email: econz@otago.ac.nz

UNIVERSITY of OTAGO
Te Whare Wānanga o Otāgo
NEW ZEALAND

A MAGAZINE ABOUT CONTEMPORARY ECONOMIC ISSUES FOR EVERYONE

EcoNZ@Otago 20
FEBRUARY 2008

Wondering about welfare? Characteristics of New Zealand beneficiaries

Sophie Elliott*

What determines whether or not an individual receives welfare assistance? Given he or she collects a benefit, what determines the type of benefit received? These questions are addressed by analysing data on New Zealanders' characteristics and their status with respect to whether they receive a benefit or not.

The New Zealand Labour government confirmed its Social Development Policy in 2005, which stated that 'for most people, the best form of social assistance is a well-paying, sustainable job'. There are some people for whom such a job is not a feasible option. Due to the existence of various social welfare programmes offered by Work and Income New Zealand (WINZ), individuals have a potential alternative to working for a living.

Although receiving a benefit is a necessity for many people, some individuals may choose to be a beneficiary. For example, a parent may choose to source income from the domestic purposes benefit (DPB) instead of employment if the costs of working (paying for childcare, less time to spend with children, etc) exceed the advantages (greater income, the opportunity to interact with work colleagues, etc). Likewise, a recipient of the unemployment benefit may choose to devote limited resources to finding employment. Determining why individuals join particular welfare programmes is important in evaluating the radical reforms to New Zealand's benefit system over the past decade.

Sophie Kate Elliott, 1985 – 2008

Sophie Elliott completed a First Class Honours degree in Economics in 2007 and was due to start her career at the New Zealand Treasury in Wellington in January 2008. This lead article is based on her Honours dissertation. It exemplifies her interest in applying economics to substantive issues. Sophie shone academically, but she was about more than outstanding grades. She was truly engaged with learning for its own sake. She wanted to understand more deeply and was keen to debate the big issues.

As one of a small number of final-year Honours students, Sophie was well-known and respected in the Department of Economics. Tragically, she died on 9 January 2008 after a violent attack at her family home. We would like to express our sincerest condolences to Sophie's parents and family on the loss of their loving and exceptionally talented daughter.

* This article is based on Sophie Elliott's Honours dissertation as summarised by Niven Winchester.

INSIDE THIS ISSUE

Types of benefits

WINZ identifies 11 benefit categories. For the purpose of this research, these categories are used to distinguish five groups of people: individuals who receive (i) the unemployment benefit, (ii) the DPB, (iii) the invalid or sickness benefit, (iv) any other benefit not previously specified (e.g., the disability allowance or the orphans benefit), and (v) individuals who do not receive a benefit. An individual must meet certain eligibility criteria in order to claim a benefit. A person can obtain the unemployment benefit if he or she is at least 18 years of age, not in full-time employment, actively seeking full-time employment, and has resided in New Zealand for at least the last two years. In addition to the age, employment and residential criteria for the unemployment benefit, individuals claiming the sickness benefit must be willing to work full time but be unable to (or be employed at reduced hours) due to sickness, injury or disability. In order to be eligible for the invalids benefit, an individual must be at least 16 years old, have lived in New Zealand for ten years or more and be a New Zealand citizen or permanent resident, and be *permanently* and *severely* restricted in his or her ability to work due to sickness, injury or disability.

Although there are three different forms of the DPB, this benefit is commonly paid to sole parents. Sole parents receiving the DPB must be 18 or over, have at least one dependent child under 18, not be living with the other parent or a new partner, and not be adequately maintained by the other parent's child support payment.

All benefits are subject to income abatement, whereby once the combined non-benefit income of the individual and his or her partner (if they have one) exceeds a certain amount (usually $80 per week) the value of the benefit payment decreases as non-benefit income rises. The value of a benefit payment falls to zero if the individual's income is large enough. Income abatement criteria vary across benefits, but rules relating to the DPB are, in general, less strict. This gives DPB recipients a greater incentive to work and reduces depreciation of their skills during child rearing.

Beneficiary characteristics

This study identifies seven characteristics thought to influence whether or not an individual claims a benefit. Specifically, the study relates an individual's benefit status to their age, gender, ethnicity, marital status, whether or not he or she has dependent children, whether or not there are other people living in the same household who are employed, and the individual's highest formal education qualification.

With the exception of age, the expected determinants of benefit status are qualitative. The impact of qualitative variables on benefit status can be quantified by defining base categories for each variable. For example, by choosing male as the base category for gender the impact of being female on receiving a benefit can be expressed as the difference between the probability of a female receiving a benefit and a male receiving a benefit.

Data on benefit payments and characteristics thought to influence benefit payments are taken from the Confidential Unit Record File (CURF) for the 2004 June quarter. The CURF is a compilation of the Household Labour Force Survey and the New Zealand Income Survey, compiled by Statistics New Zealand. The data are filtered so that only individuals in the working-age population are included.

The chosen statistical method determines the influence of a particular characteristic on benefit status when the effect of other characteristics are controlled for. This is important because failing to control for the impact of other characteristics can lead to biased results. For example, on average, New Zealand Europeans have higher qualifications than Māori (Ministry of Māori Affairs, 2000), and the probability of being on a benefit decreases with education (this is shown below). Consequently, examining the relationship between benefit status and ethnicity without accounting for the influence of education will result in an over-statement of the estimated impact of being Māori on claiming a benefit.

Characteristics and benefit status

The estimated influences of the characteristics identified above on the probability that an individual will claim a benefit are summarised in Table 1. The positive influence of age on the likelihood of receiving a benefit could reflect the fact that people are more likely to be a sole parent and/or become sick (and therefore more likely to meet the eligibility criteria for more benefits) as they age.

The results also indicate that a female is more likely to claim a benefit than a male with the same characteristics. As being a sole parent is required to claim the DPB (which accounts for around one-third of all benefit payments) and 74% of sole parents are female in our sample, it seems that this result is driven by females' greater propensity to be sole parents.[1]

Turning to the results for dependent children, having dependent children is a direct requirement of the DPB so it is not surprising that individuals with dependent children are more likely to receive a benefit. This finding may also reflect the high cost of childcare and a desire for parents to spend time with their children, both of which make working less attractive.

