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Almost as exciting as a general election!!!

INSIDE THIS ISSUE

FROM THE EDITOR

Welcome!

Here, at last, is Issue 15 of *EcoNZ@Otago*.

As most readers know already, *EcoNZ@Otago* is a magazine about contemporary economic issues, published by the Department of Economics at the University of Otago.

The contents of the previous 14 issues of *EcoNZ@Otago* are listed at the back of this issue, and single issues are available on request (our addresses are 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:

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Or you can write to *EcoNZ@Otago*, Department of Economics, University of Otago, PO Box 56, Dunedin.

I hope you enjoy this issue.

Paul Hansen

Professional Baseball and Cricket: Survival of the Fittest?

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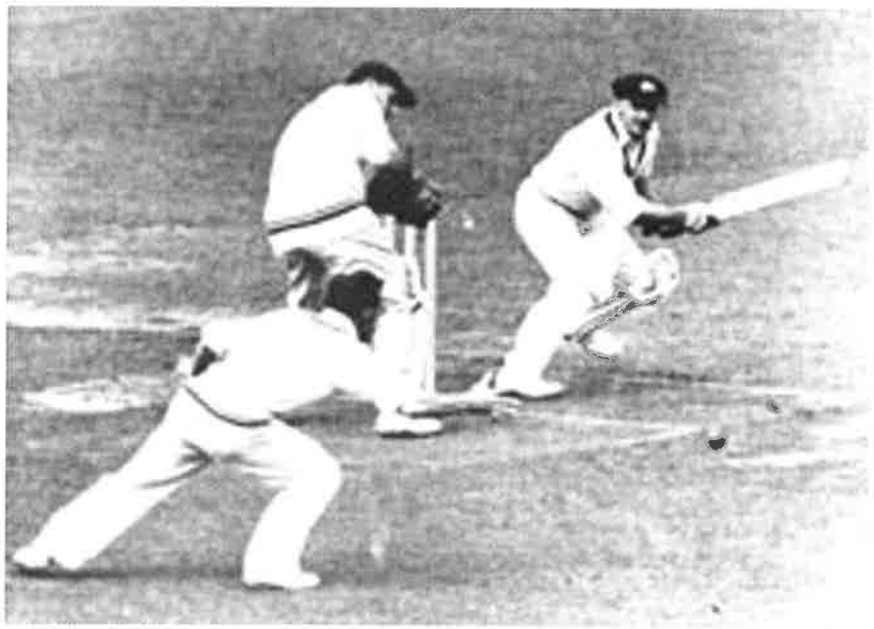


(Reproduced with the permission of the Bradman Museum of Cricket, Bowral, New South Wales)

Sir Donald Bradman: The greatest batsman of all time?

IN BASEBALL, a .400 ('four hundred') hitter is a player who averages at least four safe hits for every 10 times he (usually a man) comes to bat. Such performances over a whole season are very rare in modern professional baseball. The last time it happened in Major League Baseball (MLB) was 1941 when Ted Williams of the Boston Red Sox batted .406 (see Table 1, next page).

Some baseball buffs argue that the disappearance of .400 hitters means that today's baseball players are not as good as those of the past. And yet today's players (as in most professional sports) are obviously bigger, stronger and faster than ever before. How to explain this apparent contradiction?

Stephen Jay Gould, an evolutionary biologist, uses Darwin's theory of natural selection to explain it. The purpose of this article is to explain Gould's approach, and to consider whether it also applies to professional cricket.

It's only natural

An important idea in evolutionary biology is that living things progress from being primitive organisms toward more complex and advanced species. These changes occur through a process of *natural selection* whereby unfit members of the population are eliminated and only the fittest survive. This, of course, is the essence of Darwinism.

This process (survival of the fittest) serves to increase the species' potential for survival in environments that are changing. Species that remain at a lower level of complexity – or that are stuck at some 'left wall' of biological simplicity – have a lower tolerance of environmental changes and, therefore, a lower chance of survival.

As organisms evolve over time, this creates crowding at some 'right wall' of maximum possible biological complexity, which also serves to reduce the amount of variation in the species.

In the case of sporting performances – such as baseball (or cricket) batting – we can regard this invisible 'right wall' as representing the bio-mechanical limits of human ability.

Swing theory

In the baseball analogue to natural selection for species, Gould (1986) demonstrates that the absence of .400 baseball hitters is not due to a decline in batting ability over time but rather to a *decrease in the disparity between the worst and best baseball players*. Simply put, nowadays there are fewer weak pitchers and hitters relative to strong pitchers and hitters than there used to be.

Table 1 reports baseball hitting statistics for nine decades of the 20th Century. As can be seen in the second and third columns, although the *mean* of hitting averages has remained relatively constant over time, the extreme performances (both good and bad) have tended to move closer to the means, as represented by the declining *standard deviation* of hitting averages. This indicates that there has been convergence in hitting performances over time.

Truly the good ol' days?

Given that the best hitters of the past have higher hitting averages than the best hitters of today (see the Table 1's fourth column), is it correct to conclude that the hitters of the past are really better?

One simple way of testing for this is to construct a statistical measure that takes into account how *extreme* each era's best hitters are relative to the mean hitting performance in that period. This measure is called a *standardised z score* and is calculated as:

$$z = \frac{\text{Maximum hitting average} - \text{Mean of hitting aves.}}{\text{Standard deviation of hitting averages.}}$$

Standardised z scores are reported in the final column of Table 1, where it can be seen that, compared to the *maximum hitting average*, they are relatively constant over time.

This reveals that what appears to be a declining standard of hitting averages of the top hitters on an *absolute scale* turns out to be stable on a *relative scale* as measured by comparing standardised *z* scores across the decades. In other words, the best hitters of the modern era are in fact at a similar extreme of human excellence. An apparent decline in measured performances, such as fewer people hitting .400, may actually be a sign of improvement when the shrinking variability of those performances is taken into account.

The gains from specialisation

Why has the quality of play in baseball – specifically pitching – improved? In the early days, most pitchers did so for the entire game. Nowadays, all MLB teams include specialist pitchers: "starters" who specialise at the start of the game, "middle relievers" who pitch two or three innings in the middle, and "closers" in the last inning. Pitchers may also specialise in facing left- or right-handed hitters, in striking them out, or in getting them to hit the ball along the ground.

Similarly, most fielders today specialise in only one fielding position. In addition, statisticians analyse opposing hitters to discover their weaknesses. The end result of these increases in specialisation is that even the weakest of today's MLB teams play highly competent, defensive baseball, which makes it harder for today's hitters to get as many safe hits as yesteryear's.

