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Economics: The Peaceful Science!

FROM THE editor

Welcome to Issue 19 of EcoNZ@Otago!

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

The contents of the previous 18 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 econz@otago.ac.nz.

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

I would like to thank Stephen Knowles for doing an excellent job in charge of the previous issue, and Alan King for his significant contribution to this issue.

Niven Winchester

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The 2006 Nobel Peace Prize was awarded jointly to Mohammad Yunus, and the Grameen Bank of Bangladesh (which Yunus founded in the mid 1970s). By discussing the activities of the Grameen Bank, this article attempts to provide some insights into how a member of the economics profession, a group not normally considered at the forefront of efforts to achieve world peace, came to win the Nobel *Peace* Prize.

What is the Grameen Bank?

The Grameen Bank differs from traditional banks in that it lends relatively small sums of money to poor people who have no collateral (assets that can be transferred to the bank if the borrower is unable to repay the loan). Traditionally it was believed that default rates would be high if borrowers were not required to put up collateral on loans. The experience of the Grameen Bank, and other banks that have copied the Grameen model, suggests this need not be the case. Lending small sums of money to poor people with no collateral has become known as 'micro-credit'.

INSIDE THIS ISSUE

The Grameen Bank began in a very informal manner. While Mohammad Yunus was working as an economics professor at the University of Chittagong, he started lending small sums of money to poor people in the village near the campus of the university. He soon discovered two things: (1) how happy it made people to be able to borrow small amounts of money from him without having to pay high interest rates, and (2) they all paid the money back.

The Grameen Bank has grown exponentially since the 1970s. It now has over 7 million clients, the vast majority of whom are women on very low incomes, borrowing relatively small sums of money. In his Nobel Lecture (the reference for which is given below) Yunus argues that 80% of poor households in Bangladesh have been reached by micro-credit. Despite the fact that borrowers are not required to provide any collateral on borrowed funds, repayment rates exceed 90 percent. Money is lent to people for investment, rather than consumption, with the majority of money being lent for livestock and poultry raising (46%), processing and light manufacturing (25%), and trading and shop-keeping activities (23%) (Todaro and Smith, 2006, p.244).

The benefits of group lending

The key innovation of the Grameen Bank was to lend money to groups of people, rather than individuals. Initially money was lent to individuals, but ultimately the Grameen Bank found it more effective to lend money to groups of people. This innovation of group lending has now been copied by many other Micro Finance Institutions (MFIs) in many countries around the world.

To discuss the benefits of group lending, we first need to consider why banks have traditionally found it unprofitable to lend to those with no collateral. It is obvious that a poor person with no collateral who borrows money for a business project (e.g. buying some chickens in order to sell eggs to other villagers, or buying a rickshaw to drive tourists around town) will be unable to repay the loan if the project fails. The fact that the poor have no collateral leads to four other potential problems for banks when lending to the poor. These problems are adverse selection, moral hazard, auditing costs and enforcement costs. We will discuss each of these in turn, as well as discussing how these problems can potentially be overcome by group lending.

Adverse selection

Imagine there are two types of borrowers: those who are likely to be able to repay their loans (safe borrowers) and those who are less likely to be able to repay their loans (risky borrowers). The bank would like to charge higher interest rates to risky borrowers (as the probability of getting their money back from such borrowers is lower), but the bank is unlikely to know who the risky borrowers are. Furthermore, if the bank is only lending small sums of money to each borrower, it is not profitable for the bank to invest too much time trying to work out if borrowers are risky or safe.

Faced with this imperfect information, banks will end up charging everyone the same interest rate, meaning safe borrowers will be charged a higher interest rate than if they could convince the bank they are a safe borrower. Some safe borrowers are likely to respond by not borrowing, further pushing up the interest rate. Ultimately, the only people borrowing money will be risky borrowers who are charged high interest rates and are unlikely to repay the loan. Economists refer to this problem as 'adverse selection'. This problem also occurs in insurance markets, where if insurance companies do not know which of their customers are most likely to make claims they have to charge higher premiums to everyone, driving safer clients out of the market.

This problem of adverse selection could be overcome if borrowers were required to put up collateral on a loan. When there is collateral the bank still gets their money back if the project fails, so there is less need to charge risky borrowers higher interest rates. However, this is not an option when lending to poor people who have no collateral to offer.

Safety in numbers

As noted above, a key innovation of the Grameen Bank was to lend money to groups of borrowers, rather than to individuals. After some experimentation, the Bank settled on lending to groups of five people. In the first instance, money is only lent to two members of each group. If they make regular repayments, then money is lent to the remaining group members. Eligibility for future loans also depends on all group members continuing to make repayments.

We now turn to the issue of how group lending can overcome adverse selection. Recall that the underlying cause of adverse selection is that banks do not know who the risky and safe borrowers are. It is likely, however, that potential borrowers will know which of their friends and neighbours are safe and which are risky. Borrowers will only want to join a group with safe borrowers, as this will maximise their own chances of getting a loan. This means that risky borrowers are less likely to be able to join a group, and hence are less likely to borrow.

If risky borrowers are kept out of the market, then the problem of adverse selection is overcome. Recall that the symptoms of adverse selection are high interest rates and most loans going to risky borrowers (so we would expect repayment rates to be low). The Grameen Bank currently charges an interest rate of 16 percent, which is reasonably low for loans with no collateral (it is probably less than what most readers pay on any outstanding balances on their credit cards) and repayment rates are high. In the words of the Grameen Bank website, "the collective responsibility of the group serves as the collateral on the loan" (www.grameen-info.org/bank/cds.html).

