

**INTERNATIONAL AGREEMENT ON
CLIMATE CHANGE MITIGATION AFTER THE
GREAT CRASH OF 2008**

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I have described the mitigation of human-induced climate change as a diabolical public policy problem, harder than any other issue of high importance that has come before our polity in living memory (Garnaut, 2008, p xviii). It is as difficult in the United States as in Australia; in both countries, past abundance and low prices of fossil fuels have encouraged exceptionally high per capita emissions of greenhouse gases, and a peculiar political history on mitigation has caused us both to be late in making a start.

Climate change policy has many demanding features, any one of which might seem to make it unlikely that the human species will be up to the challenge. For one, while the average expectation from the reputed science argues for strong and early action, there is uncertainty around this average. Given humanity's risk aversion in circumstances where variations in outcomes have large consequences, analysis shows that uncertainty strengthens the case for early and strong action, but to the innocent it makes a case for delay. Second, the costs of mitigation come early, and the benefits are long delayed, requiring unaccustomed comparisons of welfare across generations. Third, there are complex income distribution consequences of action and inaction, both domestic and international, which greatly complicate the political economy of policy. Fourth, the combination of complexity, uncertainty and unusual income distribution effects provides fertile ground for effective intervention by vested interests in the policy-making progress, at a time when the democratic polities are struggling to maintain a place for the national interest in the big policy contests with vested interests. Here there are parallels with the Great Crash of 2008, and the problem is even more acute for climate change than financial regulation (Garnaut 2009, especially p 201). Hardest of all, there can be no effective mitigation without strong contributions by all substantial economies, on an issue in which international collective action is particularly difficult.

With this background, we should be surprised less by the limited extent of progress on the path to next month's United Nations' meeting in Copenhagen, than by the substantial positive movement that has occurred. Not that we are headed quickly towards an international agreement that holds out good prospects for reducing the risks of dangerous climate change to levels that most informed people would judge to be acceptable; but substantial global action looks more likely now than two years or three years ago. Your country and mine, and the world's largest emitter of greenhouse gases, China, have each changed political trajectory over the past couple of years to an extent that brings strong global outcomes within the realm of the possible. I will come back to these three national policy stories after discussing the nature of the international agreement that will be required. The lecture concludes with some observations about economic risks of emerging climate change mitigation policies in the aftermath of the Great Crash of 2008.

THE CHALLENGE OF INTERNATIONAL AGREEMENT

It has been clear for some time and obvious since the G20 meeting in Pittsburgh that we will not get to a satisfactory global treaty in one shot at Copenhagen. What we have

to work towards is a framework at Copenhagen that allows officials working to heads of government to fill in crucial numbers in the year or so after that. The more detail at Copenhagen the better—so long as the detail that can be agreed now does not remove stronger options that may enter the sphere of the possible at some later time.

There can be no effective mitigation without all countries of substantial size making major contributions to the solution. And yet each country has an interest from a narrow national perspective in doing as little as possible, so long as its own free riding does not undermine the efforts of others. Lagging by some undermines domestic support in others, partly because of resentment at inequitable sharing of the burden, but also because associated distortion of the terms of competition in emissions-intensive, trade-exposed industries generate visceral political economy reactions.

There is a common tendency for people in each country to think that they can free ride on others without that affecting the global outcome, and an even stronger tendency for people in each country to fail to recognise the extent of action in other countries and therefore the extent of their own free riding.

The apparent national benefits from free riding make climate change mitigation a more difficult subject of international negotiations than trade liberalisation—once the bread and butter of the Peterson Institute of International Economics, on which I have presented papers on half a dozen or so occasions over the past quarter century in this place and at the Institute's old home on Dupont Circle

With trade, unilateral reduction of protection makes a country richer whatever other countries do. And yet it is hard enough to achieve international agreement on mutual reduction of protection.

By contrast, it is not possible to point to real national economic benefits from acting alone to reduce emissions.

The problem is made even more difficult by one feature of the history of international discussion of climate change. The international community agreed at the beginning of formal international discussion in the early 1990s that the developed countries would make commitments to and implement major actions to reduce their emissions before developing countries would be expected to take these steps. Further, developed countries would be expected to meet the incremental costs of mitigation in developing countries.

