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A MAGAZINE ABOUT CONTEMPORARY ECONOMIC ISSUES FOR EVERYONE

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FROM THE EDITORS

International trade is important to New Zealand. This edition of *EcoNZ@Otago* includes two articles that help us to think about international trade: one considers how economic changes in China affect its trading partners, and the other looks at the effect on NZ of changes in world prices and the 'terms of trade'. Two other articles explore different ways in which innovations in media and ICT intersect with economics, taking us away from the world envisaged by traditional textbooks: at the macroeconomic level, we have an article on Twitter and US monetary policy; at the microeconomic level, is an article on the design of mobile-banking apps. We conclude with our regular commentary on the NZ economy.

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ALSO IN THIS ISSUE

China's changing comparative advantage: Trends and implications

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Source: observers.france24.com/en

In 1978, China was one of the world's poorest countries and barely engaged in the global economy. Today China is the world's second largest economy (after the United States) and is the fastest growing in terms of per capita income, expanding at more than 7% per annum since 1978.[1] The country's economic reforms, which started in 1978, have resulted in a rapid transition from a central planning system to a market-oriented one.

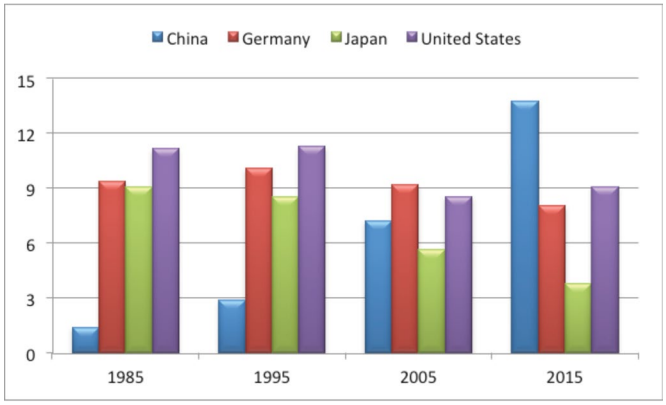
GONE GLOBAL

For many years, China's development was largely indigenous, mainly because of the country's isolation from other countries. However, China has become an increasingly important part of the global trading system, especially over the last two decades. China, the world's most populous country, has become the leading exporter for merchandise trade in the world.

Figure 1 displays the shares in total world merchandise exports of China, Germany, Japan, and the US. China overtook Japan in 2004 and was the world's third biggest exporter in 2005. China passed the US in 2007 and Germany in 2009 to become the world's leading exporter. The share of China's exports in world merchandise trade increased from 1.4% in 1985 to 13.8% in 2014.

1 See Üngör (2016) for a brief review of China's economic development since 1978.

Figure 1: Leading exporters in world merchandise exports (percentage shares)



Source: World Trade Organisation (2016).

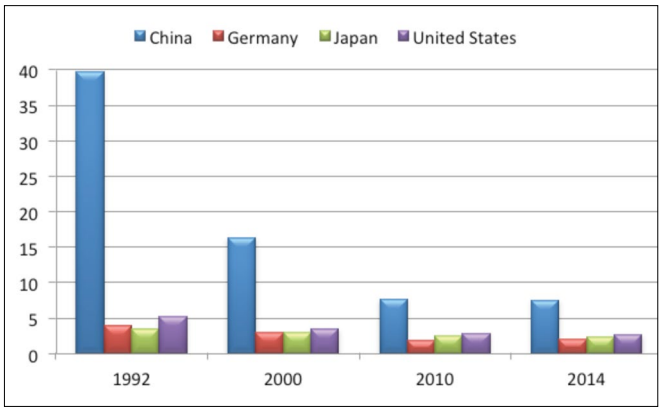
CHINA OPENS ITS DOORS

Since 1978, China has been moving toward a much more liberal trade regime. Reforms include: gradual elimination of central plans and the introduction of market competition in tradeable sectors; reduction of barriers to trade, including both tariff and non-tariff restrictions; and freeing up of the foreign exchange regime. Market-friendly special economic zones were established on China's southern coast, far away from Chinese power centres.[2]

Trade liberalisation laid the basis for China's integration into the global economy. An important phase of liberalisation began in 1992 when the 14th National Congress of the Communist Party endorsed a "socialist market economy" whereby markets were to be extended to all main sectors of the economy.

Foreign direct investments (FDIs) surged from US$4.4 billion in 1991 to US$11.2 billion in 1992 – a 156% increase.[3] Tariff rates and non-tariff barriers were significantly reduced. Figure 2 shows the evolution of tariff rates in China, Germany, Japan and the US.[4] Tariff rates have been in continual decline in China: from about 40% in 1992 to less than 8% in 2014.

Figure 2: Tariff rates, all products (%)



Source: World Bank (2016).

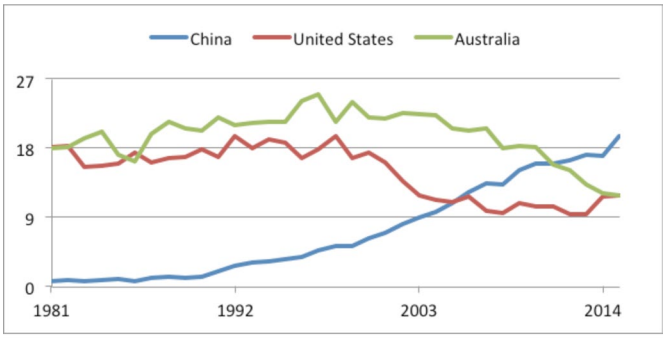
LET'S TRADE!

China's accession to the World Trade Organisation (WTO) marked an important milestone. China officially started its WTO membership application in 1986 and was formally accepted on 11 December 2001. In accordance with WTO rules, China committed to liberalise further in order to better integrate into the global economy.[5]

Since 2002, China has signed many free trade agreements (FTAs) to strengthen international economic cooperation.[6] New Zealand is the first developed country to have signed a FTA with China: the NZ-China Free Trade Agreement took effect in October 2008,[7] resulting in a large increase in trade between the two countries.

Figure 3 shows NZ's three most important partners in terms of total commodity imports. In 1981, Australia and the US supplied 36.2% of NZ's commodity imports. That share declined to 23.7% in 2015 as China increased its share of NZ's imports from 0.7% in 1981 to almost 20% in 2015.[8] China gradually became NZ's main source of imports.

Figure 3: Shares of NZ imports (%), 1981-2015



Source: United Nations (2016).

INCREASING SOPHISTICATION

Table 1 decomposes Chinese trade in the post-1978 period into industrial categories (according to one-digit Standard International Trade Classification codes). Two main trends stand out.