The next row of results in Table 1 suggests that being married reduces the probability of receiving a benefit by 13.4%. Such a result is expected as a married person is most likely to be living with a partner, which decreases the probability of that person being eligible for a benefit (recall that a person's benefit entitlement falls with income). Likewise, a person living with another employed person is more likely to be in a *de facto* relationship than someone who is not, so the impact of living with another person on the probability of claiming a benefit is similar to being married.

With respect to qualifications, more highly qualified individuals are less likely to claim a benefit than less-

[1] Although the analysis controls for the influence of dependent children it was not possible to control for whether the individual was a sole parent.

Table 1: The influence of characteristics on benefit status

Characteristic	Influence on benefit status (all else being equal)
Age	The probability of receiving a benefit increases with age at a diminishing rate.
Gender (Base: male)	
Female	Females are 7% more likely to claim a benefit than males.
Ethnicity (Base: New Zealand European)	
Māori	Māori are 8.5% more likely to claim a benefit than New Zealand Europeans.
Pacific Islander	Pacific Islanders are 5.5% more likely to claim a benefit than New Zealand Europeans.
Marital status (Base: unmarried)	
Married	A married individual is 13.4% less likely to claim a benefit than an unmarried person.
Dependent Children (Base: no dependent children)	
One or more dependent children	An individual with one or more dependent children is 8.3% more likely to claim a benefit than someone with no dependent children.
Other working adults in household (Base: no other working adults)	
One or more other working adults	An individual with one or more other working adults in their household is 12.4% less likely to claim a benefit than someone with no other working adults in his/her household.
Qualifications (Base: no qualification)	
School qualification	An individual with a school qualification is 7.5% less likely to claim a benefit than someone with no qualifications.
Trade qualification	An individual with a trade qualification is 6.4% less likely to claim a benefit than someone with no qualifications.
Bachelor's degree	An individual with a Bachelor's degree is 10.0% less likely to claim a benefit than someone with no qualifications.

educated people. This is probably because qualifications are highly correlated with income and (as noted above) an individual becomes ineligible for a benefit once their income is above a certain threshold. Highly qualified individuals may also be less likely to claim a benefit as their opportunity cost of not working (foregone income) is generally higher than the opportunity cost for individuals with lesser qualifications.

The study also looked at how the characteristics in Table 1 influenced people's membership of different benefit types by implementing the analysis separately for three benefit categories: the unemployment benefit, health-related (invalid and sickness) benefits and the DPB. The results for these analyses are similar to those described above but several features are worth noting. With respect to the health-related benefits, highly qualified individuals are less likely to claim this benefit than those with few or no qualifications. Two possible reasons can be offered for this result. First, highly qualified individuals generally spend more money on health care, so they are less likely to experience health problems. Second, these individuals have a greater financial incentive to seek employment as they can earn higher wages than most unqualified people.

Analysing each benefit category also indicated that being unmarried and having dependent children have a larger influence on whether an individual receives the DPB than being female. Also with respect to the DPB, the overrepresentation of Māori in this group can be explained by other characteristics (e.g., relatively low qualifications) rather than membership of a particular ethnic group. These observations highlight the importance of controlling for other characteristics when determining the influence of a particular attribute.

Conclusions

This article analysed the characteristics of New Zealand beneficiaries. Statistical analysis revealed that a person is more likely to claim a benefit if they are female, a Māori or a Pacific Islander, unmarried, responsible for at least one dependent child, or have few or no formal qualifications. A policy implication arising from this research is that, except for those with no choice, financial incentives play a key role when individuals select their benefit status. This finding coincides with the opinion of Brian O'Donovan, Westpac's chief economist, that '... the main reason workers are hard to find is that the Working for Families package has reduced the incentive to take on paid employment and has encouraged people to switch to part time' (MacKenzie, 2008). This suggests that tax incentives and/or income abatement guidelines could be altered to reduce the number of beneficiaries.

Some questions to think about

This study did not include income in the statistical analysis (due to data constraints).

1. Why do you think including income is desirable?
2. Do you think including income in the analysis would increase or decrease the estimated impact of having a Bachelor's degree on the probability of claiming a benefit? Why?

Further reading

Knutson (1998), McKay (1998) and Department of Labour & Ministry of Social Development (2001) make some useful observations about New Zealand's welfare reforms.

Useful websites

Information about the structure of New Zealand's welfare system can be found at the Department of Labour's web site: www.dol.govt.nz

Data on the number of people receiving benefits is available at Statistics New Zealand's web site: www.stats.govt.nz

References

Department of Labour & Ministry of Social Development (2001), Evaluating the February 1999 domestic purposes benefit and widows benefit reforms, Wellington.

D Knutson (1998), Welfare reform in New Zealand: Moving toward a work-based welfare system. Axford Fellowships Office, New Zealand United States Educational Foundation, Wellington.

R McKay (1998), Targeting in social security: The New Zealand experience, Joint working paper of the International Social Security Association, Geneva, and the Department of Social Welfare, New Zealand.

Minister of Māori Affairs (2000), Progress towards closing social and economic gaps between Māori and non-Māori: A report to the Minister of Māori Affairs, Wellington, New Zealand: Te Puni Kokiri.

D Mackenzie (2008), Wage growth predicted to stay high as jobs plentiful, *Otago Daily Times*, February 5.

WINNER OF THE ERKIN BAIRAM MEMORIAL PRIZE FOR 2007

TOM GRAHAM

In memory of the life of Professor Erkin Bairam (1958-2001) and his many contributions to the Department of Economics and the University of Otago, the Erkin Bairam Memorial Prize is awarded annually to the student with the highest marks across the core third-year honours Economics papers. The winner for 2007 is Tom Graham (past winners: Aaron Carson, 2003; Madeline Penny, 2004; Ashley Dunstan, 2005; Christopher McDonald, 2006).