There was some justice in this approach, since the countries that are now developed had been responsible for the increase in concentrations of greenhouse gases in the atmosphere that had taken the world to the threshold of dangerous climate change.

It also seemed at that time, the nineties, that such an approach was consistent with effective climate change mitigation. In the early nineties, developing countries accounted for only about a quarter of global emissions, and there was still thought to be some headroom in concentrations before the thresholds of danger had been crossed.

In 2009, the constraints are much tighter. In the early twenty first century, the headroom has gone. Moreover, emissions have been growing much more rapidly than before and than previously anticipated.

The Great Crash of 2008 and the Great Recession have led for a while to some reduction in growth in total global emissions, although not to a reduction in emissions themselves in any complete year. The restoration of growth in the large Asian developing economies through 2009 has made that a brief interlude in the growth of global emissions. In any case, in late 2008 and early 2009, in the depths of by far the worst economic downturn since the 1930s, emissions remained at a level at which concentrations of greenhouse gases in the atmosphere were growing strongly.

We have squandered the time and the headroom that we had in the early 1990s. We need to change the trajectory of global emissions urgently if high risks of dangerous climate change are to be avoided. Developing countries now account for over 40 percent of emissions. The calculations presented in the Garnaut Climate Change Review (Garnaut 2008) indicate that, in the absence of mitigation, developing countries would be likely to account for around 90 percent of the growth in emissions over the crucial two decades ahead.

The international community's limited progress in the dozen years since Kyoto has been strongly influenced by the failure of two developed countries—your country and mine—to ratify the agreement to which they were parties. This history increases the importance of the steps that have been taken in Australia and the United States in recent times. More of that later.

THE FRAMEWORK OF INTERNATIONAL AGREEMENT

It seems unfair to many participants in the discussion that developing countries have to accept major commitments to mitigation with associated constraints on economic growth when the countries that grew rich before them were not so constrained. Unfair or not, if the differentiated treatment in favour of developing countries of which the UNFCCC agreements speak takes the form of long delays in developing countries being required to reduce emissions to well below business as usual, there will be no effective mitigation. Obligations to reduce emissions, however, can be set in different ways for developing than for developed countries.

There will be no effective global agreement that reduces to acceptable levels the risks of dangerous climate change unless all substantial countries think that it is fair.

An international agreement would need to have the following interlocking elements:

1. Agreement on the level of greenhouse gas concentrations that would strike the best balance between economic costs of emissions reduction and risk of damage from climate change. There is increasing international focus—an emerging agreement—on the objective of holding concentrations at or below 450 parts per million (ppm), or to a rough equivalent, holding the probable increase in temperature to about 2 degrees Celsius above pre-industrial levels.

The 450 ppm is now possible only after a period of overshooting and then holding global emissions below the absorptive capacity of the world's natural systems. Parts of the scientific and environmental communities advocate tighter goals. The awful reality is that the only path to any more ambitious outcome is through an initial agreement to 450ppm, which can be extended as confidence grows in the feasibility of reconciling emissions reductions with rising material standards of living.

2. The global emissions concentrations objective defines a global budget for emissions over a specified period. There needs to be an agreement on allocation of that budget amongst countries. Agreement has to be based on principles that are widely seen as being fair. Seen to be fair in rich and poor countries. Seen to be fair in rich countries which start with extremely high emissions per person, like Australia Canada and the United States, and in rich countries in which each person has far lower levels of emissions, like Europe, Japan and New Zealand. Seen to be fair in developing countries with rapidly growing economies like China, India and Indonesia, and in poor countries with stagnant or slowly growing economies as in many parts of Africa and the South Pacific. No proposal has any chance of being accepted as being fair through most of the developing world, and in my judgement in the world as a whole, unless it is based on the idea that each country's entitlements to emit will converge on equal per capita levels at some time in the future. There will be widely different views of the time over which convergence should occur.
3. The agreement needs to be based on entitlements and not on actual emissions. The prospects for effective climate change mitigation are much better if there are opportunities to trade entitlements. Countries in which mitigation is relatively cheap and easy can then reduce emissions below their entitlements, and sell the "surplus" entitlements to countries in which reduction in emissions is expensive and difficult. For example, there are good prospects of Indonesia and Papua New Guinea accepting and exceeding strong mitigation targets within a global agreement, but only if there are opportunities to sell what turn out to be surplus entitlements.
4. The developed countries need to agree to take the lead in public support for research, development and commercialisation of new technologies. The Garnaut Climate Change Review suggested that high-income countries (with per capita income above \$11,000 per annum) should share responsibility for providing public support for innovation in the low-emissions technologies to the extent of \$100 billion per annum (Garnaut 2008, pp221-3). Other numbers around this level have become part of the international discussion. A proportion of expenditure within an International Low Emissions Technology Commitment would be deployed in developing countries. Jagdish Bhagwati (2006) and others close to the Indian Prime Minister have suggested that the vexed issues of historical responsibility for the increase in emissions concentrations so far is best handled by developed countries accepting the primary role in development of new, emissions-reducing technologies.

