Even stronger than the New Zealand dollar!!!

FROM THE EDITOR

Welcome to Issue 14 of *EcoNZ@Otago*!

This issue represents something of a milestone: the magazine's eighth year. Since 1998, *EcoNZ@Otago* has been published by the Department of Economics at the University of Otago.

The contents of the previous 13 issues are listed at the back of this issue, and single issues are available on request (our addresses are below).

As mentioned in the previous issue, 40 of the best *EcoNZ@Otago* articles from Issues 1 to 11 have been updated and revised and published in a book by Pearson Education: *Keeping Economics Real: New Zealand Economic Issues*.

More information about the book appears on page 12 below.

If there are any economic issues that you would like examined in a future issue of *EcoNZ@Otago*, then please email your suggestions to econz@otago.ac.nz

Or you can write to *EcoNZ@Otago*, Department of Economics, University of Otago, PO Box 56, Dunedin.
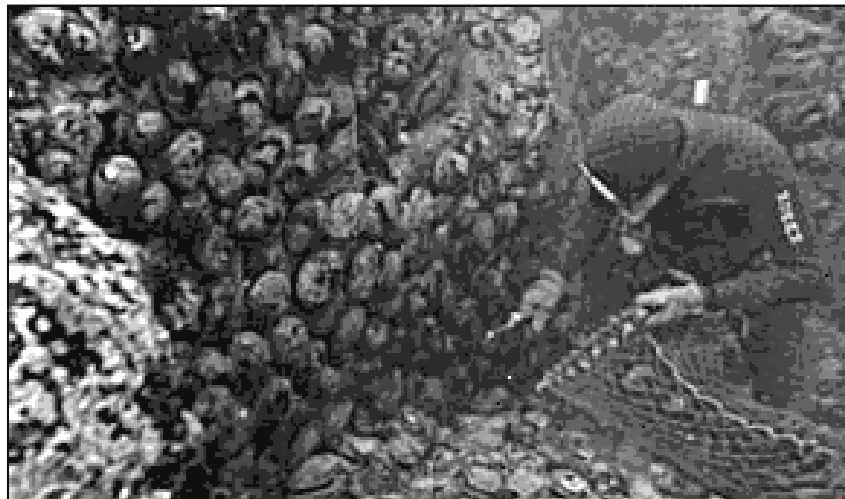
Happy reading!
Paul Hansen

Paua to the people!
How might paua divers respond to marine reserves?

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IN 2003 the Food and Agriculture Organisation (FAO) of the United Nations estimated that 50% of the world's commercial fish stocks were fully exploited and 25% over-exploited (FAO 2003). Since World War II, many countries around the world, including New Zealand, have relied on traditional methods of reducing over-fishing, such as gear restrictions, limiting access to particular fisheries and special taxes. Unfortunately, half a century later commercially-valuable fish stocks are still dwindling.

New Zealand is one of a few countries that now manages its fisheries via a property rights based system. Since 1986, the Minister of Fisheries sets a total allowable catch (TAC) each year for each species based on an estimate of the number available and their biological characteristics (birth and death rates, etc.). Each species' TAC is then split into smaller quantities, known as individual transferable quota (ITQ), that are owned by fishers and can be traded in a market like any other good or service.

Currently 45 species are covered by the ITQ system, including paua. Although quotas serve to restrict the amount of paua caught (legally), as we explain below, the biological characteristics of paua suggest the need for an additional measure based on restricting divers' access to areas where paua are found. Later in the article, we investigate how divers might respond to a network of paua fishing areas being closed down. To what extent might divers decide to fish in other (open) areas, or even to not to go diving at all?

More than just pretty shells

Paua is more commonly known internationally by its North American name, abalone. Paua/abalone is found in western North America, Australia, Japan, the Pacific Islands and New Zealand. There are three species of paua in New Zealand. The most commonly caught one is 'blackfooted' paua (*Haliotis iris*), which lives in rocky intertidal and subtidal habitats in up to 15 metres of water.

In the early days, the main source of income from gathering paua was from its iridescent shells, which were (and still are) used in jewellery and souvenirs. However, since the 1960s the small domestic market in paua meat has expanded to Southeast Asia, where canned abalone has become an increasingly popular delicacy. As more and more paua were caught, however, concerns increased about the sustainability of the fishery, and in the 1980s paua was included in the ITQ system. In addition, divers are not allowed to use SCUBA or to catch paua of less than 125 mm in length.

Why worry about paua?

Paua is one of New Zealand's top 10 seafood exports, but recently catches have been dropping significantly in some areas, such as Stewart Island. This suggests that the ITQ system might not be working that well for paua. The reason is likely to lie in paua's biological characteristics.

Paua live in large groups or 'patches' on reefs and divers tend to target the largest patches first, as this minimises their effort. (Remember, divers usually have to hold their breath while catching paua!) Although paua are spread to adjacent areas when they produce larvae, once the larvae have grown into paua they do not move much. This means that paua is a sedentary marine species (unlike fish, for example).
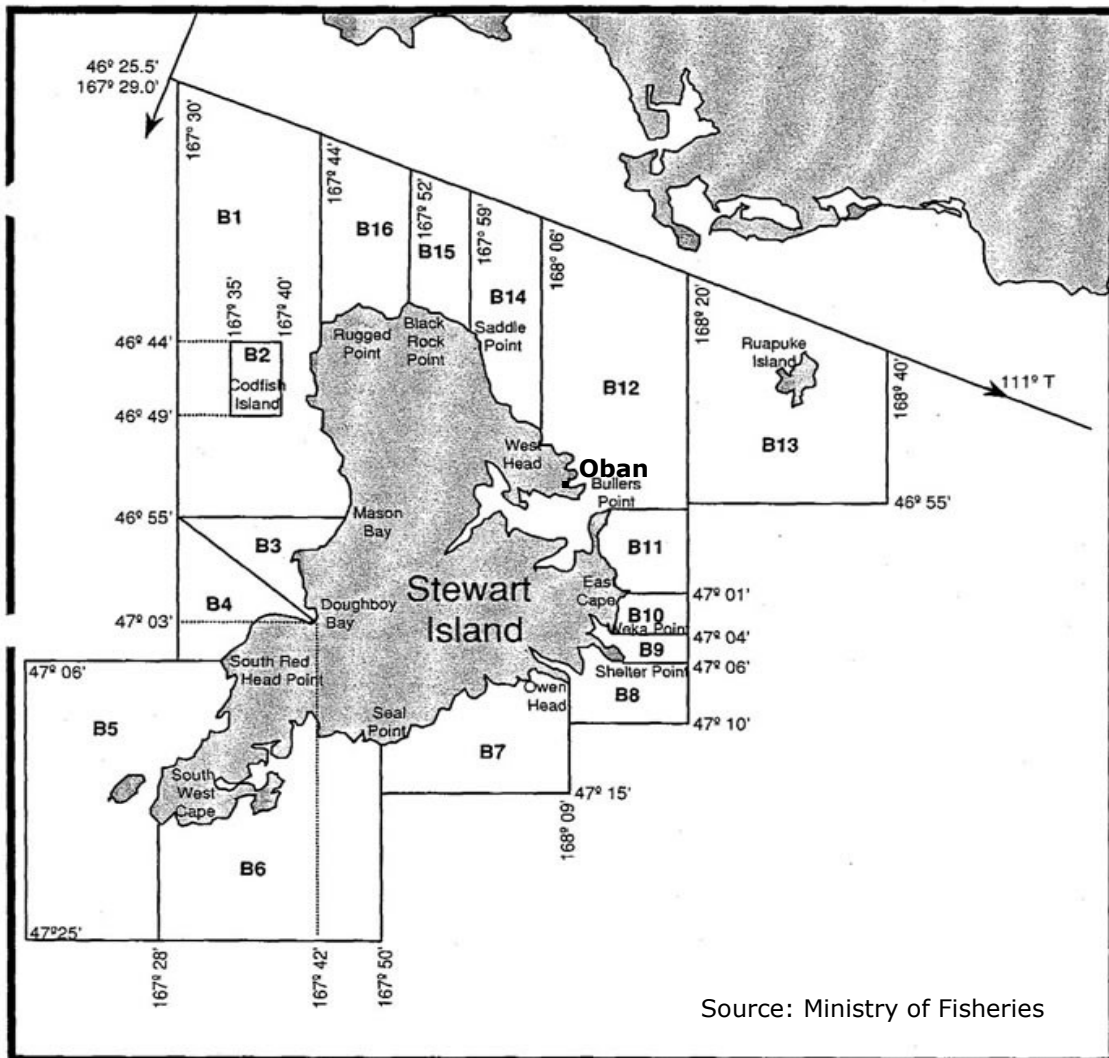
Therefore the number of paua being caught in an area can remain quite stable for many years, even though divers are gradually depleting one patch after another. The quota levels, which are set based on catch information from previous years, do not reflect this local small-scale depletion – the shortcomings of which are painfully revealed when catches suddenly drop dramatically. A network of paua no-take areas (marine reserves) may play an important role in mitigating this problem.

