DESIGNING REALISTIC CLIMATE POLICY[1]

. The almost religious focus on targets and timetables no matter what it costs is the biggest hurdle to overcome in the climate change policy debate.

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The climate policy problem

Climate policy needs to deal with a problem that is highly uncertain. This is a very difficult policy environment. We see both natural variability and human induced climate change co-existing. To unravel how much of observed climate change is human induced and how much is natural variability is a complex question. Perhaps it will one day be shown that there is no clear link between human greenhouse gas emissions and climate change but it is clear that to do nothing when many experts believe the opposite involves considerable risk. At a minimum, an insurance policy is needed for the climate issue just in case the large body of scientific knowledge is correct.

Science does not tell us exactly what concentration target we should aim for but there is a pretty convincing argument out there that we need to be heading in a direction where we are trying to avoid concentrations of 450 parts per million. Nor are the precise cuts that each country individually should undertake a scientific question even if we knew the global target. The entire climate change issue at the national level is an issue of not just science but of economics, morality, politics and a whole range of other considerations

often dominated by religious zeal. Not surprising, this is a difficult environment to formulate a sensible long term policy framework.

What are the implications of this complexity? Many economists who initially start working on climate policy start with the idea that a 'cap and trade' emission trading market would be a good approach. Cap and trade is based on an assumption rather than a scientific finding about what the annual cap or a cap over a period of time should be. Given a cap, use a market to achieve it. However the initial assumption is wrong – we don't know with any degree of confidence what an appropriate annual cap for a given country should be. Yet, this tends to be the assumption and therefore the economic framework on which many policy reviews are based (e.g. the Garnaut Review and Stern Review[2]).

What needs to be done?

Climate change policy should focus on managing risk and dealing with climate and economic uncertainty. That is the essence of the climate problem. We do not know how much carbon to cut, but we think we should be cutting significantly. We want to manage the risks to the environment, and to the economy. Most importantly, we have to design systems, markets in particular, that let us deal with this fundamental uncertainty. In particular governments need to create markets which currently are missing so that individuals and corporations can manage their own risk in making decisions on technology choice over long time periods.

Pricing carbon is a necessary but not sufficient condition

Addressing climate change calls for a whole range of policies. Carbon pricing needs to be at the core because the carbon price is a way of coordinating all the decisions of all agents all over the economy who are making carbon emitting and carbon abating decisions. Therefore, the carbon price has to be designed and implemented very carefully.

There is no doubt that a short-term carbon price is a cost to the economy. On the other hand, a long-term carbon price provides an opportunity for benefits to the economy. These two time dimensions are frequently not distinguished. Many argue that there should be a high carbon price today because that is the only way to stimulate renewable energy. My view is that a high initial carbon price is more likely going to hurt the economy in the short run. What matters for renewable energy sources is not the price of carbon today, but the price that people expect over the next 20, 30 or 50 years. What is needed is to set very clear long term carbon prices for the global and national economy. This will enable individuals and countries to manage their domestic costs of carbon abatement to suit their national and global self-interest.

Many ways to price carbon

There are many ways to price carbon. Whatever approach is chosen will require regulations that require a carbon emitter to have a permit to emit carbon or to pay a fee to the government in order to emit. There are different ways of creating a carbon trading system. One way is for the government to limit the supply of permits. This creates a fixed amount of carbon emissions in the economy. The market then determines the price of scarce carbon permits. This is a 'cap and trade' permit system where emissions are capped and the associated permits traded in a market. An alternative approach is to set a price at which you can buy permits from the government and allow as many permits to be bought from the government as desired in a particular year. This approach is the equivalent to a tax on carbon although it is a permit trading system but with a fixed price. An more direct tax would be not to have a market at all but just fine carbon emitters a fixed amount or tax per unit of carbon emitted.

The advantage of the 'cap and trade' approach is that once the cap is fixed, the environmental outcome will be known. The disadvantage is that you do not know what carbon will cost. In fact, a lot of volatility could result in the short-term carbon market because there is no flexibility in the supply of permits. On the other hand, the advantage of a carbon tax or a market with a fixed price is that you know exactly what the carbon

price will be, but you do not know what the emissions outcome will be in any year. Volatility in short term carbon markets is good for financial market participants that thrive on making money out of reducing volatility at a price, but does little for the environment or the economy.

