Economic Regrets

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Previous meetings have suggested some uncertainty regarding what we mean by 'economic regrets'. This note is intended to clarify some of these issues. We are trying to model this more completely, but that work will not be ready in time for the next CCLF meeting.

Preliminaries

There are two key dimensions to "Economic regret": the identity of the party having regrets; and the type of regret.

The party is either:

(i) the society as whole, often a country, or

(ii) an individual household or firm, or a collection of such firms that form a distinct subset of the society (eg an agricultural sector).

There are (at least) four main types of regret.

(i) Regret that the world is not a fairer place: that a person would take a different action if only it were allowed or if others faced the same rules.

(ii) Regret that an action was not taken because of timidity.

(iii) Regret over an action/decision that went wrong (was unprofitable or costly) for reasons other than randomness or bad luck.

   a. It occurred because the decision was made poorly, possibly because of a bad decision making procedure, possibly because the decision makers did not make use of information that would have resulted in a different decision.
   b. The action went wrong because the actions of another party were different than anticipated. Often the regret is because another party acted opportunistically, despite saying they would not.

(iv) Regret over the timing of an action: that if the same action had been done at a different time, the pay-off would have been much greater.

Consider three different types of regret that may occur as a result of New Zealand adopting an Emissions Trading Scheme.

Type (i) regret.

Type (i) regret is a concern that some efficient New Zealand firms will close down and be replaced by less efficient offshore firms because New Zealand adopts an ETS scheme while the foreign country does not. The efficiency can either be in terms of technical productivity efficiency or in terms of the New Zealand industry being a relatively low emitter of greenhouse gases. This regret is most likely to be felt by an affected industry. An example would be if a low emission NZ firm shut down and imported an alternative product made by a high emission factory in Chile simply because the NZ firm had to purchase emission units while the Chilean factory did not.

Assuming the cause of the "unfairness" cannot be rectified – New Zealand has decided to join Kyoto as an Annex-1 country, Chile has not – the question remains whether a Government can adopt policies that minimize the overall size of this regret. This question is analogous to the question of how a country should respond to foreign tariffs and subsidies. While the international trade literature does not have a clear answer on this question, the traditional New Zealand response is that in most circumstances a small country should not impose tariffs or subsidies at home in response to tariffs or subsidies imposed abroad as this lowers aggregate welfare. The basic insight of this literature is that any attempt to protect the domestic industry from a foreign subsidy will generate greater costs on domestic consumers or taxpayers than benefits to the affected industry. (If Chilean tax payers were to pay for a subsidy to provide New Zealand consumers with cheap goods, at the cost of putting a New Zealand firm out of business,

then so be it.) This position can be subject to many qualifications. For example, a large country may gain from imposing a tariff on an imported good if the tariff is absorbed by the producer and there is no retaliation. There are also circumstances when a subsidy may give a first-mover advantage to a firm that enables it to capture large monopoly profits when it becomes the dominant global player (strategic trade theory). Nonetheless, the normal New Zealand position has been that policies to protect a New Zealand firm or industry from "unfair" foreign competition have a greater cost to society as a whole than the benefit that accrues to the affected sector.

The situation with the Emissions Trading Scheme is slightly different because of concern about emissions. By signing the Kyoto Protocol, the New Zealand government not only signaled that it has concerns about global emission levels and local economic welfare but that it is prepared to accept lower local economic welfare if it reduces global emissions – that is, it is happy to see economic activity transfer to offshore locations if this lowers total emissions. As a corollary, it is possible that it could regret the transfer of an industry to a higher emitting offshore location, for even though there are economic gains from the transfer (conditional on having adopted an ETS), the (conditional) benefits of these gains may be offset by higher emissions. In these circumstances, a subsidy to the domestic industry may be welfare enhancing, for the reduction in global emissions from subsidising the domestic industry would offset the net welfare costs from the subsidy. Whether such action would be allowable under World Trade Organisation rules is a different issue.

Type (iii b) regret

At the firm level, this type of regret would occur if a firm made an investment decision in the expectation that a foreign country or the New Zealand government were to change a policy in the future, but the government then does not make the change. For example, a firm might decide not to invest in a larger dairy factory because it expects the New Zealand government to introduce agriculture into an ETS scheme in 2013, but the New Zealand government delays until 2020. Alternately, it might decide to invest in the expectation that China will adopt an ETS, but finds the investment unprofitable if China did not.