A model of paua divers' behaviour

The model that we used to predict the behaviour of paua divers is based on what is known as a 'random utility model', and is applied here to Stewart Island for the period January 1997 to August 2003.

In essence, on any given day, paua divers must decide whether to go diving or not, given the weather conditions and expected catch of paua. If they decide to go diving, they must choose where to go from amongst Stewart Island's 16 paua fishing areas (B1 to B16 in Figure 1). This depends on each area's 'attractiveness', which is defined to be the expected catch in the area, relative to the cost to the diver of getting to that area, defined to be the distance she/he must travel from Oban (Stewart Island's main port and settlement).

Figure 1: Stewart Island paua fishing areas, B1 to B16

Source: Ministry of Fisheries

The Ministry of Fisheries provided a data set that included: the estimated weight of paua caught on each diving trip, the dates and durations of the trips, the number of divers per ITQ holder, and the fishing area (B1 to B16 in Figure 1) in which the paua were caught. Daily weather data were obtained from the National Institute of Water and Atmospheric Research (NIWA).

After we had estimated the underlying model predicting paua divers' behaviour we used it to simulate the effects of imposing a network of areas around Stewart Island in which it is illegal to catch paua. These no-take areas were selected according to several criteria, including the requirement that areas were dispersed so that paua stocks in no-take areas can regenerate and their larvae spill over to open areas, and the desire to minimise the economic impacts of such closures.

Simulation results and conclusion

We found that the closure of areas B4, B5, B13 and B16 (see Figure 1, previous page) would have the smallest economic impact in terms of lost paua diving trips. Only 109 fewer trips would be undertaken if these areas were closed, but diving activity would increase in adjacent areas, especially B9, B10, B11 and B12.

Although it is difficult to make accurate policy predictions without including physical and biological data (e.g., ocean currents, transfer rates of larvae, recruitment rates, etc.), we can conclude that closing some fishing areas does not necessarily lead to large economic losses for divers in the short run. There will be some losses, but they can be minimised by choosing the best areas for closure. Moreover, paua stocks would be expected to recover, thereby increasing the long-run sustainability of the fishery.

Some questions to think about

1. As discussed above, the closure of areas B4, B5, B13 and B16 would result in fewer paua diving trips in total, but more trips to adjacent areas, especially B9, B10, B11 and B12. What do you think might be the effects of this on paua levels in the long run, bearing in mind their biological characteristics (as discussed in the article)?

2. The introduction of marine reserves has been a very controversial issue in New Zealand (and elsewhere in the world). Can you think of reasons on both sides of the argument (i.e., for and against reserves) that would have made it such a hotly-debated topic (e.g., look out for newspaper articles about the application for a marine reserve around Nugget Point in South Otago!).

Further reading

For more information about the abundance of paua see McShane (1995), and for the effects of marine reserves in general see Smith & Wilen (2003).

Useful websites

More information on paua can be found at the New Zealand Seafood Council's website: www.seafood.co.nz/business/fishaqua/species/paua.asp

In addition, the Council's views on marine reserves are available from: www.seafood.co.nz/about/buspol/marine.asp

References

Food and Agriculture Organization of the United Nations (2002), *The state of world fisheries and aquaculture*, Fisheries Department, FAO, United Nations, Rome.

MF Smith & JE Wilen (2003), Economic impacts of marine reserves: The importance of spatial behaviour, *Journal of Environmental Economics and Management* 46, 183-206.

PE McShane (1995), Estimating the abundance of abalone: the importance of patch size, New Zealand *Journal of Marine and Freshwater Research* 46, 657-62.

What does the 2004 Nobel Prize in Economics have to do with New Zealand?

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The 2004 Nobel Prize in Economic Sciences was awarded to Finn Kydland and Edward Prescott "for their contributions to dynamic macroeconomics: the time consistency of economic policy and the driving forces behind business cycles." (The Royal Swedish Academy of Sciences 2004). Few non-economists will have come across the phrase "time consistency", but Kydland and Prescott's contribution in this area (Kydland & Prescott 1977) led to major changes in the way industrialized economies are run. In New Zealand, these changes are embodied in the Reserve Bank of New Zealand Act (1989). We will explore the ideas that led to the introduction of the Act, beginning with the work of a New Zealand economist in the 1950s.
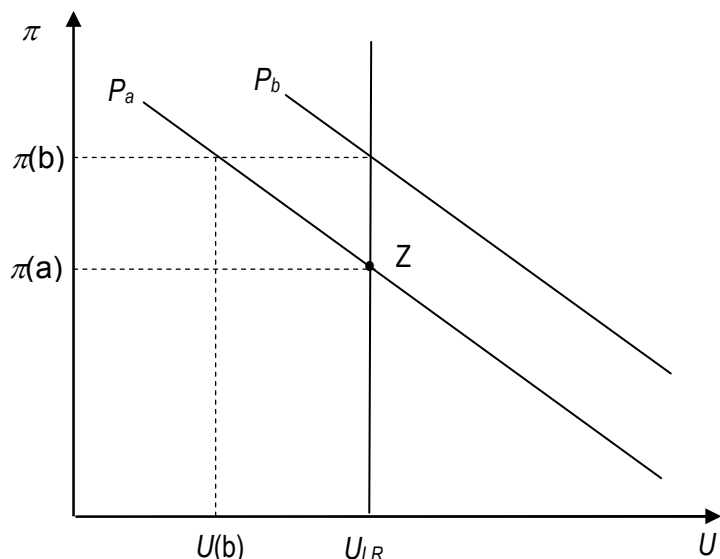
The Phillips Curve
In 1958, A.W.H. Phillips – originally an electrical engineer from Hawke's Bay, but by that time an economics professor at the London School of Economics – published one of the most influential papers of the post-war period (Phillips 1958).

