A MAGAZINE ABOUT CONTEMPORARY ECONOMIC ISSUES FOR EVERYONE

FROM THE EDITOR

Calvin Coolidge, the 30th President of the United States, once said "Economy is the method by which we prepare today to afford the improvements of tomorrow". This issue of *EcoNZ@Otago* focuses on establishing goals and pursuing a better future. We explore the benefits (and costs) associated with emigrating to New Zealand from other Pacific island nations. We also look at the future of agriculture in Sub-Saharan Africa under the impending threat of climate change. The retirement incomes for the next generation of Kiwi workers are inspected in a review of New Zealand's pension scheme. Finally, we profile this year's recipients of the 2011 Nobel Prize in Economic Sciences and recognise the achievements of Economics students at the University of Otago. *Highlights* – short commentaries on economic issues – accompany selected articles.

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ALSO IN THIS ISSUE

Using a randomised policy experiment to examine the costs and benefits of emigrating to New Zealand

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Over four million people around the globe emigrate every year in search of better economic and social opportunities. World Bank calculations suggest that restrictions on these flows of people have larger welfare costs than the more widely studied restrictions on international trade. Moreover, one million foreign-born individuals currently live in New Zealand. How large are the benefits to these individuals from migrating to this country? How do the benefits compare to the costs they incur, such as increased stress? Knowing the answers to these questions is crucial for appropriately managing labour and development policies.

To determine the costs and benefits to migration, we ideally want to compare the experiences that a migrant has had after they arrive in New Zealand to the experiences that they *would have had* if they remained in their country of birth. Unfortunately, it is not possible to know the latter as that state of the world never occurs. To approximate it, researchers often look at the experiences of similar people who still live in the country of origin. However, this will only reveal the true impact of migration if migrants are a *random sample* of the population. Most researchers suspect that this is unlikely to be the case. Migration is a rare event and migrants are typically younger, more educated, less attached to their families and are likely to be more ambitious than the average person in their country of birth.

In technical terms, migrants are *self-selected*. For example, suppose that an individual in one country feels that there are richer rewards for hard work in the neighbouring country and decides to migrate. After spending considerable amounts of time, effort and money completing a rigorous application process and physically moving to the new nation, her weekly income is 65% larger than an average person in her home country. Does this mean there is a 65% return to migration? The answer is 'no'. The migrant is clearly a particularly motivated individual. She may be receiving rewards for this characteristic in the labour market. In other words, some of the 65% benefit includes a difference in work ethic between the migrant group and the non-migrant group – not all of it is due to the act of relocating. In this example, migrants are *positively self-selected*, which is what we typically expect to find.

So how can economists account for self-selection when determining the returns to migration? The typical approach is to try and control for as many observable differences as possible between migrants and non-migrants when comparing the two groups. Of course, differences in some characteristics, such as gender, age and education, can typically be measured by researchers. However, it is unlikely that survey data can capture all the things that make migrants different from people who remain in their country of birth. Hence, there are good reasons to be sceptical of these sorts of estimates. An ideal way to calculate the impact of migration would be to conduct an experiment where a random sample of individuals are selected in one country and then dropped into another. The impact of migration could then be calculated by comparing outcomes for individuals randomly selected to be migrants to those of individuals who were not selected.

This type of experiment may seem very difficult to implement. In fact, New Zealand has an immigration policy in place which nearly does this! The Pacific Access Category (PAC) was established in 2001 and allows an annual quota of 650 individuals in Pacific Island nations[1] to migrate as permanent residents to New Zealand without going through the usual migration categories used for groups such as skilled migrants and business investors. Specifically, any citizens from these countries aged 18-45 who meet certain basic English language, health, and character requirements can register for the PAC. For Tonga, many more applications are received than the quota allows, so a *ballot* is used by the New Zealand Department of Labour to randomly select from amongst the registrations. Thus, this policy creates a situation where there is a group of migrants and a comparison group who are otherwise identical to the migrants, but remain in Tonga only because they were not successful in a random ballot.

To take advantage of the natural experiment provided by the PAC, Professor Steven Stillman (Otago), Professor John Gibson (Waikato), Senior Economist David McKenzie (World Bank) and Dr Halahingano Rohorua (Waikato) designed and implemented the Pacific Island-New Zealand Migration Survey (PINZMS). This ongoing comprehensive household survey collects data from random samples of five groups: (i) Tongan migrants to New Zealand who were successful participants in the 2002-2005 PAC ballots, (ii) successful participants from the same ballots who were still in Tonga at the time of the survey either because their application for New Zealand residence was still being processed or because it was not approved, (iii) unsuccessful participants from the same ballots who were still in Tonga, (iv) individuals in Tonga who did not apply to the PAC in these years, and (v) individuals in Tonga who previously lived with migrants[2] from the 2002-2005 PAC ballots.

By comparing the successful and unsuccessful ballot applicants, it is possible to obtain the only known experimental measure of the impact of migration on a multitude of outcomes. As not all individuals whose names were selected in each ballot had migrated by the time of the survey, these estimates account for non-compliance to the "treatment" of migration. Further comparing the non-applicant group to the PAC applicants enables assessment of the degree of self-selection among potential migrants and the extent to which non-experimental methods can provide a correct estimate of the gains from migration. Comparisons between outcomes for the individuals that migrants lived with prior to migration and similar individuals in unsuccessful ballot households can also be used to examine the impact that migration has on those left behind.

SHOW ME THE MONEY

Comparing the weekly earnings (in New Zealand Dollars) in Tonga of migrants *prior to migrating* to those of individuals who did not apply to the PAC in the same time period shows the degree to which migrants are self-selected. Migrants and non-applicants are seen to differ both in terms of observable and unobservable characteristics. Without controlling for observable differences between groups, migrants are found to earn $56 per week more than non-applicants prior to emigrating. After controlling for observable characteristics, this difference falls to $31 per week. Given that the average income of non-applicants is $34 per week, migrants are estimated to have earned almost twice as much as observationally similar non-applicants before leaving Tonga. This indicates that there is positive selection on unobservables which will lead non-experimental estimators to overstate the income gains from migration.

Comparing the average weekly income for migrants who were successful in the PAC ballot to the average for unsuccessful applicants (while controlling for the fact that not all successful applicants had moved at the time of our survey) reveals that migration led to a $274 increase in weekly earnings for individuals who have lived in New Zealand for one year on average. This was a 263% increase in income compared to what migrants would have been earning in Tonga. While this increase is large, it is only half of that suggested by differences in per capita income between the two countries. Further, this increase is less than that calculated using non-experimental methods to compare observationally similar migrants and non-migrants.