In considering the difference between national markets and global markets, again there are attractions from a theoretical economic point of view in allowing global permit markets to emerge. Using a global market makes it possible to reduce costs in Australia if it proves difficult to hit an annual emissions target. This is the essence of the argument in the Garnaut Review and the White Paper.[3] Countries with high marginal costs of reducing carbon emission, can buy permits from countries with low marginal abatement costs. Such trading tend to produce a common carbon price in the global market.

However, while trading is good in reducing the costs of abatement in theory, it does not actually solve the problem of uncertainty. While a target fixed for Australia that turns out to be too expensive can be traded offshore, it does not reduce the global cost of the target fixed for the world. Moreover, there are also some serious problems associated with the global allocation of permits. Trading permits across borders is transferring resources from one country to another through the trading mechanism. This can lead to problems outlined next. A further problem with trading across countries is that it may be associated with considerable short-term price volatility. The European trading system is a good example of how markets can trade from 36 Euros down to 2 Euros just because of some information that is revealed to the market. Shocks in one market would be transmitted instantly to all markets that are linked.

Lessons from monetary history

There are some historical lessons to be learnt about linking markets.[4] It is possible that once you start trading permits, big transfers from one region to another region of the world can lead to large fluctuations in real exchange rates and trade balances. This

volatility can destabilise the global trading system. There are no gains in my view from short term permit price volatility and significant risks in trading across national borders.

The second lesson from historical experience relates to the fact that all attempts to create a single world currency or a system of permanently fixed exchange rates between countries have ultimately failed. The reason there is not a single world currency is the same reason there will never be a single global carbon market trading at a common world price. Emission permits are very similar to national money - permits are not a physical commodity. Permits are promises of a government to hit an emissions target in the same way that a unit of money is a promise of a government to maintain purchasing power. The value of that promise depends on the government's credibility and because different governments in the world have different degrees of credibility and different incentives over time to debase their currencies, problems could arise with governments reneging on carbon trading markets and debasing the global carbon currency. Indeed there are incentives to do just that in a global carbon market especially when the costs of taking abatement action outweigh the benefits.

The third lesson from history is that many countries have converged in the way they run monetary policy. Economists used to think that you could target the quantity of money and then let short term interest rates fluctuate. In theory, this would lead to a good outcome with the quantity of money tying down the price level. Policymakers discovered very quickly that this did not work very well in practice. In addition, there were substantial costs arising from short-term interest rate volatility. The lesson for monetary policy is that tying down expectations about the policy goal is critical to achieving that goal. In many countries today, the target for monetary policy tends to be inflation, or inflation over the cycle, or other nominal targets, but policy is implemented through manipulating the short term price of money while gradually adjusting to the long term goal. This is exactly the insight and lesson that we should learn for climate policy. Gradually adjust the price of permits to achieve a long term target but let the timetable be the outcome of the process and not part of the target itself.

The lesson is that climate policy should have a ***short run price goal*** - the price of carbon to the economy - and a ***long run quantity goal*** - atmospheric carbon concentrations. The economy would then move from the short term to the long term in the same way that monetary policy works.

It is clear from the discussion so far that climate policy is more like monetary policy than trade policy. The world and Australia needs a climate policy where there are clear concentration targets, not necessarily annual timetables for emission reductions. Further, as in monetary policy, there needs to be an independent agency at the national level charged with reaching those targets free of political interference but managing the costs of adjustment from where we are to where we want to be. There needs to be a very clear long term price for carbon, because just as it is the long term interest rate rather than the short term interest rate that drives investment, it is the long term carbon price that will drive greenhouse gas-reducing technologies and investment. However, it is necessary to control the short term carbon price in the same way that the short term interest rate is controlled to minimise economic disruptions

Implementing the analogy between climate policy and monetary policy

The McKibbin Wilcoxen Hybrid[5] is the monetary approach to climate change policy. It can also be implemented as a global system if countries ultimately agree to take coordinated action but it does not require that agreement as a precondition for implementing it as national policy. The Hybrid works in the following way.