Moral hazard

Another problem that can occur because of the absence of collateral is 'moral hazard'. In this context, this means that borrowers may be less careful with the bank's money (which they only have to pay back if the project they borrow the money for is successful), than they are with their own. This means fewer loans are repaid, so the bank has to charge higher interest rates in order to cover

its costs. Again, an analogy with insurance markets may be helpful. Moral hazard occurs in insurance markets if people are less careful with their assets because they are insured. This leads to more insurance claims, which in turn leads to higher premiums.

Group lending can help overcome the problem of moral hazard. Given that group members' access to credit depends on other group members repaying their loans, each group member has an incentive to put pressure on other group members (e.g., threatening exclusion from social activities) to use the borrowed money wisely, and hence to make repayments on time.

Monitoring and enforcement costs

Recall that when borrowers have no collateral, they can only repay their loans if the projects they borrowed the money for are successful. This may create an incentive for borrowers to report to the bank that their projects failed, when they really succeeded. The bank, therefore, has to monitor projects and this takes time and money. These are known as 'monitoring costs'. Group lending gets around this problem as members will know if their partners' projects really did succeed, and if they did, have an incentive to report this to the bank.

Another potential problem is that some borrowers who can afford to repay their loans may simply refuse to. As the bank has no collateral to seize, trying to force borrowers to repay results in 'enforcement costs'. Again, group lending is a possible solution as members have an incentive to apply whatever pressure they can to encourage potential defaulters to pay their loans back.

Has the Grameen Bank reduced poverty?

Anecdotal evidence suggests that many households that have borrowed from the Grameen Bank are better off as a result. Several examples are given in Yunus' Nobel Lecture. However, to determine whether or not the Grameen Bank has reduced poverty for the majority of borrowers, rather than just a small proportion, we need to compare a large random sample of households who have borrowed money from the Bank, with a large random sample of households (with similar characteristics in all other respects) that have not. One study that performs such an exercise is Pitt and Kandker (1998), who find that households in which *women* have borrowed from the Grameen Bank are more likely to send their children to school, and have higher household consumption and wealth, than households that have not borrowed. The positive effects of borrowing are not as strong for men, but households in which men have borrowed from the Grameen Bank do have higher levels of household consumption than households that have not borrowed from the Grameen Bank.

Why reward an economist who founded a bank?

Economists and bankers are not traditionally known for promoting world peace, so it may initially seem puzzling that the Nobel *Peace* Prize was awarded to an economics professor who founded a bank. However, when presenting Yunus with the 2006 Peace Prize the Nobel Committee stated "lasting peace can not be achieved unless large population groups find ways in which to break out of poverty. Micro-credit is one such means. Development from below also serves to advance democracy and human rights" (http://nobelprize.org/nobel_prizes/peace/laureates/2006/ presentation -speech.html). In other words, poverty is a threat to peace, and micro-credit has played a part in reducing poverty.

Conclusion

The Grameen Bank has shown, counter to traditional wisdom, that poor people with no collateral *are* highly likely to repay their loans. A key feature of the Grameen Bank has been to lend to groups of people, rather than individuals – a model that has been replicated by many other micro-providers around the world. The Nobel Committee believe that the Grameen Bank has made a big enough dent in poverty, and hence a big enough contribution to world peace, to award the Bank and its founder the Nobel Peace Prize.

Some questions to think about

1. Group lending relies on peer pressure to ensure that all group members repay their loans. Can you think of any problems this might create? (Hint: would you want to borrow money if you knew you were letting others down if you couldn't repay your loan?)
2. This article hints at one possible reason why most Grameen Bank borrowers are women. Can you think of any others? (One possibility is given by Yunus in his Nobel Lecture.)

Further reading

The Economist (2006) discusses the awarding of the Nobel Peace Prize to Muhammad Yunus. Todaro and Smith (2006, pp.241-7) contains an excellent summary of the work of the Grameen Bank.

Useful websites

The official website of the Grameen Bank can be found at www.grameen-info.org/index.html

The Nobel Prize website contains both a hard copy and video of Yunus' Nobel Lecture. Note that the first three minutes of the video are not in English, but the remainder is. This can be found at http://nobelprize.org/nobel_prizes/peace/laureates/2006/yunus-lecture.html

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Dr Bollard and the curse of the impossible trinity

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On Monday June 11, the Reserve Bank of New Zealand (RBNZ) surprised traders in the foreign exchange market by intervening to push down the value of the dollar. It was a surprise because, while the RBNZ has always had the power to intervene, it had not done so since the dollar was floated in March 1985.

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The intervention

The attempt to manipulate the exchange rate came after a surge in the dollar's value following the RBNZ's decision the previous Thursday to lift the official cash rate (OCR) from 7.75% to 8%. The dollar, which had already risen to a 25-year high of US75 cents before the announcement, gained a further US1.5 cents by the weekend.

On the Monday afternoon, Dr Alan Bollard, the RBNZ governor, announced that the dollar's value had become "exceptional and unjustified" and so the central bank had intervened by buying foreign currency. By the end of the day, the dollar was again trading at around US75 cents. It fluctuated around this level for several days before steadily rising to US80 cents by late July.

On June 27, the Deputy Governor, Grant Spencer, clarified the RBNZ's position, stating that it had no intention of defending a particular level of the exchange rate. Instead, its aim was to avoid unnecessary variability in the exchange rate.

This episode, however, raises the question of why the RBNZ does not try to hold the exchange rate below its current level? After all, this would give some relief to exporters and other firms in the tradable goods sector, who are being squeezed by the dollar's recent appreciation.

The impossible trinity

The short answer is that the RBNZ cannot target the exchange rate, or, at least, it cannot do so without losing control over monetary policy. This is because of *the impossible trinity*.