Table 1: Hitting statistics in MLB baseball, 1901-90

Decade	*Mean of hitting averages*	*Standard deviation of hitting averages*	*Maximum hitting average*	*Standardised z-score*
1901-10	0.253	0.040	0.426 (Nap Lajole, 1901)	4.32
1911-20	0.258	0.038	0.420 (Ty Cobb, 1911)	4.26
1921-30	0.286	0.038	0.424 (Rogers Hornsby, 1924)	3.63
1931-40	0.276	0.033	0.390 (Al Simmons, 1931)	3.46
1941-50	0.260	0.033	0.406 (Ted Williams, 1941)	4.42
1951-60	0.259	0.032	0.388 (Ted Williams, 1957)	4.03
1961-70	0.250	0.032	0.361 (Norm Cash, 1961)	3.47
1971-80	0.257	0.032	0.390 (George Brett, 1980)	4.16
1981-90	0.259	0.031	0.370 (Tony Gwynn, 1987)	3.47

Source: Chatterjee & Yilmaz (1999, Table 1)

What about for leather on willow?

The remainder of the article addresses whether professional cricket has experienced the sort of convergence in performance that is apparent in professional baseball. Cricket is similar to baseball in the sense that it is composed of mini-battles between batsmen and bowlers and has had, in the main, a stable set of rules since the 19th Century.

Also, in cricket there are specialist batters, specialist bowlers, all-rounders (adept at both batting and bowling), and wicketkeepers who are expected to bat. Therefore, at face value, we might expect cricket to mimic the experience of baseball.

An evolutionary dead end?

Jones (1996), after comparing batting averages as a way of determining the convergence in defensive ability of international test playing nations, argues that "there is no sign of such an effect in cricket. Far from rivalry leading to an escalation of excellence, [cricket] is at an evolutionary dead end. The amount of variation in batting averages among cricketers has scarcely changed since the game began."

However, this comparative analysis using batting averages fails to control for several important factors: improved equipment, the character of the pitch and the properties of the particular make of the cricket ball used (which has a huge influence on batting and bowling styles), changing weather conditions over the five days of a test match, and the varying number and quality of test playing nations. A measure of performance that at least partially attends to these varying elements is required if Gould's hypothesis is to be thoroughly examined.

Better batting data

To this end we investigate a more comparable metric over time, namely, the LG cricket ratings, which: (i) adjusts the batsman's score for the strength of the opposition's bowling (as measured by the opponent's ratings); (ii) gives more credit to runs from lower scoring matches (e.g. that both teams scored heavily means that run scoring was easy in the match because of a 'flat' pitch); (iii) gives more credit for more 'effective' performances, such as when the team wins the match; and (iv) gives a player a bonus for not being dismissed (which diminishes as the batsman's score increases).

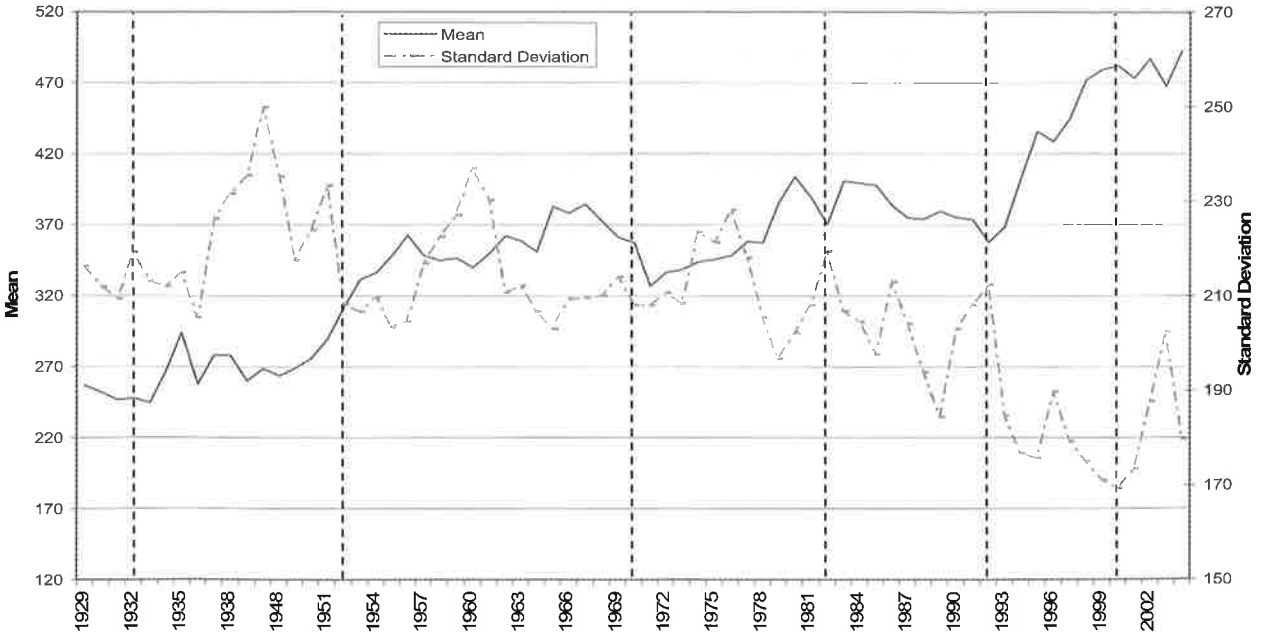
100 of the best

Figure 1 plots the means and standard deviations of the LG ratings for the top 100 batsman in test cricket from 1929 to 2004 (omitting 1940-48).[1] As can be seen, the mean has increased and the standard deviation decreased over the period. This is consistent with Gould's findings for baseball.

The increase in the mean may reflect technological advances in batting over bowling associated with the introduction of protective equipment, the move to covered pitches, heavier bats, better sightscreens, etc.

The decrease in the standard deviation probably reflects better technology, nutrition, training and equipment. Bowling techniques have evolved bio-mechanically and fielding standards have improved (reflecting increased specialisation in fielding positions). Indeed some teams had no coaches in the early days! With better media coverage and data about opponents, the science of where to bowl (in terms of line and length) and to set fields to modern-day batsman has become more sophisticated.

Figure 1: LG cricket rating means and standard deviations for the top 100 batsman in test cricket



Notes: The vertical lines show the points at which new test match nations were added or removed. Due to sanctions in response to apartheid laws, South Africa did not compete from 1970 to 1992. It appears that there are no substantial changes in the LG mean due to the fact that as more teams play test cricket there are more specialist batsmen.

[1] Prior to 1951, there were fewer than 100 international cricketers, and so all of them are included in the analysis. After 1951, only the best 100 batsmen are included.

Howzzzzzat!

Having established that there is some form of convergence in batting performance in cricket, the next question is how to compare this across eras of differing variability?

As for baseball, we can construct *standardised z scores* that take into account *how extreme* the best performers in each era were compared to the mean performance in each era. These z scores (see the earlier formula) are displayed in Figure 2.

The greatest batsman of all time

Two clear results emerge from Figure 2. First, the most exceptional performances were from Australian Sir Donald Bradman in the mid-1930s (the cover picture is of him at Lords in 1948). Bradman's superiority is despite his having played on uncovered pitches, without modern-day protective gear and with unlimited bouncers from bowlers who could bowl with unrestricted fielders behind square leg. His was also an era with only five test playing nations and an associated wider range of abilities (which would tend to depress this era's z scores).

Second, after 1952, when there was a larger group of test playing nations, the best batsmen of today are similar to those of the past in terms of their performances relative to the mean performances of their era.