Born in Cyprus, most of Erkin's working life was spent in the Department of Economics at the University of Otago. At the age of 33, he became one of the youngest full professors to be appointed in NZ and by the time of his death had published over 60 articles and 4 books.

The annual cash prize ($500) is from a fund established from the donations of Erkin's former students, friends and colleagues.

The end of oil: Sense or nonsense?

John Parker
jparker@business.otago.ac.nz

Two recent articles in the *Otago Daily Times* demonstrate widely differing views on the future of oil. In one, Bishop (2007) asks what happens beyond Peak Oil. He describes the situation in the world today as one where oil demand exceeds supply, where we are now past peak oil production, and notes that five barrels of oil are being extracted for every new one found. All sorts of dire consequences are predicted to follow, including the effective end of oil in 2026. In contrast, de Bueger (2008) tells us not to panic because oil is going to be around for the next 50 years and the laws of supply and demand will work to stem the relentless price rise. Who is right and who is wrong? Can we as economists use our knowledge of how markets work to guide our way through this debate? The answer is yes we can and we can also draw on past experience to corroborate our opinion.

Doom and gloom

'My grandfather rode a camel, my father rode a camel, I drive a Mercedes, my son drives a Land Rover, his son will drive a Land Rover, but his son will ride a camel.' (Attributed to Sheikh Rashid bin Saeed Al Maktoum, Emir of Dubai)

'Peak Oil' is the term used to describe the point in time when the maximum global petroleum production rate is reached, after which the rate of production enters its terminal decline. Such a forecast portrays a non-stop upward price spiral and oil running out in the near future. This scenario is plausible and persuasive at a first glance but is ultimately flawed. The population of the world is growing, countries like China are industrialising, standards of living are rising, and very cheap cars like the Tata Nano are going to be available soon, opening up automobile ownership to many extra millions of people (Chandran, 2008). All of these things suggest an ever-increasing demand for oil. Add to this the shortfall between the annual increase in the consumption of oil and the quantity of new discoveries, and the gloomy picture is complete. However this depiction of the current situation is flawed because it ignores the role of the market and its influence on producers and consumers. The supply and demand for oil is not independent of price. Buyers and sellers react to price signals and markets will ensure that the price will not accelerate ever upwards and supply plummet to zero.

A brighter future

How do markets work to vanquish the pessimistic view of world oil? A high price for oil and oil-based products makes users more careful in their consumption habits. On the supply side, higher prices encourage more adventurous exploration and also induces innovations especially in the development and adoption of substitutes. Alternatives to oil come from latent technologies and innovations that have yet to be devised. Latent or dormant technologies are existing technologies that are currently unprofitable to use but can be pressed into service when economic circumstances warrant. Rising oil prices also increase the returns to new technologies, which enhances incentives to innovate. Certainly there will be a time lag before these make a significant difference to supply, but like all new entrants, the possibility of their arrival will influence current prices. Hence there is likely to be a constraint on the upper limit for the price of oil, which will be related to the level at which substitutes become profitable.

Been there, done that

Has the world been here before? Yes, the oil crisis of the mid 1970s to mid 1980s exhibited many features of the situation today. Supply constraints, primarily orchestrated by the Organisation of Petroleum Exporting Countries (OPEC), pushed the price of oil to unheard-of levels and it was taken as axiomatic that the price would climb ever

upwards. In New Zealand we reacted with 'carless' days and the government promoted Think Big projects. These were grandiose schemes which we now judge to be ill advised.

It is constructive to note that demand can only exceed supply or supply exceed demand when markets are not free to function properly. Otherwise prices will always adjust to equate supply and demand. Thus, when the price rises in a market this does not mean that demand exceeds supply. Rather it means that the price has risen to equate supply and demand. In effect, at the new higher price, supply and demand are equal and the market clears. Only when markets are constrained in their operation (e.g., by regulation) is it correct to describe the situation as one where supply and demand are not equal.

So what actually happened in the 1970s and 80s? As expected, the market mechanism did what it was supposed to do and came to the rescue. With high prices it became worthwhile to develop new technologies and to explore for oil in increasingly inhospitable places. Massive change occurred, seen most obviously in major discoveries made possible by innovative offshore oil drilling technologies. It also led to experimentation with alternatives to oil. With a lag, supply adjusted and the price of oil eventually fell. Between 1986 and 2000 oil prices fell to below US $20 per barrel and in 1998 they were as low as US $11 per barrel (de Bueger, 2008). Most of the alternative technologies were put on hold to await more favourable economic circumstances. They became part of today's latent technology.

Alternatives to oil

'I'd put my money on the sun and solar energy. What a source of power! I hope we don't have to wait until oil and coal run out before we tackle that.' (Thomas Edison, 1931)

So what are these substitutes and what is the time frame within which they are likely to make an impact on today's price of oil? Substitutes that already exist for the propulsion of motor vehicles include: ethanol, coal conversion, methane, electricity, vegetable oils, hybrid vehicles, hydrogen, steam and char technology (a procedure that turns wood and wood waste into hydrocarbons). However knowledge of the 1970s and early 1980s has made the proponents of such alternatives cautious. They remember the 1980s when the supply adjustment in the form of extra production from off-shore oil discoveries was so vigorous that substitutes soon became uneconomical. With that experience in mind, developers of alternatives will need to be convinced that the era of cheap oil is indeed over. When that is accepted, the price-modifying impact of future supply by other fuels and technologies will become evident. The timeframe within which this will occur is of course difficult to estimate. However markets will anticipate the supply impact of these new entrants. The upper bound to prices suggested above is likely to be operative in a surprisingly short period of time – probably within years rather than decades.