There are not many policy responses to this type of regret, other than for the New Zealand government to ensure that it adopts time consistent policies so that it is not in the situation whereby it has an incentive to renege on an agreement it has made.

At the Government level, type (iii b) regret can occur when the Government negotiates an international agreement in good faith, but the agreement is then reneged upon at a later stage by the foreign country. In the mean time New Zealand firms undertake activities which they later regret because they prove to have been costly.

Again, there are not may policy options, other than for the New Zealand Government to ensure it enters agreements which do not provide incentives for other parties to default.

Type (iv) regret- timing issues.

Type (iv) regret concerns timing. The most interesting issue concerns the costs of a government introducing a policy at the wrong time. In normal circumstances, timing matters because it results in a different allocation of costs and benefits. For example, adopting an ETS in 2012 may impose higher costs on producers and lower costs on taxpayers than adopting it 2020. However, under some circumstances it is possible that the long run shape of the economy would be different if a policy were introduced at one time rather than another: that some firms or industries that would exist after 2020 if the ETS were adopted in 2020 would not exist if it were adopted in 2012. In general, however, these circumstances are quite unusual.

For concreteness, consider the following example.
Suppose the government could adopt a policy (the ETS) at time τ or a later time T.
A firm chooses whether to operate from τ to T and chooses whether to operate after T.

The firm has profitability π_τ^T from time τ to T, and profitability π_T^∞ after period T

(a)If long run profitability π_T^∞ does not materially depend on whether or not the firm operates during the period τ to T, the long run shape of the economy will be unaffected by the timing of the ETS. If it is not profitable for the industry to exist after T, it won't exist whether the ETS was adopted at τ or T ; if it is profitable for the industry to exist after T, it will exist whether the ETS was adopted at τ or T, although of course some firms may have gone out of business before T, to be replaced after T by new firms.

(b) If long run profitability π_T^∞ depends on whether or not the firm operated between τ and T, the shape of the economy can be affected by timing. (Formally, economists term this effect hysteresis.) These conditions might occur if the cost of operating after T is so much lower if the firm or industry operated from τ to T than if it did not (because it learnt from experience) that operation after T switches from being unprofitable to profitable. In essence, operating from τ to T has two sets of benefits to the firms: the profit π_τ^T , and the option of a higher profit π_T^∞ in the later period if it chooses to operate. The additional profit may make the difference between whether the industry operates or not after T.

The notion of "regret" in such an economy is still problematic. When a firm decides to operate at time τ, it will do so in cognition of the long term profits as well as the short term profits. For the Government's timing to matter, adopting the ETS at τ rather than T must lower profits from τ to T by so much that it negates the cost advantage in the subsequent period; and the cost advantage must be sufficiently large that the firm would have different equilibrium decisions after T (that is, it would choose to be active with the cost advantage, but would shut down without it.) As Arthur and Krugman make clear, these circumstances can exist, although they may not be normal[1].

A schematic example

This simplified example is intended to clarify the tradeoffs involved in increasing free allocations to avoid leakage beyond the current government commitment.

<table>
<tr><th colspan="2"></th><th colspan="2">A China enters in 5 years</th><th colspan="2">B China stays out</th></tr>
<tr><td colspan="2">Firm 'should be' always out</td><td colspan="4">No firm regret; social regret if subsidised</td></tr>
<tr><td rowspan="2">Firms that society wants to be in (economically) if China comes in within 5 years but otherwise wants to be out</td><td>Firm out

Environ-mental loss</td><td colspan="2">1 Firm regrets decision
Social regret: Firm loss + loss to NZ workers from loss of capital and unnecessary social adjustment cost
No environmental loss</td><td colspan="2">2 No regret</td></tr>
<tr><td>Firm in</td><td colspan="2">3 No firm regret
Government subsidised firm
Social gain if firm would have left otherwise and value to workers / avoiding unnecessary adjustment exceeds cost of subsidy</td><td colspan="2">4 Firm regret
Government subsidised firm
Social regret
Government did not subsidise firm
No social regret</td></tr>
<tr><td colspan="2">Firm in regardless of Kyoto</td><td colspan="4">No firm regret
Social regret if government provides subsidy</td></tr>
</table>

[1] W. Brian Arthur (1989) "Competing technologies, increasing returns, and lock-in by historical events," Economic Journal 99 116-131.
Paul Krugman (1991) "History and expectations," Quarterly Journal of Economics 106 (2) 651-667.