Conclusion and a final question

This article has shown that the tendency to use *mean* statistics alone to describe changes in performances over time may give a distorted impression. The *standard deviation* of performances is also important.

In addition, it appears that sport imitates life in the sense that in a world of ever-increasing accountability the minimum tolerable level of performance is also increasing.

So, over time, will sports teams converge on a more-or-less identical level of performance (i.e. perfect 'competitive balance')? Probably not.

It is clear that as the financial costs of supporting the increasingly sophisticated networks surrounding teams increase, then any significant differences in teams' financial wealth may become more apparent in their on-field performances. Consequently, team performances will not converge unless there is a degree of financial equality to support a more uniform distribution of talent. The appropriate organisational structure to allow this remains an important issue facing sports policy makers.

A question to think about

1. How do you think the proposed new rules in One-Day International cricket – namely, bringing in a substitute player during the match and choosing when to invoke the fielding restrictions – will change the amount of variability in performances?

Useful website

More details on the construction of the LG cricket ratings referred to in the article are available from: http://www.cricketratings.com/

Further reading

An interesting perspective on the appropriateness, or lack thereof, of the way in which the conventional batting average is calculated is Howells (2001).

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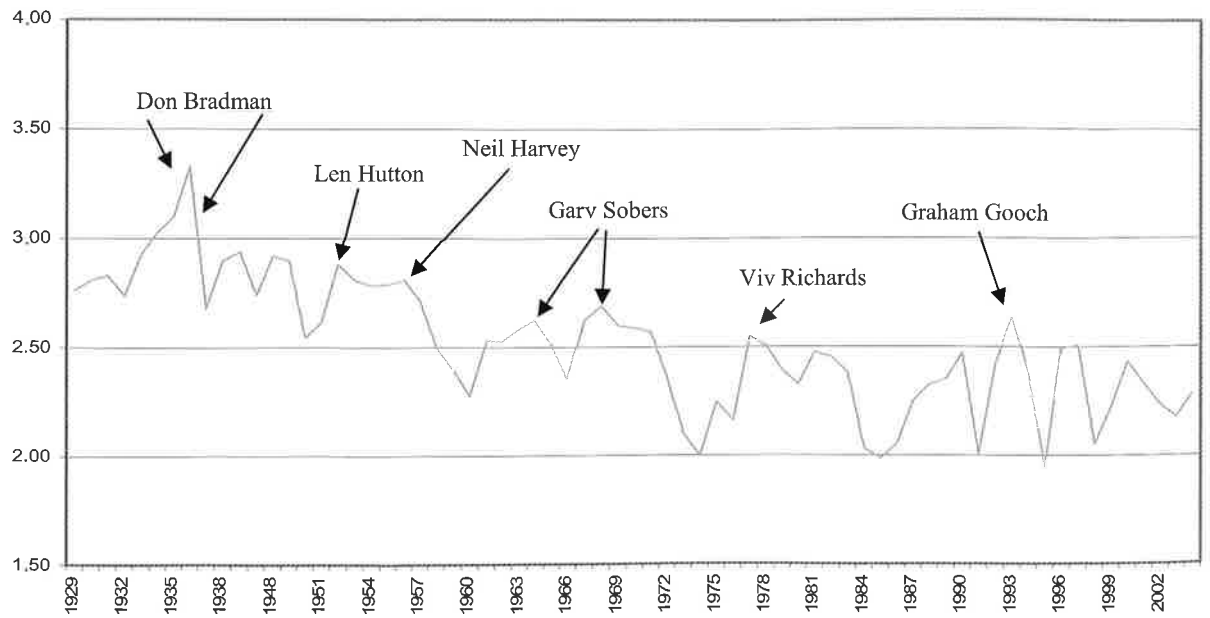
Figure 2: Standardised z scores of the best 100 batsman



Will the G8 package help *Make Poverty History*?

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In July of this year, the leaders of eight of the world's largest economies – known as 'the G8' (the Group of Eight) – agreed to a package of measures aimed at reducing (absolute) poverty[1] in developing countries, especially in Africa. The leaders agreed to double aid flows by 2010 and to forgive the debts[2] of a group of poor countries with relatively little corruption. Hopes are high that poverty in Africa will fall significantly as a result. This article discusses the prospects for this.

Has it worked in the past?

It is tempting to think that foreign aid and debt forgiveness *must*, by definition, lead to economic growth and less poverty in the recipient countries, as they will, as a result, have more money to spend on achieving these outcomes.

In reality, however, whether this will happen or not depends on what the money is spent on. Spending on basic education, health care and infrastructure (i.e. roads, ports, etc.), for example, is more likely to encourage growth and reduce poverty than is spending on things like presidential palaces or armaments.

South Korea, Taiwan and Botswana are often held up as examples of where foreign aid has been successful. However, there are also many cases where foreign aid has been an abject failure.

Giving good money after bad

The worst case is Zambia. Easterly (2001, pp. 42-3) calculated that if the US$2 billion worth of foreign aid that Zambia has received since the 1960s had all gone into productive investments, then Zambia's income per capita would now be more than US$20,000. Instead Zambia's income per capita is only about US$600 – which is lower than it was in the 1960s!

Debt forgiveness is just another means (like foreign aid) of transferring resources from one country to another. Simply put, if developing countries do not have to service their debts, this means they have more money to spend on other things. Hence, in countries where foreign aid has not worked, there should be concerns about whether debt forgiveness will work.

Aid with strings attached

Foreign aid has often been given with political objectives in mind, especially during the Cold War (from the end of World War II till the early 1990s). This helps explain why South Asia (a relative backwater during the Cold War) did not receive much aid (per capita), despite being one of the poorest regions of the world.

Some foreign aid has also been given with other strings attached. For example, aid is sometimes given on the condition that the money is used to purchase goods and services from the donor country. This is not a problem if the money is spent buying goods the recipient country can benefit from, and purchased at the going world price. However, if the aid is spent on over-priced goods that the recipient country does not need, then it should be no surprise if this aid is ineffective. And, clearly, this is not the fault of the recipient country.

Governments have to *want* to develop

With respect to conditions in recipient countries, the most obvious reason why foreign aid has not always worked is that some governments in recipient countries are not particularly interested in promoting economic development.

The developing countries where economic growth has been the highest (and where poverty reductions have been the largest) have been in East

[1] Absolute poverty is defined as being unable to afford the basic necessities of life (especially food). Typically this is measured as the proportion of the population whose incomes are less than US$1 per day (adjusted for purchasing power).

[2] In essence, debt forgiveness means not requiring the borrowing country to repay the money it borrowed and/or the interest owed.

Asia, namely Hong Kong, Singapore, South Korea, Taiwan and China. Note that not all of these countries are democratic in the sense we would normally use the word; in fact, three are, or have been, dictatorships.

However, the governments of all of these countries do seem to have been interested in economic development (and poverty reduction), and have introduced policies broadly consistent with this goal.