Phillips was the first economist to identify a systematic correlation between unemployment and the rate of growth of wages and prices. When inflation was relatively high, unemployment was relatively low.

This relationship is now known as the *Phillips Curve*.[1] Figure 1 depicts a stylised Phillips Curve, the downward-sloping line P_a. It shows that at higher rates of inflation (π) we can expect a lower rate of unemployment (U).

Figure 1: The Phillips Curve

The main reason for the negative correlation between inflation and unemployment is that during high inflation periods some workers underestimate the extent to which prices are rising, so their wage demands do not keep up with actual inflation. This means firms' profits are higher – their revenue is rising faster than the cost of hiring workers – which encourages them to expand production and hire more people.

Suppose, for example, that the unemployment rate is U_{LR} in Figure 1, and that the rate of inflation people currently expect is π(a). Then there is an unanticipated rise in the inflation rate to π(b). In the short run, unemployment falls to U(b): the economy moves along the Phillips Curve labelled P_a. (The figure is drawn so that this Phillips Curve intersects the U_{LR} line at the inflation rate people expect, π(a). So if actual inflation is higher than expected we move up Phillips Curve P_a away from point Z.)

If workers' misperceptions are short lived then this fall in unemployment will only be temporary. In the long run, workers will realise that inflation has risen and adjust their wage demands accordingly. As wages rise in proportion to inflation, profits return to their original level, and so does the unemployment rate. In effect, the Phillips Curve shifts upwards, and is now represented by Phillips Curve P_b.

Surely, then, a sensible government would not try to inflate the economy to reduce unemployment? The gains from doing this would only be temporary, and the increase in inflation would be permanent. But in the two decades before the Reserve Bank of New Zealand Act (1989) average annual inflation in New Zealand – as in many other industrial countries – was over 10%. Kydland and Prescott's contribution, for which they won the Nobel Prize, was to explain why governments find it so difficult to keep inflation low.
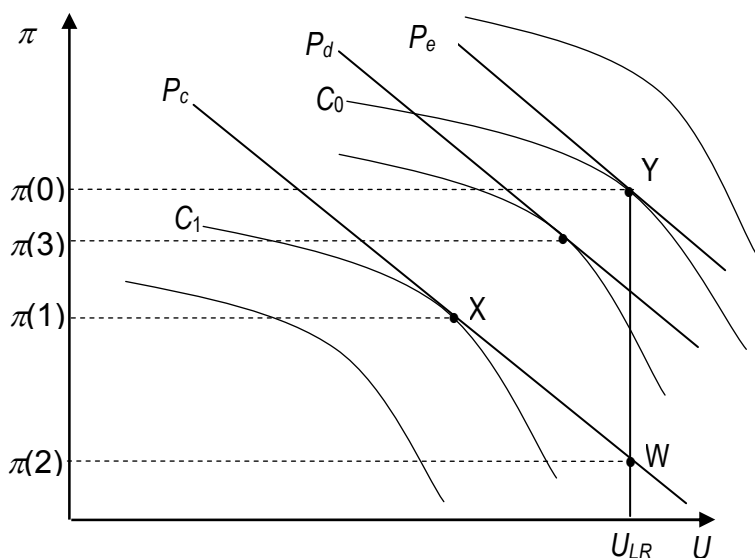
A simplified version of the Kydland-Prescott story
The government can influence the inflation rate via its control of interest rates, and suppose that it values both low inflation and low unemployment. However, it would prefer moderate levels of both to a very high level of one and a very low level of the other.

With such government preferences, we can draw a contour map over the Phillips Curve diagram to show how happy the government is for any given inflation rate and unemployment rate: the 'boomerang'-shaped curves in Figure 2. Each curve shows all combinations of inflation and unemployment with which the government is equally happy. These curves are like contour lines on a map, but indicate a certain level of government happiness rather than a certain altitude above sea level. As we travel north-eastwards in the figure we move down the 'hill' to lower levels of government happiness.

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[1] For more information about 'Bill' Phillips and his Curve, as well as The Phillips Machine, see McDougall (2004).

Figure 2: The Phillips Curve and the government's preferences

Now suppose the government *announces* that it will target a low inflation rate, $\pi(2)$ in Figure 2. If people really believed the government then we would see the Phillips Curve P_c, which crosses the U_{LR} line where inflation equals $\pi(2)$. Several contours intersect this Phillips Curve, but the one corresponding to the highest level of government happiness is C_1, which just touches the curve at point X.

Point X is attainable if the government sets an inflation rate $\pi(1)$; this is the inflation rate that should actually be targeted by a rational government. Since $\pi(1)$ is higher than $\pi(2)$, people will have been deceived: the government has 'cheated'. If people know what the government is up to, they will never really believe that inflation is going to be as low as $\pi(2)$. Nor will they expect inflation to be $\pi(1)$, because they know that such an expectation – leading to the Phillips Curve P_d which crosses the U_{LR} line at $\pi(1)$ – will give the government an incentive to set the actual inflation rate even higher, at $\pi(3)$. The only level of expected inflation that doesn't give the government any incentive to 'cheat' is $\pi(0)$. Then we see the Phillips Curve P_e which crosses the U_{LR} line at $\pi(0)$, and the highest attainable contour is C_0. Now the best the government can hope for is to attain point Y. It can do this by targeting $\pi(0)$, and people get the inflation rate they expected.