The impossible trinity states that a country cannot simultaneously (1) be open to international financial capital flows (that is, allow New Zealanders to invest overseas and foreigners to invest in New Zealand), (2) run an independent monetary policy, and (3) choose its exchange rate. Policymakers may choose only two of these three objectives and, since March 1985, the RBNZ has opted for (1) and (2).[1]

To see why simultaneously achieving all three objectives is impossible, consider what would happen if the RBNZ tried to hold the New Zealand dollar's value below the market equilibrium level. To do this it would need to increase the supply of dollars by purchasing foreign currency. From where does the RBNZ get these dollars?[2]

1 The impossible trinity does imply that the RBNZ could control both the exchange rate and monetary policy if the domestic economy were cut off from international capital flows. However, as policymakers are not currently contemplating restricting international capital flows, this option is not explored in this article.

2 A point to note is that, when a central bank buys foreign currency in this way, it would normally use it to buy a readily marketable, low-risk, income-generating foreign asset (e.g., a US government bond), rather than hold large amounts of actual cash in its foreign exchange reserves.

In all modern economies, the central bank (which is the RBNZ in New Zealand's case) is the sole organisation that has the legal authority to create domestic currency. When a central bank buys something, it pays for it by literally producing new domestic currency out of thin air. In fact, this is how money enters into circulation in the first place; the central bank issues it to members of the public in exchange for some other financial asset (e.g., domestic or foreign government bonds).[3] Therefore, when a central bank intervenes in the foreign exchange market by buying foreign currency, it increases the domestic money supply.

Hence, a decision to aim for objective (3) (in the absence of effective controls on international capital flows) implies that domestic monetary conditions will change whenever an intervention in the foreign exchange market occurs. That is, in taking control over the exchange rate, the central bank foregoes control over monetary policy.

Sterilised intervention

A slight qualification to this statement is that control over monetary policy can still be maintained if the intervention in the foreign exchange market is *sterilised*. A sterilised intervention is one in which the central bank carries out a second transaction, in the market for domestic financial securities (typically, government bonds), designed to reverse the effect on the money supply of the first.

Specifically, if the central bank's original intervention involved buying foreign currency (and injecting domestic currency into circulation), its second (or sterilising) transaction would be to sell some of its holdings of government bonds to the public. When private investors pay the central bank for these bonds, they are returning domestic money to the organisation that issued it in the first place. Therefore, this money is by definition no longer in circulation and hence no longer forms part of the domestic money supply. If the value of the foreign currency the central bank buys exactly matches the value of the domestic bonds it sells, the net effect of the two transactions on the money supply will be zero. The intervention's impact on the money supply would have been 'sterilised'.[4]

Sterilising foreign exchange market interventions, however, does not fundamentally alter the constraint imposed by the impossible trinity. Purchases of foreign currency can only be sterilised if the central bank has domestic bonds on hand to sell. A sustained effort to hold down the domestic currency's value by sterilised intervention will eventually exhaust the central bank's stock of bonds, which would rule out any further sterilisation and again render monetary policy the slave of any subsequent interventions to maintain the exchange rate target.

Intervention and the OCR

It is also worth emphasising that the impossible trinity is not rendered irrelevant by the fact that monetary policy in New Zealand does not currently involve directly targeting the money supply. Instead, the RBNZ influences domestic interest rates by its choice of the OCR's value.

The OCR defines the interest rate at which the RBNZ will (without limit) borrow money from, or lend money to, (registered) commercial banks. Specifically, the RBNZ charges the OCR plus 0.25% for money the commercial banks borrow from it and pays the OCR minus 0.25% on any money these banks deposit with the RBNZ. Hence, if the RBNZ raises the OCR, other interest rates in New Zealand have to rise to compete. So, how would intervening in the foreign exchange market affect the RBNZ's ability to control monetary policy in this way?

If the RBNZ wanted to fix the dollar's value (in terms of, say, the US dollar) below its current level and at the same time set the OCR (and hence all New Zealand interest rates) well above US interest rates, this would give commercial banks licence to profit at the RBNZ's expense.

To see why, first recall that, to push the dollar's value down to the desired level, the RBNZ would have to sell dollars in exchange for foreign currency. The people buying these dollars (with foreign currency) would mostly be investors wanting to use them to buy New Zealand financial securities (e.g., bonds) in order to take advantage of their relatively high interest rate. This extra demand for bonds will bid up the equilibrium price of bonds and so drive down their interest rate.[5] As the interest rate on domestic bonds falls, the interest rates commercial banks need to offer to attract deposits would also fall. Once deposit rates fall below the OCR minus 0.25%, commercial banks can profitably on-lend any deposits they receive to the RBNZ.

Hence, the RBNZ would end up borrowing money from commercial banks at an interest rate that exceeds both (a) what it actually needed to pay (because all other domestic interest rates have fallen) and (b) what it could earn from the US dollar assets acquired through the foreign exchange market intervention. Hence, not only would the RBNZ be making a loss, the OCR would have become an irrelevance as far as influencing the general level of domestic interest rates is concerned. So, despite being able to choose the OCR, the RBNZ would still lose control over monetary policy.

3 Hence the reason anyone holding money treats it as an asset, or a form of wealth, is not because these pieces of paper or base metal are inherently valuable, but because they represent a legal claim against the assets the central bank acquired when issuing money.
4 Grant Spencer's statement of June 27 indicates that the RBNZ's interventions are normally sterilised.
5 The holder of a bond receives a fixed dollar amount in interest at regular intervals over the term of the bond (the value of which is set when the bond is originally issued). Hence, the actual interest rate the bondholder earns depends on the price paid for the bond. The higher the price paid the lower the interest rate implied.

Conclusion

In an environment of unrestricted international capital flows, the RBNZ must choose between the ability to control domestic monetary conditions and the ability to control the value of the dollar. It cannot (sustainably) do both.