One, 'primary goods' (i.e., food and live animals chiefly for food) have declined in importance as a proportion of China's total commodity trade. Two, China's exports have changed from being dominated by labour-intensive manufactured products in the 1990s to more sophisticated manufactures nowadays. For example, in 1994 40.6% of exports were miscellaneous manufactured articles (e.g. clothing, footwear, furniture, etc) whereas in 2014 45.8% of exports were machinery and transport equipment.[9]

2 Goodfriend and McDermott (1998) and Naughton (2007) argue that China's rapidly growing coastal provinces benefited from the proximity to Chinese-speaking Hong Kong and Taiwan.
3 During the 1980s, FDI inflows never exceeded 1% of GDP, whereas they were more than 6% in 1993 and 1994.
4 Simple 'mean applied tariff' is the unweighted average of effectively applied rates for all products subject to tariffs, calculated for all traded goods.
5 China's commitments can be found at: wto.org/english/news_e/pres01_e/pr243_e.htm.
6 These agreements include: China-ASEAN FTA, China-Pakistan FTA, China-Chile FTA, NZ-China FTA, China-Singapore FTA, China-Peru FTA, China-Costa Rica FTA, China-Iceland FTA, China-Korea FTA, and China-Australia FTA. See *China FTA Network* for details (fta.mofcom.gov.cn/english/index.shtml).
7 On April 7, 2008, Chinese Premier Wen Jiabao and NZ Prime Minister Helen Clark witnessed the signing of the NZ-China Free Trade Agreement in Beijing, which came into force on October 1, 2008.
8 Similarly, China has become NZ's top commodity export destination in recent years; for example, about 20% of NZ's exports went to China in 2014.
9 Chinese brands, such as Lenovo and Huawei, have been shaping the global manufacturing sector since the 2000s.

Table 1. Export and import shares of China, by category of goods, 1984-2014 (%)

	Shares in China's Exports				Shares in China's Imports			
Category (SITC code)	*1984*	*'94*	*'04*	*'14*	*1984*	*'94*	*'04*	*'14*
Food and live animals (0)	12.4	8.3	3.2	2.5	8.3	2.7	1.6	2.4
Beverages and tobacco (1)	0.4	0.8	0.2	0.1	0.4	0.1	0.1	0.2
Crude materials, inedible, except fuels (2)	9.2	3.4	1.0	0.6	9.2	6.2	9.8	13.8
Mineral fuels, lubricants and related materials (3)	23.0	3.4	2.4	1.5	0.5	3.5	8.6	16.3
Animal and vegetable oils, fats and waxes (4)	0.6	0.4	0.02	0.03	0.3	1.6	0.8	0.5
Chemicals and related products, not elsewhere specified (5)	5.2	5.1	4.4	5.6	15.3	10.4	11.5	9.6
Manufactured goods classified chiefly by materials (6)	19.3	19.7	17.1	17.3	26.5	24.3	13.2	8.9
Machinery and transport equipment (7)	5.7	18.0	45.2	45.8	27.1	44.9	45.1	37.0
Miscellaneous manufactured articles (8)	18.0	40.6	26.3	26.4	4.4	5.6	9.0	7.2
Commodities and transactions, not elsewhere specified (9)	6.1	0.3	0.2	0.1	8.0	0.6	0.3	4.2

Source: United Nations (2016).

DYNAMIC COMPARATIVE ADVANTAGE

Kwan (2002, pp. 15-17) provides a simple approach for revealing a country's comparative advantage by calculating the specialisation indices for its major sectors or products. Comparative advantage concerns a country's ability to produce certain goods at lower opportunity costs than other producers. Instead of trying to produce a wide range of goods, countries can grow faster by specialising in the goods they can produce most cheaply and trading for others.[10]

For a particular sector, the specialisation index is defined as its trade balance (exports − imports) divided by its volume of trade (exports + imports).[11] By definition, this index ranges from −1 to +1. A higher value implies stronger international competitiveness for the sector concerned, and positive values reveal a comparative advantage and negative values a comparative disadvantage.[12]

Kwan argues that the trade structures of many Asian countries (e.g. Japan, Korea, Taiwan) have passed through some or all of the four stages listed in Table 2. A country's trade structure can be classified into any of these four stages according to the relative magnitudes of the country's specialisation indices across these three sectors: *Primary commodities* (SITC codes 0-4), *Other manufactures* (SITC codes 5, 6, 8, 9) and *Machinery* (SITC code 7). In this formulation, *Machinery* proxies for capital-and-technology-intensive products whereas *Other manufactures* represents labour-intensive products.

As can be seen in Table 2, the first stage is the Developing Country stage, where Primary commodities are more competitive than both *Other manufactures* and *Machinery*. The second and third stages are the young and mature NIEs (newly industrialised economies) respectively, where for both stages *Other manufactures* is the most competitive sector, but the ranking of *Other manufactures* vis-à-vis *Machinery* is opposite. At the fourth stage – the pinnacle of trade structures – *Machinery* is most competitive.

Table 2. Four stages of trade structure

Stage	Specialisation Index (relative magnitudes)
1. Developing Country	Primary commodities > Other manufactures > Machinery
2. Young NIE*	Other manufactures > Primary commodities > Machinery
3. Mature NIE*	Other manufactures > Machinery > Primary commodities
4. Industrial Country	Machinery > Other manufactures > Primary commodities

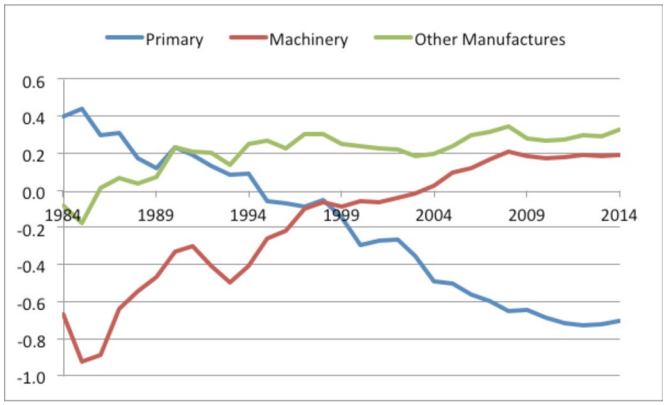
* NIE = Newly-Industrialised Economy. Source: Kwan (2002, p. 17)

MATURITY

Figure 4 illustrates the evolution of China's trade structure during 1984-2014. It can be seen that China became a young NIE in 1990 – when the specialisation index of *Other manufactures* surpassed that of *Primary commodities* – and then a mature NIE in 1999 – when *Machinery* passed *Primary commodities*. This pattern is consistent with the changing composition of China's exports, from labour-intensive products to a more sophisticated mix led by various types of machinery and equipment.[13]

10 See Winchester (2004) for a simple illustration of the theory of comparative advantage.
11 Various measures and indices of revealed comparative advantage have been proposed to approximate actual comparative advantage since Liesner (1958), Kojima (1964), and Balassa (1965). Recent studies provide theoretical foundations to guide the empirical analysis (Eaton and Kortum, 2002; Costinot et al., 2012).
12 The rationale behind the index is that countries are revealed as having a comparative advantage in a particular product if they export more of it than they import.
13 It is worthwhile noting that not all countries follow these stages in the course of economic development, as the stages of trade structure are listed in Table 2 on a somewhat ad hoc basis. The purpose of this exercise is to show that simple calculations can offer some insights into the changing nature of China's comparative advantage.

Figure 4: Evolution of specialisation indices in China: 1984-2014



Source: United Nations (2016).