$274 seems like quite a lot of extra weekly income. However, while migrants might earn more whilst living in New Zealand, they must also spend more on goods and services. The researchers could correct for potential differences in prices by looking at the cost associated with similar consumer items in each country and comparing that to the exchange rate used to convert non-migrant income into New Zealand dollars. Results suggest that even after accounting for differences in the cost of living the gap in earnings is robust: migrating to New Zealand from Tonga via the PAC leads to a substantial increase in income.

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1 250 individuals from Tonga, 75 from Kiribati, 75 from Tuvalu, and 250 from Fiji.
2 Successful applicants are allowed to bring only their spouse and dependent children under age 25 with them, so often leave behind parents, siblings, and nieces and nephews with whom they previously lived.

HERE'S TO YOUR HEALTH

There are additional costs and benefits to migration that income alone cannot account for (i.e. non-monetary costs and benefits). One area examined by the project is the impact of migration on mental health. Here, selection is different than that for income: migrants are in fact *negatively selected* on mental health. In other words, individuals who are unhappy about their current living situation or depressed about not having certain opportunities in life are *more* likely to apply to the PAC. Comparing the unsuccessful applicants to the non-applicants shows that individuals in poor mental states are 20% more likely to apply to migrate. Once this selection is controlled for, it is found that migration results in improved mental health. This result is particularly strong for women and for those in a poor mental state prior to migration. This is contrary to most of the literature which typically finds lower mental health for migrants. Hence, improved mental health appears to be an additional benefit of migration for Tongans moving to New Zealand.

Another area examined is physical health. Interestingly, unlike with income and mental health, Tongans who would like to move to New Zealand but are unsuccessful in the PAC ballots generally have the same physical health as those that do not apply to migrate. This is also true for the children of these individuals. The experimental results indicate that migration has both positive and negative effects on physical health. The main positive effect is that the young children of migrants are significantly taller than those of the unsuccessful applicants, even though both sets of children were born in Tonga. On the negative side, however, it is found that slightly older migrant children are also more likely to be obese (higher BMI) and that the adult PAC migrants themselves have increased blood pressure and increased likelihood of being hypertensive.

The comprehensive nature of the PINZMS data allows the potential pathways for these changes to be examined. One big change that is observed is in the diet of households. Families who move to New Zealand increase their consumption of meats, fats, milk and sodium. The increases in milk consumption and sodium intake are particularly large and are likely related to both the changed height and weight of migrant children and the elevated blood pressure of adult migrants. Interestingly, this change of diet does not seem to be caused by the large increases in income for migrant households. It is suspected that the greater availability and lower price of less nutritious food in New Zealand and perhaps reduced physical activity are more likely to be responsible for these changes. Higher stress is also found for adult migrants than for unsuccessful applicants and it is suspected that this also may be a cause of the increased blood pressure and hypertension they experience.

THE POWER OF POLICY EXPERIMENTS

The uses of a randomised ballot by the New Zealand Department of Labour to select applications from an oversubscribed immigration quota allows the impact of migration on a wide range of outcomes to be estimated in a way that accounts for the fact that migrants have both different observed **and** unobserved characteristics than individuals who remain in their country of birth. This research shows that being able to do this is crucial to obtaining the correct estimates of the impact of migration and that most previous research in this area is likely to have produced the wrong answers.

In the particular case of Tongans moving to New Zealand, it is found that migrants experience large gains in income and improvements in mental health, but are also more stressed, have worse diets and have increased rates of hypertension. While this is a particular group of migrants, search for better employment opportunities is one of the most common forms of migration worldwide. Also, in many important respects Tongan migrants are not atypical of the average developing country migrants elsewhere in the world. This suggests that these results may apply more broadly to migrants in other countries.

QUESTIONS TO CONSIDER

1. Can you think of other examples of a 'natural' policy experiment or policy variation that could be used to isolate the impact of a particular policy or behaviour?

2. Should policymakers be encouraged to design programmes like the Pacific Access Category that use randomised ballots to choose among interested participants? Would this allow for researchers to better judge the impacts that these programmes are having?

3. In what ways other than ambition might migrants be different than other individuals?

FURTHER READING

There are a number of recent papers from this project that might interest readers:

J Gibson, D McKenzie & S Stillman (2012), The impacts of international migration on remaining household members: Omnibus results from a migration lottery program, *Review of Economics and Statistics,* forthcoming.

J Gibson, D McKenzie & S Stillman (2011), What happens to diet and child health when migration splits households? Evidence from a migration lottery program, *Food Policy: Migration and Food Security,* 36 (1), 7-15.

D McKenzie, J Gibson & S Stillman (2012), A land of milk and honey with streets paved with gold: Do emigrants have over-optimistic expectations about incomes abroad?, *Journal of Development Economics,* forthcoming.

There are several papers discussing why social experiments can be really important for understanding a wide range of policy outcomes and behaviours in economics and the other social sciences:

J Angrist & J S Pischke (2010), The credibility revolution in empirical design: How better research design is taking the con out of econometrics, *Journal of Economic Perspectives,* 24(2), 3-30.

J Heckman & J Smith (1995), Assessing the case for social experiments, *Journal of Economic Perspectives,* 9(2), 85–110.

G Imbens (2010), Better LATE than nothing: Some comments on Deaton (2009) and Heckman and Urzua (2009), *Journal of Economic Literature,* 48(2), 399-423.

USEFUL WEBSITES

For more on pacific migration, see http://pacificmigration.ac.nz/.

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J Gibson, S Stillman, D McKenzie & H Rohorua (2012), Natural experiment evidence on the effect of migration on blood pressure and hypertension, *Health Economics,* forthcoming.

D McKenzie, J Gibson & S Stillman (2010), How important is selection? Experimental versus non-experimental evidence of the income gains from migration, *Journal of the European Economic Association,* 8(4), 913-945.

S Stillman, J Gibson & D McKenzie (2012), The impact of immigration on child health: Experimental evidence from a migration lottery program, *Economic Inquiry,* 50(1), 62-81.

S Stillman, D McKenzie & J Gibson (2009), Migration and mental health: Evidence from a natural experiment, *Journal of Health Economics,* 28(3), 677-687.

Are taller people better off? Yes. (Really...they are!) Anthropometric data suggest that height is a fairly good indicator of nutrition and the prevalence of childhood disease. We expect that children born into high-income households would have better access to high-quality food and medical care, allowing them to grow taller than poorer children. Note, however, that 'income' hasn't always been an indicator of access to resources. In the early 19th century, the Native American's main diet of buffalo, a high-protein food source, and nomadic lifestyle free from the disease of urban life allowed them to grow taller than white settlers (in fact, they were among the tallest in the world at that time). During the American Civil War, farmers (with access to fresh food and who lived far from urban centres) tended to be taller than white collar workers, who in turn tended to be taller than labourers.