In an economic sense, the current situation is no different from the 1970s except that perhaps the prospects for alternative technologies are more promising. The major signal determining consumer and producer response is still the price of oil. Sure, the adjustment process will be lumpy and involve significant time lags. However, doom and gloom is not warranted unless political stupidity swamps the adjustment mechanisms. The prediction that the world price of oil will spiral ever upwards and then oil will run out is no more convincing today than it was in the 1970s. Consumer reaction plus induced technological change will rescue us from the more dire predictions of those who believe that the end of oil is nigh.

A warning

As a final comment, whether we should continue burning oil for transport and industry, secure in the knowledge that markets will rescue us, is of course another matter. If global warming is exacerbated by our use of oil, then perhaps a truly radical adjustment, beyond the scope of markets to orchestrate, will be required for the survival of our planet. In other words, in the presence of a negative externality associated with oil consumption (costs in the form of environmental damage borne by individuals not involved in the decision to consume or produce oil), markets need a helping hand.

Some questions to think about

1. Can you give two examples from the past where induced-technological change solved a major supply constraint and caused a significant shift in the resource base of economies? Clues: mineral oil for whale oil, and coke for charcoal.
2. Would it make sense for the government to impose a maximum price for petroleum? Why or why not?

Further Reading

Simmons (2005) provides a discussion of Peak Oil. The economics of innovation is outlined by Freeman & Soete (1997).

A useful web site

Peak Oil is also discussed at http://en.wikipedi.org/wiki/Peak_oil

References

G Bishop (2007), End of oil demands decision, *Otago Daily Times*, December 19.

R Chandran (2008), Tata Motor's $2500 car to put India on global autos map. *The Boston Globe*, January 7.

J de Bueger (2008), Nuclear footprint much smaller than that of Carbon, *Otago Daily Times*, January 21.

C Freeman & L Soete (1997), *The Economics of Industrial Innovation*, 3rd edition. Cambridge, Massachusetts: The MIT Press.

M R Simmons (2005), *Twilight in the desert: The coming Saudi oil shock and the world economy*. Hoboken, New Jersey: John Wiley & Sons.

Measuring trust: An experimental investigation

Alvin Etang*
aetang@business.otago.ac.nz

A large amount of research on social capital has been produced following the seminal work by Putnam et al. (1993). In Issue 17 of this magazine, Knowles (2006) discussed different ways in which social capital has been measured. Social capital is often proxied by measures of trust, either by using the generalised trust question from the World Values Survey or by conducting experiments. Most cross-country studies have measured trust using the former approach.

This article focuses on economic experiments as an alternative way of obtaining measures of trust, and provides empirical evidence from a rural setting in Cameroon. What is trust? Why are economists concerned about trust? How can we measure trust using experiments? How does economic theory relate to practice? Does it pay to trust others? What are the determinants of trust? These questions are explored in this article.

What is trust?

Trust can be defined in a number of ways. First, trust can signify reliance on someone or something. Second, trust implies making an exchange with someone when you lack complete information about them, their intent and the things they are offering to you. This is common in our daily business transactions. Third, trust denotes giving something now with an expectation that it will be repaid in some specified way at some specified time in the future (e.g., to sell on credit). Fourth, trust means enabling other people to take advantage of your vulnerabilities (but expecting that they will not). This last definition best describes the nature of the transaction in the trust experiment discussed below.

Why do economists care about trust? Fukuyama (1995) argues that the economic function of trust is to reduce transaction costs associated with formal coordination mechanisms such as contracts, hierarchies and bureaucratic rules. Group-based microfinance programmes (e.g., the Grameen Bank in Bangladesh) also prove that trust acts as a substitute for collateral demanded by formal banks. Trust can therefore play an important role in the variety of financial transactions that take place in the financial markets. Indeed, we need trust in our everyday lives. Longman in Sapovadia (2007, p. 3) notes that with trust 'it becomes easier to simply enjoy life.'

The Trust Game

The experiment, commonly known in the literature as the Trust Game, follows Berg et al. (1995). In the Trust Game, subjects are divided into two groups and assigned the role of either a 'sender' or 'recipient'. Each sender is paired with a recipient, most often anonymously. Each sender is given a sum of money and has to decide how much (if any) to give to the recipient. This amount is tripled by the experimenter, before being passed to the recipient, who has to decide how much money (if any) to return to the

* I am grateful to David Fielding and Stephen Knowles for their help with this article.

sender. As is standard in the literature, the proportion of money sent by the sender is interpreted as a measure of the degree of trust, while the proportion of money returned by the recipient is interpreted as a measure of reciprocity or trustworthiness.

The game is a strategic situation in which before making a decision, it is vital for the sender to predict how his or her partner will behave. A dilemma arises when senders assume that their partners only care about maximizing their own payoff. So this poses the question: how should senders behave? Traditional economic theory predicts that the recipient will retain the entire amount received and therefore the sender will not send any money (Barr, 2003). Technically, this outcome is known as the subgame-perfect Nash equilibrium.Therefore, a deviation from so-called 'rational' behaviour is needed for any money to be transferred. Economic theory also promotes the *Homo economicus* ('economic man') model, which postulates that people are only concerned with their own economic well-being; hence, recipients will allocate the entire stake to themselves and return nothing to the sender (Gintis, 2000). The results from testing these predictions are discussed below.

An application to Cameroon

The experiment was conducted in a village in Cameroon. From a pool of potential subjects, a random sample of 140 members of Rotating Savings and Credit Associations (ROSCAs) and 60 non-members of ROSCAs were chosen. A ROSCA is an informal association formed by men or women (or both), who at regular periods contribute a fixed amount of money to a common fund. At each interval a different member will receive the amount of money collected. To illustrate how the ROSCA operates, consider a ROSCA with ten participants who each contribute $10 per month. In most cases the order of rotation is predetermined, typically by lottery. At the first meeting, the group will mobilize $100, which is immediately given to the first person on the rotating list. Each time the members convene and make their contributions, a new fund ($100) is formed and given to a participant. The process continues until each contributor has had his or her share and the ROSCA cycle comes to an end. Generally speaking, at the end of the cycle a new cycle begins. This type of informal finance is common in many developing countries, particularly in rural areas where banks are usually absent.