POLICY ISSUES

China's rapid rise poses both challenges and opportunities for other countries as they are exposed to increased competition at home and abroad. For many firms in rich countries, intensifying competition from China's exports has reduced demand for the goods they produce, with a corresponding decline in workers employed. Such changes in the global economic environment affect the allocation of factors of production and cause sectoral productivity fluctuations, as well as driving changes in comparative advantages among nations.

Trade between developing (e.g. China) and developed economies (e.g. US) has been on the rise. Developed countries with high wages and expensive welfare programmes are having trouble coping with the effects of developing countries becoming major global players. An active research agenda is investigating such issues. For example, Acemoglu et al. (2016) estimate that 2.0-2.4 million people in the US lost their jobs as a result of increasing Chinese import competition during 1999-2011.

IMPLICATIONS FOR NZ

Similar issues to the ones above are potentially relevant for NZ. What is the effect of the trade relationship between NZ and China on labour-intensive sectors in NZ? Might Māori and Pacific Peoples be more at risk of job losses than other ethnic groups, given these two ethnicities are over-represented in relatively low-skilled occupations (MBIE, 2015)? In general, how does trade with China affect the welfare of its trading partners like NZ?

Determining answers to such questions and bringing them to the attention of policy-makers are important challenges ahead.

QUESTIONS TO CONSIDER

1. Have China's reforms led to a convergence between the country's trade patterns and its underlying comparative advantage?
2. How does trade with China affect low-skilled occupation groups in developed countries?
3. Why have so many manufacturing jobs been lost in the richest countries in recent decades?
4. Do changes in trade patterns have implications for trade tensions between developed (e.g. US) and developing economies (e.g. China)?

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Central bank communication and Twitter #FED

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Over the last 50 years central bank communication about monetary policy has changed dramatically. For example, until 1981 the United States' Federal Reserve Bank ('the Fed') didn't make any policy statements at all. Now it has a large communications department using a wide range of media, including Twitter. But why should communication about policy be important to central banks? Isn't it enough just to act?

SPEAKING TO THE MASSES

Generally speaking, communication has two purposes: creating news about monetary policy and reducing market uncertainty. Blinder (1998) argues that increased communication enhances the effectiveness of monetary policy. More communication, he argues, will provide markets with more information, increasing the predictability of the central bank actions. With more predictability, there will be a smaller risk premium on assets with a long time to maturity.

Woodford (2001) argues that the essence of monetary policy is about managing expectations. Communication about intended monetary policy will influence people's expectations about interest rates, and these expectations will affect macroeconomic outcomes.

The new research that we are conducting quantifies the response of key macroeconomic variables to monetary policy announcements. We construct a novel time series capturing announcements made by the Board of the Federal Reserve Bank from 2012 to 2016, constructed from the Board's Twitter account. Since its launch in 2006, Twitter has accumulated approximately 330 million users worldwide, with about 500 million tweets per day. The Fed has announced its policy decisions via Twitter since 2012.

What is the advantage of using Twitter? Good communication should be clear, effective, and honest. Twitter outperforms the usual communication channels (written reports and speeches) as it is clear (only 140 characters are allowed per message), effective (as it is time-saving and precise), and honest (there is no intermediary). Importantly, Twitter allows a much faster diffusion of news. Shiller (1984) argues that investments are a social activity and so influenced by social movements.

THE EFFECT OF COMMUNICATION ON INTEREST RATES

The first part of our research involves estimating the effect of communication on the daily rates of interest on four different Treasury bonds with different times to maturity. The communication takes the form of Twitter messages about items such as new data, economic forecasts, Fed committee meetings and speeches by Fed officials.

If the arguments above are correct, then this extra information (alongside the actions that the Fed has actually taken) should reduce uncertainty about Fed policy and make short-run interest rates (i.e. rates on bonds with a short time to maturity) more predictable, without necessarily having any effect on the average level of short-run rates. Everything else being equal, this predictability should reduce long-run interest rates (i.e. rates on bonds with a long time to maturity), because there is now a smaller risk premium.

Our data analysis shows that Fed announcements have no effect on the average level of short-run interest rates but do affect how predictable this rate is. This is consistent with the arguments above.

However, the effect of the announcements on predictability is more complicated than we expected: the rate is indeed more predictable when there has been an announcement on the previous day, but *less* predictable when there has been an announcement on the current day. We are still investigating the reasons for this contradictory effect.

Encouragingly, we do find that announcements put downward pressure on long-run interest rates (e.g. rates on bonds with five or seven years to maturity), which suggests that announcements are effective in reducing the size of the risk premium.

1 Helmut Schmidt University, Hamburg.

THE EFFECT OF ANNOUNCEMENTS ON MACROECONOMIC OUTCOMES

In a second part of our research, we are investigating the effect of announcements on the US economy through the lower risk premium and lower long-run interest rates. In theory, lower interest rates should boost aggregate demand, which should raise industrial production, household consumption and GDP while lowering unemployment, but at the expense of higher inflation. Lower interest rates should also raise the price of bonds and so provide a boost to the stock market.

We find strong evidence that announcements do have such effects: that is, holding constant what the Fed *actually* does, announcements providing information about what it's doing lead to higher production, consumption, GDP and inflation, lower unemployment, and a rise in the S&P500 stock market index.

Announcements by the FED made via Twitter do seem to have had the desired effect between 2012 and 2016. The announcements raise output and employment, at least temporarily, although initial estimates suggest that the employment effect is relatively small. Our results are similar to the findings by Hansen and McMahon (2015), but contrast with those of Lucca and Trebbi (2009), whose treatment of time-series data is more restrictive than ours.

SUMMARY AND CONCLUSION

There is a growing literature stressing that a central bank's communication policy should be sensitive to institutional settings. This literature focuses on the differences between speeches and statements and ignores the effects of social media on the society. With the emergence of services like Facebook and Twitter, news consumption has changed dramatically. The diffusion rate of news is faster and the importance of being connected has increased.

For central banks, communicating with the general public could be as important as communicating with financial markets. In particular, such communication might help to lower uncertainty and manage expectations during recessions, which could be highly beneficial in stabilising consumption and investment. Initial results from our research suggest that in the US, at least, communication via Twitter has a marked effect on economic outcomes.

QUESTIONS TO CONSIDER

1. Do you think that New Zealand Reserve Bank tweets would have the same effect on the NZ economy as the effects on the US economy discussed in this article? Why, or why not?
2. The incidence of social media use is highly correlated with certain demographic characteristics; for example, younger people and women are much more likely to use social media than older people and men. What implications do these differences have for the economic impact of Fed announcements?

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Better decision-making!