However, this is not to say that, by choosing to do the former, the RBNZ has absolutely no influence over the exchange rate. The dollar's value on the foreign exchange market today is, in part at least, determined by what private investors expect will happen to the dollar in the future. By its interventions, the RBNZ is signalling a belief that foreign currency looks quite cheap just now and that it expects to profit from a future depreciation of the dollar. To the extent it can convince private investors to think along similar lines, demand for the dollar will soften and so hasten its return to a more sustainable valuation.

Some questions to think about

1. It has been claimed that the RBNZ is too small a player on world currency markets to be able to intervene on a large enough scale to significantly reduce the dollar's value. How true is this?
2. The RBNZ's recent purchases of foreign currency have not prevented the dollar from appreciating further. How might the RBNZ (and the taxpayer) yet have the last laugh?

Further reading

The official announcements regarding the RBNZ's interventions in the foreign exchange market are given in RBNZ (2007a & 2007b). The operation of monetary policy in New Zealand is described by Wooding (2004a & 2004b).

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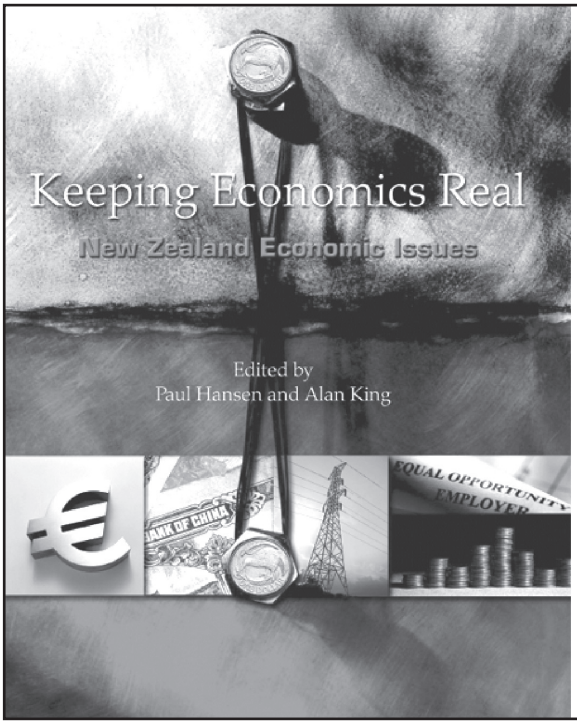

Forty of the best articles from Issues 1 to 11 of EcoNZ@Otago have been revised and published as:

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Rugger me! Is it time to shift the 'goal posts'?

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The Brumbies won more Super Rugby round-robin matches in 2006 than the Bulls. But the Bulls, who collected a large number of bonus points, qualified for the semi-finals and the Brumbies did not. Is the allocation of bonus points in Super Rugby fair? This article determines decision rules for allocating competition points that most appropriately reward strong teams. This is done by building 'strength indices' to help predict match outcomes and choosing measures of strength to maximise prediction accuracy.

The Super Rugby competition has been played annually since 1996 by provincial or state sides from South Africa, New Zealand and Australia (SANZA). Each tournament begins with a round-robin phase where each team plays every other team once. The top four teams from this stage qualify for the semi-finals and the two winning semi-finalists contest the final.

Between 1996 and 2005, there were 12 Super Rugby teams (five from New Zealand, four from South Africa and three from Australia) and the competition was known as the Super 12. Two extra teams from Australia and South Africa respectively were added in 2006 and the tournament was renamed the Super 14. The name 'Super Rugby' encompasses both competitions.

Teams are awarded points during a game by scoring tries and kicking goals. Competition points – the subject of this article – are awarded at the completion of each match according to several decision rules. A winning team is awarded four points, a losing team zero points and each team earns two points if the match is tied. In addition, bonus points may be awarded for: (a) scoring four or more tries, and/or (b) losing by seven or fewer points. So, a winning team may earn five or four competition points, a team that ties a match may be awarded three or two points, and a losing team may earn two, one or zero points.

The origin of the bonus point for losing by a small margin (rather than a large one) can be traced back to the 1986 New Zealand National Provincial Championship (NPC) and was included on the grounds that a team that loses by a small margin is stronger than a team that loses by a large margin. In contrast, a bonus point for scoring four or more tries was introduced by SANZA in 1996 to encourage teams to play attacking rugby.

What's the point?

As competition points are used to identify semi-finalists, it seems logical that stronger teams should receive more competition points than weaker teams. Does the current allocation of bonus points appropriately reward strong teams?

In addition to the example at the beginning of the article, teams missed out on semi-final berths even though they recorded more wins (or as many wins and more ties) than at least one semi-finalist in 1996 and 2000. The inclusion of bonus points has also altered the ordering of semi-finalists relative to if bonus points were not included in seven seasons of the competition so far.

Elsewhere, a bonus point system has been adopted for the group stages of the Rugby World Cup (the world's third largest sporting event) and most other rugby competitions. Notably, several commentators called for the introduction of a bonus point system in Europe's Six Nations competition (one of the few rugby competitions not to include bonus points) after France narrowly edged out Ireland for the 2007 title on points difference. If a Super Rugby bonus system had been in place, Ireland would have been 2007 champions.

Despite the importance of bonus points in determining semi-finalists and their widespread adoption elsewhere, to the author's knowledge, the appropriateness of bonus points has not been evaluated. That is, it has not been determined whether or not the current allocation of Super Rugby points is the best method for rewarding strong teams.

Modelling strength

The merits of alternative points allocation methods are evaluated here by using a prediction model. This framework characterises the outcome of a match by calculating the net score (points scored by the home team minus points scored by the away team). So, for example, if the Highlanders score 35 points and the Hurricanes 29 in a game hosted by the Highlanders the net score is 35 - 29 = 6. Likewise, if the Blues host the Crusaders and score 16 points and conceded 28 the net score is 16 - 28 = -12.