In the Cameroonian village where the study was conducted, each sender was given ten 100 CFA (Communaute Financiere Africaine or African Financial Community) franc coins and had to decide how many of them (if any) to send to the corresponding recipient.[1] All senders chose to send at least half of their endowment to the corresponding recipient. This shows that the game did not end in the subgame-perfect Nash equilibrium of *no trust*. The mean proportion sent in the experiment was 86.5% of the initial endowment. This is high when compared to other studies in developing countries, but is similar to what Glaeser et al. (2000) found for Harvard undergraduates. On average, the proportion sent by ROSCA members was 89.4%, which is significantly higher than the 75.0% for non-members. Furthermore, on average, a ROSCA sender sent 92.0% of their money to a ROSCA recipient and 81.5% to a non-ROSCA recipient. This indicates that ROSCA members are more trusting when their partners are fellow ROSCA members than when they are not. This is consistent with the conjecture that trust will be higher amongst people who interact more frequently with each other.

Turning to the actions of recipients, each receiver returned some money and ROSCA members returned more than non-members. Again, economic theory failed the experimental test as subjects violated the assumption of selfish behaviour. This suggests that in addition to their own outcomes, people care about reciprocity and fairness at their own cost. This fits well with the expectation that people are often willing to reward those who have been generous to them at their own cost or to punish those who have behaved in a selfish way. The average proportion returned by all recipients was 46.7%. This result is similar to the findings of Johansson-Stenman et al. (2006) in Bangladesh, Greig & Bohnet (2005) in Kenya, and Barr (2003) in Zimbabwe. When ROSCA members played the role of recipients, the average proportion returned was 49.3%. This is slightly higher than the 42.9% for non-members, with the difference between the two means significant in a statistical sense.

Determinants of experimental behaviour

We analyse the data more formally to explore the determinants of trust and reciprocity, using a statistical (econometric) analysis. In addition to ROSCA membership, the variables that might explain experimental behaviour include the subject's socio-economic characteristics such as gender, age, marital status, household size, number of children, years lived in the village, whether or not they have lived in an urban area, income, duration of ROSCA membership, and education. Our statistical analysis relates the amount sent and the amount returned to the socio-economic features described above.

The results indicate that, holding other factors constant, when both the sender and the recipient are from the same ROSCA, the average ROSCA member sent 20% more than when neither of them was a ROSCA member. When the sender was a ROSCA member and the recipient was a non-member, 13% more was sent than when the sender was a non-member. These results confirm the descriptive results above, suggesting that ROSCA members are inherently more trusting than non-members. Similarly, an average ROSCA member returned 9% more than non-members, holding other factors constant. This is consistent with expectations and justifies the high degree of trust that people placed in their fellow ROSCA members.

Examining other factors revealed that, holding other factors constant, senders who were divorced sent 20% less than those who were either married or who have never married before. This finding is consistent with the argument that trust decreases with past traumatic

[1] At the time of the experiment, ten 100 CFA franc coins (or 1000 CFA franc) were worth about US$2, roughly half of an average villager's daily wage, and could buy about 4kg of rice.

experiences (Alesina & La Ferrara, 2000). Also, the number of years the individual had lived in the village and having lived in an urban area had negative effects on trust and positive effects on reciprocity. Specifically, an extra ten years spent in the village reduced the degree of trust by 2% and someone who had lived in a town or city sent 10% less, on average. The result relating to length of time living in the village is surprising. We might instead expect that the longer people live in the village, the more familiar they become with fellow villagers, which in turn would increase the degree of trust.

Education was also found to be a significant determinant of experimental behaviour. On average, subjects with formal education sent and returned higher amounts, conditional on other factors. This corroborates the argument by Fukuyama (2000) that education is one avenue where trust and reciprocity can be encouraged. Finally, we found that, on average, a 1% increase in the amount sent is associated with a 3% increase in the amount returned. Therefore, trusting behaviour paid off. The results also showed that the other variables (gender, age, household size, number of children, income and the duration of ROSCA membership) do not account for any significant portion of the variation in experimental behaviour.

Conclusion

The Trust Game allows us to understand trusting behaviour at the micro level. Subjects' behaviour in the experiment did not conform with the predictions of economic theory. Therefore, the 'rational economic man' model does not predict well in our case. The average amount sent in our study is high compared to previous experiments in developing countries. Empirical evidence associates this with the prevalence of ROSCAs in the village. It is also found that marital status, years lived in the village, having lived in an urban area, income and education have significant effects on experimental behaviour. The amount sent explains a significant part of the amount returned. Therefore, trusting behaviour paid off.

Some questions to think about

1. If you were the sender, how many of your 10 coins would you trust your partner with? Why?
2. Imagine that you were the recipient and your partner trusted you with all his/her 10 coins. How many of your 30 coins (recall that you would receive three times the amount sent) would you return to the sender? Why?
3. Would you expect the results to differ when villagers play the Trust Game against non-villagers? If so, why?

Further reading

This article is a greatly condensed version of Etang et al. (2007).

References

A Alesina & E La Ferrara (2000), The determinants of trust, *National Bureau of Economic Research Working Paper* No. 7621, Cambridge: Massachusetts.

A Barr (2003), Trust and expected trustworthiness: Experimental evidence from Zimbabwe, *Economic Journal*, 113, 614-30.

J Berg, J Dickhaut & K McCabe (1995), Trust, reciprocity, and social history, *Games and Economic Behaviour*, 10(1), 122-42.

A Etang, D Fielding & S Knowles (2007), Survey trust, experimental trust and ROSCA Membership in rural Cameroon, *University of Otago Economics Discussion Paper* No. 0713.

F Fukuyama (1995), Social Capital and the global economy. In D Halpern (eds.) Social capital: The new golden *goose*, unpublished report, Faculty of Social and Political Sciences, Foreign Affairs, 74(5): 89-103, Cambridge University.

H Gintis (2000), Beyond Homo Economicus: Evidence from experimental economics, *Ecological Economics*, 35(3): 311-322.