5. We are too late to avoid considerable costs of climate change. That will be a problem in all countries. Poor developing countries do not have the institutions, financial capacity or human skills to respond alone in an economically effective way to the problem. Developed countries will need to make major additional commitments to development assistance to support developing countries' adaptation to climate change.

The Garnaut Climate Change Review suggested an allocation of the global mitigation entitlements budget that was based on convergence towards equal per capita entitlements in 2050. The general approach of contraction and convergence (Global Commons Institute, 2000; Garnaut 2008, pp 202-213) was modified to allow for the special circumstances of rapidly growing developing countries: a target that limited growth in emissions to half the GDP growth rate until 2020 or a prior date at which emissions per capita reached the (rapidly declining) average of developed countries. The constraints were expected to apply from 2013, the beginning of the post-Kyoto period.

Convergence towards equal per capita entitlements increases appropriately the adjustment burden on countries with the highest per capita emissions at the beginning--especially Australia, Canada and the United States amongst developed countries. It reduces the absolute reductions in emissions required in countries with relatively high population growth—as it happens, also Australia, Canada and the United States, the three outstanding countries of immigration. The tendency for these two considerations to work in opposite directions reduces the range of percentage reductions in total emissions across developed countries: by 2020 from a base of 2000, to achieve a concentrations objective of 450ppm, by 31 percent for all developed countries, 25 percent for Australia, 28 percent for the United States, 30 percent for the European Union, 41 percent for Japan and 45 percent for Canada. In per capita terms, the requirements are more demanding for Australia (40 percent), the United States (40 percent), Japan (40 percent) and Canada (54 percent) than for the European Union (33 percent).

The approach to allocation of a 2013-20 global budget adopted in the Garnaut Climate Change Review was built on “one-sided” targets for developing countries. With one crucial special case, there would be no penalties for developing countries failing to hold emissions within their allocations within the initial (2013-20) period. However, there would be powerful incentives for developing countries to accept and to live within their notional entitlements: apart from the poorest and administratively weakest, for which exceptions would be made, only developing countries that lived within their allocations would be able to sell permits, or to draw on international support for low-emissions technologies, or for adaptation to climate change. The special case was China: the arithmetic of global mitigation simply would not work unless China agreed to being bound to its allocation from the beginning.

The proposed allocations for developing countries required reductions of about 10 percent from what could have been expected under business as usual. Business as usual took into account a normal tendency for energy intensity of output to fall (see

moderately with economic growth and the passing of time (Garnaut, Howes, Jotzo and Sheehan, 2008).

The realisation of an ambitious global mitigation target—450ppm—would require much tighter constraints from 2020 to 2050 on both developed and developing countries. The world would need to reduce emissions from 2000 levels by 50 percent in 2050. Developed countries' entitlements would fall by 86 percent (Australia 90 percent and the United States 89 percent). Developing countries would need to reduce entitlements by 14 percent (China, by 45 percent; India could increase entitlements by 90 percent from 2000 emissions because of its low per capita starting point).

The Review embodied a rigorous approach to achievement of specified emissions concentrations. The numbers proposed added up to the required concentrations. This meant that to achieve the 450ppm target, if one country committed to less, others would have to commit to correspondingly more.

There has been much international discussion of the Garnaut Review's proposed basis for allocating entitlements. Some commentators in developing countries, including China, have said that 2050 is too long to wait for convergence (Project Team of the Development Research Centre of the State Council 2009).