Factors thought to influence match outcomes include home advantage and the strength of the two opponents. Table 1, which reports the percentage of home matches won for each team between 1998 and 2007, indicates that home advantage varies across teams. Notably, the Brumbies and the Crusaders have higher home win percentages than other teams. Distance travelled by the away team is also likely to influence the match outcome.

For example, South African teams playing in, say, Australia experience greater away disadvantage than South African teams playing in South Africa. These factors are included in the prediction model.

Table 1: Home wins, 1998-2007 (%)

Team	Home wins
Blues (New Zealand)	71.1%
Brumbies (Australia)	76.3%
Bulls (South Africa)	49.1%
Lions (South Africa)	44.4%
Chiefs (New Zealand)	55.3%
Cheetahs (South Africa)	50.0%
Crusaders (New Zealand)	85.1%
Highlanders (New Zealand)	71.1%
Force (Australia)	34.6%
Hurricanes (New Zealand)	64.0%
Reds (Australia)	62.3%
Sharks (South Africa)	55.3%
Stormers (South Africa)	54.4%
Waratahs (Australia)	67.5%

Strength is estimated by constructing indices based on the number of wins, number of ties, number of losses by seven or fewer points, and number of times four or more tries were scored by each team in the previous and current seasons. As the model is used to predict match outcomes, the forecast for, say, round six in 2004 is based on data from matches up to and including round five in 2004. Also, points earned in the current season receive a greater weight (and points earned in the previous season a lesser weight) in strength index calculations as the season progresses.

After compiling the data, a numerical procedure is used to choose the number of competition points to award for each event (winning, scoring four or more tries, etc) and values for home advantage and travel variables so that predicted net scores are as close as possible to actual net scores. As, after controlling for the influence of home advantage and travel, a stronger team is likely to beat a weaker team, this procedure essentially chooses the allocation of competition points that provides the best measure of team strength.

Put differently, predictions using strength indices built on an allocation of competition points that is not good at revealing strong teams will be less accurate than predictions based on an allocation that is good at identifying strong teams. By generating predictions using a large number of different allocations of competition points and choosing the allocation that provides the most accurate predictions, the procedure is able to determine the allocation that is best at revealing strong teams.

Is rugby the winner?

The model was estimated using observations from 528 round-robin Super Rugby games played between 1998 and 2005.[1] Statistical testing revealed that the try bonus point is not correlated with strength and the narrow-loss bonus point is only a weak determinant of team strength. The appropriateness of the try bonus point can be questioned on the grounds that it is not uncommon for teams that lose by a large margin to earn a try bonus point. For example, in round nine of the 1998 competition the Stormers earned a try bonus point even though they lost 24-74 to the Blues.

This could be because whether or not a losing team earns a try bonus point is largely determined by the attitude of the winning team. For instance, a dominant team may decide to bring on bench players and/or play with less aggression/enthusiasm. Support for this hypothesis is that the average losing margin when defeated teams are awarded a try bonus is similar to the average losing margin when beaten sides do not earn a try bonus point.[2]

Regarding the narrow-loss bonus point, perhaps a seven-point margin is not indicative of a close game. After all, such a margin implies that the losing team needed to score the maximum number of points available for a single scoring play (a try plus a conversion) to tie the game. In the NPC between 1992 and 1995 teams could only earn a narrow-loss bonus point if an additional maximum score would have resulted in a win. So, history suggests that administrators are unsure how to define a narrow loss.

Try again

As alternative cut-offs for bonus points may improve the accuracy of strength indices, modelling exercises were undertaken for alternative cut-off values. The results indicate that a try bonus point should be awarded if a team scores seven or more tries and a narrow-loss bonus point granted if a team loses by five or fewer points. Both types of bonus points are significant determinants of team strength when these cut-offs are used.

As a losing team only once scored seven or more tries in our sample, the try bonus point cut-off all but rules out losing teams earning this type of bonus point. The cut-off for the narrow-loss bonus point indicates that a defeated team should be awarded a bonus point if two additional penalties or a converted try by this team would have resulted in a win for the losing team.

Turning to other competition points, the analysis suggests that a win should be worth three competition points (instead of four) and, as in the existing system, a tie should be worth two points. Overall, relative to the current system, it appears that bonus points should be harder to earn but they should be worth more relative to the number of competition points awarded for a win. Interestingly, if the points allocation system promoted here had been used in the 2006 Super 14, the Brumbies would have made the semi-finals at the expense of the Bulls.

1 The sample is restricted to 1998-2005 as Super Rugby participants were constant during this period. As such, the model does not use data from matches involving either of the teams added to the competition in 2006 (the Cheetahs and the Force).
2 The average losing margin when defeated teams are awarded a try bonus point is 13.0 points and the average losing margin when beaten teams are not awarded a try bonus point is 14.7.

What about the razzle dazzle?

Despite the focus of this article, bonus points may be included for reasons other than to reward strong teams (as appears to be the motivation for including a try bonus point). If administrators are willing to trade off strength accuracy against entertainment, an allocation that is best at revealing strong teams may not be optimal from SANZA's perspective.

Additionally, an allocation of bonus points different from that currently in use may encourage teams to play a different style of rugby. If the allocation touted above significantly altered how teams behaved, the validity of the approach could be questioned. That said, it seems reasonable to assume that, as implied in the procedure used above, each team wishes to win, prefers a narrow loss to a large loss, and endeavours to score as many tries as possible.

Conclusion

This article derived a points allocation system for Super Rugby that more appropriately rewards strong teams than the existing method. The preferred allocation awards three points for a win, two points for a tie, one point for scoring seven or more tries, and one point for losing by five or fewer points.