L Glaeser, L Laibson, A Scheinkman & L Soutter (2000), Measuring trust, *Quarterly Journal of Economics*, 11(3), 811-46.

F Greig & I Bohnet (2005), Is there a reciprocal-exchange economy? Evidence from a slum in Nairobi, Kenya, Kennedy School of Government, mimeo. Available at www.cirano.qc.ca/ee/ESA2005/papers/Greig.pdf

O Johansson-Stenman, M Mahmud & P Martinsson (2006), Trust, trust games and stated trust: Evidence from rural Bangladesh, *University of Göteborg Department of Economics Working Paper* No. 166.

S Knowles (2006), Trust me, social capital matters! *EcoNZ@Otago* 17, 5-7.

R Putnam, R Leonardi & R Nanetti (1993), *Making democracy work: Civic traditions in modern Italy*, Princeton, NJ: Princeton University Press.

V Sapovadia (2007), *Trust – an essential element & pillar of micro finance*, B.K. School of Business Management, Gujarat University.

Has inflation gone with Milton Friedman?

Alfred A. Haug
ahaug@business.otago.ac.nz

Milton Friedman, who passed away in 2006, received the Nobel Prize in economic sciences in 1976. He famously stated that 'inflation is always and everywhere a monetary phenomenon.' Everywhere, it seems, except at the Reserve Bank of New Zealand (RBNZ) and other central banks. Inflation targeting is the standard these days at central banks, not monetary targeting as advocated by Friedman. That is, the RBNZ tries to keep inflation in a target range (1% - 3%) by managing short-term interest rates rather than by controlling the growth rate of monetary aggregates as specified by monetary targeting.[1] New Zealand adopted explicit inflation targeting in 1990 when the Reserve Bank Act of 1989 took effect. This article examines the roles of monetary targeting and inflation targeting and outlines some implications for New Zealand.

Does money matter?

Friedman and monetarism

Friedman revived monetarism in the 1960s and 1970s. The central hypothesis is that sustained money growth in excess of output growth produces inflation. (The process through which money growth influences inflation is illustrated in Box 1.) The reverse holds true as well. The theory was put to a test in 1979 by Paul Volcker, then chairman of the Federal Reserve, the central bank of the US, and also in the UK in the early 1980s during the Thatcher government. It was not a success story. Inflation rates dropped but so did economic growth.

Based on the quantity theory of money, monetarists predict that an increase in the growth rate of money causes excess holdings of money. These excess holdings will be spent in the first instance on financial assets and then on goods and services. This will cause an increase in inflation if the economy is running at or near full capacity. It can also fuel bubbles in financial markets or in the housing market. The crucial assumption behind this theory is that the demand for money is stable. However, due to continuing financial innovation, the amount of money that people wanted to hold kept changing in New Zealand, the UK, the US, and other countries (i.e., the demand for money was not stable when the monetarist experiments took place.) Although monetary targeting reduced inflation, it also caused erratic movements in interest rates that hurt the economy.

Box 1: How more money drives up prices

Gold coins took over as the major metallic money during the 19th century in Europe. Before then, silver coins were most common. Unlike today's coins, these coins were valued because they contained precious metal. In those times, rulers who ran into financial problems would often call in coins in circulation and issue new coins. This was done by melting down old coins and adding a cheap base metal (so the number of new coins produced exceeded the number of coins collected). The precious metal content of new coins was lower than that of old coins.

The ruler would then give back to each person the same number of coins handed in and keep some coins for him/herself. There were then more coins in circulation than before and this drove up prices; that is, more new coins were needed to buy the same quantity of goods. This allows us to conclude that continued increases in the money supply (number of coins in circulation) causes continued price rises (i.e., inflation).

[1] Monetary aggregates measure the stock of money in the economy. There are different alternative measures available. A narrow measure is M1, which consists of notes and coins and chequeable deposits. Broader measures, like M2 and M3, include savings deposits and other instruments.

Ignoring Friedman

The mainstream economics profession has moved to macroeconomic models that ignore money altogether. There is no active role for money in these models and the money supply simply adjusts to whatever level is needed to keep interest rates at a desired level. Economists refer to this as (the quantity of) money being endogenously determined. One of the main proponents of this view is Michael Woodford of Columbia University.[2] He argues a central bank setting short-term interest rates, the official cash rate or OCR in the case of New Zealand, only needs to consider inflation expectations and how much slack there is in the economy (the so-called output gap). Monetary policy based on this relation is referred to as policy following the Taylor principle, named after John Taylor of Stanford University.[3] If inflation is heading above the target range, an increase in the short-term interest rate will bring it back down. As long as the public believes that the RBNZ is credible with its policy, short-term spikes in inflation will be absorbed without setting off a wage and price spiral. So far, the RBNZ has been successful in keeping inflation low by following the Taylor principle; however, this theory has not been put to a real test yet.

On a theoretical level, there is an ongoing controversy on whether New Keynesian Phillips Curve Models following a monetary policy based on the Taylor principle have a unique solution for the price level in the economy (the so-called indeterminacy problem). In other words, these models may not provide an anchor for inflation.[4]

Money strikes back

Recently, Christiano et al. (2007) extended the New Keynesian model to give money the important role of providing an anchor for monetary policy. In other words, in this model it is necessary to monitor money growth and be prepared to react to money growth movements if necessary. In addition, Beck & Wieland (2007) provided an alternative theoretical model where monitoring money avoids systematic misperceptions when carrying out monetary policy based on the Taylor principle.

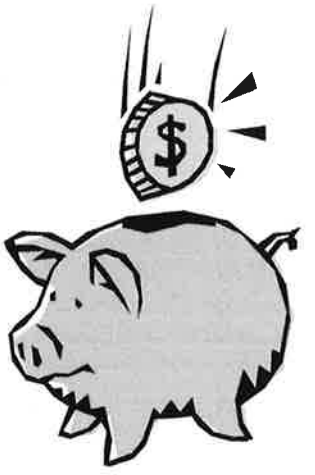
Not all central banks follow the Taylor principle strictly. The European Central Bank (ECB) also monitors money growth rates. This forms a 'second pillar' for monetary policy (Issing, 2006). The second pillar is there to make sure that policy aimed at the short-run movements over the business cycle does not depart from the right path in the longer run.[5] Policy based on the Taylor principle usually looks only one or two years into the future because this is the typical forecast horizon used by central banks.