This is the discussion that the world has to have: discussion of alternative ways of dividing up a global emissions budget that add up to avoidance of high risks of dangerous climate change.

COMMITMENTS LEADING UP TO COPENHAGEN

How do commitments leading up to Copenhagen line up against what is necessary for a 450ppm concentrations outcome? The answer is surprising in the light of popular discussion in the United States and Australia and in much of the world: a strong outcome from a series of discussions commencing in Copenhagen does not seem out of reach. There is a deal to be done, within what is politically feasible in the major countries.

The Garnaut Climate Change Review allocations proposed that Australia's proportionate contribution to an effective global agreement to achieve an ambitious (450ppm) international agreement would be to reduce emissions entitlements by 25% from 2000 levels by 2020, and by 90% by 2050. The Australian Government accepted the recommended target for 2020, conditional on corresponding commitments being made by other developed countries, and major developing countries making commitments to hold emissions below business as usual. The Australian Prime Minister has so far not varied the 2050 target (a reduction of 60 percent from 2000 levels) that he took successfully to the 2007 election, but has undertaken to seek a mandate for a stronger target at the next election.

The European Union's conditional commitment to reductions of emissions by 30 percent is in line with the Garnaut Review proposals. The new Japanese Government

has offered to reduce emissions by 25% in the context of an effective global agreement. This is substantial, although it falls short of assessed requirements for concentrations at 450ppm.

It is the extent of proposed commitments from the large developing countries that holds out the possibility of the numbers holding up for ambitious mitigation. This is evident in Indonesia, Brazil, and most importantly in China.

RECENT DEVELOPMENTS IN AUSTRALIA, THE UNITED STATES AND CHINA

Australia has been going through a dramatic legislative process on climate change mitigation that is still incomplete, but which has divided and greatly damaged the conservative parties in opposition and seems to leave the most valuable cards with a Government committed to Australia playing its proportionate part in a strong global effort.

Australian Governments of both political persuasions, conservative and Labor, had been full participants in the international discussion of climate change mitigation through the 1990s, and had been supportive of effective mitigation. Australia was a party to the Kyoto agreement in 1997, and there was no public suggestion at the time that it might not go on to ratify the treaty. This position was nevertheless contested with focussed effort by Australia's unusually large fossil fuel energy interests.

The election of the Bush (HW) Administration in 2000 changed the international political environment on climate change. The conservative Howard Government announced that it would join the United States in not ratifying the Treaty. The Howard and Bush administrations stood shoulder to shoulder against international cooperation on reduction of emissions until they had to respond to a groundswell of community interest in action late in the second Bush term.

In Australia, the Labor Opposition, politically stronger under the new leadership of Kevin Rudd from late 2006, began to make ground with a critique of the government's refusal to ratify the Kyoto treaty. State Governments began to design an emissions trading system for implementation in the absence of a national scheme. The State and Territory Governments together and with Kevin Rudd announced that they would commission a Report into Australia's national interest in climate change policy. This led to the commencement of the Garnaut Climate Change Review in April 2007. The Government accepted that it had to take a more supportive position on mitigation, and commissioned a Task Force comprising five of its Department Secretaries and seven leaders of industry—all but one (the one from the finance sector) drawn from high-emissions industries—to provide advice on design of an emissions trading scheme.

The Howard Government-Industry Task Force reported in May 2007, with recommendations to introduce an emissions trading scheme, but no suggestions on targets for emissions. The influence of the high-emissions industries was evident in the absence of economic discipline in proposals for support for both domestically oriented and trade-exposed emissions-intensive industries. Nevertheless, it broke the ice for the conservative government's support for active mitigation policies. It paved the way for

an announcement that the Government would, if re-elected, introduce an emissions trading scheme in 2011 or at the latest 2012.

I presented the Garnaut Climate Change Review to the Prime Minister and State Premiers on September 30 2008. The Rudd Government, elected in November 2007, eventually accepted the Review's recommendations on 2020 targets: an unconditional target of minus 5 percent on 2000 levels, and conditional targets up to minus 25 percent depending on the extent of commitments in other countries. The target of minus 25 percent would be appropriate if other countries accepted commitments that added up to 450ppm emissions concentrations. The Government offered rather more assistance to emissions-intensive industries than could be justified on grounds of economic efficiency or equity, treading a path between the approach of the Garnaut Climate Change Review and the Howard Government's Task Force.