Human history can be viewed as the history of good and bad decision-making:

- "Choices are the hinges of destiny." *Pythagoras (570 BC-495 BC)*
- "Nothing is more difficult, and therefore more precious, than to be able to decide." *Napoleon Bonaparte (1769-1821)*
- "Life is a sum of all your choices." *Albert Camus (1913-60)*
- "Man is man because he is free to operate within the framework of his destiny. He is free to deliberate, to make decisions, and to choose between alternatives." *Martin Luther King (1929-68)*
- "Making good decisions is a crucial skill at every level." *Peter F Drucker (1909-2005)*
- "Ever notice that 'what the hell' is always the right decision?" *Marilyn Monroe (1926-62)*

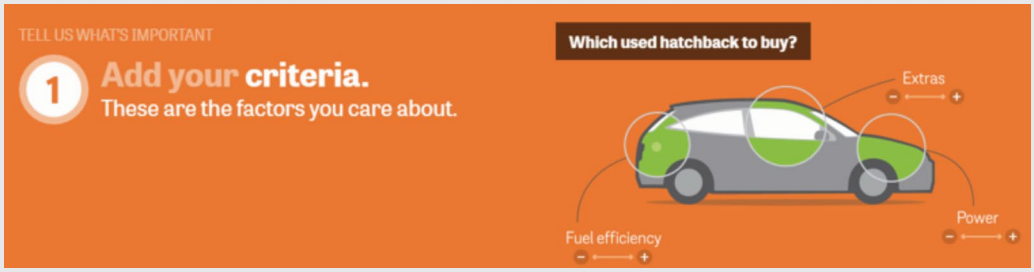
Nowadays, specialised software is available to help people make decisions. An example is 1000Minds (1000minds.com) which emerged from research by Paul Hansen of Otago's Department of Economics and Franz Ombler. Since 2003, 1000Minds has been helping 1000s of organisations and individuals all over the world to make important decisions.[1]

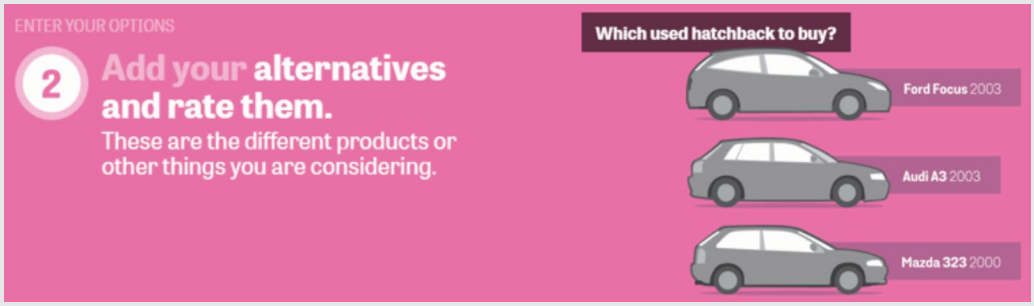
FREE DECISION-MAKING TOOL

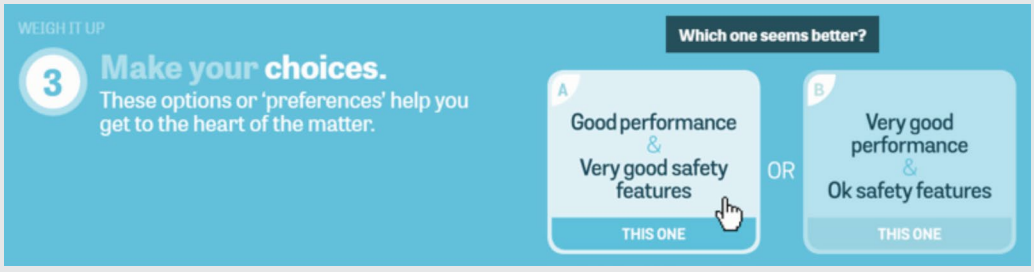
This month, 1000Minds released MeenyMo (meenymo.com) – a FREE web app for everyday decision-making, powered by 1000Minds technology. As a kitten is to a lion, MeenyMo is a miniature – and very cute! – version of 1000Minds. If you want to make everyday decisions on the go (e.g. using your mobile device), give meenymo.com a go. Sign-up, it's free!

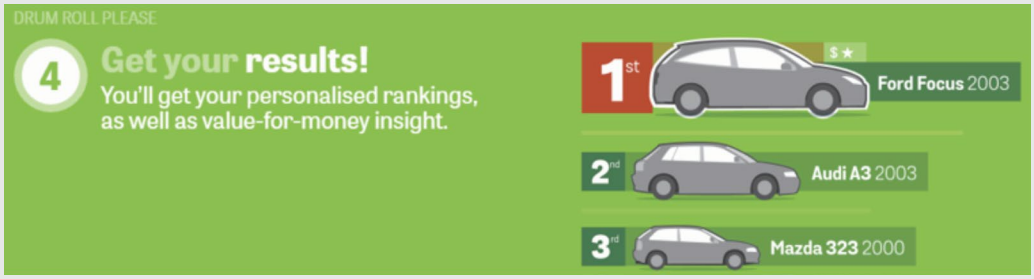
A FOUR-STEP PROCESS

Imagine you are trying to decide which used hatchback to buy (e.g. that you've seen on Trade Me). MeenyMo takes you through these four steps.









1 Several 1000Minds applications have featured in *EcoNZ@Otago* articles over the years, including the fourth article in the current issue.

Terms of trade and real income changes

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Source: radionz.co.nz

TERMS OF TRADE

The relative prices of goods measure what you give up when you purchase something. Therefore, prices are important in making international comparisons of standards of living and in understanding business and trade. An important measure of international prices is known as the *terms of trade*, defined as the average price of a country's exports divided by the average price of its imports.

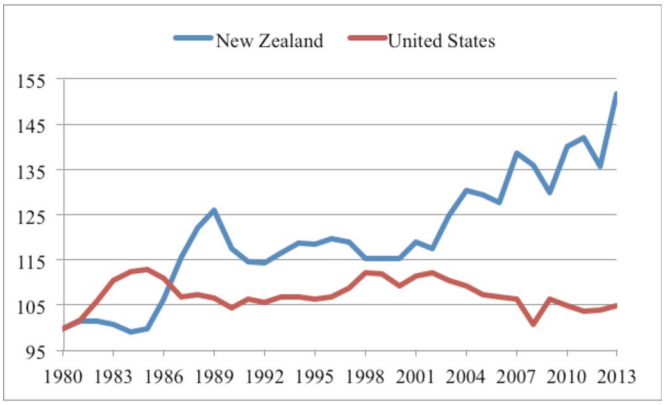
The terms of trade measure the purchasing power of a country's exports abroad. Changes in a country's terms of trade are closely related to the gains from international trade for that country. These issues are especially important for countries that are heavily reliant on export income.[1]

The terms of trade (ToT) are calculated by dividing a nation's export price index by its import price index; this can be multiplied by 100 to express the ToT as a percentage:

$$ToT = \frac{Export\ Price\ Index}{Import\ Price\ Index} \times 100 \qquad (1)$$

Figure 1 shows the evolution of ToT in New Zealand and the United States between 1980 and 2013, where the ToT are an index set equal to 100 in 1980. In the US, the ToT index rose between 1980 and 1985, and then remained fairly stable between 1986 and 2002. It then declined until 2008, and is now close to its level in the early 1980s. The decline in the index coincided with a period in which the price of petroleum and other primary commodities that the US imports rose sharply. Oil prices started their climb from a low of US$30 per barrel in 2002 to a high of around US$150 by mid-2008 (see Bhar and Malliaris, 2011).[2]

Figure 1: Terms of trade: NZ and the US, 1980-2013 (1980=100)



Source: OECD (2016).