First, the aim is to impose a long term carbon concentrations goal - we do not discard emission targets, we only discard annual timetables. We argue that a particular concentrations target is what we are aiming to achieve, but we are not sure when that will be achieved. We also propose a way to distribute this target across countries.

Second, we use this emissions commitment to establish the expected ***carbon price*** in a long term market where there is a long term ***carbon target*** within each national jurisdiction, in order to drive energy investment decisions. At the same time, we control short-term costs (or carbon prices).

Third, it is also necessary to create markets, which currently do not exist, where corporations and households are able to manage their own climate risks. If a company wants to build a coal-fired power station in the LaTrobe Valley, it can have a way of hedging that investment in order to proceed despite the risks by buying carbon rights today. If the carbon price rises dramatically in the future because we need to cut emission more quickly than expected, there is no obstruction to closing that investment down and cashing in the long term carbon rights and adopting a different technology. If on the other hand an inventor wants to invest in a new way of sequestering carbon or producing energy that is only economic at a high future carbon price, if the expected future price of carbon is above the threshold required an investor in the project could fund the project and sell carbon permits forward at the high expected price. If the actual carbon price in the year of delivery does not ultimately reach the threshold price then the project can be shut down but the carbon rights can be bought at a low price in that year and sold at the high contracted price thus providing a profit to offset the loss of closing the project. Thus the physical investment can be hedged using the financial transaction in the carbon futures market. Financing investment is abatement technology is a key issue that tends to be ignored in the policy debate.

Components of the McKibbin Wilcoxen Hybrid

First, long term permits are created. These long term permits are a bundle of annual permits with different dates for each annual permit. The quantity of annual permits at each date inside the long term permit become smaller and smaller over time, so effectively the permits eventually disappear. These permits are equal to the carbon goal. The rights created are a diminishing right to a resource which is the long term target.

These long term permits are allocated freely to households and to industry and can be traded in a long term market (the allocation could be done differently and does not change the basic idea). The permits are owned by consumers and firms who can sell them to generate the revenue needed to reduce their emissions. Why is that important? Because ownership of the right to emit creates a constituency throughout society who own the rights to the carbon and who are empowered to object to any government backsliding on future policy commitment. It also enables those who reduce emissions to gain financially from doing so.

Think of these long term permits as similar to government bonds of a kind which provides annual coupons that diminishes in quantity every year. Thus, if a company owning these emission rights does nothing to change its emissions, the quantity of the coupons disappears in time and more and more rights would need to be purchased in the carbon market to continue under business as usual emissions. The value structure of the bonds provides an incentive for companies and individuals reduce emissions as soon as possible in order to cash in on the bonds.

The second component of the policy – and this is where the central bank of carbon has a key role - is that the central bank should print annual permits in order to maintain a pre-announced price of carbon. The annual price that will apply five years at a time. Every five years the price is reset based on observed emission reductions or as part of a global agreement on the carbon price. If an emitter cannot get enough emissions from its long term allocation, it can obtain an annual permit for a fixed price from the carbon central bank.

What this means is that there is a permanent elastic supply of these annual permits at a fixed pre-announced price in a given year. This acts like a safety valve. It means that in any given year a company can reach its legal emissions requirement either by using an annual coupon from the long term permit or by buying an annual permit - effectively paying a tax - from the central bank of carbon. That is why this policy is called ‘Hybrid’ -

it allows trading of the long term permits but with a carbon tax effectively implemented in the form of an annual permit. Thus, emissions can be met from either source.

At a national level, the Hybrid approach controls the short term cost of carbon abatement policy because we currently do not know what the rest of the world will be doing. If the rest of the world has done nothing by way of carbon abatement, the price can be kept low until they undertake serious action. However, if a global agreement eventuates and countries implement policies consistent with it, the short term price would be stepped up over time, based on where global carbon concentration was heading. Thus, this price-stepping approach can be implemented either through national action or through a global agreement.

The way I see the global system evolving is that each country will inevitably have its own system. It might be a carbon tax in a Scandinavian country. It could be a McKibbin-Wilcoxen in the US and EU, but the common element of the system is that there is a uniform price in the short term. Note that this is an efficient outcome because there are no further gains from trading permits across borders because prices are already equalized through domestic action. An American company does not gain by buying from a European company because it can buy the required permits from their own government.