How access to resources influences a person's height (and health) is intriguing to economists. What we find even more interesting, though, is how a person's height influences their access to resources. Data suggest that tall people earn more than short people. Taking into account family characteristics, such as parents' income and family size, an additional inch (2.54 cm) of height will result in a 2.2% increase in wages for white males in the UK (a 1.8% increase in wages for the same group in the US). In other words, labour markets reward height.

There are several reasons why this might not be surprising. Perhaps society associates height with dominance, putting shorter people at a disadvantage when negotiating wages. Maybe, in light of how good nutrition fosters height, employers assume taller workers are healthier and thus more productive. Or maybe taller people have more self-confidence and are more likely to ask for raises, to work on lucrative projects or to apply for high-skill jobs (did you know that US presidents are, on average, taller than the American population?). Perhaps taller workers are more outgoing, develop more effective networks with others and gain more information about lucrative jobs or references from influential people.

A study by Persico, Postlewaite and Silverman (2004) suggests that none of these reasons adequately explains the "height premium". In fact, it's not a person's height at all that influences their income, but rather their height *when they were young*. Controlling for family characteristics and adult stature, an additional inch of height at the age of 16 corresponds to a 2.1% increase in adult wages in the UK (and a 2.6% increase in adult wages in the US). That means if we consider two middle-aged workers *of the same height* with similar family backgrounds, the worker who was 1 inch taller when young would earn about 2% more than their peer.

So what exactly happens at 16 that would impact a person's earning potential? Persico, Postlewaite and Silverman claim that some activities (particularly clubs and sports) that cater to tall youth provide human capital (teamwork, discipline, self-motivation, communication skills, etc.) for which they are paid later in life. Persico, Postlewaite and Silverman evaluate whether or not human growth hormone treatments are worth their cost in terms of higher future earnings. Perhaps there are less invasive ways to foster human capital development in high school which can "level the playing field" later in life.

OTAGO UNIVERSITY PRIZE WINNERS IN ECONOMICS

WINNER OF THE ERKIN BAIRAM MEMORIAL PRIZE FOR 2011: **BENJAMIN KRIEBLE**

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. 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 New Zealand and by the time of his death had published over 60 articles and 4 books. The winner for 2011 is Benjamin Krieble (past winners: Aaron Carson, 2003; Madeline Penny, 2004; Ashley Dunstan, 2005; Christopher McDonald, 2006; Tom Graham, 2007; Hugh McDonald, 2008; Samuel Struthers, 2009; Auren Clarke and Dannielle Thian, 2010).

WINNERS OF THE SOPHIE KATE ELLIOTT MEMORIAL PRIZE FOR 2011: **SCOTT TAYLOR** AND **STEFAN FAIRBROTHER**

In memory of the life of Sophie Elliott (1985-2008), the Sophie Kate Elliott Memorial Prize is awarded annually to the fourth-year Honours student with the highest overall grades. After completing a First Class Honours degree in Economics in 2007, Sophie Elliott was due to start her career at the New Zealand Treasury in Wellington but was tragically murdered in January 2008. Sophie was an outstanding scholar and was well-known and respected within the Department of Economics at the University of Otago. The winners for 2011 are Scott Taylor and Stefan Fairbrother (past winners: Tom Graham, 2008; Hugh McDonald, 2009; Ross Wilson, 2010).

The impact of climate change on crop yields in Sub-Saharan Africa

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Climate change has gained increasing public attention over the last decade. While catastrophes such as melting ice caps and the disappearance of the polar bears are some of the more graphic predicted outcomes of global warming, food production will also be severely affected in many parts of the world. Changes in crop yields can have devastating effects for Sub-Saharan Africa (SSA), where most people depend on agriculture for subsistence. In this study, the expected reduction in crop yields due to climate change is calculated. A grim picture of food availability in SSA emerges.

CLIMATE CHANGE IMPACT ASSESSMENTS

In the 1990s, Rosenzweig and Parry (1994) conducted a global assessment of climate change on the food supply. Since this seminal paper, various other studies have estimated the impact of climate change on crop yields (crop production per unit of land) around the world. For some countries, the impact is more severe than it is for others. For example, global warming can have devastating effects for Sub-Saharan Africa (SSA) where most people depend on agriculture for subsistence and income (Badiane & Delgado, 1995). Agriculture in this region is heavily dependent on weather events as 97% of agricultural land is rain-fed (Rockström et al, 2004). As the climate becomes warmer and dryer, we can expect fewer crops to be produced resulting in an increased likelihood of famine and poverty.

In their early study, Rosenzweig and Parry (1994) predicted grain yield losses of up to 10% in several SSA countries between 1990 and 2080. Recently, Blanc (2011) implemented a study that focused on the four most commonly grown crops in the region: cassava, maize, millet and sorghum. The findings from this research indicate that the losses from climate change are far more severe than initially expected.

AGRICULTURE PRODUCTION IN SSA

Traditionally, empirical studies have estimated the relationship between agricultural outputs and inputs: land, labour and capital (tractors and other farm machinery). Blanc (2011) considered the effect of land productivity in Africa which, like in other regions, often varies within farms. Indeed, farmers usually cultivate better soils first and then expand to land of lesser quality. However, agriculture in Africa differs from the rest of the world in several ways. For instance, labour is a key determinant of agricultural production as 89% of cultivated land is cropped manually in Africa. Animal power is used on only 10% of cultivated land and machinery (e.g. tractors) is used on just 1% of cultivated land (IAC, 2004). As most of the labour input for African farms comes from family members, the level of labour input depends on family structures in addition to the number of hours worked and work efficiency (Upton, 1987). Consequently, as African agriculture relies mainly on non-mechanical power, capital requirements for traditional agriculture are low (Wolman & Fournier, 1987).

Moreover, fertilizer use in SSA is low compared to the rest of the world due to market inefficiencies, low levels of liquidity held by farmers, and high fertilizer prices relative to crop prices (Morris et al, 2007). Irrigation is used for only 3% of the cultivated land in SSA (Faurès & Santini, 2008), partly because of unfavourable market and institutional situations, but also because of technical problems due to poor soil quality and topography. As a result, many areas depend on rain to water their crops.

STATISTICAL ANALYSIS

As African agriculture is particularly vulnerable to weather, Blanc (2011) focused specifically on the effect of weather on crop yields. To do so, the analysis considered a range of weather indicators. Common weather variables include temperature and rainfall, but other weather indicators can also be used. For instance, water can be transferred from the land surface to the atmosphere through transpiration (the loss of water vapour from plants) and evaporation. These processes depend on temperature, humidity, wind, solar radiation, soil cover and each plant's growth stage. To include several of these factors that affect water availability, Blanc (2011) calculated reference evapotranspiration, which represents the total evaporative demand of the air.