The Government introduced legislation for the emissions trading scheme in mid-2009. It soon passed the House of Representatives, in which the Government has a secure majority, but not the Senate. It was opposed in the Senate by both the conservative Opposition parties (which accepted the targets, but insisted on even more assistance to emissions-intensive industries), and by the Australian Greens (which wanted conditional targets of minus 40 percent). Only the conservative Opposition could deliver the numbers for Senate passage, and the Government entered negotiations and eventually agreement with the Opposition leadership on amendments. The agreement increased the economic cost of the scheme by increasing support for emissions-intensive industry and permanently exempting agriculture.

Australian political parties are highly disciplined, so that the next developments were unusual—indeed, had no parallel in the previous half century of Australian politics. The Government reached agreement with the major Opposition party on November 22. On 23 November, an Opposition party room discussion of the agreement broke down in rancour, leading quickly to a challenge to the party leadership. Tuesday morning 1 December—that's today, but yesterday evening Washington time—the Opposition opted by a single vote to switch leaders, from Malcolm Turnbull who supported the Government's amended legislation, to Tony Abbott, who was committed to defeating it. It is still possible that a split in the Opposition in the Senate will allow passage of the legislation. The Government is in a strong position to secure its objectives after a likely victory at a new election for the House of Representatives and half of the Senate (or the whole of the Senate if the Government uses the Constitutional provisions for resolving conflict between the Senate and the House of Representatives). While the Opposition drama has been playing itself out, the Prime Minister has been here in Washington talking through the approach to Copenhagen with the President and the Secretary for State.

The past week has also seen major developments on climate change policy in the United States and China—more substantial although rather less dramatic than in Australia.

The Obama Government's commitment last week to reduce emissions from 2005 levels by around 17 percent by 2020 and 83 percent by 2050 is truly historic, and problematic. It places the President's full weight behind the House of Representatives' commitment to changing the trajectory of emissions growth, and therefore increases the chances that that commitment will be accepted by the Senate. It puts US numbers on the table for the Copenhagen meeting, and therefore increases the chances of others—particularly developing countries—taking steps towards firm outcomes. It was a prerequisite for China accepting firm targets—which were presented on cue the day after the Obama statement as internally binding targets.

It is problematic for two reasons. First, it precedes a Senate decision and therefore may not become law. There is a chance that this commitment will go the way of United States support for the formation of the League of Nations, and the Kyoto Protocol, with similar consequences for international cooperation. But there is no way of removing this risk, and it seems that the chances of the United States government ending with a strong climate change position backed by law are higher as a result of the announcement.

It is problematic also because it does not go far enough for the United States to make a proportionate contribution to a global effort towards achieving concentrations of 450ppm, especially for 2020. The 2005 starting point is higher than 2000, and minus 17 percent is not 28 percent. The 2050 target is closer to what is required from the United States in a strong global mitigation effort, and presumably is more readily strengthened in the light of experience.

Given where the United States debate has been and is at in November 2009, it looks to a foreigner as if the 2020 target is as good as is possible before Copenhagen, from a government that wants to go as far as is possible. More might be possible a year hence, and I myself think that the prospects of a strong global outcome would be enhanced by confining the Copenhagen outcome to articulation of principles, with final agreement on numbers being left until more is feasible. That may yet be the judgement of leaders at Copenhagen. That approach would run some risk of worse US outcomes a year or so hence.

As the Garnaut Climate Change Review observes, there are many combinations of national commitments that add up to a particular global emissions concentration (pp 205-11). A goal of 450ppm can be reached despite one country doing less, so long as other countries do more. The good news is that the major developing countries are prepared to do more than anticipated in my 2008 proposals for global effort directed at 450ppm (Garnaut, 2008, pp 205-11).