NZ's ToT since the mid-1980s have grown steadily relative to the US's ToT. In contrast to the US, NZ's ToT increased markedly between 2000 and 2007. NZ is a primary commodity exporter, and the increase in NZ's ToT during the 2000s reflected rising export prices. In addition, as argued by Steenkamp (2014), NZ has benefited from reductions in non-oil import prices due to increased levels of low-cost manufacturing production in emerging Asian economies. Nevertheless, declines in the ToT of both the US and NZ were seen during the global financial crisis of 2007-2009.

1 Several different studies focus on the evolution of NZ's terms of trade over time (Steenkamp, 2014; Mellor, 2015). There are also studies that concern terms of trade volatility and its impact on long-run growth in NZ (see Grimes, 2006).
2 From a price of US$150 per barrel in mid-2008, the price crashed back to around US$30 by the end of 2008.

REAL INCOME AND TERMS OF TRADE

A nation's total output can be greatly affected by its ToT. When imports become more expensive for a nation relative to exports – i.e. the ToT deteriorates – the purchasing power of the nation declines and hence consumption and welfare decline. On the other hand, an improvement in the ToT makes it possible for an increased volume of goods and services to be purchased by residents out of the income generated by a given level of domestic production (United Nations, 1993).

Diewert and Morrison (1986) point out that an improvement in the ToT is similar to technological progress, as it raises the amount of goods that a country obtains for a given level of effort (see also Kehoe and Ruhl, 2008, 2010). Therefore, when changes in the ToT are large, Gross Domestic Product (GDP) may be a seriously misleading measure of a country's income. GDP may not reflect the real purchasing power of an open economy if there are significant changes in the ToT.

REAL GDP AND REAL GDI

GDP is the market value of final goods and services produced in a country in a given period of time. 'Real' GDP adjusts this value for changes in prices, so that we can make comparisons over time. At the national level, the following accounting relationship shows how real GDP at any point in time *t* is comprised of its major components:

$$GDP_t = \frac{C_t}{P_t^C} + \frac{G_t}{P_t^G} + \frac{I_t}{P_t^I} + \frac{X_t}{P_t^X} - \frac{M_t}{P_t^M} \qquad (2)$$

C is consumption, G is government purchases, I is investment, X is exports, and M is imports. Real GDP is computed by deflating the current value of the components of GDP by their respective prices.

An alternative measure of income is Gross Domestic Income (GDI).[3] GDI measures the purchasing power of the total income generated by domestic production, so that when the ToT change there may be a significant divergence between real GDP and real GDI.

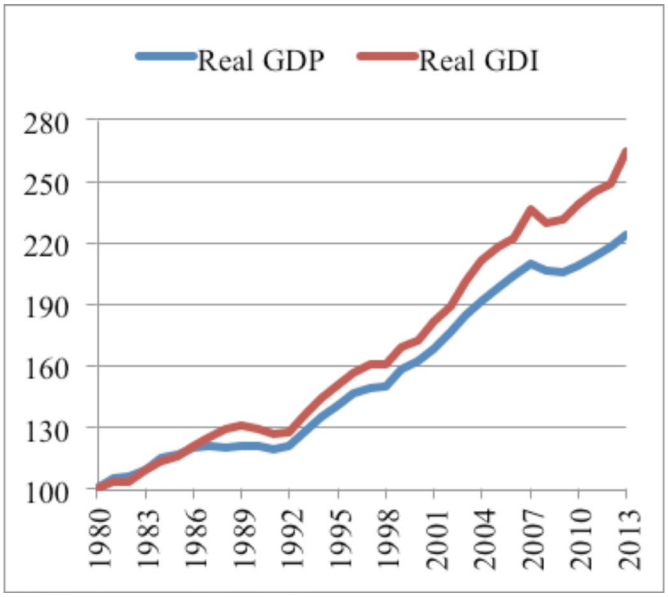
The real GDI measure treats the domestic components of expenditure in the same way that real GDP does – i.e., the components are deflated by their respective price indices. However, it differs in the way that the trade balance is deflated: when calculating GDI, the trade balance is deflated by the import price. The idea here is to think about the quantity of imports that are made possible by the exports (Kohli, 2004; Kehoe and Ruhl, 2008). Real GDI at any time t can be calculated as:

$$GDI_t = \frac{C_t}{P_t^C} + \frac{G_t}{P_t^G} + \frac{I_t}{P_t^I} + \frac{X_t - M_t}{P_t^M} \qquad (3)$$

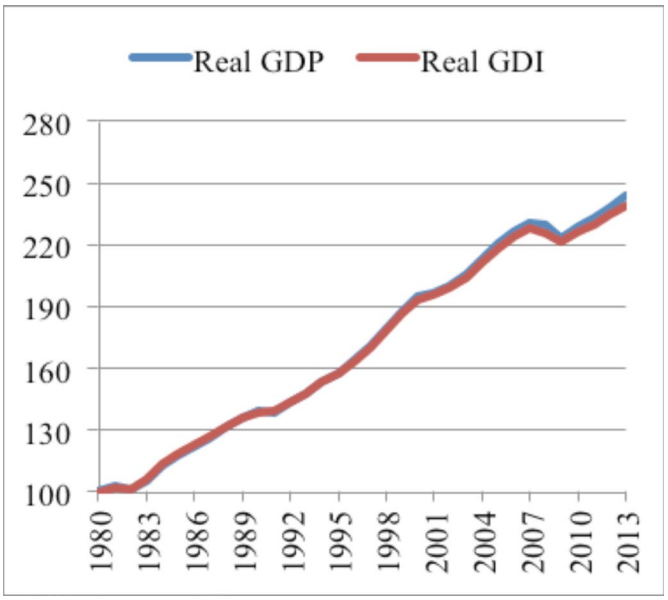
Panel (a) in Figure 2 shows that real GDI has grown faster than real GDP in NZ,[4] because NZ has enjoyed a steady improvement in its ToT. Real GDI grew by an average annual rate of 3% over 1980-2013, compared to 2.5% growth in real GDP. On the other hand, we can see from panel (b) that real GDP and real GDI are *almost indistinguishable* in the US, where both real GDP and real GDI grew by 2.7% per year.

Figure 2: Real GDP versus Real GDI: NZ and the US, 1980-2013 (1980=100)

(a): New Zealand



(b): United States



Source: World Bank (2016).

THE FINANCIAL CRISIS OF 2007-09

The global financial crisis of 2007-09 profoundly affected the world. The basic difference between this crisis and previous ones is that the 2007-09 crisis was experienced broadly and intensely throughout the whole world. Many argue (e.g. see Ohanian, 2011) that the recent crisis resembled the Great Depression of 1929 far more closely than it did of any of the post-war recessions.

Romer and Romer (2014) state: *"The recession that lasted from December 2007 until June 2009 was the longest since World War II, and the collapse of GDP and employment at the end of 2008 and the start of 2009 dwarfed any declines since the demobilization at the end of that war."* However, measures of the magnitude of the effect of the crisis depend on whether we look at GDP or GDI.