In addition, the amount of rainfall relative to the climatology of a region may be more informative than absolute rainfall in that region. For instance, an additional millimetre of rain in an arid region will have a different effect on crops than an additional millimeter of rainfall in a tropical humid region. For this reason Blanc (2011) constructed a standardised precipitation index (SPI), which represents precipitation compared to a long-term trend in a particular area. Using the SPI, it is also possible to identify periods of droughts and floods.[1]

The analysis in Blanc (2011) is based on country-level crop data from 1961 to 2002 sourced from FAOSTAT (2007). Weather data at the 0.5×0.5 degree resolution, which represents areas (or *grid cells*) of approximately 50km^2, are sourced from the CRU TS 2.1 dataset (Mitchell & Jones, 2005). As weather changes in grid cells where crops are not grown are unlikely to influence crop production, weather data are only considered over crop-growing areas as defined by satellite-derived land cover data from Leff et al (2004).

In most grid cells, temperatures increased and precipitation decreased over this period. The SPI indicates that precipitation was generally higher than normal in the first half of the period in each crop zone and lower than normal in the second half of the period compared to the 1901-2002 average. Particularly low SPI values were observed in

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1 Droughts (or floods) are classified as periods of rainfall significantly below (or above) the long-term trend.

the middle of the 1980s. The incidence of drought spells also increased during the sample period, and the occurrence of drought was the highest in the mid-1980s.

Data for the period 1961-2002 suggest yields have *increased* for all crops, except millet. Much of this increase may be due to improved farming practices or better technology. The econometric analysis in Blanc (2011), however, showed that temperature increases *reduced* crop yields. Precipitation increases, on the other hand, improved yields but only up to a certain amount. Once this threshold is reached, additional precipitation reduced yield.

CLIMATE CHANGE PREDICTIONS

Future climate is predicted using atmosphere-ocean general circulation models (AOGCMs). These mathematical models are designed to simulate the dynamics of the oceans and atmosphere of the Earth under specific assumptions about green-house gas (GHG) emissions. Five AOGCMs are considered in this study (labelled CSIRO2, HadCM3, CGCM2, ECHAM4 and PCM). These models are each driven by four alternative scenarios of GHG emissions proposed by the Intergovernmental Panel on Climate Change (IPCC 2000): A1FI, A2, B1, B2. Their storylines differ with respect to assumptions regarding population growth, economic and social development, energy and technology, and agriculture and land-use emissions. By the end of the 21st Century, GHG emissions are predicted to be the highest under the A1FI scenario and the lowest under the B1 scenario.

Data for the 20 future climate change scenarios at the 0.5×0.5 degree resolution from 2003 to 2100 were extracted from the TYN SC 2.0 dataset. Over the 21st Century, the largest temperature increases, the largest precipitation changes (which increases or decreases depending on the AOGCM), and the largest changes in droughts and floods are predicted under the IPCC's A1FI scenario. Alternatively, the smallest variations in climate change are predicted under the IPCC's B1 and B2 scenarios, with B1 predicting the smallest increases in temperature and B2 the largest increases in precipitation. Using these predictions and the econometric analysis completed in Blanc (2011), we can deduce expected crop yields during the next century.

HOT STUFF!

Based on the statistical analysis presented above, yields of the four crops are expected to increase during the 21st Century. As mentioned, however, most of these yield increases are driven by technological change. In order to identify the specific effect of climate change on crop yields, predicted yields under different scenarios of climate change are compared to reference predictions which assume no change in weather variables. Predicted yield impacts of climate change are negative for most crops. Maize yield decreases relative to the reference scenario are predicted under nearly all scenarios by the late-2000s (2040 to 2059), and reach 18.8% under the A1FI scenario (which predicts the largest increase in temperature). However, a gain of up to 6.3% is predicted under the B2 scenario (which predicts the largest increase in rainfall). Similarly, millet yields are predicted to decrease by up to 37.5% under most climate scenarios compared to the reference scenario. Yield increases of up to 12.5% are, however, predicted under B1 and B2 scenarios. For sorghum, climate change by late-2000s causes yield decreases ranging from 46.7% under the A1FI scenarios to 6.7% under the B1 scenario.

These calculations show that, compared to a scenario of no climate change, climate change is predicted to decrease yields for all crops, except cassava. Comparing predictions across scenarios shows that climate impacts are smallest under the B1 scenario, which assumes reduced GHG emissions via, among other things, the introduction of clean and resource-efficient technologies and focusing on global solutions to economic, social and environmental sustainability. These findings highlight that a global agreement to reduce GHG emissions will benefit subsistence farmers in some of the world's poorest nations.

QUESTIONS TO CONSIDER

1. Do you think that increases in crop productivity will be enough to solve the food shortage problem in SSA?

2. Beside changes in climate, which other challenges are faced by African agriculture?

FURTHER READING

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USEFUL WEBSITES

Intergovernmental Panel on Climate Change at http://www.ipcc.ch/. The MIT Joint Program on the Science and Policy of Global Change at http://globalchange.mit.edu/.

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2012 will be an eventful year. *The Hobbit* will rake in US$ 300.24 million (NZ$ 365.59 million) at the box office in December. Mitt Romney will be named the Republican candidate for the next US presidential election at the Republican Convention in August. In the June quarter, New Zealand inflation will be less than 2% while GDP growth will be positive but less than 1%. How can we possibly know these things will happen? Believe it or not, this information is *not* produced from movie studios, political commentators or economic analysts. These predictions are actually made by average people like you and me, each with relatively little knowledge about the internal workings of industry, politics and economics. What's more interesting is that predictions like these are often pretty close to correct!

Like other goods and services, the future can be bought and sold in what are known as "prediction markets". For example, in 1998 the *Hollywood Stock Exchange* (HSX) opened for business. The HSX works just like the big stock exchanges around the world that trade financial assets. On its website (www.hsx.com), players use virtual money (H$) to buy and sell shares of movies currently in conception, production or near release. For every H$1 the stock is worth, the associated movie is projected to earn US$ 1 million at the box office. The current stock price for *The Hobbit* is H$ 300.24. If traders believe this film will earn more than US$ 300.24 million (i.e. that the stock is undervalued), they buy hoping the price will rise over time. If enough players hold this belief, the market price for the stock will, in fact, rise. The stock market for movies reflects the aggregated predictions of a large group of people while also describing the film preferences for society as a whole (a more valued film has a higher share price). The HSX collects the share price data and sells it to the entertainment industry as a tool to guide marketing efforts and product design.