China's commitment to reduce 2020 emissions intensity of output to 40 to 45 percent below 2005 levels goes beyond my proposals. Chinese leaders have said that their commitments are binding domestically. The gap from binding internationally must be bridged if the world is to have effective global mitigation in the aftermath of Copenhagen. The shifting of the emissions trajectory has commenced earlier than under my proposals: the Review had presumed that Chinese departures from business

as usual would commence in 2013, but the Chinese proposals are premised on a start having already been in the five year planning period 2006-10. The total reduction below the Review's business as usual by 2020 is about 25 percent for a 40 percent reduction in emissions intensity and about 30 percent for a 45 percent reduction; these can be compared with the Review's proposal of 10 percent (Stephen Howes, personal communication 29 November 2009 and Howes, 2009). China's status as by far the world's biggest emitter by 2020 means that the additional Chinese contribution is larger than the US shortfall.

There has been some negative commentary on the Chinese commitment: it is said that it does not go much beyond what China has been doing anyway; and that it is only a commitment to reduce the emissions intensity of production and not emissions themselves.

China has made a great deal of progress over the past year or so. It has had a domestic goal of reducing the energy intensity (not emissions intensity) of output since 2006, but only started to make ground late in 2007. Change has accelerated sharply over the past year. Reductions in energy intensity were supported by commitments to increase the renewable share of energy supply to 15 percent in 2020; again the strong progress has been recent and impressive, and there is current discussion of raising the targets.

Last week's announcement breaks new ground because it is framed in terms of reducing emissions intensity and not energy intensity; and for the first time it announces as firm policy the continuation of strong objectives for reducing emissions intensity to 2020. But even if there had been no new ground, it would be counterproductive to exclude from the value of commitments towards an international agreement any measures that had been developed independently of the negotiations. That would discourage progress outside negotiations. It would lead us into the unproductive trade negotiations syndrome in which trade liberalisation at home is held back as bargaining coin in negotiations.

There has been dramatic change in the tone of domestic Chinese discussion of mitigation policies over the past two years, and especially over the past year. There is growing confidence that the role of alternatives to coal can be expanded quickly, with inefficient coal mines being closed at an impressive rate for a number of policy reasons that include climate change mitigation. There is growing confidence that the energy intensity of production—more or less stable in the first six years of the twenty first century—can be kept on a new, downwards trajectory. Confidence has been increased by improvements in manufacturing efficiency that are bringing down the costs of low-emissions energy, and of low-emissions substitutes for various consumer products. There is considerable excitement about progress on wind and solar manufacturing costs, and on the electric car. These developments made the recent Chinese commitments possible. Their continuation and extension are likely to make even more ambitious commitments possible over time, and possibly from an early date. Agreements on Sino-American cooperation on low-emissions technology during this month's visit by President Obama to China are helpful to momentum in both countries.

To express disappointment that the Chinese commitment takes the form of reductions in emissions intensity rather than absolute reductions is to reveal ignorance of the whole framework of international discussion so far. The realisation of strong global concentrations objectives will require absolute reductions in emissions from an early future date probably around 2020, from a base that is much lower than it would have been under what seemed like business as usual a short while ago.

China's November 2009 announcement makes it more likely that other large developing countries, including Indonesia, Brazil and South Africa, and with greater difficulty and smaller prospects India, will go further towards firm commitments.

The chances of a strong outcome at Copenhagen and its aftermath would be enhanced if other countries accepted that the recent US announcement may be the best that is possible at this time, and think in terms of other countries covering the shortfall. If a foreign friend and frequent visitor to Washington can be allowed a comment on domestic politics, it seems to me that the US will go further when that is possible politically; a United States administration committed to strong global outcomes will make use of political opportunity when it arrives, and strident international commentary will not bring forward the time of arrival. The danger that the rest of us have to avoid is that today's US position will become a new norm; that other developed countries take the view that they have done enough if they go as far as the United States. Such an approach would soon put the prospects of an international agreement around 450ppm out of the world's reach.