What happens in the economy beyond the business cycle is relevant. Central banks need to know what effect money has once short-run adjustments in the economy have taken place. This is where monetary aggregates provide useful information. In a recent lecture, Mervyn King (2007), Governor of Britain's central bank, warned against neglecting monetary aggregates. It seems that the pendulum has swung too far to the side of monetary neglect.

The growth rate of monetary aggregates is closely and predictably linked to the inflation rate in the longer run, even when short-term price movements are affected by many factors. Haug & Dewald (2004) analysed historical data back to 1880 for 11 industrialized countries and found very high correlations in the longer-term movements of money growth and inflation. These results hold for various different time periods and across countries that differ greatly with respect to economic policies, histories and institutions. Table 1 shows correlations of longer-term components of money growth and inflation for New Zealand since the second half of the nineteenth century. A correlation coefficient value of 1 means perfect correlation and a value of 0 means that there is no co-movement. The peak correlation for M1, and also for M3, occurs between money growth on the one hand and inflation one year later (i=1) on the other hand. The correlations are relatively large and money growth runs ahead of inflation; that is, it affects inflation with a lag.

What does this mean for New Zealand?

Inflation has become a worry in New Zealand lately. The inflation rate based on the consumer price index moved beyond the RBNZ's 3% upper limit to 3.2% in the December quarter of last year. According to RBNZ forecasts, inflation may be above 3% for much of 2008 and may be 3.5% in the third quarter of 2008. The long-run connection between money and inflation suggests that the RBNZ should analyse the information in the New Zealand monetary aggregates and, similar to the ECB's strategy, use this information to anchor monetary policy in the longer run. This will avoid wandering off in the wrong direction with OCR changes, or as stated succinctly by King (2002): 'no money, no inflation.'



The best inflation protection?

2 See, for example, Woodford (2007) and references therein to his numerous others studies.

3 The 'Taylor Rule' refers instead to current (and not expected future) inflation and output. These models are named 'New Keynesian Phillips Curve Models'. The Phillips Curve relates inflation to the unemployment rate or alternatively to the output gap. The inflation-adjusted (or real) long-run rate of interest is kept constant in the simple version of a Taylor-type rule but can change in more complicated models.

4 See Cochrane (2007).

5 Beck and Wieland (2007) modelled the ECB's two-pillar policy of cross-checking.

Table 1: Correlations for New Zealand longer-term cycles: money growth and inflation components

Money measure and period	Cross-correlations of money in period t with inflation in period t+i:							
	i= −2	i= −1	i=0	i=1	i=2	i=3	i=4	i=5
M1								
1863-2004	.21	.42	.59	.66	.65	.56	.42	.29
M3								
1877-2004	.34	.49	.59	.62	.56	.44	.31	.22

Note: The components have been extracted with so-called band-pass filters as explained in Haug and Dewald (2004). The filter extracts cycles that last longer than the business cycle (i.e., 8 to 40 years). The data were retrieved on 21/10/2007 from www.stats.govt.nz/tables/ltds/default.htm

Some questions to think about

1. Why is inflation generally considered a bad thing for the economy?
2. The piggy bank picture claims that the piggy bank provides inflation protection. Why is this incorrect?
3. What does it mean to have a trade-off between inflation and unemployment? (This is the famous Phillips curve relationship; A.W.H. Phillips, a New Zealander, published his seminal paper 50 years ago.)
4. In what way does inflation in New Zealand depend on exchange rate movements?
5. Why is the RBNZ particularly concerned about the price of housing in regards to inflation? Also, what is the meaning of a housing bubble?

Further reading

For more details about the operation of monetary policy see King (2002, 2007), Issing (2006) and Woodford (2007). Wooding (2004a, 2004b) details how monetary policy works in New Zealand.

References

G W Beck & V Wieland (2007), Money in monetary policy design under uncertainty: The two-pillar Phillips Curve versus ECB-style cross-checking. *Journal of the European Economic Association* 5, 524-33.

L Christiano, R Motto & M Rostagno (2007), Two reasons why money and credit may be useful in monetary policy. *National Bureau of Economic Research Working Paper* No. 13502.

J H Cochrane (2007), Inflation determination with Taylor rules: A critical review. *National Bureau of Economic Research Working Paper* No. 13409.

A A Haug & W G Dewald (2004), Longer-term fluctuations in money, output, and prices, major industrial countries, 1880-2001. *European Central Bank Working Paper* No. 382.

O Issing (2006), The ECB's monetary policy strategy: Why did we choose a two pillar approach? 4th ECB Central Banking Conference.

M King (2002), No money, no inflation - The role of money in the economy. Bank of England *Quarterly Bulletin* 42, 162-177.

M King (2007), The MPC ten years on. Speech to the Society of Business Economists, London, May 2.

M Woodford, (2007), How important is money in the conduct of monetary policy? *National Bureau of Economic Research Working Paper* No. 13325.

P Wooding, (2004a), The changing operation of monetary policy at the Reserve Bank. In: P Hansen & A King (eds), *Keeping Economics Real: New Zealand Economic Issues*, Auckland: Pearson Education, 131-3.

P Wooding, (2004b), The implications of setting interest rates. In: P Hansen & A King (eds), *Keeping Economics Real: New Zealand Economic Issues*, Auckland: Pearson Education, 134-7.