Can groups of non-experts interact in markets to accurately predict the future? The answer seems to be 'yes'. In the past few years, many such prediction markets have been created. In addition to forecasting the future box office success of movies, the HSX also sells assets calculating the success or popularity of different actors (which can help studios in casting). The Iowa Electronic Markets (IEM) in the US runs a similar market for presidential candidates. The price of an asset that pays $1 if Mitt Romney wins the Republican nomination now sells for about $0.80, indicating he's the favourite to win. His stock at the IEM rose higher than the other candidates back in September; polls didn't show him as the favourite until late December.

There are other markets for economic derivatives (Goldman Sachs, Deutsche Bank and the Chicago Mercantile Exchange to name a few) where buyers guess the outcomes of economic data releases (which tell economists about expectations that may affect savings and spending behaviour). The inflation and GDP predictions for the June 2012 quarter mentioned above come from iPredict, a New Zealand prediction market operated by the commercial arm of Victoria University. iPredict also sells assets predicting the outcomes of other events in New Zealand (election outcomes, petrol prices, and even scientific/technology events such as what average global temperature will be or when the next iPad will be released). Intrade and Foresight Exchange are other prediction markets which offer securities over a variety of sports, news, and current event outcomes.

These markets vary in their structure (their rules, their use of real versus virtual money, the variety of assets they utilise) and have been shown to foretell future events as accurately as experts, if not more so. As a result, prediction markets have drawn the attention of economists, policy makers and industry leaders and have made making decisions about an uncertain future a little bit easier.

Interested in prediction markets? See page 14 for references and further reading.

SPOTLIGHT: ÉLODIE BLANC, A RECENT PhD GRADUATE

Élodie joined the PhD programme in the Economics Department at Otago University in 2007 after receiving a Master of Economics of Sustainable Development, Environment and Energy from the École des Hautes Etudes en Sciences Sociales (EHESS) in Paris, France.

In her thesis, Élodie conducted an assessment of climate change impacts on production for the four most commonly grown crops in Sub-Saharan Africa (SSA). In September, Élodie started a 2-year post-doc at the Massachusetts Institute of Technology where she joined the Joint Program on the Science and Policy of Global Change, a multidisciplinary research centre on global climate change and its social, economic, and environmental consequences. She is working on a global water resources system model in this programme.

She completed the requirements for her PhD and graduated in June, 2011. Learn more about Élodie's work by reading her article, "The impact of climate change on crop yields in Sub-Saharan Africa", in this issue of *EcoNZ@Otago*!

Pay-as-you-go retirement schemes

Andrew Coleman

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All OECD countries have compulsory saving schemes that provide resources to people when they retire. These schemes vary in many ways. Almost all countries offer a small benefit to people without other sources of income once they reach a certain age, typically 65 or 67. In addition, most countries have "tier 2" schemes that are designed to provide workers with a retirement income that is related to their working-age incomes. Many countries, such as the United States or Germany, have dedicated social security taxes on labour income that are used to fund a government pension which is proportional to the amount of taxes a person pays. Other countries, like Australia, require workers to place a fraction of their income in a private superannuation account that can only be accessed on retirement. New Zealand is unusual as, along with Ireland, it is the only OECD country not to have a tier 2 scheme. Rather, it offers a flat rate pension to all people over the age of 65, funded out of general taxation.

The diversity of superannuation schemes makes it natural to classify them by the types of benefits they offer. However, as Paul Samuelson (1958) and Peter Diamond (1965) demonstrated half a century ago, it is much more interesting to classify them according to how they are funded. There are two basic funding methods. Under a pay-as-you-go (PAYGO) scheme, taxes are collected and transferred directly to pensioners. Since resources are simply transferred to some people from others, PAYGO retirement systems accumulate no capital. Under a pure save-as-you-go (SAYGO) scheme, taxes are collected and transferred to a fund where they accumulate. In time, the pension is financed by drawing down the fund. A SAYGO scheme is *fully funded* if each cohort contributes enough in taxes to cover their retirement pension entitlements paid by the fund. New Zealand Superannuation is largely PAYGO funded, although in 2002 the New Zealand Superannuation Fund was created to partially prefund future retirement benefits. It currently has $18 billion in assets.

PAYGO VERSUS SAYGO

Samuelson analysed a PAYGO system in which each generation transferred resources to the retired when they were working and got a pension from the working when they were retired. If there is a constant birth rate, contributions earn a return equal to the growth rate of income. Giving 1% of your income to your grandparent's generation and getting 1% of your grandchildren's generation's income is a pretty good deal if you earn $1000 per week and 40 years later people earn $2000 per week. If there is a growing population, the deal is even better! Since each generation has to support a small number of old people, they get large benefits without needing to contribute much.

Peter Diamond fundamentally extended Samuelson's work by asking when a SAYGO system is more efficient than a PAYGO system. He showed that if the return to capital was *higher* than the rate of economic growth (per capita income growth plus population growth) a SAYGO system was more efficient than a PAYGO system. This is because the contributions a person puts aside while working are invested in productive capital, which earns a return that compounds quickly through time. Empirically, the returns to capital have been considerably higher than the rate of economic growth meaning there is a powerful case for believing a SAYGO funded pension scheme is more efficient than a PAYGO funded pension scheme, no matter the structure of benefits.

A few numbers in the New Zealand context make this clear. Given the current birth rate, the size of the pension, and life expectancy, if New Zealand Superannuation continues to be financed as a PAYGO system, taxes worth 7.2% of GDP will be needed by 2055 – a big increase from the current level of 4.3% of GDP. In contrast, if we had a mature SAYGO system, the exact same pensions could be financed with only 3.2% of GDP – 44% as much. In current terms, this is a savings of $2000 per year for every person in the country.


FROM PAYGO TO SAYGO?

So why don't we adopt a SAYGO system? Unfortunately there is a catch. To get much lower taxes in the long run, there has to be a temporary increase in taxes to build up the SAYGO fund. In essence, some generations have to double pay – they have to pay for their grandparents' and parents' pensions while at the same time saving for their own. Whenever a SAYGO system is mooted, a cry emerges from the mouths of the middle-aged up and down the country: "It's not fair! We shouldn't be asked to pay for others and save for ourselves as well. It is simply bad luck for young people that they will pay more taxes in the future."

Fortunately for the young, the middle-aged are wrong. The numbers show that even though the middle-aged would be asked to double pay, the amount of taxes they have paid, are paying at the moment, and will pay is only half the amount they will receive in retirement benefits. Making people "double pay" is not unfair if they start from a position where they only pay half.