In countries with corrupt governments who are more interested in their own interests than those of the poor, it is not surprising that aid has often had little effect on poverty. In such countries, foreign aid is likely to be more effective in the future if it is disbursed by non-government organisations (NGOs), such as World Vision and Save the Children, than by governments.

Development begins at home

Economic policy in some developing countries can also be blamed for the persistence of poverty. To give one example, in many developing countries businesses are over-regulated. If poverty is to be reduced, jobs need to be created for the poor, which requires that businesses are able to expand and new businesses be created. These businesses need not be particularly large; they could be as small as sole traders.

Not surprisingly, over-regulation of business in many developing countries does little to encourage business expansion (and hence job creation).

Two studies from the World Bank (2004a,b) report, for example, that in Haiti it takes 203 days to register a new company (compared to only two days in Australia, for example), and in Sierra Leone it costs more than 12 times that country's income per capita to register a company.

Similarly, setting up a new business in a developing country requires, on average, twice as much paper work and at three times the cost (relative to a country's income per capita) than in developed countries. (Of course, some regulation of business is necessary to protect consumers from anti-competitive behaviour, false advertising etc, but much of the regulation that exists in many countries goes beyond this.)

The need for trade reform remains

The organisers of the *Make Poverty History* Campaign were also hoping that the leaders at the G8 Summit would make progress on trade reform.

North American and European countries subsidise domestic production of agricultural goods, which makes it harder for developing countries to find export markets for their agricultural goods. The amount of money spent by developed countries on agricultural subsidies greatly exceeds what they have agreed to spend on debt forgiveness and foreign aid.

In addition, many developed countries protect their domestic markets against labour-intensive manufactured goods, such as clothing. This also harms developing countries that want to export these goods. No firm commitments on freeing up trade were made at the G8 Summit, other than to agree to talk more on the issue in the future.

However, with regard to trade it should be noted that economic policies in some developing countries are themselves biased against exports. The most obvious example of this is countries where the exchange rate is deliberately over-valued (making their exports less competitive). Thus, not all of the blame for the problems faced by exporters in developing countries can be laid at the feet of the developed countries.

Conclusion

The increases in foreign aid and debt forgiveness announced at the G8 Summit should help to promote economic development and reduce poverty in developing countries. However, foreign aid and debt forgiveness *alone* will probably not eliminate global poverty. Neither will greater access to developed country markets.

These initiatives will be the most successful in countries where governments are genuinely committed to poverty reduction, and where economic policy is consistent with this goal. Over-regulation of business, over-valued exchange rates, corruption, and a lack of respect for property rights and other domestic factors are likely to continue to hold back economic development in some developing countries.

Some questions to think about

1. Why do you think debt forgiveness and foreign aid has only been extended to poor countries in which corruption is a relatively minor problem?

2. Do you think foreign aid should still be given to countries when it is unlikely to do much good? What are the opportunity costs of giving aid to such countries?

3. How do over-valued exchange rates create problems for exporters?

4. Can you think of examples of aid with strings attached (i.e. *tied* aid) that would impede economic development in developing countries?

Useful websites

The *Make Poverty History* Web Site is:
www.makepovertyhistory.org/

The Commission for Africa Web Site is:
www.commissionforafrica.org/english/report/introduction.html

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Some economics of foreign direct investment

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Globalisation has become a watchword for the global integration of commodity and factor markets. But what drives globalisation? The increase in world commodity trade is the usual suspect, but it turns out that the main driving force is *foreign direct investment* (FDI) – investment by multinational firms in the productive capacity of countries, such as setting up factories or buying existing ones. As can be seen in Figure 1 below, aggregate sales by foreign affiliates of multinational firms (i.e. the outcome of FDI) have exceeded aggregate world exports for decades.

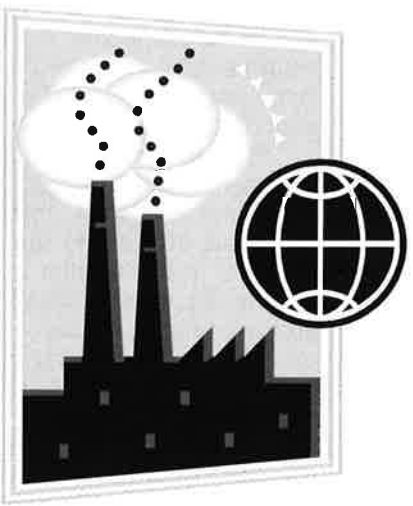
HOWEVER, GLOBALISATION in general and FDI and multinational firms in particular are not unanimously welcome. Some people think that multinational firms dominate markets, and even governments and countries. This fear has led to protests during World Summits and WTO meetings (e.g. see King 2004). This article attempts to shed some light on the role of multinational firms and FDI in the globalisation process.

Why is FDI so popular with multinationals?

In general, a multinational firm would prefer to own its production activities in a country in which it wants to operate rather than license these activities to a foreign firm there. This is because such licensing contracts are said to be 'incomplete'. They cannot prevent the foreign firm that is licensed to produce the multinational firm's goods from quitting the contract and using the knowledge it has gained for free and starting its own competing business.

Hence, if the knowledge assets of a multinational firm are substantial, it would prefer to make an FDI (foreign direct investment) in the country. This guarantees it ownership and control of its production activities.

The two main types of FDI are *greenfield investment*, by which a firm sets up a new factory in the foreign country, and, as discussed later, the purchase of an existing factory.



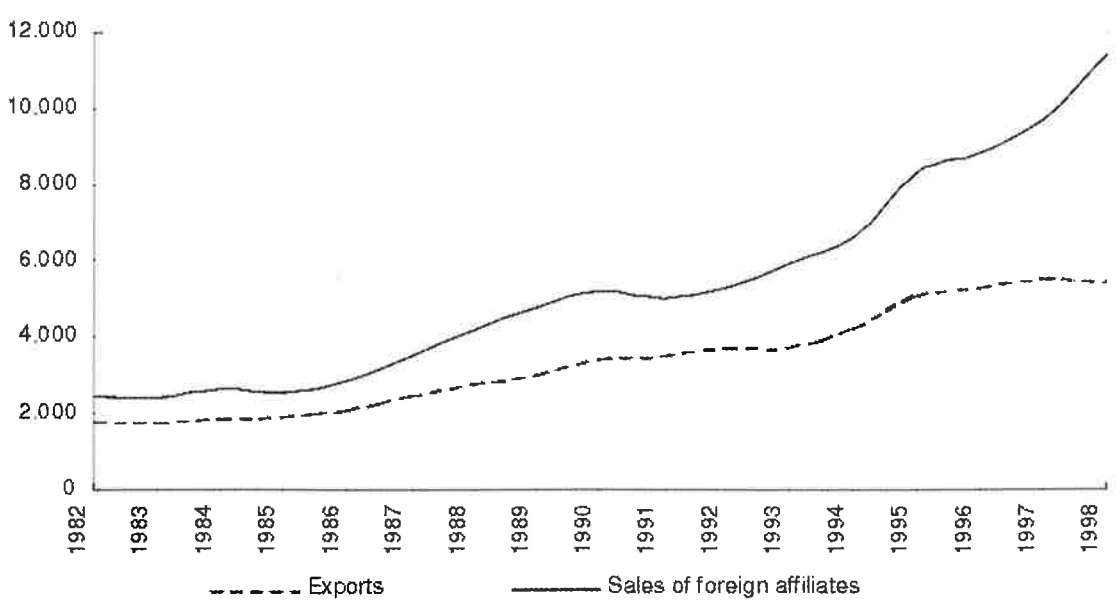
The grass is always greener

Greenfield investment may be either *horizontal* or *vertical*. Horizontal greenfield investment involves the setting up of an additional factory in the foreign country while retaining one or more domestic factories, whereas vertical greenfield investment involves the home factory(s) being shut down and effectively replaced by the foreign one(s).