Further reading

This article is a greatly condensed version of Winchester (2007). An alternative prediction method is outlined by Clarke (1993).

Some questions to think about

1. Strength calculations in the prediction model attach a smaller weight to competition points earned in the previous season and a larger weight to competition points earned in the current season as the season progresses. Do you think this is desirable? Why or why not?

2. In most football (soccer) competitions three points are awarded for a win and one point for a tie. Do you think bonus points should be awarded in football? Why or why not?

Useful web sites

Predictions for the Super 14, Air New Zealand Cup, and Heartland Championship are available at www.s12predictions.tv

Predictions for a variety of sports are available at www.puntingace.com and www.sportpunter.com

A useful web site for sourcing Super Rugby (and other rugby) data is www.pickandgo.info

References

S Clarke (1993), Computer forecasting of Australian Rules Football for a daily newspaper, *The Journal of the Operational Research Society*, 44(8), 753-9.

N Winchester (2007), What is the optimal allocation of Super Rugby competition points? *Economics Discussion Papers*, University of Otago, forthcoming.

OTAGO LEADS NEW ZEALAND IN ECONOMICS RESEARCH

In 2007, the NZ Tertiary Education Commission (TEC) carried out an assessment for the Performance-Based Research Fund (PBRF), covering the period 2001-2006. This involved assessing the importance of the research carried out by all university departments across New Zealand. The government funding allocated to each department depends on its research "score", which is decided by an expert academic panel. This score is based on the the panel's evaluation of the importance and impact of the work done by each researcher, paying particular attention to those whose work is of international standing ("A-rated" researchers). The University of Otago has been ranked first overall and first in Economics. According to TEC, the overall quality of Otago's Economics research is higher than that of any other New Zealand university. Further, Otago has the largest number of economists with an A rating, and the largest percentage of economists with an A rating.

Top-Scoring Commerce Departments in the 2007 PBRF

Department	University	Score	Number of A-rated researchers
Economics	Otago	6.1	5.00
Tourism	Otago	6.0	1.00
Economics	Auckland	5.2	2.38
Marketing	Auckland	5.2	4.00

A current concern, or of no account?

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New Zealand's current account balance, the difference between our international income and expenditure, was in deficit by $14,446 million (the equivalent of 9.0% of gross domestic product, GDP) in the 2006 calendar year. This is the largest annual deficit (in GDP terms) New Zealand has experienced in over 30 years. Not only was the deficit particularly large, it had also grown in size with some speed. Just five years earlier the deficit was a mere $3,409 million (2.8% of GDP). Various commentators have described the deficit as "alarming", "dreadful", "frightening", "ugly", an "absolute shocker" and "among the worst in the developed world". In this article we will look at why the deficit has grown and consider whether deficits in general, and our one in particular, should be viewed as a cause for concern.

Dissecting a deficit

There are two ways in which a change in the current account balance can be analysed. First, changes in the components of the current account can be individually explored. Second, the nature of the behaviour underlying the deficit's growth can be examined. We will consider both.

To take the first approach, we need to define the contents of the current account more precisely. The current account records the income New Zealanders receive from the export of goods and services to the residents of other countries and the interest and profits earned from our overseas investments. This is then offset against our purchases of imported goods and services plus the interest and profits foreigners have earned from their investments in New Zealand. In addition, the current account also records what are known as unilateral (or one-way) transfers. These differ from other income or expenditure transactions in that one party gives up something of value, but receives nothing in return (or vice versa). Common examples of such transfers include foreign aid and the transfer of wages earned by a person living in one country to family members living in another country.

Table 1 shows the breakdown of New Zealand's current account balance for 2001 and 2006. Clearly, the increase in the deficit over these five years is largely due to a substantial rise in the level of investment income accruing to foreigners and a fall in the balance on trade in goods (reflecting a dramatic increase in imports).

The former is largely a reflection of the long history of foreign investment in the New Zealand economy and the fact that the economy was stronger (and firms were more profitable) in 2005/06 than was the case five years earlier. As the economy has been cooling a little lately, our deficit on investment income should shrink somewhat in the immediate future.

However, as the current account deficit measures the amount by which New Zealand's international spending exceeds its income, it also captures the extent to which the country has to raise new foreign loans or sell more assets to foreign investors to finance this spending. Therefore, the long-term outlook for New Zealand's investment income deficit is for it to grow as long as the current account remains in deficit.

What drives a deficit?

Whether or not we should be worried about the large increase in imports and increased rate of debt accumulation critically depends on what is motivating this behaviour and, hence, what we are using this extra debt to finance. To get a handle on this, we need to begin by looking at the national income identity.

This identity is based on the idea that the value of goods and services produced within an economy (i.e., its GDP) will always equal the aggregate (i.e., domestic plus foreign) demand for these goods and services.[1] Aggregate demand is defined as private expenditure on consumption *(C)* and investment in capital goods *(I)*, plus government spending on such goods *(G)*, plus export sales *(X)* less import purchases *(M)*,[2]

$$GDP = C + I + G + X - M. \qquad (1)$$

Adding net international investment income *(INV)* and unilateral transfers *(TR)* to both sides of this identity gives:

$$GDP + INV + TR = C + I + G + X - M + INV + TR$$

$$GNP + TR = GNDI = C + I + G + CA, \qquad (2)$$

1 This is ensured through the treatment of unsold production as (possibly involuntary) investment in inventories.
2 Consumption, investment and government spending will each include some spending on goods and services produced abroad. As this should not be counted towards New Zealand's aggregate demand, we need to subtract total imports to remove the imported components of *C, I* and *G*.