The diagram simplifies the future into two states: A and B. One is where 'China' ('China' in this table means everyone who is not in Kyoto at the moment) is a part of the international agreement in five years. The second is where we don't get a global agreement in five years. Firms and the Government are having to make decisions now and are hoping that they won't regret them five years out.

The same approach could be used with a longer time frame though the costs of ongoing subsidy are likely to overwhelm the benefits of protecting firms if the lag before 'China' enters becomes too long. This is analogous to the argument for not providing trade protection when we cannot affect others' trade behaviour.

The diagram identifies three types of firms. The first, at the top of the diagram, are firms who should always close or leave New Zealand – they are carbon inefficient, and even with a global agreement they won't be competitive. We don't want to subsidise these firms. These could be part of industries that are 'doomed' on the basis of their high greenhouse gas emissions relative to value.

The firms at the very bottom of the diagram will stay in New Zealand regardless of the global agreement. They are very profitable in New Zealand, have low emissions or are not trade exposed. Again we don't want to subsidise these firms – they will continue operating anyway. The first challenge is to identify firms in either of these categories and exclude them.

The middle firm type falls between these extremes. These are firms that we would like to stay in New Zealand in the long run. We might be willing to subsidise these firms if we knew a global agreement would happen in five years. We need to consider the private and social costs and benefits of subsidising production.

'Firm out' If a firm in this category decides to close (or not invest) and 'China' joins Kyoto in five years, this will have environmental and economic consequences: scenario 1. The firm's production will move offshore (or equivalent production will increase offshore), increasing emissions in countries outside the global agreement and hence raising global emissions. The firm that closed will itself will have economic regrets when China joins if the loss of profit it would have needed to bear for the next five years is less than the long term loss of profits from closure or the cost of reversing their decision to leave New Zealand.

There will also be an additional cost to New Zealand's workers – the firm's capital is no longer in the country. The workers will end up with lower wages than they would have had if the firm had remained in New Zealand. Other resources (such as natural resources) may have lower value without appropriate capital to work with. There will also be a social adjustment cost. Some of these may be transitional losses as capital could gradually return to New Zealand possibly at a higher cost.

However, if 'China' stays out (scenario 2), a firm that leaves has no regret. There is also no social regret if the cost of subsidising them to stay in for five years would have been greater than the additional value to workers over the five years.

'Firm in' Alternatively, a firm in this category could decide to stay in. If 'China' joins the global climate agreement in five years (scenario 3), this firm has made the right decision, despite facing extra competition in the intervening years. If 'China' stays out (scenario 4) this firm is going to have regrets, since they remain trade exposed.

The last section looks at the Government's response. If the government has subsidised one of these firms to induce it to stay 'in', it will be happy if 'China' enters in five years, provided the cost of the subsidy it provided is less than the additional social costs would have been had the firm been lost. These costs include the value to the workers and the costs of adjustment. If the

firm stays in without subsidy the Government will also have no regrets, since the outcome is the same for less cost.

Alternatively, if the government subsidises a firm and the firm stays in, but 'China' does not join the global climate agreement, the government (and the firm) will have regrets.

The challenge is for us to balance the costs and benefits of policies based in part on our assessment of the likelihood of the two scenarios. We need to consider how likely it is that 'China' will enter the global climate agreement. We also need to work out how to categorise firms in the way described, and then weigh up the firm regrets and social regrets alongside the cost of subsidising.

An additional complication arises because if 'China' has not entered in five years, there is still the possibility that it would enter in 10 years. Thus the problem can repeat after the first five years. At that point the problem is more or less identical to now. This adds an extra element to the government's regret in scenario 4. Not only have they subsidised a firm that continues to be non-viable, but they are now faced with the costly decision of whether to continue that subsidisation. In the very first year, they need to consider the possibility that once they start subsidising, they will choose to subsidise for ten years (or longer) in part to avoid a one-off cost of reversing an investment decision. They may have better information in this second round, but in any case it should bias them toward reducing the subsidy in the first phase.