The motive for horizontal greenfield investment is the avoidance of the transport costs of exporting, whereas the motive for vertical greenfield investment is the exploitation of lower factor prices, such as wage rates, in the foreign country.

Because of its impacts on local labour markets (as factories re-locate around the world), the pros and cons of vertical greenfield investment are hotly debated. However, most greenfield investment is of the horizontal type, as most FDI takes place among industrialised countries, which tend to have quite similar factor prices (e.g. wage rates).

Figure 1: World exports and sales of foreign affiliates of multinationals ($US billions)



Source: Elberfeld, Götz & Stähler (2005)

A simple 'game' of horizontal greenfield FDI

The analysis of horizontal FDI can be very complex (De Santis & Stähler 2004). Nonetheless, some unexpected effects can be demonstrated easily via the following simple model.

Assume for simplicity that there are just two identical countries (i.e. markets), with both countries hosting one firm each which serves both markets. When a firm exports to the other country's market, it has to ship commodities across the border, which is costly.

Therefore the profits from selling in the home market are larger than the profits from selling abroad. Suppose the local firm earns a profit of $12 million in the home market, but only $6m when it exports. Adding the profits up for both markets, each firm earns $18m (by producing at home and exporting).

By setting up a factory in the foreign country (i.e. a horizontal greenfield investment), a firm can avoid the transport costs, but it has to cover the fixed cost of building the factory. It will also become stronger in the foreign market, so that the price will decline as it is profitable for the multinational to produce more. Assume that both markets will give each firm a profit of $8m if they are both producing in each country under the same conditions. This reflects both that the foreign firm has lost its transport cost disadvantage and that competition has become more intense. In addition, the foreign firm has to cover the fixed cost of setting up the factory, which is $1m.

These profits to the two firms in the two countries ('A' and 'B') from exporting and engaging in FDI are shown in Table 1, where each firm's profit depends on what the other firm does too.

What should each firm do?

Should each firm stick with exporting (instead of FDI)? Or should it set up a factory via FDI (instead of exporting)?

Clearly, given the payoff structure discussed above and represented in the table below, each firm is always better off with FDI, regardless of what the other firm does: If it exports, it earns $6m in the foreign market; if it sets up a factory via FDI, it earns $7m. Consequently, both firms will earn profits of $15m in equilibrium (i.e. $7m + $8m).

However, both firms would be jointly better-off if they exported to the foreign market instead of setting up a factory there – as explained above, resulting in them earning $18m each instead.[1]

The reason is that FDI increases competition, so that consumers benefit from FDI, but both firms end up with lower profits. This is an example of FDI that, in equilibrium, is price-reducing (good for consumers) instead of being profit-increasing.

Together they stand?

Instead of setting up a factory in another country, the foreign firm could buy an existing factory. A lot of countries have experienced cross-border merger waves, and a common fear is that merged firms will dominate markets. While this fear is not without substance, it is worth looking at the incentives for mergers. Two firms that are already active will merge only if the profit of the merged firm is larger than the sum of profits they would earn as (two) independent firms.

However, the 'merger paradox' has shown that a profitable merger requires cost reductions if more than the two merging firms are active in the market (see Salant, Switzer & Reynolds 1983 and Perry & Porter 1985). The reason is that a merged firm will coordinate and reduce output if costs do not change. This strategy, however, makes other firms increase output. Because merging firms anticipate this effect, they will merge only if merger-induced cost reductions are substantial, which may be beneficial for consumers as a more productive firm is in the market.

Conclusion

Both examples should have demonstrated that it is not necessarily true that FDI has adverse effects on consumers. In addition, FDI may result in a (beneficial) technology transfer to the host country. All of these things have to be taken into account, and it is thus not necessarily true that FDI has adverse effects.

Table 1: Profits ($millions) for two firms in two countries, depending on what each does

		Firm in Country B: In addition to producing for its home market, it will either...		
Firm in Country A: In addition to producing for its home market, it will either...		Export to *A*	OR	Build a factory in *A* (FDI)
	Export to *B*	*A*'s profits: 12 + 6 = 18 *B*'s profits: 12 + 6 = 18		*A*'s profits: 8 + 6 = 14 *B*'s profits: 12 + 8 – 1 = 19
	OR			
	Build a factory in *B* (FDI)	*A*'s profits: 12 + 8 – 1 = 19 *B*'s profits: 8 + 6 = 14		*A*'s profits: 8 + 8 – 1 = 15 *B*'s profits: 8 + 8 – 1 = 15

[1] This is an example of a Prisoners' Dilemma type 'game', whereby both firms playing their 'dominant strategies' (to build a factory) inevitably end up with an outcome (profits of $15m each) that is inferior to the outcome if they both played their alternative ('dominated') strategy (to export).

Further reading
A textbook overviewing the literature on FDI and multinational firms is Markusen (2002), and a summary article is Markusen (1995). Recent *EcoNZ@Otago* articles on the trade liberalisation aspects of globalisation are Winchester (2004, 2005, and also King (2004). Another useful source of information is UNCTAD (2004), which can be downloaded from the following website.

Useful website
The United Nations Conference on Trade and Development (UNCTAD) website is: www.unctad.org

Some questions to think about
Assume that two local firms and a foreign firm compete in the local market, where market demand can be represented by the inverse demand function: $P = 1 - Q$. The marginal cost of production (MC) is equal to 1/3, but the foreign firm has to add a transport cost of 1/9 to the marginal cost.

1. Determine the profits of all three firms if the foreign firm exports.

2. The foreign firm is considering setting up a factory in the local country, but this would incur a fixed cost of 1/4. Would this FDI be profitable?

3. Instead of greenfield investment, the foreign firm could merge with a local firm. Would a merger be profitable if the marginal cost of the merged firm is equal to the marginal cost of the local firm?

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Answers to questions from "Options made easy" from the previous issue of *EcoNZ@Otago*

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As promised in the previous issue of *EcoNZ@Otago*, here are the answers to "some questions to think about" that were posed at the end of Colin Smithies' article, "Options made easy":[1]

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

In this situation we are looking at a covered call, that is, you own the shares and have written (sold) a call option for these shares. So if the share is currently selling for $2.25 and the expiration (strike) price is $2.00, the option is an "in-the-money".