So, if people are sensible we end up at Y, with high inflation and an unemployment rate no different from the long-run rate U_{LR}. Any point on the U_{LR} line below Y would be an improvement on this, putting us on a higher contour. The problem is that to attain such a point we need a lower Phillips Curve: that is, we need lower inflationary expectations. But people know that such expectations would give the government an incentive to raise inflation above the expected level, so points below Y are effectively unattainable: in the terminology of Kydland and Prescott, they are not *time consistent*. (This insight earned them the Nobel Prize.)
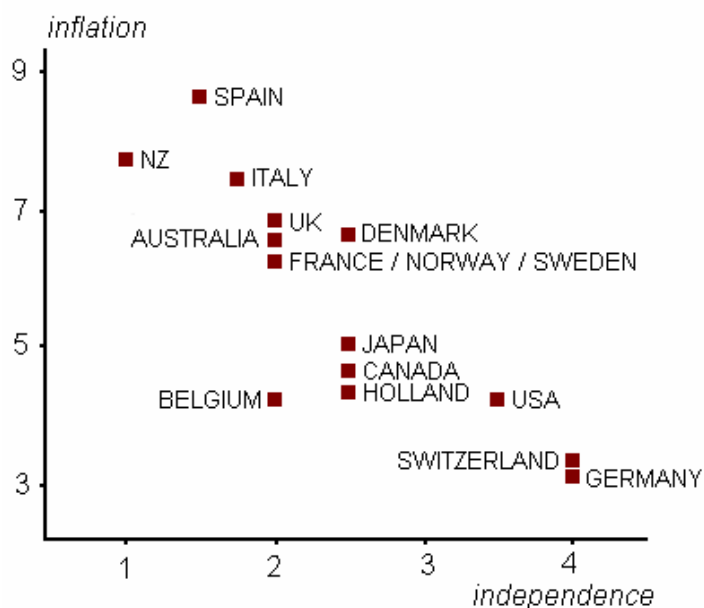
Reserve Bank independence

One solution to this problem is for the government to delegate control of the interest rate to an authority that does not share its preferences. For example, it can delegate control to a reserve bank governor whose employment contract specifies that he/she must target a low inflation rate, say $\pi(2)$. If people are confident that the contract is binding, then they will lower their expectations of inflation, taking us back to Phillips Curve P_c. If the contract is indeed binding we will end up at point W, which is better than the government can achieve without delegation.

Figure 3 suggests that this idea is at least partly correct. It plots average annual percentage inflation rates for different countries before 1988 against a measure of the degree to which control over monetary policy was delegated to an independent reserve bank.[2]

As can be seen in the figure, New Zealand had the least delegation and the second highest inflation rate. With the exception of Spain, countries with more delegation had lower inflation. The points in the figure fall roughly on a downward-sloping line, suggesting a systematic relationship between inflation and reserve bank independence.

Figure 3: Reserve bank independence and inflation, 1955-1988

Source: Alesina & Summers (1993)

The 1989 reforms

The Reserve Bank of New Zealand Act (1989) was designed to beef up the country's independence index, thereby lowering inflation to the levels enjoyed by Germany and Switzerland.
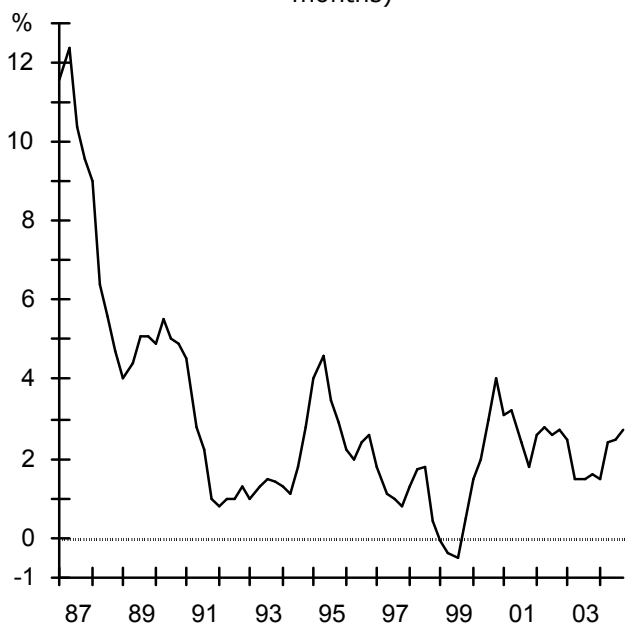
The key instrument for ensuring independence is the *Policy Targets Agreement* (PTA). This is a public contract between the Minister of Finance and the Governor of the Reserve Bank of New Zealand (RBNZ). The current PTA stipulates that: the RBNZ has an inflation target of 1-3% per annum; when inflation is above or below this target, the RBNZ will

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[2] The index is taken from Alesina and Summers (1993). It is constructed on the basis of several factors capturing the extent to which government can influence the day-to-day running of the reserve bank.

respond so as to meet the target in the medium term. The Minister of Finance plays no part in setting interest rates, and the policies followed to meet the conditions of the PTA are entirely under the control of the Governor, who will lose his job if he fails to meet the terms of the contract.

As a result of the Act, New Zealand's independence index jumped from the bottom of the pile to the top. Figure 4 shows what happened to the inflation rate in subsequent years. It appears that the 1989 reform was successful in changing private sector expectations and reducing inflation.

Figure 4: New Zealand inflation since 1987
(% change in consumer prices over previous 12 months)

Source: RBNZ (www.rbnz.govt.nz)

However, reserve bank independence is not necessarily costless (Rogoff 1985). Worsening international economic conditions (e.g., an increase in world fuel prices) can push a country into recession. Then a reserve bank programmed only to keep inflation low, regardless of the consequences for unemployment, might create excessive economic damage. Whether this is a price worth paying depends on the frequency and magnitude of such events and on the relative importance attached to controlling inflation and unemployment. Existing evidence suggests that the costs of increased reserve bank independence in industrialized countries over the last decade have been small, but then the world economy has been much calmer than it was in, say, the 1970s.

The current PTA, mindful of this potential pitfall, stipulates that the RBNZ should also minimise "unnecessary instability" in the economy. However, no major international shocks have tested the Reserve Bank's ability to avoid such instability while maintaining low inflation. The real test for reserve bank independence will come at that point in the future when the world economy experiences shocks equal to those of the 1970s.

Some questions to think about
1. Draw a version of Figure 2 in which all the Phillips Curves are steeper, but with contour lines roughly parallel to those in the original figure. What does a steeper curve say about the short-run trade-off between inflation and unemployment? What does it imply for the size of the gap between $\pi(1)$ and $\pi(2)$, and therefore the magnitude of the time inconsistency problem?

2. A recession might be represented by a temporary rightward shift of the Phillips Curve (which is P_c if we have an independent reserve bank and P_e otherwise). Draw a figure to represent a recession in each of these two cases. Assume that during the recession an independent reserve bank will continue to target $\pi(2)$, but without such independence the government can alter the inflation rate. Which of the two cases is worse, according to the contour map you have drawn? Can you redraw the contour map or adjust the slope of the Phillips Curves to give the opposite result? What does this tell you about the factors affecting the desirability of reserve bank independence?

Useful websites
More information about the winners of the 2004 Nobel Prize in Economics (and other years' winners), as referred to in this article, is available from: http://almaz.com/nobel/economics/economics.html

The Reserve Bank of New Zealand's website, which includes information about the Act (1989) and the Policy Targets Agreement (PTA), is: www.rbnz.govt.nz

References
A Alesina & L Summers (1993), Central bank independence and macroeconomic performance, *Journal of Money, Credit and Banking* 25, 151-62.

F Kydland & E Prescott (1977), Rules rather than discretion: The inconsistency of optimal plans, *Journal of Political Economy* 85, 473-91.

S McDougall (2004), The relationship between unemployment and inflation: The Phillips Curve, *EcoNZ@Otago* 12, 4-6.

A Phillips (1958), The relation between unemployment and the rate of change of money wage rates in the United Kingdom, 1861-1957, *Economica* 25, 283-99.

