same reasoning, if the price of a good increases but income rises so that households are no worse off than before, households will consume less of the good in question, and more of other goods. (In fact, economists commonly measure response to price changes using a concept called the 'compensated elasticity of demand').

So, if the revenue derived from a carbon price is returned to households through higher transfer payments, income tax cuts or cuts in taxes on goods in general, the incentive to reduce consumption of carbon-intensive goods and services will be unaffected. The same applies if businesses are compensated through cash payments or reductions in the general level of taxation.

This is obvious, in one sense. One way or another, any increase in government revenue must eventually flow back to households (directly, or via payments made to businesses) in the form of additional spending or lower taxes. Policies like the … simply make this explicit, so that it is possible to assess the net impact on particular households. If returning revenues to households undermined incentive effects, it would be impossible for any tax policy to affect behavior, which is obviously not true.

The potential problem arises only if compensation is made conditional on consuming electricity or carbon-intensive goods and services. In this case, the compensation reduces the effective price of emitting carbon and therefore undermines the effectiveness of the original price signal

Assessing the proposed compensation package

Broadly speaking, Australian households derive their primary income either from taxable market income (wages and returns on investments) or from pensions and benefits. Most recipients of pension and benefit income are in the bottom 40 per cent of the income distribution which, as shown above, is likely to be most affected by the direct and indirect price changes flowing from a price on carbon. Lower-income wage earners and some (but by no means all) self-funded retirees also fall into this category.

Considering first the effect on benefit recipients, the government proposes an upfront lump sum, designed to cover increases in costs for the period from the introduction of the carbon price on 1 July 2012 until 20 March 2013. This is equivalent to a 1.7 per cent increase in the rate of pensions, which will then be converted into an indexed fortnightly tax-exempt payment. This proposal applies to recipients of pensions, allowances, Family Tax Benefits and Seniors Health Card benefits.

The analysis presented above yielded the conclusion that in the absence of compensation, the costs associated with the carbon price would be equivalent to 1.2 per cent of income for the average household in the bottom quintile of the

income distribution. Allowing for variations in household expenditure patterns, some households would spend more and some less than this. However, a 1.7 per cent increase should more than offset the effects of the carbon price for the great majority of pension and benefit recipients.

Market-incomes

For low-income and middle-income earners of market income, the stated aim of the package is 'all low-income households will be eligible for assistance that at least offsets their expected average price impact from the carbon price, and middle-income households will be eligible for assistance that helps them meet their expected average price impact.' In this context, low-income is defined as $30 000/year for a single person, $45 000 for a couple without children and $60 000 for a single parent or couple without children. This group accounts for 34 per cent of all households. low-income is defined as between $30 000/year and $60000/year for a single person, between $45 000 and $120 000/year for a couple without children and between $60 000 and $150 000/year for a single parent or couple without children. This group accounts for 40 per cent of all households. The remaining 26 per cent of households, classed as high income will not be fully compensated. These definitions are based on markers in the existing tax and transfer system, such as the point where the Low Income Tax Offset begins to phase out ($30,000) and the cut out of Family Tax Benefit B and the Baby Bonus ($150,000).

The primary measure to assist households with market incomes is an increase in the tax-free threshold from $6000 to $18200. However, this benefit will be offset by a reduction in the Low Income Tax Offset (LITO) from $1500/year to $445/year, a reduction of $1055. The result is that the effective tax-free threshold rises from $16 000 to $20542.

The package has been designed so that middle and high income households receive less compensation than low income households. This is done by increasing the marginal tax rate from 15 to 19 per cent for the bottom income

bracket (now $18 000/year to $37 000/year) and from 30 per cent to 32.5 per cent for the next bracket (from $37 000/year to $80 000/year), partly offset by a lowering in the withdrawal rate of the Low Income Tax Offset.

For individuals, the benefits of the package are greatest at the new effective tax-free threshold of $20542, where the reduction in total tax paid is $831 or about 4 per cent. This is substantially greater than the likely effect of the carbon price. Because of the increase in marginal tax rates, the benefit falls to about $450, or 1.5 per cent, for single-income earners on $30 000. Again this more than offsets the average impact of the carbon price.

The benefit to middle-income earners declines somewhat further. Nevertheless most middle income households will receive tax benefits sufficient to offset the average price effects of the carbon tax. High income earners will bear a net cost, but this is the least vulnerable group in the community. Moreover, high income earners benefitted most from the tax cuts introduced by the Howard and Rudd governments.

An additional benefit is that around 1 million households will be excluded from the income tax system altogether. In some cases, these households previously paid only modest amounts as a result of the Low Income Tax Offset, but nevertheless faced the compliance costs of keeping records and submitting a tax return.