If the share price remains above $2.00 you will be called and must supply the shares at the agreed upon price ($2.00). Your profit (ignoring any time value of money) from a share is 40c (the money you received for the sale of the option) + $2.00 (the money you receive when you supply the share when it is called) – $2.25 (the initial price of the share) = 15c.

Therefore, if you buy these shares at $2.25 and receive a further 40c per share on premium you are insulating yourself from a losing position on these shares till they get below $2.25 – 40c = $1.85.

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

A stock option gives an employee the right to buy a certain number of shares in the company at a fixed price at a certain date in the future. The price at which the option is provided is usually the market price at the time the options are granted, but can also be written out-of-the money.

Employees who have been granted stock options hope that the share price will go up and that they will be able to "cash in" by exercising (purchasing) the share at the lower exercise price and then selling it at the (higher) current market price. If the share price does not go above the exercise price, the options are worthless.

Care needs to be taken when deciding on an exercise price. If the option is written too far out-of-the-money, the share price will be an unrealistic target and may be a disincentive for employees to work harder.

Nonetheless, on the whole, options offer a greater incentive than just giving shares, as shares have an intrinsic value even if the share price does not rise. With an option, the employee must increase the value of the company in order to receive a worthwhile bonus.

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

I will stick with covered calls in this answer as that is the type of call that would be written in a stock option situation. The simple answer is the out-of-the-money call would be the riskier covered call (CC) position.

This option position is riskier than in-the-money or at-the-money call positions, but has the greatest profit potential. Because the option strike price is slightly higher than the share price, a slight movement in the share price will allow the CC writer to realize a gain with the CC premium and the difference between the call option strike price minus the share purchase price. The CC premium will not be as large as an in-the-money or at-the-money position, but the combination of the share price increase and CC premium on a slightly out-of-the-money option generally has the best profit potential.

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 of the article)?*

In simple terms: The put *buyer* is anticipating that the share price will decrease, whereas the put *seller* is anticipating that the share price will stay the same or slightly increase.

The put writer (seller) has the obligation to buy the share at the put strike price should the share price decrease below the put option strike price. In return for this obligation, the put writer (seller) receives the put option premium.

If the share price increases during the option period, the option will expire worthless and the put writer retains the premium, and he/she is not assigned to purchase the share at the put option strike price.

So, simply, giving employees puts motivates them to lower the share price. Clearly, this is not in the interests of shareholders.

[1] C Smithies (2005), Options made easy, *EcoNZ@Otago* 14, 10-12. Readers are advised to read this before tackling these answers.

New Zealand: On good terms with its trading partners

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New Zealand's international terms of trade have received relatively little attention in the media recently. This is disappointing, in part because the news on this front has been good lately (and there always seems to be a shortage of good news!); but also because the terms of trade have such an important influence on a nation's standard of living.

What are the terms of trade?

The terms of trade index is a measure of the relative prices faced by a country when engaged in international trade.

Specifically, the terms of trade (ToT) is the average price of what we export divided by the average price of what we import. We can think of this ratio as indicating how many units of the foreign good we can import by exporting a single unit of domestic production.

For example, suppose for simplicity there are just two goods: wool and cars, and that New Zealand exports wool and imports cars. If the world price of wool is \$4/kg and a car costs \$32,000, then New Zealand's ToT is 1/8000 (\$4/kg ÷ \$32,000/car). In other words, the terms on which trade can take place is that a kilogram of wool may be exchanged for 1/8000th of a car.

Another way of thinking about the ToT is to recognise that its inverse represents a country's *sacrifice ratio* when it comes to international trade. In this example, New Zealand needs to give up 8000 kg of wool for every car it imports.

Why are the terms of trade important?

The importance of the ToT can be seen by noting that, should they rise, (say from 1/8000 to 1/4000), the sacrifice ratio falls (from 8000 to 4000 kg of wool per car).

As a result of this, New Zealand could:

(i) export the usual quantity of wool, but use the proceeds to import twice the usual number of cars; or

(ii) import the usual number of cars, but pay for them with just half the usual quantity of wool exports; or

(iii) import more cars (but less than twice the usual quantity) and export less wool (but more than half what is usually sold).

Either way, New Zealanders end up consuming either more cars, more wool or more of both goods *without* (and this is the key point) having to increase their production of anything. A rise in the ToT raises our collective standard of living without requiring anyone to work any harder!

Note that there is no free lunch here. If New Zealand's ToT rise, then the ToT of the countries which import our wool and export cars must have fallen. Hence the extent to which our consumption possibilities expand when the ToT changes directly reflects the extent to which those of the rest of the world contract.

What's been happening lately?

As can be seen in Figure 1 (next page), New Zealand's ToT index has been rising quite steadily over the last couple of years. After being relatively stable throughout the 1990s, the international purchasing power of the goods we export reached a level in March this year that has not been seen since 1974.

This may come as surprise as the cost of imported oil has been rising with monotonous regularity and farmers have been bemoaning the fact that the strong dollar is undermining their returns.

However, while export prices (in NZ\$ terms) were high in late 2000 and early 2001 (when our dollar was at its weakest) and have weakened significantly since then as the dollar has appreciated, the fall in export prices has been less dramatic than the dollar's rise. This is because the world price (in *foreign currency* terms) for many of New Zealand's export commodities has risen since 2001.

At the same time, because the world prices of most imported goods have not risen to any great extent (oil being the notable exception), the strengthening dollar has had a more dramatic effect on the cost of imports in dollar terms. This pattern can be seen in Figures 2(a) and (b) (also next page).