Table 1: New Zealand's Current Account, 2001 and 2006

	2001 ($m)		2006 ($m)	
Exports of goods (fob)	33,001		34,702	
Imports of goods (fob)	–29,625		–37,931	
Balance on trade in goods		*3,377*		*–3,229*
Exports of services	10,563		12,079	
Imports of services	–10,292		–11,987	
Balance on trade in services		*271*		*91*
Income from NZ investment abroad	1,461		2,224	
Income from foreign investment in NZ	–8,880		–14,320	
Balance on investment income		*–7,419*		*–12,097*
Inflow of transfers	1,392		1,995	
Outflow of transfers	–1,031		–1,206	
Balance on transfers		*361*		*788*
Current account balance		–3,409		–14,446

Note: Balances may not sum exactly due to rounding.
Source: Statistics New Zealand, *Balance of Payments and International Investment Position* releases (www.stats.govt.nz/economy/economic-indicators/default.htm).

where *CA* is the current account balance, *GNP* is gross national product[3] and *GNDI* represents gross national disposable income.

If the government's net tax revenue *(T)* is subtracted from both sides of (2), we get an expression for gross private disposable income *(GPDI)*:

$$GNDI - T = GPDI = C + I + G - T + CA \quad (3)$$

Subtracting private consumption spending from both sides of (3) leaves gross private savings *(S)*:

$$GPDI - C = S = I + G - T + CA \quad (4)$$

A final rearrangement of (4) then gives:

$$CA = (S - I) + (T - G) \quad (5)$$

= net private savings + net public sector savings (i.e., the fiscal balance)

Hence, we can see that the current account balance is simply the outcome of all the saving, investment, taxation and spending decisions made in the economy.

Investment good, consumption bad?

Based on equation (5) it would be tempting to conclude that deficits due to an investment boom are acceptable (because the future income generated by the investment will help repay the debt incurred), whereas deficits caused by a consumption-led boom or fiscal deficits are not, but this still oversimplifies matters.

Deficits reflecting high levels of investment spending did not save East Asian economies from a major financial crisis in 1997, partly because a significant proportion of this spending was made for political rather than economic reasons. Moreover, borrowing to finance consumption spending can make perfect sense. If individuals benefit more by transferring future consumption to the present than they would have to pay in interest on a loan raised against future income, then forcing them to act differently would only make them worse off. Finally, while public sector spending may not generate an explicit rate of return for the government, publicly funded health care, education, infrastructure and the like can generate a worthwhile return for society as a whole.

What ultimately matters is not what is being bought, nor who is doing the buying, but the quality of the spending decisions. If the decisions are economically sound, in that each is expected to generate a benefit to society that exceeds its cost, then the resulting current account balance will also be optimal. So, is New Zealand's deficit optimal?

What drives our deficit?

Clearly, evaluating the soundness of millions of decisions is impossible in a short article. However, what we can do is investigate the drivers behind the dramatic increase in the deficit in recent years and consider whether or not they could have a rational basis.

3 GDP measures the value of output produced (and, hence, income generated) within a country. GNP measures the income accruing to residents of that country. GDP and GNP differ when domestic residents receive income from abroad and when income generated domestically accrues to foreign residents (e.g., profits generated by foreign-owned firms).

Table 2 shows the values (expressed as a percentage of GDP) taken by each variable in equation (5) in 2001 and 2006. We can see that private investment spending has made a tiny contribution to the deficit's growth and increased government spending a more substantial contribution, though this has been more than offset by growth in tax revenue.[4] The main contributor, however, has been a sharp decline in private sector savings. In part this reflects a (relative) reduction in private disposable income as the proportion of gross income paid in tax has increased, but in the main it reflects a higher rate of consumption spending.

Table 2: New Zealand's Current Account Balance Identity, 2001 and 2006

	CA		S		I		T		G
2001	–2.8	=	14.7	–	19.8	+	20.4	–	18.1
2006	–9.0	=	8.2	–	20.1	+	23.0	–	20.2

Note: All figures are expressed as a percentage of GDP. T and G are net of transfer payments (e.g., social welfare benefits).
Source: Constructed using Statistics New Zealand, *Gross Domestic Product and Balance of Payments and International Investment Position*, data (www.stats.govt.nz/economy/economic-indicators/default.htm) and Treasury, *Half Year Economic and Fiscal Update 2005*, estimates (www.treasury.govt.nz/snaforecasts).

So, what have people been buying? Spending on most things has risen, but two items in particular stand out: fuel and consumer durables (i.e., home appliances). The increased cost of petroleum products largely accounts for the former, whereas the latter reflects an almost doubling of demand, tempered only by home appliance prices falling on average by about a third.

On the face of it, this behaviour would seem rather perverse. Given that significantly cutting fuel consumption is difficult for many people (i.e., its price elasticity is very low), the fall in home appliance prices would seem to have offered the perfect opportunity for households to pay the increased fuel prices without having to cut their real standard of living. Yet, what we find is that people are buying significantly *more* appliances. Why is this? Two explanations seem possible.

The cup's half empty

One is that households feel richer, partly because real per capita income has increased a little since 2001, but mainly because the single most important form of wealth held by most New Zealanders – the family home – has dramatically increased in value recently. Many people have extended their mortgage loans in order to finance higher consumption spending.

The problem with this is that living in a now more valuable house does not increase one's income and hence one's ability to sustain a higher rate of consumption of other goods. If New Zealanders believe high house prices will allow them to sustain a higher standard of living, then they have a nasty surprise coming.

The cup's half full

A more sanguine hypothesis, however, is that the increased spending on durables is merely a rational response to changed circumstances. Back in 2001, it was a very bad time to consider replacing major household capital goods as the dollar was unusually weak. At that time, the dollar could reasonably have been expected to appreciate and so make imported goods more affordable. The combination of a positive nominal interest rate and a negative expected rate of inflation creates a strong incentive to delay purchases where possible.