K Rogoff (1985), The optimal degree of commitment to an intermediate monetary target, *Quarterly Journal of Economics* 100, 1169-89.

Liberating Middle Earth: International trade liberalisation and New Zealand

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Many changes in the international trading environment have helped shape New Zealand's economy. Two prominent examples are New Zealand's loss of preferential market access to Britain – then the destination for more than a third of all Kiwi exports – when Britain joined the European Economic Community (EEC) in 1973, and New Zealand's unilateral reduction of import tariffs as part of a package of market-orientated reforms that began in 1984.

TRADE LIBERALISATION has gained momentum in recent decades due to the increased popularity of *free trade areas* (FTAs) and the continued progress of multilateral liberalisation via the World Trade Organisation (WTO).[1] FTAs involve the elimination of tariffs (or sometimes only the reduction of selected tariffs) on imports from member countries. Prior to 2001, New Zealand's only free trade agreement was the Australia New Zealand Closer Economic Relations Agreement (CER), signed in 1983.

In more recent years, however, the New Zealand government has energetically pursued additional free trade agreements. New Zealand now has a free trade deal with Singapore and has initiated free trade talks with China, Hong Kong, Malaysia, Thailand, Chile, and the Association of South East Asian Nations (ASEAN).[2]

As New Zealand's economy is both small and relatively open, the financial fortunes of New Zealanders are particularly vulnerable to changes in the international trading system. This article takes stock of how several proposed changes in the contemporary international trading environment will influence New Zealand by drawing on a model of global production and trade.

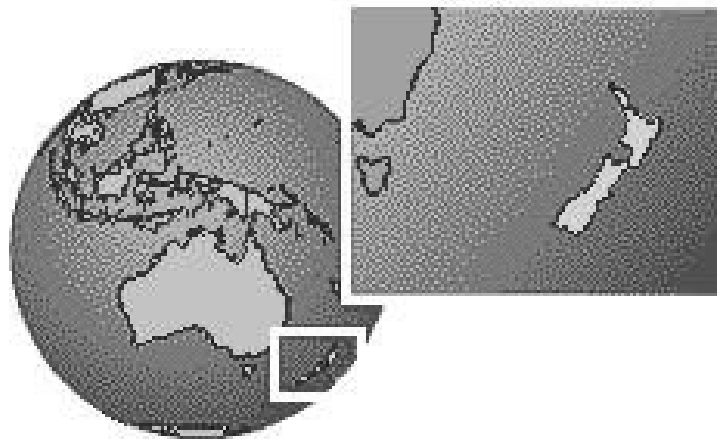**Trade creation and trade diversion**
First, though, it is helpful to understand how the formation of a FTA (free trade area) affects an economy and the welfare of its citizens. The most obvious benefit from entering a FTA is that the economy's exports can enter its FTA partner economies without tariffs having to be paid. A nation's welfare is also affected by the elimination of its own import tariffs. Whether or not a nation experiences an increase or a decrease in welfare due to the elimination of its own tariffs largely depends on the extent of *trade creation* and *trade diversion*.[3]

Trade creation relates to the increased quantity of imports due to the elimination of tariffs on imports from member nations. As well as consumers receiving cheaper imported goods, the increase in imports also results in a reallocation of resources away from the production of goods that the nation is relatively inefficient at producing in favour of other sectors in which it has a comparative advantage.

Thus trade creation increases the efficiency of resource allocation.[4]

Trade diversion arises when the formation of a FTA causes imports to be sourced from a member country that is not the world's lowest cost producer of the product. For example, suppose New Zealand can import identical kites from Malaysia and China, where they sell for $11 and $10 respectively, and there is currently a 20% tariff on imported kites to New Zealand. In these circumstances, New Zealand consumers will purchase Chinese kites at a cost of $12 (Malaysian kites will cost New Zealand consumers $13.20). Next, suppose New Zealand signs a free trade agreement with Malaysia. New Zealanders will now choose to purchase Malaysian kites at $11 each rather than Chinese kites at $12. The FTA has caused trade *diversion* as New Zealand now sources from a manufacturer with higher production costs ($11 instead of $10), which reduces efficiency.

Free trade relationships not directly involving New Zealand can also influence its economic fortunes. For example, the recently completed Australia-US free trade deal awards Australian exporters to the US a price advantage over their New Zealand counterparts.

Simulating the effects of FTAs
The results from simulating a model of global production and trade under 11 trade liberalisation scenarios, where each is considered independently, are reported in Table 1 (next page).

The 11 scenarios can be classified into four groups: scenarios (1) to (7) are free trade agreements involving New Zealand, (8) and (9) are

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[1] More information about the WTO is available from King (2004a), Winchester (2004) and Wooding (2004).
[2] ASEAN nations include Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam.
[3] See King (2004b) for a more detailed discussion of trade creation and trade diversion.

[4] Efficiency improvements associated with tariff reductions are addressed in Richardson (2004).

free trade agreements not involving New Zealand, and (10) and (11) involve international trade liberalisation on a global scale.

In the table, the reported "Annual net benefit (per capita, $NZ)" is an estimate of how much better off each New Zealander is, on average, each year under each scenario.

Generally-speaking, we would expect such gains from a free trade agreement involving New Zealand to be *larger* the *greater* the amount of trade (both imports and exports) New Zealand has with other FTA members, and the *higher* the initial tariffs on that trade. In fact, this general result is borne out, as we now discuss in detail for each trade liberalisation scenario.

Table 1: Net benefits to New Zealanders of a range of trade liberalisation scenarios

Trade liberalisation scenario	Annual net benefit (per capita, $NZ)
1. NZ-Hong Kong	–$0.12
2. NZ-Malaysia	$2.45
3. NZ-Chile-Singapore	$3.92
4. NZ-Thailand	$22.90
5. NZ-China	$106.19
6. NZ-Australia-ASEAN	$16.95
7. NZ-ASEAN	$47.38
8. FTA of the Americas (FTAA)	–$41.32
9. EU-Mercosur	–$49.22
10. Global free trade	$557.98
11. Liberalisation of agricultural trade	$608.57

Source: Winchester (2005)

Scenarios (1), (2) and (3)
Scenarios (1) and (2) consider bilateral FTAs involving New Zealand and Hong Kong, and New Zealand and Malaysia respectively. Scenario (3) evaluates the extension of New Zealand's bilateral free trade deal with Singapore to include Chile in a trilateral arrangement.

As can be seen in Table 1, for all three scenarios New Zealanders will not be greatly benefited.[5] This is because the potential FTA members are relatively unimportant trading partners from New Zealand's perspective and import tariffs on trade between New Zealand and these countries are reasonably low.

Specifically, imports from Hong Kong, Chile, Singapore and Malaysia account for 1.1%, 0.1%, 2.6%, and 2.2% respectively of total New Zealand imports, whereas New Zealand exports to these countries is just 1.3%, 0.2%, 1.2%, and 1.9% respectively of total New Zealand exports. In addition, tariffs on trade between Singapore and New Zealand are already zero and Hong Kong does not impose any import tariffs. New Zealand tariffs on imports from Hong Kong, Chile and Malaysia are less than 1.1% on average, and tariffs imposed on Kiwi commodities by Chile and Malaysia are 5.1% and 1.8% respectively.