3 This measure is also known as command-basis GDP; see Kohli (2004), Bureau of Economic Analysis (2006) and Hall (2011)
4 We can also calculate real GDI in each country using different trade balance deflators: the export price deflator, the GDP deflator, and the final consumption expenditure deflator. Results indicate that the choice of deflator does not make a substantial difference to the calculation of real GDI between 1980 and 2013 in either NZ or the US.

Table 1 shows that in both NZ and the US, real GDI declined by a larger proportion than real GDP between 2007 and 2008. In NZ, real GDP fell by 1.6% but real GDI fell by almost 3%; in the US, real GDP fell by 0.3% but GDI fell by 0.9%. On the other hand, between 2008 and 2009 real US GDP fell faster than real GDI (by 2.8% versus 2.2%), while in NZ real GDP fell while real GDI recovered.

Table 1. Comparison of real GDP and real GDI during the global crisis of 2007-09

	(percentage change)		
NZ	Real GDP	Real GDI	ToT
2007-2008	−1.62	−2.96	−1.96
2008-2009	−0.25	0.88	−4.47
2007-2009	−0.94	−1.06	−3.22
US	Real GDP	Real GDI	ToT
2007-2008	−0.29	−0.91	−5.26
2008-2009	−2.78	−2.18	5.46
2007-2009	−1.54	−1.54	−0.04

Source: World Bank (2016).

The above example shows that the impact of ToT fluctuations on real incomes varies across countries. How do real income gains from the ToT relate to other changes in income?

There are some studies that quantify the long-run impact of changes in the ToT on income growth, using different accounting frameworks. These studies disaggregate the growth rate of real GDI into different factors, including real GDP growth, changes in the trade balance, and changes in the ToT (see Kohli, 2003, 2004; Macdonald, 2010; Reinsdorf, 2010; İşcan, 2012). These studies carefully distinguish between changes in real output and changes in relative prices, because comparing real GDP with real GDI involves accounting for relative price changes related to traded products.

QUESTIONS TO CONSIDER

1. What is meant by the terms of trade (ToT)? What can account for fluctuations in the ToT?
2. How volatile are NZ's ToT? What is behind the recent evolution of NZ's ToT?
3. How do relative prices affect real income growth? Might an improvement in the ToT enable a country to exploit its comparative advantage even more?
4. Does real GDP accurately reflect the real purchasing power of an open economy? If not, what are the alternative measures that do?

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The Philosophy, Politics and Economics (PPE) programme was originally developed at the University of Oxford and is now available around the globe. Universities offering a PPE major include the London School of Economics, Yale University, and the University of Pennsylvania. The University of Otago PPE programme is the only one in New Zealand.

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For more information about the Otago PPE programme, visit otago.ac.nz/ppe/index.html.

Economic psychology applied to business: Designing a mobile-banking app

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Ever since the Economics Nobel Prize in 2002 was awarded to Daniel Kahneman for his research with Amos Tversky into 'behavioural economics', business people have looked for ways to apply ideas from the area to attract more customers – to make more money!

TO BE OR NOT TO BE?

Behavioural economics (BE) – sometimes also known as economic psychology – applies insights from cognitive psychology to economic decision-making. BE challenges the conventional economics assumption that decision-makers are completely rational, emphasising instead the role played by emotions, intuition and heuristics (rules of thumb). BE implies that when it comes to decision-making most of us are more like Homer Simpson than *Star Trek's* Mr Spock!

As a case study about how BE can be applied to business, this article reports on our research project that used BE to generate insights for improving the *YouMoney* mobile-banking app[2] developed by Bank of New Zealand as part of its *Be Good with Money* brand campaign. We wanted to see if BE concepts related to consumer emotions, intuition and heuristics can be translated into new features and interface enhancements, with the objective of increasing young people's engagement with m-banking apps.

WINK, WINK ... NUDGE, NUDGE

Because many of our behavioural traits are hard-wired into our thought processes it's often hard to recognise and mediate our irrational decision-making (Altman 2012, Kahneman 2011). Hence, in many situations human behaviour can be changed more effectively by external interventions, or 'nudges', than by non-intuitive-based means such as providing more information and education (Thaler and Sunstein 2009, Altman 2012).

Nudges influence how people make decisions by tapping into their automatic decision-making processes and reducing cognitive errors. Nudges are aspects of the 'choice architecture' that influence people's behaviour in predictable ways, and where choices are affected such that people are better off according to their own standards.

Though nudging is highly intuitive, operating primarily at a subconscious level, it may also work by raising awareness of certain situations to a more conscious level, even if only momentarily (Lunt and Staves 2011). By reframing consumer

engagement problems as behavioural ones, marketers and app designers can try to influence consumers' behaviour, while marketing strategy can be designed to change behaviour via a series of small nudges.

FIVE BEHAVIORAL ECONOMICS CONCEPTS

After reviewing the BE literature, we selected the following five BE concepts for evaluation with respect to their relevance for m-banking apps.

'Loss aversion' relates to the idea that most people feel that losses are more distressing than gains of equivalent size are enjoyable.

'Power of now' is the tendency for people to prefer thinking about the present ('the now') than the future.

'Scarcity value' captures the idea that the scarcer a thing is the more desirable it is.

'Chunking' is about the presentation of a task in its constituent parts making it seem less onerous than its presentation as a single overall task.

Finally, 'choice architecture' is a wide-ranging term relating to the design of how choices can be presented to consumers, and the impact of that presentation on consumer decision-making. Choice architecture is influenced by the many biases and heuristics discussed in the BE literature, such as primacy and framing effects and the availability heuristic (IPA 2009).

RESEARCH PARTICIPANTS AND METHODOLOGY

Three groups of participants were involved in the research:

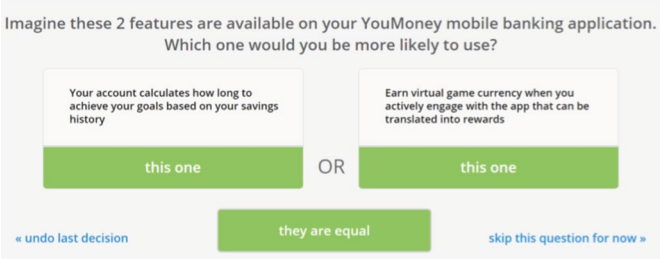
1. 60 third-year students in a creative marketing communication class at the University of Otago (taught by the first author).
2. Eight m-banking managers and app designers from BNZ and their advertising agency, Colenso BBDO.
3. 257 of BNZ's *YouMoney* app users in the 18-29 age-group (the young consumer target segment) who completed an online survey, out of 3000 potential participants invited by BNZ.

1 This article is based on Fatima's research for her MBus degree, supervised by her co-authors. A journal article is also available; see Wijland, Hansen and Gardezi (2016).
2 Mobile-banking apps are banking software applications – 'apps' – that run on mobile devices.