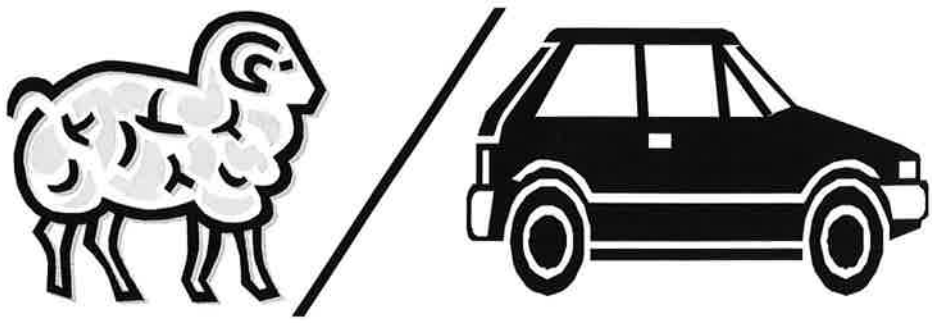
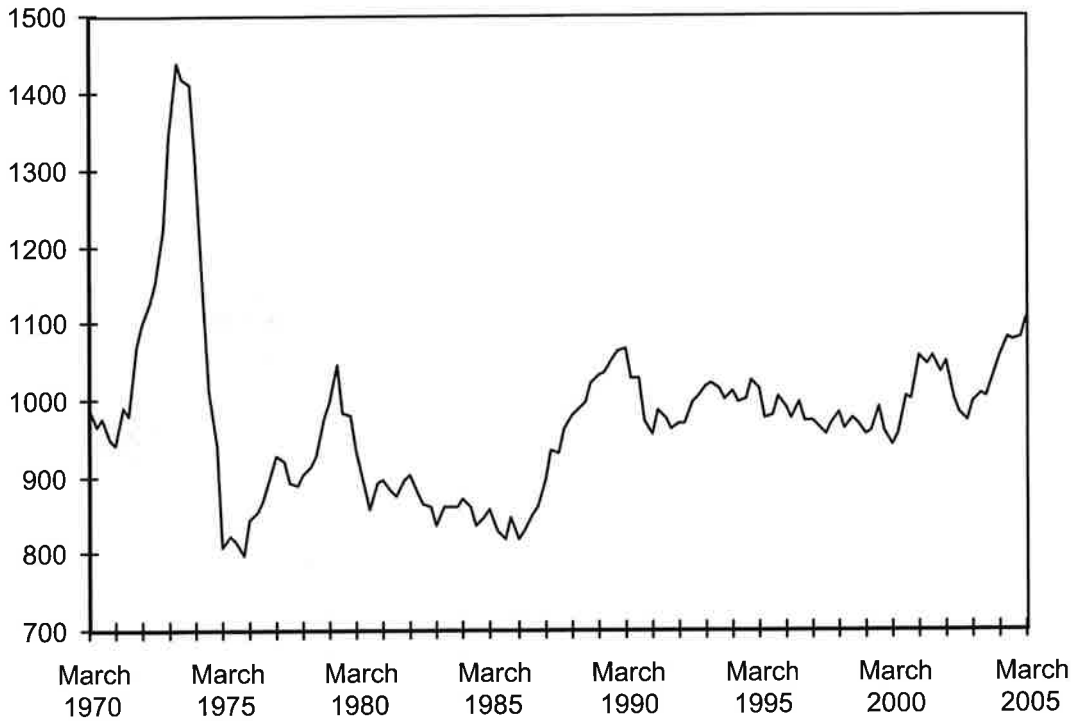


Figure 1: New Zealand's Terms of Trade index

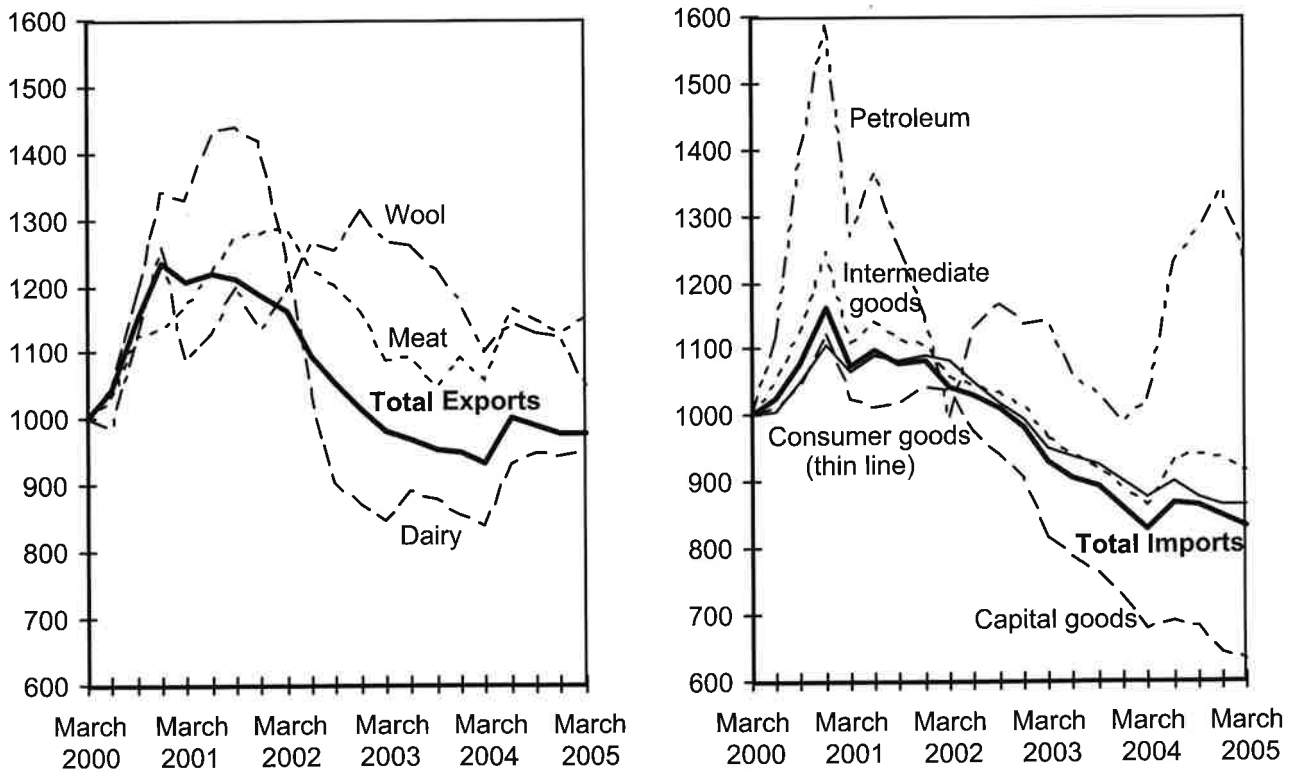
March 1970 – March 2005 (June 2002 = 1000)



Source: Statistics New Zealand (2005)

Figure 2: (a) New Zealand's Export Price indices ***(b) New Zealand's Import Price indices***

March 2000–March 2005 (March 2000 = 1000)



Notes: Consumer goods import price index excludes food, motor vehicles and motor spirits.

Source: Statistics New Zealand (2005) (original series June 2002 = 1000)

Why have the terms of trade improved?

The simple answer is that the world is experiencing something of a commodities boom at the moment. As an exporter of mainly commodities and an importer of mainly manufactured goods, New Zealand has benefited from this boom.

This rise in commodity prices has been driven by several factors. First and foremost among these is the recovery of the US economy following the 2001 recession and the ongoing rapid growth of the Chinese economy. China's appetite for energy (in the form of oil and coal) and raw materials (aluminium, steel, copper, nickel, cement, cotton, etc.) is now close to matching (and in some cases exceeding) that of the US and it is still growing.

As new wells, mines, refineries, smelters and so forth can take years to build and, because the relatively low commodity prices of the late 1990s discouraged such construction for a time, the supply of these industrial commodities is fairly inelastic (unresponsive) at the moment. Consequently, the recent growth in demand has resulted in sharp price increases.

The increasing affluence of consumers in China and other developing countries has also meant that their demand for meat (including BSE-free beef) and grains has been increasing. Because the supply of agricultural commodities also tends to be inelastic in the short run – at least one growing season has to elapse before farmers can effectively react to increased demand – food prices on world markets have also been strong.[1]

Supply-side factors have also contributed to some other price increases. Of particular importance to New Zealand is the severe and prolonged drought in Australia. This has severely hampered Australian wool production since 2002, diverting demand towards New Zealand wool.