RISKS TO THE GLOBAL TRADING SYSTEM

This lecture has presented a relatively positive view of the prospects of strong global mitigation—rather more so than I would have expected one or two years ago. But I should draw attention to a dark side of recent developments. The approaches being adopted to emissions reduction policy in developed countries are likely to be unnecessarily expensive and corrosive both to open international trade and to fiscal recovery from the Great Crash of 2008. The standard studies of the costs and benefits of climate change mitigation, either for the world as a whole (Stern 2007) or for a single country (Garnaut 2008) presume the presence of an efficient system of policy to support the transition to a low-emissions economy. An efficient system would have two essential elements. It would include an appropriate price on emissions to correct the externality associated with the emissions themselves, imposed either as a tax on emissions or through emissions trading systems, and with similar prices in all countries. The similar price could be achieved by agreement or generated by trade in emissions entitlements. International trade in emissions entitlements or tax credits would allow emissions reductions to occur where they could be achieved at lowest economic cost. An efficient system would also include public support for research, development and commercialisation of new, low-emissions technology to correct the externality associated with innovation. The price on emissions would generate large amounts of revenue—large enough to cover the costs of support for innovation, and also to make a major contribution to the reduction of fiscal imbalances in the aftermath of the Great

Crash and the Great Recession, or to reduce the costs of other distorting forms of taxation.

The pricing of emissions, whether through a tax or a trading system, uses the economic system's taxation capacity whether the potential revenue is given to big emitters as free permits or tax exemptions, or collected by Government. If it is given to emitters it absorbs taxation capacity without contributing to the revenue, and so adds to the difficulty of fiscal consolidation.

Optimal policies cannot be taken for granted. Shortfalls from optimality could have great costs for the economy. The Garnaut Climate Change Review put the issue in the following terms:

The Review did not model the transactions costs associated with various compliance arrangements for the emissions trading scheme. This could turn out to be a substantial deadweight loss for the economy, particularly in relation to the treatment of trade-exposed, emissions-intensive industries in an ad hoc policy world. If this issue is not handled well, uncertainty will affect the supply price of investment. It will lead to a diversion of management effort into rent-seeking behaviour rather than the pursuit of low-emissions production processes. It could potentially lead to a wide corrosion of good economic governance. In the worst of circumstances it could turn out to be as expensive as the costs of mitigation itself. (Garnaut, 2008 p. 297)

The current signs are not good. Governments through the developed countries are developing emissions trading systems that give back to large emitters a high proportion of the rent value of the scarcity of entitlements. In Australia, this has encouraged rent-seeking investment in the political process on a proportionate scale unknown since the high tide of protection of domestic industry before the trade liberalisation of a generation ago.

In the case of domestic electricity generation, the free permits are sometimes given out in mistaken belief, encouraged by the generators, that this will reduce the price impact on consumers. In practice, the scarcity value of permits will be passed through to consumers, even if generators have been given free permits.

The allocation of free permits to trade-exposed, emissions-intensive industries is quantitatively more important. In every country, the free permits are partly a response to perceptions that other countries are imposing lower mitigation costs on their industries than the home country. The effect of many countries taking this approach is to exempt the most emissions-intensive industries from the discipline of emissions pricing; to utilise economies' taxation capacity without corresponding benefit to the public revenue; and to distort international trade in emissions-intensive products.

The argument for exemption from a carbon tax or for issue of free permits to trade-exposed industries on the grounds that other countries are doing less than one's own is

used much more widely than is justified by analysis of the actual effects of differential emissions pricing. All pressures for relocation of industry as a result of emissions pricing are attributed to differential emissions pricing, when some such relocation is environmentally and economically desirable and would occur with universal emissions pricing at comparable rates.

Over-compensation for carbon leakage in one country invariably stimulates claims for greater compensation in others, in ways that are familiar from the political economy of protection. New Zealand's decision to raise assistance to trade-exposed industries in response to perceptions that Australia was offering more than New Zealand, announced in the last week of September 2009, is one in a long line of such developments.

Differences in Governments' approaches to assistance to trade-exposed industries may become more important to a firm's competitiveness in the international market for an emissions-intensive product than typical inter-firm differences in the efficiency with which resources are used.

This potentially immense distortion comes on top of the recent corrosion of commitment to multilateral trade analysed by Jagdish Bhagwati in his *Termites in the System* (2008). It comes on top of the interventions in response to the global financial crisis and subsequent recession, which have made differential patterns of government subsidy more important than underlying comparative advantage in determining the location of investment in such major industries as financial services and automotive products.

The absence of principles in providing assistance to trade-exposed industries within emissions reduction policies is potentially the largest of the several recent challenges to the liberal multilateral trading system.

There are long term and transitional solutions to the dreadful international trade problems deriving from apparently differential treatment of trade-exposed industries.