It takes several steps to estimate how much people pay to fund New Zealand superannuation and how much they expect to obtain in pensions when they are old. For each cohort, you first calculate the number of people who were alive in each year from when they were 20 to when they get a pension (currently 65), and then for each year after they get a pension. Figure 1 shows the size of the population by year for the cohorts turning 60 in 1981 and 2011 using historic data from census records and future data from Statistics New Zealand demographic projections. Remarkably, almost all cohorts spend one third of their lives older than the pension age. This means that on average most New Zealanders will spend half a year over 65 for every year they are between 20 and 65.

Figure 1 – Historical and projected number of people by age: Cohorts turning 65 in 1980 and 2011
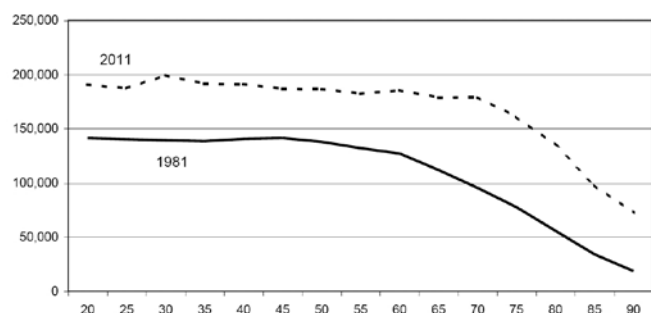
The second step is to estimate the number of retired people a person supports when they are aged 20 – 65. This is estimated by calculating the ratio of the number of people over 65 to the number of people aged 20 – 65 in a given year (say 2011) and then averaging over all the years that a cohort is aged 20 – 65. When the average is calculated, it proves that every cohort born between 1921 and 1976 on average supported a pensioner for 25 – 30% of a year, or three months, while they were between 20 – 65.

Putting these two numbers together, the typical New Zealander born before 1976 can expect to get nearly twice as much retirement income support as they give. Cohorts born after 1976 pay more, but even cohorts born before 1986 can expect to get fifty percent more support than they gave. There is no real mystery here: it is merely confirmation of Samuelson's observation that PAYGO schemes are great when there is a growing population. Most cohorts currently alive provide support to relatively few people because the number of people born each year 70 – 90 years ago is much smaller than the number of people born each year 20 – 60 years ago.

The above calculation is crude because it doesn't take into account the dollar amount of the support that is provided. In addition, because New Zealand Superannuation is funded out of general taxation, not just the incomes of 20 – 65 year olds, there has to be an adjustment for the taxes people pay when they are over 65. Both revisions can be made by expressing pension entitlements as a fraction of the average earnings of people aged 20 – 65, including those without paid employment.

These calculations show that most cohorts can expect a pension that has been or will be between 36% and 40% of average 20 – 65 year old incomes. Since people receive the pension for half as long as they are aged between 20 and 65, for every year they are alive between age 20 and 65 they can expect pension benefits of 17% to 19% of average incomes. However, cohorts born before 1981 have paid or will pay less than half as much as this in taxes to pay for other people's pensions. Cohorts turning 60 in 1980 only paid 3% of their incomes in taxes to support pensions while cohorts turning 60 in 2011 paid 6%. These payments don't include the contribution someone makes when they are over 65. This adjustment is equal to a further 1.7% – 2.5% of earnings, bringing the total to between 4.7% (those turning 60 in 1980)

and 9.2% (those turning 60 in 2046). These amounts are still very small. The numbers suggest that for every year spent between age 20 and 65, the average New Zealander has contributed or will contribute between 4.7% and 9.2% of their income to fund pensions, but can expect a pension of between 17% and 19% of average income (see Figure 2).

Figure 2 – Average pension tax contributions and receipts by cohort
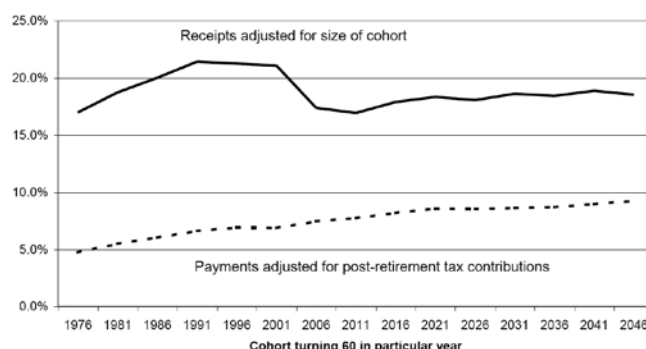
How can this happen? As noted above, it primarily happens because most New Zealanders have funded much smaller cohorts of people. It also occurs because tax is collected from sources other than personal income, particularly undistributed corporate income. Aggregate undistributed corporate income is only about a third of aggregate personal income, so even if we added this to contributions they would still be much smaller than expected benefits.

FUTURE SECURITY

For many decades, New Zealand has operated a PAYGO-funded superannuation scheme. This scheme has been very good for New Zealanders over the age of 35 for they have only had to contribute half as much as they will receive. Unfortunately this situation cannot last. As the birth rate and population stabilise, contribution rates must increase. New Zealand's youngest children and children yet to be born can expect their contribution rates to double if we keep the current PAYGO system.

Future generations of New Zealanders are likely to be significantly better off if New Zealand had a SAYGO funded pension scheme. But for this to occur, there would need to be a temporary increase in taxation, requiring one or more generations to double pay. Whether or not this transition occurs is a decision for the politicians, but it seems palpably fairer once it is realised that most New Zealanders are currently only paying half their way.

QUESTIONS TO CONSIDER

1. How might the structure of the publically-funded pension scheme change a worker's incentive to save private funds for retirement?

2. Could a switch from a PAYGO system to a SAYGO system result in some workers choosing to delay retirement? If so, what types of workers would choose to spend more of their lives at work?

USEFUL WEBSITES

Learn more about the KiwiSaver Retirement Scheme at www.kiwisaver.govt.nz.

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Economists study how people allocate resources when faced with constraints. In modern times this is done within *markets*; therefore the main focus of economic research is on market activity. Why is it that humans have become so adept at market activity? Are we pre-disposed to these activities or did we have to learn them over thousands of years of civilisation? Researchers have discovered a novel way to answer these questions: to see how monkeys behave in markets. Having shared an ancestor, we would expect that the market-driven actions of both humans and monkeys would be somewhat similar if economic decision-making has been a part of our development from time immemorial. Since the 1990s, economists and primate researchers have either observed or experimented with monkey markets. Their findings say a lot about how far we've come (and how far we've yet to go).

In studies of vervet monkeys, both goods (food) and services (grooming) are traded in much the same way commodities are exchanged in a barter economy. (In other words, monkeys create markets of their own.) Researchers showed this by conducting the following experiment: (1) choose a low-ranking female from a group, (2) give the low-ranking female a bonanza of food, (3) see if she receives more grooming than the others (i.e. see if she 'sells' food for grooming). Results showed that she will. In fact, if a second low-ranking female with a cash of food is added to the experiment, the market power of the first low-ranking female declines (in other words, the monopoly becomes a duopoly).