Commentary on the New Zealand economy

Alan King
aking@business.otago.ac.nz

	Sep 2007	Jun 2007	Mar 2007	Dec 2006	Sep 2006
GDP (real, annual growth rate, %)	2.7	2.1	1.6	1.5	1.6
Consumption (real, annual growth rate, %)	4.0	3.6	3.1	3.0	3.4
Investment (real, annual growth rate, %)	5.9	0.5	-5.2	-4.4	-5.3
Employment: full-time (000s)	1660	1670	1666	1661	1664
Employment: part-time (000s)	491	485	477	461	454
Unemployment (% of labour force)	3.5	3.6	3.7	3.7	3.8
Consumer Price Inflation (annual rate, %)	1.8	2.0	2.5	2.6	3.5
Food Price Inflation (annual rate, %)	3.3	4.1	4.0	3.9	3.9
Producer Price Inflation (outputs, annual rate, %)	2.1	1.5	3.1	4.1	4.9
Producer Price Inflation (inputs, annual rate, %)	1.7	1.2	2.7	5.2	7.0
Salary and Wage Rates (annual growth rate, %)	3.1	3.1	3.2	3.2	3.2
Narrow Money Supply (M1, annual growth rate, %)	-0.5	-2.0	3.4	3.7	3.3
Broad Money Supply (M3, annual growth rate, %)	9.4	10.7	12.7	16.5	13.5
Interest rates (90-day bank bills, %)	8.81	8.32	7.88	7.67	7.56
Exchange rate (TWI, June 1979 = 100)	68.3	73.6	68.6	68.0	65.7
Exports (fob, $m, year to date)	34,673	34,939	35,306	34,634	33,868
Imports (cif, $m, year to date)	40,928	41,165	41,082	40,716	40,051
Exports (volume, June 2002 [not seas. adj.] = 1000)	1039	1049	1047	1022	1049
Imports (volume, June 2002 [not seas. adj.] = 1000)	1581	1579	1533	1502	1465
Terms of Trade (June 2002 = 1000)	1163	1122	1117	1100	1073
Current Account Balance (% of GDP, year to date)	-8.3	-8.1	-8.2	-8.6	-8.8

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

Over the year to November 2007, the world price of dairy products doubled (in US$ terms). With milk powder, butter and cheese normally accounting for around 18% of New Zealand's exports, the 'Dairy boom' will be a key factor driving most series in our table over the next year or so.

The series most likely to see the greatest eventual change is the current account balance. Over the last year the deficit has proved reluctant to shrink to any great degree from its recent high, but the upcoming surge in export receipts should produce at least a temporary return to more normal levels during 2008.

The first effects of the boom can already be seen in the terms of trade's sharp jump to a 33-year high in the September quarter. Because Fonterra sells the bulk of its output on contract, the effect of the high spot market prices takes some time to work through to export prices. Hence, further increases are expected.

Food price inflation has been high recently, thanks to strong meat and poultry prices. Recent jumps in the retail prices of dairy products will help keep food price inflation high for the time being – all of which adds to the pressure on the broader consumer price inflation rate. This would have risen to around 3% in the December quarter anyway for technical reasons, but it is now likely to remain at or above 3% throughout 2008, almost certainly ruling out significant interest rates cuts before the end of the year.

The strengthening terms of trade and renewed confidence in the persistence of New Zealand's interest rate differential appears to be behind the dollar's rebound from its August dip. Developments in world dairy markets (along with the ongoing 'credit crunch') will doubtless be an important determinant of the exchange rate in 2008.

Finally, what is the implication of the boom for growth? That partly depends on what dairy farmers decide to do with their windfall. If they use it to retire debt, save for retirement or purchase imports, the effect on real GDP will be practically nil. Only to the extent that they choose to buy local goods and services or expand their productive capacity will it stimulate economic activity. However, the boom's overall impact on growth will also depend on the extent to which it represents a 'bust' for those other industries who struggle with its interest rate, exchange rate and input cost consequences. Every silver lining has its cloud!

INDEX OF ARTICLES IN PREVIOUS ISSUES OF *EcoNZ@Otago*

Issue 13, July 2004

- What saved the whales from extinction? An economic analysis of 20th Century whaling
- Business compliance costs: Big or small?
- Bilateral trade: Defending the unbalanced
- Who will pay? The curious case of a new tax on Central Otago land

Issue 14, February 2005

- Paua to the people! How might paua divers respond to marine reserves?
- What does the 2004 Nobel Prize in Economics have to do with New Zealand?
- Liberating Middle Earth: International trade liberalisation and New Zealand
- *Options* made easy

Issue 15, September 2005

- Professional baseball and cricket: Survival of the fittest?
- Will the G8 package help *Make Poverty History?*
- Some economics of foreign direct investment
- Answers to questions from "Options made easy" from the previous issue of *EcoNZ@Otago*
- New Zealand: On good terms with its trading partners

Issue 16, February 2006

- Immigration to New Zealand - Kiwis by *choice* rather than accident
- How efficient are New Zealand's secondary schools?
- Deep & meaningful? The *fundamental* determinants of economic development
- How does monetary policy work in the Caribbean?

Issue 17, September 2006

- You're reffing joking! Are football referees really biased and inconsistent
- Trust me, social capital matters
- Don't let the sun go down: What should New Zealand do following the collapse of the Doha Round of trade negotiations?
- Sputnik, artificial intelligence and puzzles: An interview with a Nobel Prize winner
- What does an economist have in common with a Centaur

Issue 18, February 2007

- Kilometres and kiwifruit: Evaluating the food miles debate
- Rekindling the ANZAC spirit: Has the time come for a common currency with Australia?
- Big cities, small cities: Which grow faster?
- Going my way? Globalisation, convergence and the nation state

Issue 19, August 2007

- Economics: The peaceful science!
- Dr Bollard and the curse of the impossible trinity
- Rugger Me! Is it time to shift the goal posts?
- A current concern, or of no account?

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

Or write to

EcoNZ@Otago
Department of Economics
University of Otago
PO Box 56
Dunedin

Some issues are also available at http://www.business.otago.ac.nz/econ/econz


UNIVERSITY
of
OTAGO
Te Whare Wānanga o Otāgo
NEW ZEALAND