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[5] The negative net benefit associated with a New Zealand-Hong Kong FTA appears to result from trade diversion.

Scenarios (4) and (5)
Scenario (4) indicates that a New Zealand-Thailand free trade deal would generate more than $20 worth of annual net benefits per capita. This estimate is much larger than the predicted gain to New Zealanders in scenario (2) despite the proportions of Kiwi products sourced from and transported to Thailand and Malaysia being roughly similar. The key difference is that Thailand's average tariff on New Zealand products (12.3%) is more than double the average tariff imposed by Malaysia.

The impact of a New Zealand-China free trade deal is evaluated in scenario (5). Although only around 5.5% of total New Zealand exports are destined for China, and a similar amount of Kiwi imports are sourced from there, tariffs on trade between the two nations are relatively high (e.g., Chinese textiles, clothing and footwear entering New Zealand are subject to a tariff of around 10% and New Zealand food products entering China attract a tariff of about 15%). Consequently, gains to New Zealanders from this bilateral deal are comparatively large: worth more than $100 per person per annum.

Scenarios (6) and (7)
Scenarios (6) and (7) concentrate on New Zealand-Australia-ASEAN and New Zealand-ASEAN free trade agreements respectively. The simulations indicate that should John Howard's reluctance to sign the Treaty of Amity and Cooperation shut Australia out of free trade talks with ASEAN nations, the gains to New Zealand from free trade with the ASEAN region would be much greater than if Australia were included in such an agreement. This is because New Zealand and Australian exporters compete in ASEAN markets.

Scenarios (8) and (9)
Scenarios (8) and (9) consider two FTAs not involving New Zealand; namely, the Free Trade Area of the Americas (FTAA) and free trade between the European Union and the South American countries of Argentina, Bolivia, Chile, Paraguay, and Uruguay (collectively known as the 'Political Mercosur'). The simulation results indicate that, as Kiwi agricultural products suffer a price disadvantage relative to similar products sourced from FTA members, the average New Zealander will suffer.

Scenarios (10) and (11)
Scenario (10), involving the removal of all tariffs globally, represents a measuring stick against which all other free trade scenarios may be evaluated. The simulation result suggests that the average New Zealander will benefit by just over $550 annually and, from New Zealand's perspective, global free trade is much more desirable than regional free trade.

The section of the WTO's Doha Development Agenda, which seeks to eliminate distortions in trade in agricultural goods represents the most important multilateral negotiations from New Zealand's point of view. The exact details of the agreement are still to be sorted out but a likely scenario is the elimination of agricultural tariffs and export subsidies, which is considered in scenario (11).

The simulation results imply that the benefits to New Zealand are significantly larger than those

derived from any FTA currently in the pipeline, and slightly greater than the benefits from global free trade. This is because the US and EU governments not only protect domestic farmers by imposing high import tariffs on agriculture but also by generously subsidising their agricultural producers. Such subsidies result in an over-supply of agricultural products on global markets, thereby depressing prices and ultimately hurting Kiwi farmers.

Both winners and losers

Although Table 1 reports average net benefits (per capita), it is unlikely that the benefits from trade liberalisation will be distributed evenly amongst all New Zealanders. Some individuals will receive large gains while other will suffer losses. It is possible to elaborate on this point by analysing the formation of a New Zealand-China FTA (scenario 5) in greater detail.

In this scenario, New Zealand imports of textiles, clothing and footwear from China increase by more than 60%, which reduces the price of these commodities in New Zealand and decreases domestic production. Ultimately, workers employed in textiles, clothing and footwear industries suffer wage reductions and/or an increased likelihood of being unemployed.

On the other side of the coin, free trade with China would increase New Zealand exports of agricultural products to China by around 150% and raise the domestic price of agricultural goods, which represents a windfall gain to Kiwi farmers.

As New Zealand has a comparative advantage in agricultural products and a comparative disadvantage in many manufactured commodities, particularly those that employ large quantities of unskilled labour, changes in the distribution of the net benefits are qualitatively similar in other liberalisation scenarios to those in the New Zealand-China scenario.

This presents an interesting dilemma for policy makers: although the gains to farmers exceed the losses to manufacturing workers, farmers tend to be richer than manufacturing workers. Public officials must, therefore, weigh up efficiency gains against equity concerns. One solution would be to help displaced workers gain employment in expanding sectors by offering retraining subsidies and relocation grants.

Overall, are FTAs worthwhile?

Liberalisation scenarios involving *global* free trade produce significantly larger net benefits than those derived from regional liberalisation. This does not mean that FTAs are of little value – these agreements are important stepping stones towards global free trade.

Free trade agreements also cover issues involving international investment and business partnerships. Hence there may also be benefits due to the transfer of technology, the sharing of ideas and better business practices, which are not captured in the simulation results reported in Table 1.

Thus it appears that both regional and multilateral trade liberalisation will benefit New Zealand. The gains from freer trade on its own will not, however, be evenly distributed amongst New Zealanders.

Some questions to think about

1. Will New Zealand experience losses due to trade diversion if there is international free trade? Why or why not?

2. How would the distribution of workers across industries in New Zealand change following the creation of a New Zealand-China FTA?

Further reading

This article is a greatly condensed version of Winchester (2005).

Details concerning current and potential FTAs involving New Zealand are available from the Ministry of Foreign Affairs and Trade's web site: www.mfat.govt.nz/foreign/tnd/ceps/cepindex.html

The latest news about the Doha Development Agenda can be found at the WTO's web site: www.wto.org

References

A King (2004a), WTO: The *Wrong* Trade Organisation? In: P Hansen & A King (eds), *Keeping Economics Real: New Zealand Economic Issues*, Auckland: Pearson Education, 166-70.

A King (2004b), Free trade areas: A discriminating way to liberalise trade. In: P Hansen & A King (eds), *Keeping Economics Real: New Zealand Economic Issues*, Auckland: Pearson Education, 174-8.

M Richardson (2004), A farewell to tariffs: The case for free trade. In: P Hansen & A King (eds), *Keeping Economics Real: New Zealand Economic Issues*, Auckland: Pearson Education, 45-8.

N Winchester (2004), Lessons for trade liberalisation from the death of Lee Kyung Hae, *EcoNZ@Otago* 12, 1-3.

N Winchester (2005), Liberating Middle Earth: International trade liberalisation and New Zealand, *Economics Discussion Papers*, University of Otago, forthcoming.

P Wooding (2004), International trade and the WTO. In: P Hansen & A King (eds), *Keeping Economics Real: New Zealand Economic Issues*, Auckland: Pearson Education, 162-5.

Options made easy

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This article about options is the second on financial instruments; the first was an article on *futures contracts* – see Smithies (2004).

MIKE WATSON sat with the other directors of ACE Developments around a large mahogany board table as they pondered the poor performance of the company. As company chairman, he felt responsible.