Open-ended questions relating to the five BE concepts discussed earlier were put to the 60 students as a group to generate ideas for new features or refinements for the *YouMoney* app based on nudges. These ideas were then presented to the eight BNZ and Colenso BBDO managers and app designers for them to refine and to select two features for each of the five BE concepts.

The relative desirability of these 10 m-banking features was determined by the 257 *YouMoney* app users who completed an online 1000Minds survey (1000minds.com), where each person was asked to pairwise rank the m-banking features with respect to which feature they would be most likely to use on their *YouMoney* app. An example of a pairwise-ranking question appears in Figure 1.

Figure 1. Example of a pairwise-ranking question



RESULTS

The ideas for new features and refinements of the *YouMoney* app elicited from the student participants are discussed below, grouped according to the five BE concepts.

Loss aversion (losses are more distressing than gains of equivalent size are enjoyable)

Ideas include: the ability to open multiple accounts, the simplicity of setting personal goals for these accounts, the ease of moving money between accounts and adding personal images to accounts, and the overall convenience and ease of use. Features reporting previous transactions were described by one student as "highly addictive but also alarming":

> *People love to see what they have done, but also hate to see what they have lost. YouMoney can become highly addictive but also alarming as you can easily track where you spent your money carelessly.*

Power of now (preferring to think about the present more than the future)

Students placed a strong emphasis on balancing their impulsive spending decisions vis-à-vis their future financial well-being. Nudges in the form of alerts were suggested:

> *The app will question if you are sure you wish to make this call and a note will pop up about a compromised event or upcoming date you have been saving for.*

Scarcity value (the scarcer a thing is the more desirable it is)

Students suggested many ideas for how m-banking apps can be made unique, personal, customised and adaptable, and related these features to reducing the likelihood of switching to another bank's app:

> *Having a personal attachment to the app will lead to customers using the app more often and being less likely to discard the app for a new one because of their personal connection and the higher value placed upon a product function that is perceived as rare, personalisable and desirable.*

Though associating m-banking apps with celebrities and how they financially manage their 'cool' lifestyles was regarded as attractive, the students emphasised that they are more interested in sincere, transparent and real-life inspirational stories. These inspirational stories, such as from rising stars dealing with the same struggles as students, could help nudge them to be good with their money:

> *'The Shade' is a group of hardworking, poor students that young customers will be able to relate to – deal with similar, daily financial stresses and problems.*

Chunking (the presentation of a task in its constituent parts making it seem less onerous than its presentation as a single overall task)

Students admitted that staying motivated to accomplish long-term financial goals is difficult. They favoured a m-banking app that nudged them through a series of steps to make intuitive 'good' decisions along the course of their money-management journey:

> *People are against managing their money because they perceive it to be hard and a strenuous process to complete. The way of helping people with that is by breaking up the process of money-management into small steps which can be completed easily so the customer does not feel pressured or overwhelmed.*

The types of nudges envisaged by the students were things like a virtual guide that offered ongoing advice, 'cool' visual effects for tracking progress to illustrate how the constituent parts were building up to something bigger, alerts and achievement messages for milestones. These nudges correspond to a m-banking app as a financial 'wellness guru', functioning as a virtual friend offering instantaneous and real-time advice.

Choice architecture (how and why people make decisions, etc)

Students conveyed that there is a need for a bigger overall plan to achieve financial success, while acknowledging their own poor money-management choices. They recognised that their errors were systematic and repetitive and, at least in part, symptomatic of their life stage:

> *In our life you can get distracted with temptations and opportunities that you sometimes stumble across. You find yourself swiftly acting on these opportunities, not giving a damn about the repercussions YOLO [You Only Live Once]!*

Some students also pointed out that young people did not necessarily have financial goals and that an app that could nudge young people to start thinking about the future would be valuable:

> *Even a small reminder of what your goals and aspirations are at vulnerable times might actually help you to reach and stick to the goals you set.*

Others suggested a formal nudge to make a coherent overall plan, with a deliberate architecture and pro-active functionality:

> *Rent, electricity, food, clothing, new car, Saturday nights out … Within each mobile app there can be the option of a hierarchy of 'goodness'.*

The new-feature ideas from the students were presented to the eight managers and interface designers from BNZ and Colenso BBDO, who refined and ultimately selected the 10 m-banking features – two for each of the five BE concepts – reported in column (2) of Table 1.

The overall ranking of the 10 m-banking features, based on calculating the means from the individual rankings from the 257 *YouMoney* app users who completed the pairwise-ranking exercise, is reported in column (3) of Table 1. Also reported in columns (4) and (5) are the proportions of participants for whom the identified feature appeared in their top-three (most preferred) and bottom-three (least-preferred) features.

Table 1: Five BE concepts and 10 m-banking features, and the ranking results

(1)	(2)	(3)	(4)	(5)
			Proportion of participants for whom feature is in their:	
BE concept	M-banking feature	Overall rank	Top-3 features	Bottom-3 features
Loss aversion	1. Your account increases in interest every week – unless you spend $ before reaching your savings goal.	1st	60%	9%
	2. Your account calculates how long to achieve your goals based on your savings history.	2nd	46%	14%
Power of now	1. 'Locked savings' options – e.g. ranging from 100% locked until goal is met to all you need to do is email BNZ for a code to unlock.	3rd	46%	18%
	2. Set 'DO NOT' alerts to discourage impulse spending – e.g. "DO NOT spend more than $20 this Saturday".	4th	42%	22%
Scarcity value	1. Able to set milestones along the way to reaching your bigger savings goals.	5th	34%	17%
	2. Recommended sub accounts – e.g. for a 'vacation' goal, sub accounts for 'flights', 'hotels', 'activities', etc.	6th	31%	24%
Chunking	1. A recommended set of accounts within the app for managing your $ based on your current needs.	7th	23%	18%
	2. A virtual guide to help you manage your finances – e.g. after creating a savings account you're advised to set a savings target too.	8th	23%	31%
Choice architecture	1. Earn virtual game currency when you actively engage with the app that can be translated into rewards.	9th	32%	38%
	2. Share exceptional savings progress with other similar users: e.g. "Luke has achieved 75% of his goal: A trip to Oz!"	10th	8%	68%

MANAGERIAL IMPLICATIONS

Our research confirmed that young people see value in money-management tools that work with their intuitive nature to help them 'be good' with money. A key theme to emerge from the student discussion was that unless young people are actively nudged into making better money decisions, they will often fail and therefore such interventions are appealing to them.

The pairwise ranking exercise revealed that the most desirable new features are associated with the BE concept of loss aversion, followed by (in decreasing order of desirability) the power of now, scarcity value, chunking and choice architecture.

Participants revealed a lack of interest in features that offer aspects of exclusivity, elements of gaming and especially the sharing of individual achievements with their peers when it comes to money-management. Instead, they indicated a preference for a more basic m-banking app that addresses their main money-management concerns: about saving, achieving goals and day-to-day financial survival. It appears that this market segment – young people – mostly requires nudges that simply help them to manage their money based on their everyday needs without too much fuss.

Overall, our research reveals that m-banking app design can benefit from fundamentally different approaches (relative to traditional methodologies) that prioritise intuitive interfaces over non-intuitive-based designs, and, in particular, that behavioural economics and nudging can supply valuable insights for new features or refinements.