However, the commodity-based trading of vervet monkeys is quite different from the modern currency-based markets we use today. So to make the environment that monkeys act in more similar to that of humans, researchers taught them how to use money. In these studies, capuchin monkeys were taught how to exchange tokens for different foods. Scientists experimented with changing the number of tokens (income) provided to the capuchin monkeys and the units of food each token purchased (price) to see if they respond according to modern economic theory. The data showed that their behaviour is as consistent with rational decision-making as our own!

Further, these studies also showed that capuchin monkeys have the same biases and make the same mistakes as humans. When there is price uncertainty (risk) the monkeys have difficulty making rational choices. Researchers showed this by offering the capuchin monkeys two lotteries with *equal* expected payoffs: (1) a handler shows two grapes in a tray, but when a token is paid there is a 50-50 chance he removes one; (2) a handler shows one grape in a tray, but when a token is paid there is a 50-50 chance he adds one. While we expect a perfectly rational agent to be indifferent between the two lotteries, the capuchins (like us) preferred lottery (2): being given extra is better than losing out (known as *loss aversion*). Also, capuchin monkeys are shown to have the same attitudes towards fairness and equality that we do. When some monkeys were unfairly rewarded for giving up tokens, onlookers became upset and, in some cases, refused to participate in the market even though they would have benefited from doing so.

Monkey market behaviour teaches us that some degree of reasonableness when it comes to making choices in markets is built in – it's a part of our evolution. Since vervet and capuchin monkeys are extremely distant relations to humans, the foundations of economic decision-making must have been present for quite some time. On the other hand, the biases and irrational behaviour may be just as ancient. While many (in fact, *most*) economic theories involve perfectly rational and self-serving individuals (so called *homo economicus*), we seem to be as near and as far from these idealised agents as our primate cousins.

Interested in the evolution of economic thinking?

Keeping your eye on the prize: 2011 Nobel Prize in Economic Sciences

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Thomas Sargent and Christopher Sims are the winners of the 2011 Nobel Prize in Economic Sciences for developing methods which determine the causal relationship between economic policy and different macroeconomic variables (The Nobel Foundation, 2011). Sargent's work focuses on how changes in policy affect the state of the economy over time. Sim's work distinguishes between expected changes and unexpected changes in variables to trace out their effects.

Many macroeconomic variables (such as gross domestic product or *GDP*, interest rates, inflation rates, unemployment, etc.) are interrelated in complex ways. When one of these variables changes, such as a sharp decrease in GDP growth, it is not very easy to figure out why. Perhaps the change is due to a shock to the structure of the economy that directly impacts GDP. Or perhaps the structural shock has affected another economic variable, such as the interest rate, which in turn causes GDP to change. What if it is even more subtle than that? Any shock can affect dozens of economic variables which in turn impact each other. How can we make sense of these changes when the economy is so complex?

Figuring out why macroeconomic variables change is important for establishing effective policies which limit the havoc that deep recessions or high inflations can wreak. The 2011 Nobel Prize in Economic Sciences was awarded to two economists who developed methods for pinning down how economic variables respond to different sorts of shocks: Thomas Sargent and Christopher Sims.

BREAKING THE RULES

Many central banks around the world follow rules[1] when setting monetary policy. The Reserve Bank of New Zealand (RBNZ), for example, sets monetary policy with the goal of keeping inflation between 1% and 3% in the medium term. The RBNZ can be expected to follow this inflation-targeting 'rule' most of the time. Occasionally, however, it becomes necessary to violate the rule in response to a change in the economic environment. In this situation, it is difficult to determine whether economic variables are responding to a sudden change in monetary policy, or if they are responding to the same 'shock' that the monetary policy is attempting to address.

Sargent developed an approach to figure out exactly how macroeconomic variables respond to shifts in economic policy. His method involves three steps. First, a model of the economy is constructed. This model consists of a series of mathematical equations meant to capture the relationship between different economic variables (for example, how consumption responds to interest rates). Next, the mathematical model is solved. Deriving the solution depends crucially on how individuals in the economy form *expectations*. In other words, how people predict the variables will change is incorporated into the framework. Finally, data are used to calibrate fundamental parameters of the model solution to ensure that the model reflects the real economy. We can then use the result to simulate what would happen to different economic variables when just a shift in policy occurs.
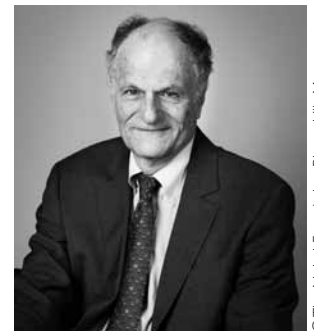
Thomas J Sargent

When identifying the causal relationship between economic variables and describing the impact of policy on the economy, Sargent's work emphasises the importance of structural model-making. Creating formal theoretical models of the economy and using them to derive how the economy works has become an important part of macroeconomic research. These models have become commonplace, particularly at policy-making institutions (such as central banks and treasuries).

CAUGHT OFF GUARD

The interconnectedness of macroeconomic variables makes identifying the source of shocks to the economy in the first place a bit difficult. When a shock occurs, some variables are directly affected. Changes in these variables are then transmitted between each other and then on to other variables whose changes then affect the first set of variables, and so on. With so many things happening at the same time, it becomes difficult to determine the origin of the shock that started it all. Identifying the direct effect of a shock on a variable and the indirect effects (the influence of the other variables on that same variable) is necessary to fully understand how the economy works.

The work of Chris Sims focuses on identifying the shocks and analysing how they are transmitted through the economy. To do this, a statistical forecast for each variable is made using a *vector-autoregression* (or *VAR*) model. Models of this sort allow for past data on several variables of interest to be used in forming the forecast. The difference between the forecast and the real value (the *forecast error*) is calculated. Sims showed that these forecast errors can

Christopher A Sims

either be due to a shock to the variable itself (a *fundamental shock*) or shocks to other variables. With an understanding of how the economy works (say, from a formal economic model), Sims shows how the fundamental shocks can be identified.

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1   The 'Taylor rule' is an example. This rule tells the central bank exactly what interest rate to target given inflation and output.

With the fundamental shocks and the indirect effects in hand, Sims uses *impulse response functions* to illustrate diagrammatically how economic variables change. Looking at these impulse response functions has increased our understanding of the dynamics of the economy. For example, it becomes clear to see how long it takes for the effects of an event (such as an increase in oil prices or rise in the interest rate set by the central bank) to fully play out. As a result, analyses of this sort have become extremely useful for timing economic policies.