The long term and general solution is to move towards all substantial (including developing) economies having caps on emissions, alongside trade in emissions entitlements. Remember that these caps can be set in different ways for economies at different levels of development: the important thing is that there are hard caps. Hard caps on emissions plus trade in entitlements will move the world towards similar emissions pricing across countries. The inclusion of all developed and the world's major developing countries in a system of binding emissions caps with opportunities for international trade in entitlements—say, the developing country members of the G20—would remove all material and legitimate concerns for carbon leakage. They would remove even the political case for support in all but a few industries. In those few industries, the residual problem could be managed by sectoral agreements, in which substantial producers on a global scale agreed to place a comparable carbon tax on the relevant industries, collecting the proceeds for their own public revenue.

If there were understanding of the fundamental importance of this issue for climate change mitigation, the global trading system and global fiscal stability, and if its importance were discussed by heads of government in the G20, it would be possible to move relatively quickly to satisfactory general arrangements. But “relatively quickly” is probably not soon enough for the post Kyoto world from 2013, especially since we have not yet broken free from the intellectual and political entanglements from Rio de Janeiro, Kyoto and Bali, which inhibit acceptance of hard caps by developing countries. There is high risk of great economic damage during the period before moving towards broadly comparable emissions pricing across major countries. Transitional arrangements are required to reduce that risk.

It is no transitional solution for countries with ambitious emissions reduction schemes to adopt countervailing restrictions on trade. The risks of capture by protectionist interests are high to the point of certainty.

Nor do the established processes of the WTO provide a solution. It is probably illegal under the WTO subsidies code to provide free permits in the form favoured in many countries’ established or emerging emissions trading schemes. Action through the established WTO processes requires the crystallisation of a dispute, with dangers of descent into endless litigation, surrounded by rising international tensions over trade measures. Most developed countries in any case would prefer to let sleeping dogs lie in relation to others’ arrangements: criticism of others’ arrangements would invite interest in one’s own.

The optimal transitional arrangement is defined and explained in Chapter 14 section 5 of the Garnaut Climate Change Review (Garnaut 2008). The central idea is that each country should limit assistance to trade-exposed industries to what is warranted by the effects on international product prices of other countries applying lower emissions prices. This requires a calculation of what the global price of an emissions-intensive product would have been if all economies had applied similar emissions pricing. It would be legitimate to provide assistance to cover the gap between actual prices, and levels that would rule with comprehensive emissions pricing.

The optimal assistance regime would be best administered internationally. The WTO is the best placed of the international organisations to take the lead. Some members would need to request the WTO organisation to work towards establishing modalities for assistance to trade-exposed, emissions-intensive industries. The objective would be to establish modalities for voluntary action rather than mandatory arrangements in the first instance.

It is an advantage of the proposed arrangements that they would be effective if applied by a single country or several countries, in the absence of universal application.

For the door to be left open for optimal transitional arrangements and for early application of a general solution to the trade distortion problem, it is essential that each country leaves open the possibility of early abandonment of current distorting forms of assistance immediately upon the establishment of the long term or the optimal transitional arrangements that I have described.

RISKS TO GLOBAL FISCAL AND ECONOMIC STABILITY

The proliferation of free allocations of emissions permits is dissipating a considerable amount of taxation capacity, at a time when all developed countries are facing daunting budgetary problems.

A carbon tax or ETS uses part of a country's revenue-raising capacity, whether the rent value of the emissions pricing is collected for the public revenues, or dissipated as free permits and tax exemptions. This was recognised in the initial fiscal programme of the Obama administration in the United States, in which the proceeds of auctioning emissions permits was to play a major role in long-term fiscal consolidation. In Australia, full participation in an ambitious global mitigation regime and subsequent auctioning of emissions entitlements would generate initial rent value of permits of perhaps one and a half percent of GDP, rising over time with the emissions price.

The dissipation of this potential support for fiscal consolidation is a major threat to sustained recovery from the Great Crash of 2008. One country alone could limit the unnecessary drain on fiscal capacity by adopting optimal approaches to transitional assistance for trade-exposed industries. All major countries together could remove completely this drag on recovery from crisis, through early movement towards caps on emissions in all substantial countries, accompanied by international trade in emissions entitlements and the auctioning of all entitlements.

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