In the last couple of years, however, the situation has been reversed. The dollar has been much stronger; so strong in fact that it is now reasonable to expect it to depreciate. Hence, imported consumer durables have not only been cheap, but are increasingly likely to become more expensive in the near future, making now the perfect time to bring forward future plans (or execute delayed plans) to replace such goods. In this context, the housing boom is simply a bonus, as the home mortgage interest rate is much lower than that for credit cards and other unsecured loans. The debt itself is not really a problem either, providing households had always budgeted to replace these goods in the normal course of events.

Establishing which explanation dominates is clearly important in assessing the current account deficit but, unfortunately, this is difficult to do, as the observed behaviour is the same in both cases. However, one observation that may offer some comfort is that businesses have also been spending up large on imported capital goods. Presumably this is not because the housing boom has made them feel richer.

A question to think about

New Zealand's current account balance can be thought of as the sum of the individual current account balances run by all its residents. Are you running a surplus or deficit (i.e., is your income greater or smaller than your expenditure on consumption and capital goods)? If you are currently running a surplus, should you be worried that most New Zealanders are in deficit? If you are currently running a deficit, should other New Zealanders be concerned about your spending and saving decisions?

Further reading

New Zealand's current account deficit is also discussed by Hansen (2004).

Reference

P Hansen (2004), Will New Zealand be held to account some day soon? In: P Hansen & A King (eds), *Keeping Economics Real: New Zealand Economic Issues*, Auckland: Pearson Education, 186-90.

4 It is worth noting that over half of the increase in G reflects an increase in public sector spending on fixed capital. The total change in national (public plus private) gross fixed capital formation is 1.6% of GDP.

Commentary on the New Zealand economy

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	Mar 2007	Dec 2006	Sep 2006	Jun 2006	Mar 2006
GDP (real, annual growth rate, %)	1.7	1.5	1.4	1.6	2.0
Consumption (real, annual growth rate, %)	2.9	2.8	3.3	3.8	4.7
Investment (real, annual growth rate, %)	–5.8	–5.3	–6.2	–1.6	3.0
Employment: full–time (000s)	1664	1660	1663	1670	1645
Employment: part–time (000s)	477	461	453	457	460
Unemployment (% of labour force)	3.8	3.7	3.8	3.6	3.9
Consumer Price Inflation (annual rate, %)	2.5	2.6	3.5	4.0	3.3
Food Price Inflation (annual rate, %)	4.0	3.9	3.9	2.2	1.8
Producer Price Inflation (outputs, annual rate, %)	2.7	3.6	4.5	5.6	4.0
Producer Price Inflation (inputs, annual rate, %)	2.7	5.3	6.9	7.8	7.2
Salary and Wage Rates (annual growth rate, %)	3.2	3.2	3.2	3.3	3.2
Narrow Money Supply (M1, annual growth rate, %)	3.7	4.1	3.7	2.3	–1.8
Broad Money Supply (M3, annual growth rate, %)	12.8	16.5	13.5	10.9	9.8
Interest rates (90–day bank bills, %)	7.88	7.67	7.56	7.47	7.49
Exchange rate (TWI, June 1979 = 100)	68.6	68.0	65.7	62.3	65.6
Exports (fob, $m, year to date)	35,320	34,634	33,868	32,430	31,098
Imports (cif, $m, year to date)	41,096	40,716	40,051	39,040	38,160
Exports (volume, June 2002 [not seas. adj.] = 1000)	1046	1022	1047	1001	995
Imports (volume, June 2002 [not seas. adj.] = 1000)	1537	1503	1463	1436	1470
Terms of Trade (June 2002 = 1000)	1122	1100	1073	1097	1069
Current Account Balance (% of GDP, year to date)	–8.5	–9.0	–9.2	–9.7	–9.6

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

The recent fall (which should continue in the June quarter) of the consumer price inflation rate back to within the RBNZ's target band would seem to represent further evidence of a weak domestic economy (alongside the low employment and GDP growth rates), but this is not actually the case. Almost all the fluctuation in the inflation rate over the last four or five years has reflected changes in the tradable goods inflation rate. (Tradable goods are those which are either imported or which are produced domestically, but face competition from foreign goods at home or abroad.) Inflation in the prices of non-tradable goods (i.e., domestically produced goods and services not exposed to foreign competition) has been stuck within a 3.5%-4.5% range (and occasionally higher) for the last four or five years. Hence, the most recent easing in consumer price inflation is almost entirely thanks to an easing in the world price of oil and the dollar's recent appreciation.

This puts the RBNZ in something of a bind. It cannot allow the dollar to weaken significantly before non-tradables inflation is lowered, as this will boost tradables inflation and so push the overall inflation rate outside its target band. A strong dollar, however, only very indirectly contributes to dampening the cost-push and demand-pull pressures on inflation in the non-tradables sector. The impact of the dollar on demand and profitability is much greater in the tradables sector, but this is not where the RBNZ's inflationary problem resides. Interest rates might be expected to have a greater impact (than the exchange rate) on the non-tradables sector, but further rises in the Official Cash Rate risk adding to the strength of the dollar and the burden being shouldered by the tradables sector.

Another problem facing the RBNZ is that the effectiveness of monetary policy at controlling inflation partly depends on the government's fiscal policy stance. Although fiscal policy has not been 'loose' in an absolute sense in recent years, the government's purse strings have become looser. While growth in private consumption spending slowed (and private investment spending fell) in the last year, general government consumption and investment spending has continued to grow strongly (by 4.5% in the year to March 2007) and so help hold the economy very close to its full capacity point. While this remains the case, curtailing non-tradables inflation will be difficult.

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