BEATING THE SYSTEM

Two themes are central to the contributions made by Sargent and Sims. First, a strong link between empirical methods and macroeconomic theory is made. In modern macroeconomics, researchers construct a detailed macroeconomic model first. The solution to this model is then used to construct an econometric model (such as a VAR) which is then estimated empirically. Second, expectations plays a key role in both winners' research. The behaviour of agents depends crucially on their expectations about the future state of the economy. It is necessary to account for these when making fiscal or monetary policy recommendations and when analysing how an economic shock affects economic activity. Rigorous model-making in tandem with a careful treatment of expectations have contributed to effective policy-making through enriching our understanding of the economy's response to shocks (either from the underlying structure of the economy or from policy changes). Once we know how the economy works, appropriate policies can be chosen to improve economic outcomes.

Thomas Sargent was born in 1943 and received a PhD from Harvard University in 1968. He currently serves as a Professor of Economics and Business at New York University. Christopher Sims was born in 1942 and also received a PhD from Harvard University in 1968. He currently serves as a Professor of Economics and Banking at Princeton University.

FURTHER READING

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USEFUL WEBSITES

Further information on the Nobel Prize in Economics is available at http://nobelprize.org/nobel_prizes/economics/.

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SPOTLIGHT: *NO MAJOR DRAMA* FROM ASSOC. PROF. PAUL HANSEN

What should I major in at university? To students, this question matters because of the lifetime benefits – and costs! – associated with higher education. The question is also of national significance given the social and economic importance of education and the scarcity of educational resources. Recently, Paul Hansen, an associate professor in the Economics Department at Otago University, co-developed *No Major Drama*, an online tool that New Zealand students can use to help select the major that suits them best.

Based on their individual skills and interests, *No Major Drama* lets students create personalised rankings of 181 major subject areas – eg. Economics, Music, Zoology, etc. – representing 730 specific majors for Bachelor degrees from across all eight New Zealand universities. For each subject area in the ranking, *No Major Drama* also provides summaries of its content, links to carefully chosen Wikipedia articles, descriptions of career opportunities and links to the universities' web pages across, potentially, all eight New Zealand Universities.

No Major Drama is quick and easy to use, and results can be shared with parents and family, school advisors and friends via email or on Facebook. *No Major Drama* is completely free – for both individual users and for schools (schools can even create customised versions of the software for their students). Students are more likely to find majors that match their abilities and interests while also being exposed to subject areas they might otherwise not have considered (such as subjects not offered at school). For more information, visit www.nomajordrama.co.nz.

Commentary on the New Zealand economy

Alan King
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	Sep 2011	Jun 2011	Mar 2011	Dec 2010	Sep 2010
GDP (real, annual growth rate, %)	1.3	1.1	1.2	1.3	1.0
Consumption (real, annual growth rate, %)	2.3	2.2	2.5	2.6	2.1
Investment (real, annual growth rate, %)	12.9	15.2	14.5	11.8	3.8
Employment: full-time (000s)	1,718	1,711	1,706	1,699	1,694
Employment: part-time (000s)	500	503	505	486	500
Unemployment (% of labour force)	6.6	6.5	6.5	6.7	6.4
Consumer Price Inflation (annual rate, %)	4.6	5.3	4.5	4.0	1.5
Food Price Inflation (annual rate, %)	6.2	7.0	4.8	4.6	0.1
Producer Price Inflation (outputs, annual rate, %)	3.5	4.5	4.2	4.3	4.0
Producer Price Inflation (inputs, annual rate, %)	4.7	4.8	5.3	4.4	3.8
Salary and Wage Rates (annual growth rate, %)	2.0	1.9	1.8	1.7	1.6
Narrow Money Supply (M1, annual growth rate, %)	6.9	8.5	5.3	3.2	2.2
Broad Money Supply (M3, annual growth rate, %)	5.0	7.3	5.6	3.3	1.7
Interest rates (90-day bank bills, %)	2.88	2.65	2.69	3.17	3.18
Exchange rate (TWI, June 1979 = 100)	71.2	70.3	65.2	67.8	66.8
Exports (fob, $m, year to date)	46,790	46,072	44,764	43,532	41,788
Imports (cif, $m, year to date)	46,065	45,073	44,024	42,360	40,810
Exports (volume, June 2002 [not seas. adj.] = 1000)	1,169	1,177	1,173	1,175	1,132
Imports (volume, June 2002 [not seas. adj.] = 1000)	1,696	1,652	1,692	1,619	1,560
Terms of Trade (June 2002 = 1000)	1,288	1,296	1,266	1,256	1,246
Current Account Balance (% of GDP, year to date)	-4.3	-3.7	-3.6	-3.5	-3.5

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

The New Zealand economy struggled to gain momentum throughout 2011 and, as a consequence, the unemployment rate remained steady at a level only a little below its Great Recession peak of 7.1% in December 2009. There are, however, a couple of bright spots in the Table.

The first is the terms of trade, which last year exceeded the level reached during the 2007/08 Dairy Boom and reflected strong international prices across a broad range of our key primary commodities. This meant that, although the quantity of goods and services we collectively produced (i.e., real GDP) over the last year was smaller than that achieved in the year preceding the financial crisis, what we could buy with them (i.e., our real gross national disposable income [GNDI], which is the better indicator of a society's material standard of living) reached its highest level ever. Even in per capita terms, real GNDI for 2011 was second only to that for 2008.

Commodity prices eased back over the second half of 2011 and so the terms of trade will continue to slip below their June 2011 high in the short term. However, providing the Europeans can avoid a full-blown financial crisis, the adjustment in prices should be more in the nature of a correction rather than a crash and the terms of trade should remain relatively strong.

The second bright spot is investment spending, which grew strongly during 2011 despite investment in residential buildings sliding to an 18-year low. In part this reflected re-stocking by businesses that had run down their inventories during 2009 and early 2010 and anticipated a surge in sales during the Rugby World Cup. There has been some suggestion that they overestimated the Cup's effects, which could have a dampening effect on investment spending in the next quarter or so.

The main driver of the recent investment growth, however, has been the acquisition of other types of fixed asset. In particular, spending on new plant and machinery grew strongly and imports of these goods are now very close to their pre-crisis peak. Imports of industrial transport equipment grew even faster during 2011, but are yet to regain their 2008 level. Interestingly, imports of parts and accessories for transport equipment soared to record levels over the last year.

All this suggests there is some confidence in the economy's future direction, but some recent surveys indicate that this confidence is wavering in the face of Europe's ongoing struggle to resolve its debt problem. So, even if the Europeans manage to muddle through, 2012 can be expected to offer only a small improvement over 2011 at best.

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All Highlights in this issue were provided by Dan Farhat **dan.farhat@otago.ac.nz**

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