Finally, China's economic expansion has exacerbated the *relative* strength of commodity prices by keeping the prices of other goods down. The resources China imports are being transformed into manufactured goods – in particular, textiles, whiteware and consumer electronics – that China then exports to the rest of the world.

In just the last five years, China's exports have tripled, making it the world's third biggest exporter (after the European Union and the US). This is good news for importers of manufactures, like New Zealand, because increasing competition from China is making it difficult for other suppliers to pass on the cost increases they are all facing as a result of the rise in commodity prices.

What's the outlook?

To a large extent, the current commodity price boom reflects an inability of supply to keep pace with the current growth in demand. Take, for example, the case of oil.

In one sense there is no shortage of oil. The world's main oil producers (Saudi Arabia, Iran, Iraq, Kuwait, the United Arab Emirates and Venezuela) have sufficient proven reserves to maintain their current production levels for between 70 and 100 years (or even longer).

The constraint on the supply of oil at the moment lies with the existing capacity of these and other countries to extract it from the ground and the existing capacity of refineries around the world to turn crude into petrol and diesel. The industry is operating at close to full capacity and it is this lack of slack which means that every little disruption to supply (a strike here, a hurricane there) drives the price higher.

However, the longer oil prices remain high, the greater is the incentive for new wells to be drilled and new refineries to be built. Given time, capacity will expand and the supply constraint will ease.

Moreover, given time, demand will increasingly react against high prices. In New Zealand there is evidence of this starting to happen, as some new car buyers seem to have adopted the maxim 'four cylinders good, six cylinders bad'. So, the price of oil will not rise ever upwards and however high the price happens to go in the short term, it will not prove sustainable over the longer term.

What is true for oil will also be true for other commodities and so the current boom should go the same way as all its predecessors, the only unknown is when the bust will come. Consequently, the current level of New Zealand's ToT is unlikely to be sustained for long.

However, there is a ray of hope. For decades the world price of several of New Zealand's key export commodities have been held down by chronic overproduction in the European Union, the US and Japan, whose farmers are massively subsidised. Following the Uruguay Round of multilateral trade negotiations that concluded in 1994, some subsidy cuts were made and some prices (especially for dairy products) improved.

The current Doha Round of talks – which have dragged on since 2001 and seem to be perennially on the verge of collapse – have also made agricultural trade liberalisation a high priority.

If – and it's a big if – the Doha Round ever reaches a successful conclusion and substantial subsidy cuts are made, higher export prices should follow. In which case, New Zealand could look forward to keeping on good 'terms' with other countries for some time to come.

Useful websites

Mostly reports on the prices of New Zealand's key commodity export are available from the ANZ website:

www.anz.com/nz/about/media/economic.asp

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[1] Not all food producers have enjoyed good prices it should be noted. New Zealand apple growers, in particular, have been labouring under the double whammy of a strong dollar and weak world prices caused by a flood of Chilean fruit onto their key European market.

Commentary on the New Zealand economy

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The New Zealand economy passed two milestones recently and, interestingly, one of these was achieved *in spite of* the other.

THE FIRST milestone relates to the current account balance, the difference between what New Zealanders earn and what they spend abroad.

Since the early 1970s, the current account balance has stubbornly remained in deficit. The deficit in the year to March this year, however, is a little bit special in that it is the first to exceed $10 billion. This doesn't mean, however, that it is the largest deficit New Zealand has ever experienced. In 1975, our international expenditure outstripped our international income by an amount equivalent to 14% of GDP, twice the size of the present deficit. (Incidentally, the 1975 deficit was the first to exceed $1 billion, which gives one cause to ponder the effect of inflation on nominal variables over the last three decades.)

The causes of the current deficit and, more particularly, its rapid increase in size (from $3.33 billion, or 2.7% of GDP, just three years ago) are easily identified. The one-third rise in the trade-weighted average value of the dollar and an average annual GDP growth rate of around 4% (compared with the OECD average of about 2.7%) since 2002 both played a major part in encouraging the volume of imports to grow at three times the rate of exports and in transforming a $2.45 billion trade surplus into a $2.44 billion trade deficit.

The buoyant local economy is also the prime suspect for the expansion in our deficit on international income from $6.64 billion to $9.44 billion. Many New Zealand firms are wholly or partly foreign owned and, when the economy does well, the profits earned by their overseas-based shareholders increase. This part of the current account deficit has a tendency to grow over time anyway, as each year's deficit – no matter how large or small – adds to the stock of foreign investment in New Zealand and hence the annual outflow of investment income.

The second milestone relates to the terms of trade, the ratio of export prices to import prices. This economic indicator, which, as discussed in the previous article, measures the quantity of imports we can buy with a given quantity of exports, is currently the highest it has been for over 30 years – which is somewhat remarkable given the price of imported oil recently. By making imports cheaper relative to exports, a rise in the terms of trade should have a dampening effect on the current account deficit. Had the terms of trade remained at their 2001/02 levels (about 3.5% below their current value), the deficit would have grown – everything else being equal – over $1 billion more than it has.

	Quarter				
	Mar 2005	Dec 2004	Sep 2004	Jun 2004	Mar 2004
GDP (real, annual growth rate, %)	4.2	4.8	4.7	4.4	3.6
Consumption (real, annual growth rate, %)	5.8	6.1	5.9	5.8	5.3
Investment (real, annual growth rate, %)	10.4	14.5	15.1	13.7	14.7
Employment: full-time (1000s)	1602	1589	1581	1561	1547
Employment: part-time (1000s)	452	466	443	442	439
Unemployment (% of labour force)	3.9	3.6	3.8	4.0	4.2
Consumer Price Inflation (annual rate, %)	2.8	2.7	2.5	2.4	1.5
Food Price Inflation (annual rate, %)	1.5	1.2	0.5	1.1	0.5
Producer Price Inflation (outputs, annual rate, %)	3.2	2.6	2.4	1.9	0.9
Producer Price Inflation (inputs, annual rate, %)	4.2	3.4	2.5	1.5	-0.6
Salary & Wage Rates (annual growth rate, %)	2.5	2.5	2.2	2.3	2.2
Narrow Money Supply (M1, annual growth rate, %)	0.7	3.2	2.9	9.6	12.6
Broad Money Supply (M3, annual growth rate, %)	6.1	6.2	5.9	8.8	7.3
Interest rates (90-day bank bills, %)	6.99	6.71	6.64	6.07	5.54
Exchange rate (TWI, June 1979 = 100)	70.7	69.0	67.1	64.2	66.3
Exports (fob, $m, year to date)	31,091	30,712	30,048	29,864	28,600
Imports (cif, $m, year to date)	35,457	34,915	34,128	33,378	32,355
Exports (volume, June 2002 [not seas. adj.] = 1000)	1005	1024	946	1042	1028
Imports (volume, June 2002 [not seas. adj.] = 1000)	1425	1384	1361	1388	1354
Terms of Trade (June 2002 = 1000)	1104	1081	1077	1080	1057
Current Account Balance (% of GDP, year to date)	-7.0	-6.4	-5.7	-4.8	-4.6

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

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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 9 of this issue of *EcoNZ@Otago* for details.

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