"OK people, tell me how we can motivate our managers to work harder for shareholders."

There was a stunned silence.

The youngest board member, Dave Evans, offered a suggestion. "Let's give them stock options as a performance bonus instead of cash!"

"We already give them shares as part of their bonus package. Isn't that incentive enough?" snorted Mike.

"I didn't say give them *shares*. I said, give them *options*," Evans shot back.

"What's the difference, Dave?" asked Mike in a rare moment of uncertainty.

"Well, the options I'm thinking of involve the option to buy ACE shares in the future at a set price, known as a 'call option'. By writing the option well 'out-of-the-money' – that is, have the price the managers will be able to buy the shares for at well above what we think the share price will be in the future if things continue as badly as they have been – then we are motivating the managers to maximise that future share price." Dave's confidence was growing with every sentence. Finally, he thought, his finance degree was giving him the edge over these overfed dullards.

He continued, "Now I know what you're all thinking: How will this motivate the managers to perform? Think about it. The options have a value *if*, *and only if*, ACE's share price at the point in the future when the managers can buy the shares – or 'exercise the option' – is higher than the price that we have agreed they can buy the shares at. If it is, the managers can exercise the option and buy the shares at the discounted price and immediately sell, thereby earning themselves an instant profit. The higher the company's value – in part at least, determined by how hard the managers work – the higher their bonus."

"OK Dave, that sounds interesting. I have to admit to ignorance in this area. Please prepare a report for me and the other directors on options, but keep it simple?" Mike asked, silently rueing the fact he did only a management degree.

Here is Dave's report:

Options: A Simple Guide
By Dave Evans

Let's start with a simple example. Suppose you go into an electronics shop to buy some batteries and suddenly see the computer of your dreams, and it is the last one left in the shop. In an ideal world you would go ahead and buy it. But in reality you have a problem that needs to be addressed: you have no money at the moment.

Therefore you ask the retailer to hold the computer and not sell it to anyone else until you have had time to talk to your bank manager, so that you can return with the money.

And the retailer quite rightly says "NO!". From his point of view you are asking him to take a risk. What if your bank manager does not co-operate and you cannot come back with the money? The retailer might have had to turn down offers from other customers and is therefore out of pocket.

So, now it is time to try and make a deal. You would like the option to buy the computer at a time in the very near future, but understand the retailer's reluctance to bear the risk. You discover from him that he sold an identical computer last week and made $100 profit on that sale. So you would like to buy the *option* for a day to buy his computer (remember, it is the last one left), and you calculate what that option is worth to the owner.

You rationalise that there is a 1 in 5 chance (20%) that in the next 24 hours someone else will want to buy the computer. There is therefore a 20% chance that the retailer will make a profit of $100, and so his expected profit is $20 (20% of $100).

So you offer the retailer $20 for the exclusive right ('the option') to buy the computer within the next 24 hours. If, by this time tomorrow, you fail to turn up with the money to buy the computer then the

$20 belongs to the retailer. But, if you do bring the money, the $20 is discounted off the purchase price, but the retailer still has had the use of the $20 for 24 hours and can (in theory) earn interest on it.

A right, not an obligation

This, in essence, is all a financial *option* is. It is the right, but not the obligation, to buy or sell an asset at a future date at a price that is set today. Naturally, this right is not free; it too has a price. Let's now look at options as they apply to shares (known as 'stock options').

As in the above example, for a small down payment (the *premium*) you can buy the right (the *option*) to buy or to sell shares at a fixed price (the *strike price*) at a fixed date in the future (the *exercise/expiry date*). All you need to do is predict in which direction the share price will move (up or down) – which is usually easier said than done!

When you buy or sell options on shares the options are grouped in *lots*. In New Zealand, a lot comprises 1000 shares (in the US, a lot is 100). The right to buy shares at a future date (e.g., in one or two months) at a fixed price is called 'an option to buy'. To obtain this right to buy, you need to *buy a call*.

If you want to sell shares at a fixed price then you need to *sell a call*, which means that you promise to someone that you will sell these shares to her at a fixed price if she asks (if you get 'called').

Being naked is risky

Not surprisingly, option trading for speculative purposes entails substantial risks. Suppose, for instance, that you were to *sell a call* (also called a 'short call position'), that is, you have agreed to sell shares to someone for a fixed price at a fixed date. If the share price were to increase, then at the exercise date you would have to purchase the shares at the (higher) market price and supply them for the (lower) agreed-upon price. Your losses could be huge and ruin you financially. This is called an *uncovered* or *naked* call.

A safer strategy is to write a *covered* call, where you write a call for shares you already own. Such calls are of two types: either *in-the-money* or *out-of-the-money*.

If you own a share that is currently trading at $1.90 and sell a call with a strike price of $2.00, then the option is said to be 'out-of-the-money'. There is no intrinsic value in this option (you have promised to sell something for $2.00 that is currently worth only $1.90).

Instead, if you sold a call with a strike price of $1.50 on the same share that you own, then the option is said to be 'in-the-money'. It is *in-the-money* by 40¢ (you have promised to sell something for $1.50 that is currently worth $1.90).[1]

See if you can follow this example...

Suppose you were to write an *out-of-the-money covered call option* on ACE Developments' shares. Each share is currently selling for $2.25, and such an option expiring on, say, 30 June 2005 with an exercise price of $2.50 is selling for 10¢ (the premium).

If you were to buy a share for $2.25 (its current price), thereby covering yourself, and then sell the $2.50 option, you would receive the 10¢ premium for the option. You would also have the potential capital gain on the share, up to the strike price of $2.50. If you are lucky, you could earn 10¢ + 25¢ = 35¢ on this trade. If you purchased one lot (1000 shares) and sold one contract your return would be $350 (1000 × 35¢).

Alternatively, if the share price remains flat at $2.25 until expiration and you aren't 'called out' (i.e., the owner of the option does not exercise it), you still earn the 10¢ premium per share. Even if the share should fall, say to $2.15, you will still not lose any money on your investment as you have the 10¢ premium from selling the option. The only thing you could lose is the opportunity of capital gains if the share price were to exceed $2.50, as you will be 'called' (the option exercised) and must sell the shares for that amount.

Try this one too...

Next, see if you can understand an *in-the-money covered call option*. Assume ACE's shares are currently selling for $2.25 each (as above) and the call with 30 June expiration and a strike price of $2.00 is selling at 40¢. If you find a buyer, you will receive $400 for the option on a lot (1000 × 40¢).

When you're called out, you will have to sell your shares for $2.00 each – 25¢ less than you paid for them. So your net profit will be 15¢ per share ($150 for the lot). The share price can fall 25¢ and the trade still works out as planned. You will be called out and you will have earned the 15¢ premium.

Alternatively, If the share is *at the money* (i.e., trading in the market for less than $2.00) you will not be called out, and you can either sell the shares, hold on to them, or write another covered option. Roughly-speaking, you only stand to make a loss if the share price falls below $1.85.[2]

How to motivate ACE's managers?