Including developing countries

One of the big problems in international climate negotiations is how to include developing countries, particularly when developing countries are legitimately arguing that they don not want to bear the same costs as industrial countries. What can be done within the Hybrid framework is to negotiate in the international forum, a much bigger allocation of long term rights than a developing country currently emits. What that means is that the short term price of carbon in a developing country could initially be zero because they are not facing an emissions constraint today. However, they would be facing a transparent constraint in the future. Thus, the long term carbon price in a

developing economy will be above zero. Eventually, the short term price would rise over time until they are equal to the price of carbon in developed economies. This is differentiation based on the level of development, but the actual catch-up in price is based on capacity to pay which is determined by the allocation of long term rights.

Summary of difference between standard approaches and the Hybrid

There are two critical differences between the Hybrid approach and the standard cap and trade approach or a carbon tax. First, the Hybrid creates long term returns to short term actions. If you own the rights for carbon for 100 years and you change your behaviour today which reduces emissions, the benefit you accrue is the present value of a 100-year of emission reductions. Projecting the future reductions in emissions into an asset that can be traded in a market today totally changes the hurdle rates of return for different technologies. It is also a way to finance innovation because it is possible to negotiate with a bank or a venture capitalist on a technology where the investment in this technology can be hedged in the long term permit market. Second, the Hybrid creates constituencies - corporations and individuals - within the domestic economy who own the long term rights to carbon in the economy. Thus, any government that tries to tinker with the future of carbon policy is more likely to face the wrath of the voters who might otherwise under a carbon tax regime lobby for a reduction in future carbon taxes since they do not gain directly from the policy.

Summing up

Climate change policy is a serious issue that all countries have to deal with, especially because of climate change uncertainty. Missing markets need to be created. These are neither short term carbon markets nor a new tax but a long term market in trading climate uncertainty. It is also important to understand that there is still a great deal of uncertainty about where world policy is actually heading. The Garnaut or Carbon Pollution Reduction Scheme type approaches involve a commitment to a precise target or a range of targets on the off-chance that if the target is exceeded, it would be possible to buy

cheap permits offshore. What happens if buying abroad is too expensive or the permit market does not develop offshore? Relying on the development of a global trading system without a safety valve domestically is a very risky policy that is acknowledged as a footnote in other policy frameworks but it is at the core of the Hybrid approach.

The final point to stress is that it is critical to get away from the idea that experts know exactly where the world emission profile should be at any point in time and that there are no trade offs between environmental and economic outcomes in getting there. The almost religious focus on targets and timetables no matter what it costs is the biggest hurdle to overcome in the climate change policy debate. There are better ways to generate carbon prices than what is currently being proposed either in a conventional carbon trading market or through a pure carbon tax. One such approach is the McKibbin Wilcoxen Hybrid.

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[1] Based on joint work with Professor Peter Wilcoxen and Dr Adele Morris as well as on the Lecture published as McKibbin W. (2009) "A New Climate Strategy Beyond 2012: Lessons from Monetary History" 2007 Shann Memorial Lecture, Lowy Institute Issues Brief.

[2] Stern, N. (2006). Stern Review: Report on the Economics of Climate Change. Cambridge University Press, UK. Garnaut, R. (2008). Garnaut Climate Change Review Final Report, Cambridge University Press, Port Melbourne

[3] Department of Climate Change 2008 Carbon Pollution Reduction Scheme: Australia's Low Pollution Future White Paper, Department of Climate Change, December

[4] See McKibbin W. , Ross, M., Shackleton R. and P. Wilcoxen (1999) "Emissions Trading, Capital Flows and the Kyoto Protocol" *The Energy Journal* Special Issue, "The Costs of the Kyoto Protocol: A Multi-model Evaluation" pp287-334

[5] McKibbin W. and P. Wilcoxen (1997), "A Better Way to Slow Global Climate Change" *Brookings Policy Brief* no 17, June, The Brookings Institution, Washington D.C. and McKibbin W. and P. Wilcoxen (2002) *Climate Change Policy after Kyoto: A Blueprint for a Realistic Approach,* Brookings Institution and McKibbin W.J. and P. Wilcoxen (2008) *Building on Kyoto: Towards a Realistic Global Climate Change Agreement*, The Brookings Institution, June