QUESTIONS TO CONSIDER

Who are *you* more like when it comes to how you make decisions: Homer Simpson or *Star Trek's* Mr Spock?

How many of the m-banking features listed in Table 1 appeal to you? Do you agree with the ranking in the table? Are there any other features you can think of that are also appealing?

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Commentary on the New Zealand economy

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	Mar 2016	Dec 2015	Sep 2015	Sep 2014	Sep 2013
GDP (real, annual growth rate, %)	2.5	2.5	2.9	3.2	2.6
Consumption (real, annual growth rate, %)	2.3	2.3	2.3	2.8	2.4
Investment (real, annual growth rate, %)	1.9	1.4	3.9	9.4	8.4
Persons Employed (full- and part-time, 000s)	2399	2371	2348	2314	2242
Unemployment (% of labour force)	5.7	5.4	6.0	5.5	6.1
Net Migration (year to date)	67,619	64,930	61,234	45,414	15,174
Consumer Price Inflation (annual rate, %)	0.4	0.1	0.4	1.0	1.4
Food Price Inflation (annual rate, %)	−0.4	−0.6	0.8	−0.2	0.8
Producer Price Inflation (outputs, annual rate, %)	0.1	−0.6	0.2	−1.0	4.1
Producer Price Inflation (inputs, annual rate, %)	−0.9	−1.1	−0.2	−2.2	3.3
Salary and Wage Rates (annual growth rate, %)	1.6	1.5	1.6	1.7	1.6
90-day Bank Bill Rate (% p.a.)	2.43	2.79	2.85	3.71	2.64
10-year Government Bond Rate (% p.a.)	3.02	3.55	3.29	4.19	4.70
Inflation-Indexed (2025) Bond Rate (% p.a.)	1.97	2.15	1.95	2.28	2.77
Lending to Households (annual growth rate, %)	7.7	7.4	6.7	4.9	5.5
Real Exchange Rate (trade-weighted index [1])	71.0	72.0	68.3	78.4	77.7
Exports (volume, annual growth rate, %)	−1.7	2.6	6.9	5.8	−8.4
Imports (volume, annual growth rate, %)	1.2	2.8	3.1	9.6	11.7
Terms of Trade (June 2002 = 1000)	1333	1277	1303	1351	1355
Merchandise Trade Balance ($m, year to date)	−3,766	−3,537	−3,169	667	−1,559
Visitor Arrivals (annual growth rate, %)	10.4	9.6	8.5	4.9	2.9
Current Account Balance (% of GDP, year to date)	−3.0	−3.2	−3.3	−2.5	−3.7

Notes: [1] Average index value over March 1985-March 2005 = 62.2
Sources: Statistics New Zealand (stats.govt.nz), Reserve Bank of New Zealand (rbnz.govt.nz).

Our table has been revamped this issue with the introduction of series on net migration, visitor arrivals, long-term real and nominal interest rates and household borrowing. Among some other minor changes, the RBNZ's nominal exchange rate index has been replaced with its real counterpart.

The difference between the interest rates on a ten-year bond and the 2025 inflation-indexed bond provides a rough measure of the average expected rate of inflation over the next decade – according to financial market participants, at least. Eighteen months ago, this measure was in line with the 2% midpoint of the RBNZ's inflation target band, but has since fallen to around 1% – i.e., the bottom of the band. This change in expectations appears to be the main reason for the sharp fall in nominal long-term interest rates (to levels not seen for at least 50 years) and suggests that the RBNZ is expected to struggle for some time to lift inflation much above its current level.

How times have changed! Under Graeme Wheeler's predecessor, Dr Alan Bollard, inflation averaged 2.5% (even when the 2010 increase in GST is ignored) and a quarter of the time strayed outside the target band's 3% upper bound. Unsurprisingly, mortgage interest rates have also reached a new low recently, which will do little to restrain house price inflation in Auckland.

The more than $4 billion increase in the trade deficit over the last year or so largely reflects the passing of the dairy boom, of course, but it is interesting to note that the current account deficit has remained, in essence, stable in dollar terms since the end of 2014 and has even shrunk as a fraction of GDP.

This difference between the two deficits reflects the fact that the current account balance is a much broader measure of NZ's international income and spending position than is the merchandise trade balance. Specifically, it records trade in services (as well as goods) plus the interest and profits we earn from foreign investments, less those paid to foreign investors in NZ assets.

Hence, the balance on the current account has kept reasonably stable because, at the same time dairy export revenue has been falling, there has been a more than $3 billion rise in net earnings from international tourism to fill the gap. This reflects a surge in the number of foreign visitors (which has grown as much in the last 18 months as over the preceding decade) and the increase in visitors' spending power due to the dollar's depreciation in the first half of 2015. If not for this boom in tourism, the slump in dairy prices would have had a much more visible impact on NZ's international income position and hence on the economy as a whole.

Where have all these extra tourists come from? Although there has been solid growth in the number of visitors from practically all countries, the single biggest contributor has been China. The future health of NZ's economy continues to rely heavily on China's ongoing prosperity.

REMINDER, and note the new closing date: **31 October**

EcoNZ@Otago Essay Competition 2016

EcoNZ@Otago is inviting years 12 and 13 secondary school students to write an essay that addresses this topic:

DIRTY DAIRYING AND RISING WATER SCARCITY IN NEW ZEALAND

The dairy sector accounts for nearly 3% of GDP, which is more than fishing, forestry and mining combined. Dairy provides more than one-quarter of NZ's total good exports, worth over $10 billion. The sector supports rural communities.

However, intensive dairy farming practices has led to water pollution from cattle effluent in many streams and rivers. Many rivers are surrounded by farmland and cows, and so they have become, in effect, cow toilets.

The pollution of streams and rivers amplifies water scarcity that is already occurring due to droughts and climate change. People who value clean rivers for swimming or fishing typically lose out. Clean rivers also provide a host of important ecosystem benefits.

How would an economist describe this problem? What should be done about it?

Some keywords and concepts that you might like to consider include:

- Externality (pollution of rivers is an external cost of dairy farming)
- Missing markets
- A river's capacity to assimilate effluents (an ecosystem service) is an open-access resource. Open access can lead to the tragedy of the commons.

COMPETITION RULES AND PRIZES, ETC

Essays should be 1500 words maximum and written in a clear, concise and insightful tone. Naturally, essays that are original, intriguing and uncommon so as to inspire and entertain are preferred. They should be enjoyable to read!

Any student in years 12 or 13 currently enrolled in a New Zealand secondary school is eligible; only one submission per student.

The best entries will be determined by a panel of economists at the University of Otago.

The winning essay will be published in a future issue of *EcoNZ@Otago*. The winner will also receive a $300 gift certificate (book voucher, iTunes card, or mix of the two) for themselves and $200 in book vouchers for their school.

The first and second runners up will each receive a $150 gift certificate (book voucher, iTunes card, or mix of the two) for themselves and $100 in book vouchers for their school.

All entries must contain the student's name, the name and phone number of their school, and be received no later than 31 October 2016.

Please send entries to:

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