The stock options that ACE Developments should write are *out-of-the-money covered call options*. That they are *out-of-the-money*, gives the managers an incentive to increase the future share price as much as possible to take maximum advantage of their options.

If the share price does not reach the strike price then the options expire worthless and the company does not lose anything. Alternatively, if the share price exceeds the strike price then the managers get the bonus they deserve (assuming that the share price is, in part at least, determined by how hard the managers work).

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[1] This option would be worth more than 40¢, depending on the amount of time left before its exercise date. As for the first example above involving the computer, an option's value is dependent on the expected return from the underlying asset, which depends on the time until the option is exercised, and the riskiness of that return.

[2] Question 1 below asks you to explain why.

Plenty of options to choose from

There are other options available as well, including *put options* (or '*puts*'), for example. Buying a put gives you the right (but not the obligation) to sell 100 of a company's shares at a fixed price (the strike price) at a fixed date in the future (the exercise/expiry date).

People buy puts, because they expect the share price will go down, and they will make a profit, either by selling the puts at a higher price, or by exercising their option (i.e., forcing the seller of the put to buy the share at the strike price when the market price is lower).

There are many strategies for buying and selling options that can offer great returns to speculators. Such strategies all involve buying different options with different characteristics (strike prices, exercise/expiry dates, calls, puts, etc.) that offer the writer of the option a means to 'tie' in a return even if the share price were to drop. Unfortunately, however, to explain the intricacies of these would take up much more space that is available in this report.

Nonetheless, I hope this has given readers a glimpse into the world of options. Even though this can be very a complicated world in practice, the principle behind most options is no more complicated than the first example above involving the computer. The option holder has the right, but not the obligation, to buy or sell for a pre-determined price at a pre-determined date.

Some questions to think about

(Answers will be in the next issue of *EcoNZ@Otago*.)

1. In the sixth last paragraph above, the claim is made, "you only stand to make a loss if the share price falls below $1.85." Explain why.

2. Why do stock options offer a better incentive to maximise share prices than simply receiving the shares as a bonus?

3. Which is riskier, writing a call *in-the-money* or *out-of-the-money*?

4. If you were a company director, why would it be unwise to issue your managers with *put options* (as noted in the final section above)?

Useful website

Information about just about everything to do with the world of finance, including options, can be found at Investopedia Inc.'s website: www.investopedia.com

References

C Smithies (2004), The long and the short of futures contracts (as used by George Soros to break the Bank of England!), *EcoNZ@Otago* 12, 10-11.

Commentary on the New Zealand economy

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The New Zealand economy began 2005 in very good shape. The unemployment rate is below 4% for the first time since the mid-1980s, reflecting rapid growth in full-time employment, driven by strong economic growth. Despite the buoyancy of the economy, consumer price inflation is still below 3%. The country's international terms of trade are also very favourable.

THE CURRENT account deficit has been growing over the last couple of years, but for most of 2004 it has only been hovering around its ten-year average value. A significant portion of its recent rise reflects increased imports of capital goods, which is to be expected given the current growth in investment expenditure, and the increased profitability of New Zealand firms with foreign shareholders. So, the deficit is a symptom of the economy's strength and arguably not an immediate cause for concern.

Notwithstanding the current sunny economic conditions, there are one or two clouds on the horizon that we should keep an eye on during 2005. The main cloud relates to the prices earned by New Zealand's key export commodities. On average and when expressed in US$ terms, these prices are at present the highest they have been for at least two decades.

These high prices have driven the rise in the terms of trade, limited the growth in the current account deficit caused by burgeoning import volumes, helped to maintain confidence in the New Zealand dollar on currency markets and insulated the agricultural sector to a large extent from the dollar's recent strength.

If these prices should happen to fall back significantly in 2005, the growth in the current account deficit is likely to accelerate and confidence in the New Zealand dollar will be eroded. A weaker dollar would mean that *tradeable* goods (i.e., exports and imports) would become more expensive domestically.

As the strong economy has already pushed the rate of inflation in *nontradeable* goods' prices up to around 5%, rising tradeable goods' prices could quickly push the overall rate of inflation out of the Reserve Bank of New Zealand's comfort zone. The Bank's likely response to such a threat is to increase interest rates in an effort to both bolster the dollar and slow the domestic economy, and so take some pressure off both sources of inflation.

So, as is usually the case with the weather, the prospects for continued economic sunshine are largely determined by factors over which New Zealanders have no control.

	Quarter				
	Sep 2004	Jun 2004	Mar 2004	Dec 2003	Sep 2003
GDP (real, annual growth rate, %)	4.6	4.4	3.6	3.4	3.7
Consumption (real, annual growth rate, %)	5.9	5.7	5.2	4.5	4.3
Investment (real, annual growth rate, %)	14.9	13.2	14.0	8.5	7.1
Employment: full-time (1000s)	1582	1561	1547	1531	1523
Employment: part-time (1000s)	442	442	439	438	445
Unemployment (% of labour force)	3.8	4.0	4.2	4.6	4.4
Consumer Price Inflation (annual rate, %)	2.5	2.4	1.5	1.6	1.5
Food Price Inflation (annual rate, %)	0.5	1.1	0.5	0.2	0.3
Producer Price Inflation (outputs, annual rate, %)	2.4	2.0	0.9	1.1	0.7
Producer Price Inflation (inputs, annual rate, %)	2.5	1.5	−0.6	−0.1	0.1
Salary and Wage Rates (annual growth rate, %)	2.2	2.3	2.2	2.3	2.3
Narrow Money Supply (M1, annual growth rate, %)	2.9	9.6	12.6	9.0	10.8
Broad Money Supply (M3, annual growth rate, %)	5.9	8.8	7.3	5.9	5.1
Interest rates (90-day bank bills, %)	6.64	6.07	5.54	5.32	5.15
Exchange rate (TWI, June 1979 = 100)	67.1	64.2	66.3	65.1	62.2
Exports (fob, $m, year to date)	30,052	29,864	28,600	28,397	28,730
Imports (cif, $m, year to date)	34,135	33,378	32,355	31,782	31,944
Exports (volume, June 2002 [not seas. adj.] = 1000)	948	1038	1032	968	949
Imports (volume, June 2002 [not seas. adj.] = 1000)	1361	1395	1359	1256	1208
Terms of Trade (June 2002 = 1000)	1078	1080	1057	1035	1004
Current Account Balance (% of GDP, year to date)	−5.8	−4.8	−4.6	−4.2	−4.3

Sources: Statistics New Zealand (www.stats.govt.nz), Reserve Bank of New Zealand (www.rbnz.govt.nz)

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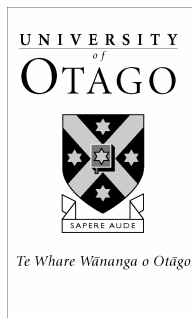
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Previous issues are available by emailing econz@otago.ac.nz with your request.

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Forty of the best articles from Issues 1 to 11 have been revised and published in a book by Pearson Education: *Keeping Economics Real: New Zealand Economic Issues*, edited by Paul Hansen & Alan King. See page 12 of this issue of *EcoNZ@Otago* for details.

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